

# 9 Water Environment

## 9.1 Introduction

9.1.1 This chapter of the EIA Report identifies and assesses the potential impacts and effects of the Proposed Development on the water environment during construction and operation. For this assessment, the water environment includes:

- The water quality, hydrology and fluvial hydromorphology of surface water such as watercourses and lakes;
- The quality, flows, and levels of groundwater features; and
- Flood risk and drainage.

9.1.2 This chapter is supported by the following figures and technical appendices:

- Figure 9.1 Surface Water Receptors and their Attributes;
- Figure 9.2 Groundwater Receptors and their Attributes;
- Figure 9.3a Present Day Flood Risk;
- Figure 9.3b Future Day Flood Risk;
- Figure 9.4 Bedrock Geology;
- Figure 9.5 Superficial Geology;
- Appendix 9.1 WFD Screening and Scoping Assessment; and
- Appendix 9.2 Environmental Authorisation (Scotland) Regulations Licenses.

9.1.3 Where there are surface water or groundwater dependent ecosystems, these are considered in this assessment when determining the importance of water features, with the effects on the relevant habitats reported in Chapter 6 Ecology. Chapter 6 Ecology also considers any impacts on the flora and fauna associated with the freshwater aquatic environment, as well as ponds (which are considered as a specific habitat type rather than a water feature). Potential impacts to groundwater are considered in this chapter other than the risk from any historical contaminate land, which is covered in Chapter 10 Ground Conditions.

## 9.2 Legislation, Policy and Guidance

### Legislation

9.2.1 Legislation, planning policy and guidance relevant to this assessment and pertinent to the Proposed Development is outlined in this section (please note that regulations transferring powers from the European Union to the United Kingdom authorities are not listed).

From 1 November 2025, the *Environmental Authorisations (Scotland) Amendment Regulations 2025* (EASR) (Ref 9.1) has replaced the following legislations relevant to the Water Environment:

- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) ('the CAR Regulations') (Ref 9.2)<sup>i</sup>; and
- Pollution Prevention and Control (Scotland) Regulations 2012 (PPC) (Ref 9.3).

9.2.2 Other national legislation relevant to the Proposed Development that will be considered as part of this assessment include:

- Reservoirs (Scotland) Act (2011) (Ref 9.4);
- Climate Change (Scotland) Act (2009) (Ref 9.5);
- Flood Risk Management (Scotland) Act (2009) (Ref 9.6);
- Nature Conservation (Scotland) Act (2004) (Ref 9.7);
- Water Environment Water Services ('the WEWS Act') (Scotland) Act (2003) (Ref 9.8);
- Town and Country Planning (Scotland) Act (1997) (Ref 9.9);
- Electricity Act (1989) (Ref 9.10);
- Environmental Protection Act (1990) (as amended) and Part 2A The Contaminated Land Regime (2006) (Ref 9.11);
- Electricity Works (EIA) (Scotland) Regulations (2017) (Ref 9.12);
- Construction (Design and Management) Regulations (2015) (Ref 9.13);
- Environmental Protection (Duty of Care) (Scotland) Regulations (2014) (Ref 9.14);
- Environmental Liability (Scotland) Regulations (2009) (Ref 9.15);
- Contaminated Land (Scotland) Regulations (2005) (Ref 9.16);
- Water Environment (Drinking Water Protected Areas) (Scotland) Order (2013) (Ref 9.17);
- The Private Water Supplies (Scotland) Regulations (2006) (Ref 9.18);
- Water Intended for Human Consumption (Private Supplies) (Scotland) (2017) (Ref 9.19);
- Environmental Authorisations (Scotland) Regulations (2018) (Ref 9.20);
- Environment Act (2021) (Ref 9.21); and
- Levelling-Up and Regeneration Act (2023) (Ref 9.22).

## **Planning Policy**

### National Planning Policy

9.2.3 The following provides a summary of relevant national planning policy.

### National Planning Framework 4 (NPF 4)

9.2.4 The National Planning Framework 4 (NPF4) (Ref 9.23), published in February 2023, replaces the previous National Planning Framework 3 (NPF3) (Ref 9.24). NPF4 sets out the Scottish Government's spatial development principles, regional priorities, national developments and

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<sup>i</sup> While EU directives ceased to have real effect following Brexit, national legislation including the 2013 Order had incorporated and given effect to the WFD so that its provisions were effectively assimilated. As the term WFD remains used by SEPA and other agencies it is used in this report.

national planning policy, covering six spatial principles which aim to deliver sustainable places, liveable places and productive places. Policy 11 within NPF4 states that project design and mitigation should address any effects on hydrology, the water environment and flood risk.

*Planning Advice Notes and Specific Advice Sheets*

- 9.2.5 Topic-specific Planning Advice Notes (PANs) and Specific Advice Sheets set out detailed advice from the Scottish Government in relation to several planning issues. PANs and Specific Advice Sheets relevant to the Proposed Development are outlined in **Table 9-1 Planning Advice Notes and Specific Advice Sheets**.

**Table 9-1 Planning Advice Notes and Specific Advice Sheets**

| Planning Advice Notes and Specific Advice Sheets                               | Key requirements relating to the water environment                                                                                                                                                                                                                                                                                                                                        | Relevance to the Proposed Development and how addressed                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Planning and waste management Advice</b> (Ref 9.25)                         | States that there should be environmental protection considerations to mitigate any potential effects on the water environment.                                                                                                                                                                                                                                                           | Mitigation measures are aligned to the Advice and are outlined in <b>9.6 Embedded Mitigation</b> and <b>9.7 Standard Mitigation</b> of this chapter.                                                                                                                                                                                                                                                                                                                                           |
| <b>Flood Risk: Planning Advice</b> (Ref 9.26) <sup>ii</sup><br>(now withdrawn) | States that planning authorities should have regard to the probability of flooding from all sources. It encourages avoidance of flood risk by not locating development in areas at risk of flooding. The Scottish Planning Policy states that where built development is permitted in medium to high flood risk areas, measures to protect against or manage flood risk will be required. | Most of the Proposed Development falls within areas deemed to have low risk of flooding from all sources, determined by a Flood Risk Assessment carried out for the associated Kincardine North Substation on the Proposed Site. Where there is potential for increased risk, appropriate mitigation measures outlined in <b>9.6 Embedded Mitigation</b> and <b>9.7 Standard Mitigation</b> have been embedded to ensure there is no increase in risk and the development remains sustainable. |

#### River Basin Management Plan

9.2.6 The River Basin Management Plan (RBMP) for Scotland 2021-2027 (Ref 9.27) sets out a range of actions to address impacts to the water environment. The RBMP outline actions for public bodies and land managers and are produced by the Scottish Environment Protection Agency (SEPA) on behalf of the Scottish Government. In summary, the RBMP provides the following:

- The conditions of the water environment;
- Pressures which could or are impacting the water environment; and
- Actions to address any impacts.

#### Local Planning Policy

9.2.7 The Proposed Development is located within Fife and borders Clackmannanshire. The Fife Local Development Plan (Ref 9.28) (LDP) was formally adopted in September 2017 and provides the local planning policy for Fife. The relevant Policies to the Proposed Development are listed in **Table 9-2 Fife LDP Policies**. A new LDP called Fife's Place Plan is currently being prepared and is anticipated to be adopted in 2028.

**Table 9-2 Fife LDP Policies**

| Policy Number                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Policy 3 – Infrastructure and Services</b> | <p><i>“Development proposals must incorporate measures to ensure that they will be served by adequate infrastructure and services including:</i></p> <ul style="list-style-type: none"> <li>- <i>foul and surface water drainage, including Sustainable Urban Drainage Systems (SUDS); and</i></li> <li>- <i>measures that implement the waste management hierarchy as defined in the Zero Waste Plan for Scotland including the provision of local recycling facilities”.</i></li> </ul> <p><i>“As a general rule, development with a drainage requirement will be expected to:</i></p> <ul style="list-style-type: none"> <li>- <i>use a public sewer connection; or</i></li> <li>- <i>if a public sewer connection cannot be achieved at a reasonable cost, use a private waste water treatment plant which must prevent any flooding or pollution and which must be adequately maintained through a legal agreement which the developer must enter into to cover ownership and maintenance.</i></li> </ul> <p><i>Where private foul drainage arrangements are proposed that will discharge to the environment, SEPA will be required to be consulted on the acceptability of the proposals under the Water Environment (Controlled Activities) Regulations 2011 (as amended). If upgrades to the present wastewater treatment works are needed this will be required before development can commence”.</i></p> |

| Policy Number                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | <p><i>“Scottish Planning Policy expects development and infrastructure to be designed to be free from surface water flooding. This policy will be used to assess whether development proposals:</i></p> <ul style="list-style-type: none"> <li><i>- accommodate the requirements of any drainage strategies of assessments carried out for the site;</i></li> <li><i>- have sufficient space within the site to accommodate sustainable drainage; and</i></li> <li><i>- include an appropriately designed sustainable drainage system. Making Fife's Places Supplementary Guidance will provide guidance on the siting and requirements of SUDS proposals”.</i></li> </ul>                    |
| <b>Policy 11 – Low Carbon Fife</b>                    | <p><i>“Planning permission will only be granted for new development where it has been demonstrated that:</i></p> <ul style="list-style-type: none"> <li><i>- Construction materials come from local or sustainable sources;</i></li> <li><i>- Water conservation measures are in place; and</i></li> <li><i>- Sustainable urban drainage measures will ensure that there will be no increase in the rate of surface water runoff in peak conditions or detrimental impact on the ecological quality of the water environment”.</i> </li></ul>                                                                                                                                                 |
| <b>Policy 12 – Flooding and the Water Environment</b> | <p><i>“Development proposals will only be supported where they can demonstrate that they will not, individually or cumulatively increase flooding or flood risk from all sources (including surface water drainage measures) on the site or elsewhere; reduce the water conveyance and storage capacity of a functional flood plain; detrimentally impact on ecological quality of the water environment, including its natural characteristics, river engineering works, or recreational use; detrimentally impact on future options for flood management; require new defences against coastal erosion or coastal flooding; and increase coastal erosion on the site or elsewhere.”</i></p> |

The Clackmannanshire Council Local Development Plan (Ref 9.29) was adopted in August 2015, and the relevant Policies to the Proposed Development are listed in **Table 9-3 Clackmannanshire LDP Policies**.

**Table 9-3 Clackmannanshire LDP Policies**

| Policy Number             | Description                                                |
|---------------------------|------------------------------------------------------------|
| <b>Policy SC4 – Water</b> | <i>“The purpose of this supplementary guidance is to –</i> |

| Policy Number                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>- Endure that developers, public, land and property owners are aware of the relationship of water issues to the planning regime and the Council's approach to decision making on water issues;</li> <li>- Raise awareness of the duties and procedures for the protection and enhancement of the water environment, including groundwater;</li> <li>- Raise awareness of the risks to the water environment from development through direct and indirect pressures;</li> <li>- Raise awareness of the Council's duty to support sustainable flood management;</li> <li>- Provide guidance on the preparation of Flood Risk Assessments by developers when considering and designing developments;</li> <li>- Provide guidance on the preparation of Drainage Assessments by developers when considering and designing developments;</li> <li>- Provide guidance on the adoption of Sustainable Drainage Systems (SuDS) for the management of on-site surface water drainage, designed in accordance with the above assessments and, if appropriate, in accordance with Scottish Water's current design guidance, to protect and enhance the water environment;</li> <li>- Highlight the role of SuDS in contributing to good design, habitat creation, biodiversity, green networks and infrastructure; and</li> <li>- Provide guidance on incorporation of integrated green infrastructure to manage flood risk and drainage as a fundamental consideration in layout design to deliver sustainable development and placemaking."</li> </ul> |
| <b>Policy SC6 –<br/>Green<br/>Infrastructure</b> | <p>"The purpose of this supplementary guidance is to –</p> <ul style="list-style-type: none"> <li>- Ensure that developers, the public, land and property owners are aware of the contribution that green infrastructure can make to achieving a successful place;</li> <li>- Raise awareness of the role of green infrastructure in contributing to the delivery of better place outcomes and improved community wellbeing;</li> <li>- Raise awareness of the potential risks to and impacts on the natural environment from development through direct and indirect pressures;</li> <li>- Raise awareness of the potential of development proposals to enhance green infrastructure and biodiversity; and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Policy Number                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | - Provide guidance on the incorporation of open space into the design of planning proposals.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Policy SC7 - Energy Efficiency and Low Carbon Development</b> | <p>“This document provides advice and guidance on various aspects of energy efficiency and low carbon development for those wishing to carry out, or otherwise concerned with or affected by, developments in Clackmannanshire.</p> <p>Policy SC7 of the Local Development Plan is set out in order to ensure that a proportion (15%) of the reduction in Carbon Dioxide emissions from new development required by Building Standards is achieved through the use of Low and Zero Carbon Generating Technologies (LZCGTs). This proportion will increase to 20% from the beginning of 2018 and will thereafter be kept under review.”</p> |

### Guidance

- 9.2.8 There are no specific formal guidance or standards to be applied to the methodology for the water environment impact assessment. The approach and criteria to determine the significance of potential effects follows good practice as used on numerous other assessments of similar infrastructure projects.
- 9.2.9 Good practice guidance on how to carry out a Water Framework Directive (WFD) assessment is provided in the SEPA Policy No. 19 - Groundwater Protection Policy for Scotland (2009) (Ref 9.30).
- 9.2.10 The Scottish Government has published the Sewers for Scotland Manual (4th Edition, Scottish Water 2018) (Ref 9.31) and Planning Advice Notes to provide national guidance on various topics (see National Planning Policy section above for more detail).
- 9.2.11 SEPA has also produced several guidance documents covering a range of environmental issues that are relevant to this impact assessment. Those documents relevant to the water environment are:
- SEPA Interim Position Statement on Planning and Flooding (2009) (Ref 9.32);
  - SEPA Engineering Activities in The Water Environment: Good Practice Guide – River Crossings (Second edition, 2010) (Ref 9.33); and
  - SEPA Guidance on Assessing the Impacts of Development on Groundwater Abstractions (2024) (Ref 9.34).

## 9.3 Consultation

- 9.3.1 **Table 9-4 Summary of Consultation** lists the consultation that has taken place in preparing this assessment. The table lists relevant results from the following scoping opinions unless otherwise stated.

**Table 9-4 Summary of Consultation**

| Consultee                       | Design element | Key issue (s) raised                                                       | Summary of Response                                                                                                                                                 | Action Taken                                                                                                                                                                                             |
|---------------------------------|----------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fife Council</b>             | OHL            | Scope of water environment assessment.<br><br>Potential flooding concerns. | Broadly agrees with the proposed scope for assessment across the EIA.<br><br>Notes that small parts of the Site are within or adjacent to potential flooding areas. | Water environment and flood risk will be assessed in this chapter.                                                                                                                                       |
|                                 | KINN           | Scope of EIA.<br><br>Potential flooding concerns.                          | Water environment to be scoped out of the EIA.<br><br>Notes some small areas may be at risk of flooding as per SEPA flood maps.                                     | A precautionary principle has been adopted, and all elements of the Proposed Development are included in this assessment.<br><br>A Flood Risk Assessment has been conducted in regard to the KINN works. |
| <b>Clackmannanshire Council</b> | OHL            | Scope of EIA.                                                              | No issues are raised on the water environment.                                                                                                                      | No further action required here, though a precautionary principle has been adopted and all elements of the Proposed Development are included in this assessment.                                         |
|                                 | KINN           | Scope of EIA.                                                              | No issues are raised on the water environment.                                                                                                                      | No further action required here, though a precautionary principle has been adopted and all elements of the Proposed Development are included in this assessment.                                         |

## 9.4 Methods

### Introduction

- 9.4.1 Baseline conditions for the water environment were established using a comprehensive range of publicly available datasets, listed below, and supplemented by information obtained directly from SEPA and local authorities. The EIA Study Area and scope of assessment are also

detailed in this section. The assessment scope excludes operational impacts due to the low-maintenance nature of the infrastructure.

- 9.4.2 The methodology by which the potential effects of the proposed works on surface water, groundwater and hydromorphology are assessed follows a qualitative source–pathway–receptor approach, with effects evaluated based on receptor sensitivity and impact magnitude, following established guidance.

#### **Baseline Data Collection**

- 9.4.3 The following sources have been used to inform the baseline upon which the effects have been assessed:

- Online Ordnance Survey digital maps (Ref 9.35);
- Met Office website (Ref 9.36);
- SEPA website (Ref 9.37);
- Scottish Natural Heritage (SNH) Standing Waters Database (Ref 9.38);
- Scotland’s Aquaculture website (Ref 9.39);
- Scotland’s Environment website (Ref 9.40);
- National River Flow Archives website (Ref 9.41);
- British Geological Society (BGS) website (Ref 9.42);
- NatureScot (Ref 9.43);
- Scotland’s aquifers and groundwater bodies (Ref 9.44);
- UK Centre for Ecology and Hydrology (Ref 9.45);
- Scotland’s Environment Map (Ref 9.46); and
- SEPA National Flood Risk Assessment Map (Ref 9.47).

- 9.4.4 A Freedom of Information request was also sent to SEPA who was able to provide additional data for the Study Area covering (received on 16 December 2025):

- Surface water and groundwater quality;
- Groundwater levels;
- Known contamination or pollution events;
- Controlled Activities Regulation (CAR) licences; and
- Aquatic species (fish and macroinvertebrates).

- 9.4.5 Private Water Supply (PWS) data were requested from Fife Council and Clackmannanshire Council and were received on 21 November 2024 and 5 November 2024, respectively. An update from both councils has been requested on the 3 November 2025 and it was confirmed by both that no changes have taken place in the intervening time. For the purpose of this assessment this data is considered to be up to date. However, it is recommended that prior to any construction starting both local authorities are re-consulted to confirm any changes to known PWS are their registers.

- 9.4.6 Please refer to **Kincardine North Substation Flood Risk Assessment** (which is being submitted as a standalone document with the planning application) for further information on baseline sources for flood risk, including a detailed overview of the hydrology and topography of the KINN Site and an assessment and proposed mitigation of the potential sources of fluvial, pluvial, groundwater and coastal flooding.

#### **EIA Study Area**

- 9.4.7 The Proposed Development is located on the northern bank of the Upper Forth Estuary, approximately 0.6 km northeast of the town of Kincardine. The gradient and flow of the landscape means that the Firth of Forth, approximately 800 m from the southern boundary of the site, is the receptor for all water features assessed.
- 9.4.8 For the purpose of this impact assessment, a 1 km Study Area has been used within which water features that may be affected by the Proposed Development have been identified. For these water features, the baseline also considers downstream attributes beyond the 1 km Study Area as water quality impacts can sometimes propagate along watercourses and it is important to consider any new or different receptors along its course that might materially influence the importance grade attributed to the watercourse. The distance downstream is variable and reflects the nature of the risk, rate of conveyance, dilution and dispersion potential at any given time.

#### **Consideration has also been given to any groundwater features or groundwater dependent ecological sites outside the 1 km Study Area up to 2 km from the EIA Boundary if it is considered that they might be hydrogeologically linked. Assessment Scope**

- 9.4.9 As described in the introduction to this chapter, the assessment of potential effects on the water environment includes consideration of impacts on the water quality of surface water features, fluvial hydromorphology of watercourses, and for groundwater features, the impact on quality, flows, and levels. This scope is summarised in **Table 9-5 Scope of Assessment**. Impacts on ecological receptors are assessed in Chapter 6 Ecology; impacts from contaminated land on surface or groundwater receptors is presented in Chapter 10 Ground Conditions.
- 9.4.10 Based on the modelling conducted in the development of the Flood Risk Assessment (FRA) for the proposed KINN, a separate FRA for the Overhead Line Works and the Scottish Power Distribution Works is not considered necessary. The design has considered the small scale of the construction and tower base areas, and the locating of towers in areas of low flood risk. Thus, there are unlikely to be any impacts on third party land and property from the Proposed Development and no further impact assessment has been carried out.
- 9.4.11 The Overhead Line element of the Proposed Development includes modifications of XL, ZCN and ZCS routes to connect them to KINN as well as potential reconductoring works of a section of XL route to the north of KINN. The reconductoring works have been scoped out for assessment in this EIAR as the scale and nature of the works mean significant effects are highly unlikely, and mitigation measures set out in the EIAR would be applied to the reconductoring works as far as they are relevant.
- 9.4.12 The Scottish Power Distribution Works comprise the removal of a section of 11 kV wooden pole OHL and the laying of replacement underground cables (UGC) within and to the east of the KINN site and these are scoped in for assessment. This comprises the removal of

approximately 1.5 km m of OHL and replacement with underground cables. Current design plans are shown on Figure 4.3 within chapter 4. These works are concentrated between Pole 17 at the northern end of the Proposed Development and Hawkhill Farm to the south, and this aspect of the Scottish Power Distribution Works is to be assessed further. However, no interactions are expected here with watercourses other than KNW-07 as identified in **Table 9 11 Surface Water Features** and **Table 9-13 Importance of Surface Water and Groundwater Features**.

- 9.4.13 The Hawkhill Road Access Improvements to the south of the main site are considered a part of the overall KINN element of the Proposed Development, and these works will widen the existing road to enable site vehicles access with a temporary cycle path constructed through fields alongside. This aspect of the KINN does not interact with any watercourses and so does not present any risk to the water environment and therefore is unlikely to result in significant effects.

**Table 9-5 Scope of Assessment**

| Impact                                              | Relevant Receptors                                                                          | Element(s) Assessed      | Development Phase          |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------|----------------------------|
| <b>Groundwater quality</b>                          | Superficial Aquifers<br>Scottish Coal Measures Aquifer                                      | KINN<br>OHL<br>SPD Works | Construction and Operation |
| <b>Groundwater quantity</b>                         | Superficial Aquifers<br>Scottish Coal Measures Aquifer                                      | KINN<br>OHL              | Construction               |
| <b>Surface water quality – Spillage risk</b>        | All surface water features that may be directly or indirectly impacted as identified later. | KINN<br>OHL<br>SPD Works | Construction and Operation |
| <b>Surface water quality – Surface water runoff</b> | All surface water features that may be directly or indirectly impacted as identified later. | KINN<br>OHL<br>SPD Works | Construction and Operation |
| <b>Hydromorphology</b>                              | All surface water features that may be directly or indirectly impacted as identified later. | OHL<br>SPD Works         | Operation                  |

### Assessment Methodology

- 9.4.14 The qualitative assessment of potential likely significant effects of the Proposed Development has been based on a source-pathway-receptor approach. For an impact on the water environment to exist, the following is required:
- An impact source or cause of effect (such as a structure over a watercourse, the release of polluting chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or the loss or damage to all or part of a water feature, cuttings/excavations and associated dewatering activities capable of causing temporary or permanent changes to groundwater level or flow pattern and quality (as in the case of groundwater));
  - A receptor that is sensitive to that impact (i.e. water features and the services they support) that could potentially be affected; and
  - A pathway by which the two are linked (i.e. all three elements must be present before a potential impact linkage can be realised).
- 9.4.15 The first stage in applying the source-pathway-receptor approach is to identify the causes or sources of potential impact from a development. The sources have been identified through a review of the details of the Proposed Development, including its size and nature, potential construction methodologies and timescales, and a site walkover survey to examine the water features.
- 9.4.16 The next step in the approach is to undertake a review of the potential receptors, i.e. the water environment receptors themselves that have the potential to be affected. Water features, including their attributes, have been identified through a desk study and site surveys as described later.
- 9.4.17 The last stage of the approach is to determine if there is a viable exposure pathway or a 'mechanism' linking the source to the receptor. This is determined in the context of local conditions relative to water receptors within the EIA Study Area, such as topography, geology, climatic conditions, land use and the nature of the impact (e.g. the mobility of a liquid pollutant or the proximity to works that may physically impact a water feature or be a source of water pollution).

### Determining Magnitude of Impact and Importance of Receptors

- 9.4.18 The assessment of effect significance outlined within the below sections is consistent with the terminology and criteria outlined within Chapter 5 Policy Context of this EIA Report.
- 9.4.19 The importance of receptors has been established based on a four-point scale, using the criteria presented in **Table 9-6 Receptor Importance Descriptors** which has been modified from Design Manual for Roads and Bridges (DMRB) LA 113 Road Drainage and the Water Environment to include hydromorphology (Ref 9.48).

**Table 9-6 Receptor Importance Descriptors**

| Importance                    | Groundwater         | Surface Water                             | Hydromorphology                                  | Flood Risk               |
|-------------------------------|---------------------|-------------------------------------------|--------------------------------------------------|--------------------------|
| <b>Very High - Nationally</b> | Aquifer providing a | Water feature having a WFD classification | Unmodified, near to or pristine conditions, with | Essential Infrastructure |

| Importance                                                     | Groundwater                                                                                                                                                                   | Surface Water                                                                                                                                                                                                                                                                                                                                                                                      | Hydromorphology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Flood Risk                      |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>significant attribute of High Importance</b>                | regionally important resource and/ or supporting a site protected under International and UK legislation Ecology and Nature Conservation. Groundwater locally supports GWDTE. | shown in a RBMP. Watercourse with a $Q95 \geq 1.0 \text{ m}^3/\text{s}$ .<br><br>Site protected/ designated under International or UK legislation (SAC, SPA, SSSI, Ramsar site, Drinking Water Protection Zone (DrWPZ), or designating bathing/shellfish water.<br><br>Major salmonid/ cyprinid fishery of national /international importance.<br><br>Species protected at an international level. | well-developed and diverse geomorphic forms and processes characteristic of river and loch type.                                                                                                                                                                                                                                                                                                                                                                                                                               | or Most vulnerable development. |
| <b>High - Locally significant attribute of High Importance</b> | Aquifer providing locally important resource or supporting river ecosystem and/ or supporting sensitive habitats of national importance. Groundwater supports a GWDTE.        | Water feature having a WFD classification shown in a RBMP. Watercourse with a $Q95 \text{ m}^3/\text{s} < 1.0 \text{ m}^3/\text{s}$ .<br><br>Major Cyprinid Fishery at a local level.<br><br>Species protected under UK legislation.                                                                                                                                                               | Conforms closely to natural, unaltered state and will often exhibit well-developed and diverse geomorphic forms and processes characteristic of river and loch type. Deviates from natural conditions due to direct and/ or indirect channel, flood plain, bank modifications and/ or catchment development pressures. Typology may be sensitive to morphological change (e.g. Plane-riffle, wandering and braided). Diverse range of fluvial processes that would be highly vulnerable to change as a result of modification. | Highly vulnerable development.  |

| Importance                                             | Groundwater                                                                                                                                                                                                                 | Surface Water                                                                                                                                       | Hydromorphology                                                                                                                                                                                                                                                                                                                                  | Flood Risk                           |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Medium – Feature of moderate quality and rarity</b> | <p>Aquifer providing water for agricultural or industrial use with limited connection to surface water.</p> <p>Groundwater of limited value because its quality does not allow potable or other quality sensitive uses.</p> | <p>Water feature not having a WFD classification shown in a RBMP and watercourse with Q95 &lt;1.0 m<sup>3</sup>/s to &gt;0.001 m<sup>3</sup>/s.</p> | <p>Shows signs of previous alteration and/ or minor flow/ water level regulation but still retains some natural features or may be recovering towards conditions indicative of the higher category.</p>                                                                                                                                          | <p>Least vulnerable development.</p> |
| <b>Low – Feature of lower quality</b>                  | <p>Unproductive Strata</p>                                                                                                                                                                                                  | <p>Water feature not having a WFD classification shown in a RBMP and Q95 ≤0.001 m<sup>3</sup>/s.</p>                                                | <p>Substantially modified by past land use, previous engineering works or flow/ water level regulation. Watercourses likely to possess an artificial cross-section (e.g. trapezoidal) and will probably be deficient in bedforms and bankside vegetation; also realigned or channelised with hard bank protection or culverted and enclosed.</p> | <p>Water compatible development.</p> |

- 9.4.20 The magnitude of adverse or beneficial impacts has been determined by the eight-point scale presented in **Table 9-7 Magnitude of Impacts** taking both DMRB LA 113 Road Drainage and the Water Environment (Ref 9.46).

**Table 9-7 Magnitude of Impacts**

| Magnitude               | Criteria                                                                       |
|-------------------------|--------------------------------------------------------------------------------|
| <b>Major Adverse</b>    | Results in a loss of attribute and/ or quality and integrity of the attribute. |
| <b>Moderate Adverse</b> | Results in impact on integrity of attribute, or loss of part of attribute.     |

| Magnitude                  | Criteria                                                                                       |
|----------------------------|------------------------------------------------------------------------------------------------|
| <b>Minor Adverse</b>       | Results in some measurable change in attribute's quality or vulnerability.                     |
| <b>Negligible</b>          | Results in impact on attribute, but of insufficient magnitude to affect the use or integrity.  |
| <b>Minor Beneficial</b>    | Results in some beneficial impact on attribute or a reduced risk of negative impact occurring. |
| <b>Moderate Beneficial</b> | Results in moderate improvement of attribute quality.                                          |
| <b>Major Beneficial</b>    | Results in major improvement of attribute quality.                                             |
| <b>No Change</b>           | No change to the quality of the attribute                                                      |

9.4.21 All impacts are also described as either long-term/short-term, temporary/permanent, direct/indirect and certain/uncertain. These descriptors are defined below.

- Long-term/Medium-term/Short-term: describes length of time for which an impact is likely to last. For this assessment, water quality impacts that are short-term tend to occur over hours, days and maybe weeks. Beyond that impacts that occur over several years are considered medium-term. Long-term are impacts that occur for longer periods, i.e. 10 years or more.
- Temporary/permanent: describes whether an impact lasts a known period or remains indefinitely.
- Direct/indirect: describes whether a receptor is impacted directly or indirectly via another pathway or mechanism because of the Proposed Development.
- Certain/Uncertain: describes the certainty of the impact predicted.

#### Significance of Effect

9.4.22 The significance of effects has been determined using the matrix presented in

9.4.23 **Table 9-8 Matrix for Assessment of *Significance*** which is based broadly on criteria first presented in DMRB LA104 Environmental assessment and monitoring (Ref 9.49). After using the matrix to determine the effect, professional judgement will be used to determine the residual significance (for example, where the matrix allows a range of possible outcomes only one will be selected). Effects classed as moderate or greater are considered 'Significant' in planning terms (i.e. the shaded in

9.4.24 **Table 9-8 Matrix for Assessment of Significance).**

**Table 9-8 Matrix for Assessment of Significance**

| Magnitude /Importance | Very High           | High                | Medium            | Low                |
|-----------------------|---------------------|---------------------|-------------------|--------------------|
| <b>Major</b>          | Very large          | Large or very large | Moderate or large | Slight or moderate |
| <b>Moderate</b>       | Large or very large | Moderate or large   | Moderate          | Slight             |

| Magnitude / Importance | Very High         | High               | Medium            | Low               |
|------------------------|-------------------|--------------------|-------------------|-------------------|
| Minor                  | Moderate or large | Slight or Moderate | Slight            | Neutral or slight |
| Negligible             | Slight            | Slight             | Neutral or slight | Neutral           |
| No change              | Neutral           | Neutral            | Neutral           | Neutral           |

#### Water Framework Directive Assessment

9.4.25 The WFD is implemented in Scotland through the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act) (Ref 9.5). A WFD Screening and Scoping Assessment (**Appendix 7.1 WFD Screening and Scoping Assessment**) has been produced to assess the compliance of the Proposed Development with the WFD. It has been produced following a desk study and considers whether the Proposed Development has the potential to:

- Cause deterioration in ecological status or potential of relevant WFD designated water bodies;
- Prevent WFD designated water bodies from meeting their objective of 'Good' ecological status/ potential; and
- Prevent or compromise WFD objectives being met in other WFD designated water bodies or water dependent Protected Areas downstream of the Proposed Development (i.e. indirect impacts).

9.4.26 The WFD screening and scoping assessment is qualitative and is based on the same source-pathway-receptor approach described earlier. However, the objective of the assessment is to see whether there is compliance with the above objectives rather than a significance of effect.

9.4.27 In undertaking the assessment, consideration has been given to the conservation objectives for any ecological Protected Areas (as defined in the Regulations), where these might be more stringent.

9.4.28 The WFD screening and scoping assessment is presented in **Appendix 7.1 WFD Screening and Scoping Assessment**. The WFD Assessment covers all the freshwater bodies which could be impacted by the Proposed Development. For this project, this refers only to the Upper Forth Estuary. The WFD Assessment also considers the two groundwater bodies which could be impacted by the Proposed Development: Alloa and Longannet.

#### **Limitations and Assumptions**

9.4.29 The EIA process enables informed decision-making based on the best possible information about the environmental implications of a development being made available. However, it is common for there to be some uncertainty as to the exact scale and nature of the environmental impacts predicted. Where there is uncertainty of design, reasonable worst-case assumptions have been made. Where this applies to the magnitude of impact and overall effect, additional mitigation may be proposed to ensure confidence in a non-significant outcome.

9.4.30 The assessment is based on data available from online sources and a site walkover. For most of the water features in the EIA Study Area there was no long-term water quality or hydrological data, and the data that was available was limited or obtained some time ago (and thus may not be wholly representative of current conditions). Therefore, the potential effects from the

Proposed Development on water quality, hydrology and hydrogeology has been assessed qualitatively and based on background information and certain assumptions defined in the impact assessment section. Given the nature of the Proposed Development this is considered acceptable.

- 9.4.31 A walkover survey was carried out on 15 November 2024. Some areas of dense vegetation and fencing prevented full access to some channels and so not all were possible to assess in detail. However, by their very nature their importance will be low, and thus significant effects are unlikely. Although the walkover survey was carried out around 18 months ago it is considered that it still reflects the characteristics of water features on and near the Site. However, it was not possible to observe all water features (i.e. KNW-09, KNW-10, KNW-11 and KNW-14), thus these are assessed based on a desk study only. Others – KNW-05, KNW-06 and KNW-07 – have been visited subsequently to assist in the baseline data gathering and further assessment.
- 9.4.32 Any borehole data from BGS (Ref 9.50) sources are included on the basis that “*the British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation*”.
- 9.4.33 There is no data on groundwater flow across the Site. However, it is most likely that groundwater flows southwest towards the River Forth, following the natural topographic gradient.
- 9.4.34 It is assumed that works on watercourse crossings will be permanent upgrades enabling access for maintenance during operation following construction. It is assumed that the structure will be extended by 5 m as per the road widening above on a like for like basis. It is also assumed that it will be a box culvert and that the existing culvert dimensions beyond extensions required for the road widening will be maintained in accordance with SEPA guidance (Ref 9.1) to minimise potential flood risk downstream.
- 9.4.35 For the initial installation and removal of OHL cables, it is assumed that existing field access will be used without the need for any new watercourse crossings or upgrades to existing watercourse crossings.
- 9.4.36 Where cables are to be laid beneath watercourses, it is assumed that Horizontal Direct Drilling (HDD) will be used for installation, or if not, then open cut trenches with temporary overland pump will be used instead.
- 9.4.37 It is assumed that there is no positive drainage from the Hawkshill Road with runoff draining over the edge, and therefore any upgrades will maintain the same arrangement. Therefore, no surface water outfall or change in runoff is expected to any watercourse and no further assessment has been provided.
- 9.4.38 Due to the smaller scale of the chapter scope at the outset, the site walkover survey did not incorporate KNW-07, a watercourse which is now scoped in due to potential impacts from multiple elements of the Proposed Development. Assessment of this watercourse is therefore limited to information from a desk study only.
- 9.4.39 This chapter should be read considering the legislation, statutory requirements and/or industry good practice applicable at the time of the assessment being undertaken. Any subsequent changes in this legislation, guidance or design may necessitate the findings to be reassessed

considering these circumstances. Further details and specific design information, including dimensions of infrastructure units and works, are given in **9.6 Embedded Mitigation**.

## 9.5 Baseline

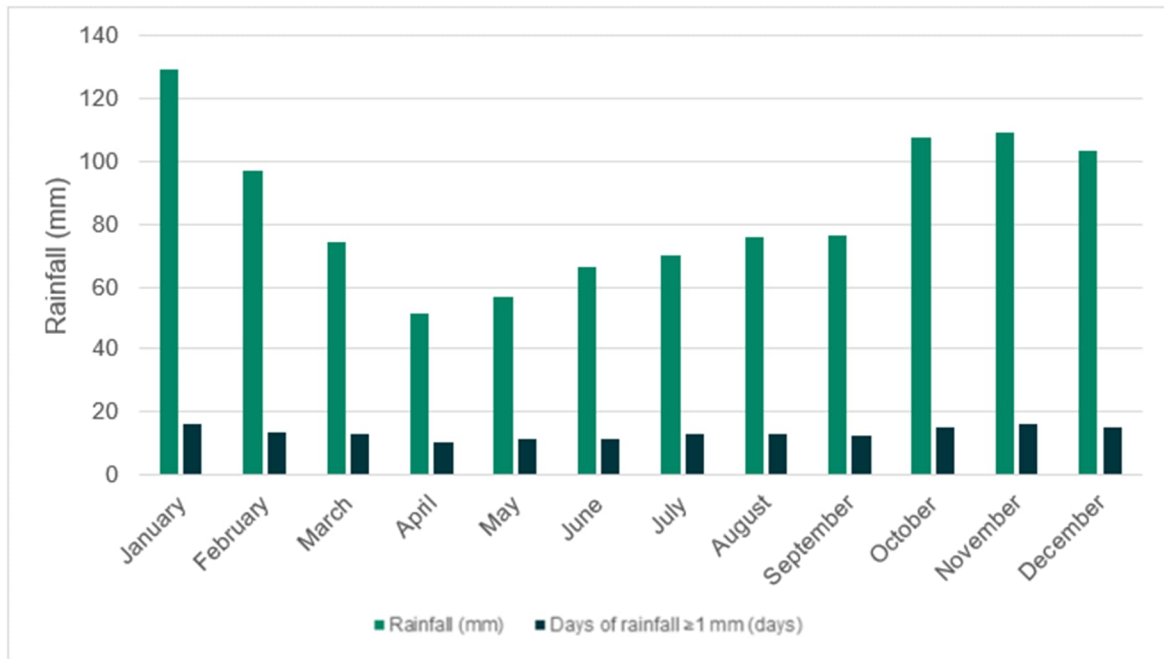
### Study Area

- 9.5.1 The Proposed Development is located around 0.5 km from the northern bank of the Upper Forth Estuary to the southwest, and approximately 0.6 km northeast of the town of Kincardine. It is bounded within the A876 to the west and the A977 and the Stirling-Alloa-Kincardine railway line to the east. Arable agricultural fields are located within the Site, which has a largely flat topography below 10 m Above Ordnance Datum (AOD).
- 9.5.2 The Canal Burn runs along the west side of the Site, with several small drains and basins associated with it. These are discussed in further detail under 'Surface Water Features' below.
- 9.5.3 The proposed Kincardine North Substation (KINN) is located centrally within the EIA Boundary at approx. NS 92604 89371. A derelict waste management facility and an office building are located to the north of this. Woodland is located to the south. The land within the EIA boundary and on which the KINN is proposed is currently arable fields.
- 9.5.4 Existing overhead lines (OHL) - the XL, ZCN and ZCS routes - traverse the Site. As part of proposed upgrades to these lines, three existing pylons towers will be removed, and twelve new towers will be constructed to connect the KINN to these routes. The existing Scottish Power Distribution Works 11kV OHL currently run northeast from the proposed KINN site and will connect through its southern side.
- 9.5.5 The proposed access strategy to the Site is via Hawkhill Road for general construction and permanent operational access, supported by road widening, traffic management measures, and pedestrian/cycle segregation where required, while the A876 access is retained only for abnormal indivisible loads (AILs), emergency access/egress or future larger-scale maintenance such as transformer replacement, subject to the necessary approvals and controls.

### Topography, Land Use and Climate

- 9.5.6 The topography of the EIA Study Area is low-lying at approx. 0-10 m AOD, located on an estuarine plain on the northern bank of the Forth Estuary. The Proposed Development is therefore located within a short distance of the Firth of Forth Site of Special Scientific Interest (SSSI) and connected to it via the Canal Burn.
- 9.5.7 The land use of the area is predominantly agricultural, with fields and some small woodland present within the EIA Study Area. It is flanked by the A876 on the west side of the Site, and the A977 on the east side. Some small-scale industrial works are found to the north and south of the Site, and the small town of Kincardine is located approximately 0.6 km southeast of the Proposed Development.
- 9.5.8 The days of rainfall above 1 mm is also recorded by the Met Office. Stirling South Works climate station, located approximately 14 km west of the Proposed Development, is the closest station with historical data. **Chart 9-1 Average Rainfall and Days of Rainfall above 1 mm sourced from Stirling South Works Climate Station (1991-2020)** shows the rainfall data from Stirling South Works Station in 2024. January has the highest recorded rainfall (129.29mm), and the

highest number of days with rainfall above 1 mm (16.29 days). April has the lowest recorded rainfall (51.39mm) and the lowest number of days with rainfall below 1 mm (10.62 days).



**Chart 9-1 Average Rainfall and Days of Rainfall above 1 mm sourced from Stirling South Works Climate Station (1991-2020)**

## Geology and Soils

- 9.5.9 The assessment on geology and soils can be found within Chapter 10 Ground Conditions. This section aims to inform the hydrogeological understanding of the EIA Study Area for the assessment of potential impacts on groundwater quality, levels and flows.

### Soils

- 9.5.10 There are three principal soil types underlying the Proposed Development and EIA Study Area that can be viewed on the soil map of Scotland (Ref 9.51):
- Noncalcareous Gleys – characterized by poor drainage
  - Alluvial Soils – with undifferentiated drainage characteristics
  - Brown Earths – typically well-drained

### Superficial Geology

- 9.5.11 Five superficial deposits have been identified within the EIA Study Area from the BGS GeoIndex (Ref 9.52), these can be viewed within **Figure 9.5 Superficial Geology**. The predominant deposit is Raised Tidal Flat Deposits (Holocene), composed mainly of silt and clay. These sediments were originally formed in the intertidal zone but have since been uplifted above the current sea level.
- 9.5.12 To the north of the KINN Study Area, Raised Marine Deposits (Devensian) are present, consisting of clay, silt, sand, and gravel. Like the tidal flat deposits, these were also formed in a marine environment and subsequently elevated above sea level.

- 9.5.13 Small areas of peat are present within the wider area: Class 1 Peat on the banks of the Black Devon east of Forest Mill, and Class 5 Peat to the east of the A977 and north of the A907. However, these areas of peat are not within the vicinity of the Proposed Development. Based on BGS GeoIndex and the Carbon and Peatland Map there is no peat present where new overhead line infrastructure (i.e. terminal towers) is proposed to connect XL, ZCN and ZCS routes to the proposed KINN.
- 9.5.14 Additionally, there are deposits of Glacial Till (Devensian), composed of diamicton, and Glaciofluvial Ice-Contact Deposits (Quaternary), which include gravel, sand, and silt. These deposits are found within the northeastern section of the KINN Study Area.

#### Bedrock Geology

- 9.5.15 The majority of the EIA Study Area is underlain by rocks from the Carboniferous period, including Scottish Middle Coal Measures Formation, the Scottish Lower Coal Measures Formation and the Passage Formation as shown in **Figure 9.4 Bedrock Geology**.
- 9.5.16 The Scottish Middle and Lower Coal Measures Formations are dominated by cyclic sequences of mudstone, siltstone, sandstone, ironstone, and coal, reflecting repeated episodes of deltaic and fluvial deposition interspersed with peat accumulation in swampy environments.
- 9.5.17 Underlying these is the Passage Formation, which marks a transitional unit between the Coal Measures and the older Clackmannan Group. It is composed of sandstones, siltstones, mudstones, and occasional thin coals, and represents a shift to more fluvially dominated sedimentation.

#### **Hydrogeology**

##### Superficial Aquifers

- 9.5.18 There is no superficial aquifer listed within the Hydrogeology 625K Scale Map of the UK (ref 9.54). However, it is likely that some superficial deposits will hold small volumes of groundwater which could have the potential to support Groundwater Dependent Terrestrial Ecosystems (GWDTE). **Table 9-9 Superficial Aquifers** list the superficial deposits found within the EIA Study Area and their hydrogeological significance (Ref 9.53).

**Table 9-9 Superficial Aquifers**

| Geological formation              | Hydrogeological significance                                                                                                                                                                                                       |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Peat</b>                       | Peat has high water content but low permeability; generally, acts as a water-retaining layer rather than a productive aquifer.                                                                                                     |
| <b>Alluvium</b>                   | Sands and gravel layers have the potential to be groundwater stores. Due to the alluvium deposits being centred around present day surface water bodies, they are likely a point of contact between surface water and groundwater. |
| <b>Glaciofluvial deposits</b>     | Likely to store water. Will depend on how frequently lower permeability materials such as clay or silt are interbedded with permeable deposits such as sand and gravel.                                                            |
| <b>Raised marine deposits and</b> | These deposits aren't likely to be productive, as thick clay beds are common. But gravels beds within the deposit could be highly permeable forming a perched aquifer.                                                             |

## raised tidal deposits

|                         |                                                                                                                                   |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Till - Diamicton</b> | These deposits will likely be unproductive. There may be small volumes of water situated within perched sand and gravel aquifers. |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

### Scottish Coal Measures Aquifer

- 9.5.19 The Scottish Coal Measures are the only bedrock aquifer underlying the Proposed Development and EIA Study Area identified on the Hydrogeology 625K Map (Ref 9.54). This aquifer is classified as moderately productive and consists of multi-layered strata that have been extensively mined. Groundwater movement is predominantly through fracture flow, with minor contributions from intergranular flow. Additionally, significant groundwater flow occurs through mined voids, such as shafts and cavities, which enhance permeability.
- 9.5.20 The Scottish Coal Measures form part of the Carboniferous (mined) aquifer group (Ref 9.55), which exhibits higher permeability than its unmined counterpart. Mining activities have increased the number of fractures and created pathways that facilitate groundwater movement. The removal of impermeable coal seams has further improved connectivity, allowing groundwater flow paths to extend over distances of 1 to 10 km (Ref 9.55).
- 9.5.21 The hydrogeological properties of the Carboniferous (mined) aquifer group indicate a moderate to high capacity for water transmission and efficiency. The transmissivity of the aquifer ranges from 10 to 1,000 m<sup>2</sup>/day<sup>55</sup>, reflecting its ability to transmit groundwater through fractures and mined voids. The specific capacity is recorded between 48 and 132 m<sup>3</sup>/day/m, which further supports its classification as a moderately productive aquifer.
- 9.5.22 The storativity is recorded at approximately 0.0001 (Ref 9.55), which is low for a moderately productive aquifer. This suggests the presence of confined conditions, likely due to impermeable layers such as coal seams, which restrict water release. Consequently, drawdown during pumping may occur more rapidly.
- 9.5.23 The operational yield ranges from 1,987 to 3,279 m<sup>3</sup>/day (Ref 9.55), reflecting the enhanced groundwater flow through mining-induced features.
- 9.5.24 Groundwater quality data for the Scottish Coal Measures is limited. BGS records indicate that the groundwater is often anoxic and generally moderately to highly mineralised.

### **Groundwater Levels and Flow**

- 9.5.25 There is currently no ground investigation data publicly available that provides direct measurements of groundwater levels across the Site. However, borehole records accessed via the BGS GeoIndex (Ref 9.56) offer some indication of groundwater conditions. It is important to note that these groundwater levels were recorded during historic drilling activities, and therefore do not reflect seasonal or spatial variations, nor current conditions. Instead, they provide a general indication of where groundwater may be encountered.
- 9.5.26 Based on the borehole data, groundwater strikes appear to range from approximately 1.5 m to 4.5 m below ground level (bgl). These strikes were observed within the Raised Tidal Flat Deposits, typically in clay layers containing gravel and shell fragments. The variability in strike depths suggests that groundwater levels are not uniform across the Site. Instead, it is likely that small, perched aquifers exist within sand and gravel lenses interbedded with clay, resulting in localised groundwater conditions.

- 9.5.27 Using BGS GeoIndex (Ref 9.50), the groundwater levels were indicated to range between:
- BGS Record – NS98NW769 (BGS ID: 18071127), Grid Reference – 292323, 689079, Groundwater Strike: 1.4 m bgl (4.8 maOD);
  - BGS Record – NS98NW402, Grid Reference – 292170, 689093, Groundwater struck at 5 m bgl and rose to 1.5 m bgl after 25 minutes;
  - BGS Record – NS98NW549, Grid Reference – 292196, 689251, Groundwater strike at 2.1 m bgl in clay with shell fragments;
  - BGS Record – NS98NW550, Grid Reference – 292220, 689351, Groundwater seepage observed at 3 m bgl; and
  - BGS Record – NS98NW (BGS ID: 15990047) Grid Reference – 292323, 689079, Groundwater struck at 4.5 m bgl and rose to 4.1 m bgl after 20 minutes.
- 9.5.28 As noted above, there is no data to confidently determine the direction of groundwater flow across the Site but it is likely that groundwater flows southwest towards the River Forth, due to the natural topographic gradient.
- 9.5.29 Within the Scottish Coal Measures, groundwater movement is primarily controlled by fracture flow. These fractures are typically more prevalent in the upper weathered zone, where rock has been exposed to weathering and stress relief. As depth increases, the number and connectivity of fractures generally decrease, resulting in reduced groundwater flow at greater depths.

#### WFD Designation of Groundwater

- 9.5.30 According to SEPA's Water Classification Hub the KINN, Overhead Line Works and Scottish Power Distribution Works Study Areas cover two WFD groundwater bodies: Alloa (ID: 150536) which covers an area of 62.3 km<sup>2</sup> and Longannet (ID: 150484) which covers an area of 33.2 km<sup>2</sup> (Ref 9.57). The Proposed Development is underlain by the Alloa WFD Body which has a Poor overall classification from 2024 (Cycle 3) (see **Table 9-10**). The status has been unchanged since 2012 and is likely due to the Poor Water Quality. Longannet WFD Body is situated to the east of the Proposed Development and has had a Poor overall classification from 2024 (Cycle 3). This has been downgraded from a Good overall classification from 2013 to 2023. Both the Alloa and Longannet WFD bodies are considered as Drinking Water Protection Zones, as the whole of Scotland is included in this designation.

**Table 9-10 Water Classification Data for Alloa and Longannet (2024 Cycle 3)**

| Parameter                              | Classification: Alloa | Classification: Longannet |
|----------------------------------------|-----------------------|---------------------------|
| Overall status                         | Poor                  | Poor                      |
| Quantitative status                    | Good                  | Good                      |
| Quantitative - Saline Intrusion        | Good                  | Good                      |
| Quantitative - SW Interaction          | Good                  | Good                      |
| Water balance                          | Good                  | Good                      |
| Chemical status                        | Poor                  | Poor                      |
| Chem – Surface Water Interaction (SWI) | Good                  | Poor                      |

| Parameter                            | Classification: Alloa | Classification: Longannet |
|--------------------------------------|-----------------------|---------------------------|
| SWI - Specific pollutants            | Good                  | Poor                      |
| SWI - Chromium                       | Good                  | Good                      |
| SWI - Zinc                           | Good                  | Good                      |
| SWI - Manganese                      | Good                  | Poor                      |
| SWI - Other Substances               | Good                  | Good                      |
| SWI - Nitrate                        | Good                  | Good                      |
| SWI - Priority substances            | Good                  | Good                      |
| SWI - Cadmium                        | Good                  | Good                      |
| SWI - Lead                           | Good                  | Good                      |
| Drinking Water Protected Area (DWPA) | Good                  | Good                      |
| DWPA - Priority substances           | Good                  | Good                      |
| DWPA - Atrazine                      | Good                  | Good                      |
| DWPA - Simazine                      | Good                  | Good                      |
| DWPA - Other Substances              | Good                  | Good                      |
| DWPA - Epoxyconazole                 | Good                  | Good                      |
| DWPA - Nitrate                       | Good                  | Good                      |
| Chemical - General tests (CGT)       | Poor                  | Good                      |
| CGT - Priority substances            | Good                  | Good                      |
| CGT - Atrazine                       | Good                  | Good                      |
| CGT - Simazine                       | Good                  | Good                      |
| CGT - Trichloroethene                | Good                  | Good                      |
| CGT - Benzene                        | Good                  | Good                      |
| CGT - Specific pollutants            | Good                  | Good                      |
| CGT - Chromium                       | Good                  | Good                      |
| CGT - Other Substances               | Poor                  | Good                      |
| CGT - Electrical Conductivity        | Poor                  | Good                      |
| CGT - Epoxyconazole                  | Good                  | Good                      |
| CGT - Nitrate                        | Good                  | Good                      |
| CGT - Free Product                   | Good                  | Good                      |
| CGT - Vinyl Chloride                 | Good                  | Good                      |
| Water quality                        | Poor                  | Poor                      |

### Groundwater Dependent Terrestrial Ecosystems

- 9.5.31 GWDTEs are ecosystems that rely on groundwater to sustain their ecological functions. These can include wetlands, springs, rivers, lagoons, and similar habitats. Based on the findings from the Phase 1 Habitat Survey (see Chapter 6 Ecology and the accompanying Figure 6.4 Habitat Survey Results for further details), there is no evidence of GWDTEs present within the Site. Furthermore, there are no designated sites such as SSSIs, Special Protection Areas (SPAs), or Special Areas of Conservation (SACs) within the EIA Study Area that have been identified as GWDTEs.
- 9.5.32 Ponds support a variety of ecosystems and are potentially supported by groundwater. Their ecology is assessed in Chapter 6 Ecology.

### **Surface Water Features**

- 9.5.33 There are several surface water features in proximity to the Proposed Development which have been assessed for scoping in or out of consideration within the EIA. Those not considered at risk of contamination from surface run-off, pollution or other means are scoped out. Those considered at a potential risk, and so scoped in for assessment here, are presented in **Table 9-11 Surface Water Features** and shown in **Figure 9.1 Surface Water Receptors and their Attributes**.

**Table 9-11 Surface Water Features**

| Watercourse                          | Assigned ID | Approx. NGR location | Details and reasoning for assessment decision                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|-------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Upper Forth Estuary (Firth of Forth) | KNW-01      | NS 91702 88441       | WFD body. Major watercourse and into which the Canal Burn flows. Scoped in as a receptor for other scoped in watercourses.                                                                                                                                                                                                                                         |
| Canal Burn                           | KNW-02      | NS 92079 89227       | Stream inflowing into Firth of Forth. Crossed by existing and diverted overhead lines and potentially crossed by access track for abnormal loads. Located approximately 60 m from new tower and 66 m from KINN. Planned outlet for Sustainable Drainage System (SuDS) from KINN site. Canal Burn is also the downstream receptor for other scoped in watercourses. |
| Unnamed drainage basin               | KNW-03      | NS 92548 89789       | Scoped out as no clear pathway.                                                                                                                                                                                                                                                                                                                                    |
| Unnamed tributary of KNW-02          | KNW-04      | NS 92440 89709       | Straightened drainage channel. Scoped in as potential receptor of runoff as 25 m from new tower.                                                                                                                                                                                                                                                                   |

| Watercourse              | Assigned ID | Approx. NGR location | Details and reasoning for assessment decision                                                                                                                                                                                                                                                                                                                     |
|--------------------------|-------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unnamed drainage channel | KNW-05      | NS 92196 89245       | Straightened drainage channel. Scoped in as potential receptor of runoff as approximately 45 m from access track for abnormal loads.                                                                                                                                                                                                                              |
| Unnamed drainage channel | KNW-06      | NS 92214 88984       | Straightened drainage channel. Scoped in as potential receptor of runoff as approximately 20 m from Carse Road access track.                                                                                                                                                                                                                                      |
| Unnamed drainage channel | KNW-07      | NS 92473 89004       | Straightened drainage channel along southern edge of EIA boundary. Scoped in as receptor for planned SuDS drainage from KINN, potential receptor of runoff from Carse Road access and watercourse crossing, with existing culvert to be reinforced for this, and crossed at two points by the undergrounding of cables for the Scottish Power Distribution Works. |
| Unnamed drainage basin   | KNW-08      | NS 92285 89489       | Storage/drainage basin with in/outflow into KNW-02 at NS 92344 89454. Scoped in as potential receptor of runoff due to proximity to, and potentially crossed by, access track for abnormal loads, and as there is potential inflow from scoped in KNW-02.                                                                                                         |
| Unnamed drainage channel | KNW-09      | NS 92154 89700       | Scoped out as no clear pathway.                                                                                                                                                                                                                                                                                                                                   |
| Unnamed drainage channel | KNW-10      | NS 92323 89722       | Scoped out as no clear pathway.                                                                                                                                                                                                                                                                                                                                   |
| Unnamed drainage channel | KNW-11      | NS 92339 89849       | Scoped out as no clear pathway.                                                                                                                                                                                                                                                                                                                                   |
| Unnamed drainage channel | KNW-12      | NS 92483 89965       | Scoped out as no clear pathway.                                                                                                                                                                                                                                                                                                                                   |
| Unnamed drainage channel | KNW-13      | NS 92509 89855       | Scoped out as no clear pathway.                                                                                                                                                                                                                                                                                                                                   |

| Watercourse            | Assigned ID | Approx. NGR location | Details and reasoning for assessment decision                                                                                                                                                                                                    |
|------------------------|-------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unnamed drainage basin | KNW-14      | NS 92165 89381       | Storage/drainage basin with in/outflow into KNW-02 at NS 92150 89396. Scoped in as potential receptor of runoff due to proximity to, and downstream of, access track for abnormal loads, and as there is potential inflow from scoped in KNW-02. |

- 9.5.34 The Upper Forth Estuary is the only WFD classified surface water body in proximity to the KINN, Overhead Line Works and Scottish Power Distribution Works Study Areas, and all other watercourses considered here are within its catchment.

#### Upper Forth Estuary

- 9.5.35 The Upper Forth Estuary (WFD ID: 200437) is a transitional watercourse where the River Forth opens out into the Firth of Forth. Much of this area and the Firth of Forth itself is classed as a SSSI and a SPA and so is sensitive to environmental changes and adverse impacts. The Upper Forth Estuary covers an approximate area of 9.7 km<sup>2</sup> and flows southeast from Stirling to the Kincardine Swing Bridge, beyond which SEPA class the Firth as a separate WFD body (Middle Forth Estuary, ID: 200436). The Upper Forth Estuary is considered a heavily modified water body with much anthropological alterations along its course, this limiting further changes without causing an increase in flooding or other physical damage.
- 9.5.36 In 2024, SEPA classified the Upper Forth Estuary with an Overall Status of Moderate Ecological Potential. This is consistent with every previous year since 2013. Before this, it was classed as Poor or Poor Ecological Potential. A further breakdown of the classifications awarded it by SEPA in 2024 are given in **Table 9-12 Water Classification Data for Upper Forth Estuary** (ref 9.57).

**Table 9-12 Water Classification Data for Upper Forth Estuary (2024 Cycle 3)**

| Parameter                    | Classification                |
|------------------------------|-------------------------------|
| Overall Status               | Moderate Ecological Potential |
| Pre-HMWB Status              | Moderate                      |
| Overall Ecology              | Moderate                      |
| Physico-Chem                 | Good                          |
| Dissolved Oxygen             | Good                          |
| Dissolved Inorganic Nitrogen | Good                          |
| Biological Elements          | Good                          |
| Fish                         | Good                          |

| Parameter           | Classification |
|---------------------|----------------|
| Specific Pollutants | Pass           |
| Unionised Ammonia   | Pass           |
| Hydromorphology     | Moderate       |
| Morphology          | Moderate       |
| DO (lab. salinity)  | Good           |
| DO (field salinity) | Good           |
| Water Quality       | Good           |

- 9.5.37 The Canal Burn, or KNW-02, (shown in Plate 9-1 and Plate 9-2, below) is the largest watercourse that passes within the Proposed Development. The Burn sources at National Grid Reference (NGR) NS 93043 90018 and flows southwest for approx. 1.9 km to a confluence with the Upper Forth Estuary at NGR NS 91788 88547. The surrounding land use is largely agricultural, with some light industrial areas and two major roads – the A876 and A977 – passing nearby. The Canal Burn passes beneath the A876 at NGR NS 92207 89408. Several channelised drainage watercourses and water storage basins flow into the Canal Burn along its course. Two of these basins have been scoped in for assessment as potential receptors whilst a third – KNW-03 – has been scoped out for further analysis due to its distance of 140 m from the works and its upgradient location restricting any potential pathways for sediment and pollution. KNW-06 and KNW-07, both tributaries of the Canal Burn and assessed here as potentially impacted by works at the southern end of the Site, are shown in Plate 9-3 and Plate 9-4, respectively.



*Plate 9-1 Canal Burn (KNW-02), photographed 15 November 2024 from NS 92908 89901, looking upstream*



*Plate 9-2 Canal Burn (KNW-02), photographed 15 July 2026 from NS 92056 89118, looking upstream.*



*Plate 9-3 KNW-06, photographed 15 July 2026 from NS 92243 88946, looking upstream.  
Note that the channel was dry due to seasonal heat at time of visit.*



*Plate 9-4 KNW-07, photographed 15 July 2026 from NS 92270 88903, looking upstream.*

- 9.5.38 The SEPA data requested and received on 16 December 2025 stated that there are no recorded pollution events within a 1 km radius of the Proposed Development. Further, no data on fish or macroinvertebrates is held within this area.

### **Private Water Supplies**

- 9.5.39 There are two types of PWS defined in the regulations, Type A and Type B. Type A PWS are larger supplies (providing 10 or more cubic metres of water per day or serving 50 or more persons) or supplies that have a commercial or public activities usage irrespective of size. These are regulated by the Water Intended for Human Consumption (Private Supplies) (Scotland) 2017 (Ref 9.19) which aim to protect human health from the adverse effects of any contamination of water intended for human consumption by ensuring that the water meets water quality standards. Type B PWS locations are those serving 50 persons or less and are regulated by Private Water Supplies (Scotland) Regulations 2006 (Ref 9.18). This legislation states that all PWS within the council area must be registered with the corresponding local authority.
- 9.5.40 Clackmannanshire Council responded on the 5 November 2024 confirming that "*There are no known private water supplies within the Clackmannanshire Council area of the provided search area.*" An update was subsequently requested, and it was confirmed by Clackmannanshire Council on 23 June 2026 that this is still the case.
- 9.5.41 Fife Council responded on the 21 November 2024 confirming that "*There are no private water supplies recorded as being within 1km of the specified NGR.*" An update from Fife Council confirmed on the 10 November 2025 that there are no new PWS within 1km of the Proposed Development.

### **Environmental Authorisation (Scotland) Regulations (EASR) Licences**

- 9.5.42 From the 1 November 2025, Environmental Authorisations (Scotland) Regulations 2018 (Ref 9.58), has replaced the previous CAR Regulations.
- 9.5.43 A data request received from SEPA on 16 December 2025 identified several EASR (formally CAR) licences granted within a 1 km radius of the Proposed Development. These are listed in **Appendix 9.2 EASR Licences**.
- 9.5.44 Only one - CAR/L/1164536 – was identified within the 1 km study area as an abstraction licence. It is not stated if it is a groundwater or surface water abstraction point. However, it is situated 270 m upgradient of the works. It is also outside the 250 m buffer zone recommended by SEPA within '*Guidance on Assessing the Impacts of Development on Groundwater Abstractions*' (Ref 9.59). Therefore, it has been scoped out of the assessment.

### **Ecological Designations**

- 9.5.45 The Firth of Forth, including stretches of the Forth Estuary and coastline, is considered both a SSSI and SPA (Ref 9.44). The alterations made as part of the Proposed Development are projected to have minimal impact on any watercourses entering the Firth of Forth. There is the possibility of chemical spillages affecting watercourses that then flow to the shore, but it is expected that dilution enroute and in coastal waters will reduce any potential for significant adverse effects.
- 9.5.46 Otherwise, the nearest SSSIs are over 3 km north of the Site with no pathway for impacts on the water environment and so are not considered here.

### **Flood Risk**

- 9.5.47 The **Kincardine North Substation Flood Risk Assessment** carried out to determine flood risk on the KINN site determined that KNW-02 and KNW-07 were the most likely sources of fluvial flooding on the Site. It was determined that the main KINN platform is outside the fluvial flood

risk area, and an examination of the available SEPA flood map data indicates this is also the case for the towers to be constructed for the OHL development. Some fluvial flood risk is noted at the access track to be constructed at the southern end of the Proposed Development, and this is addressed in the Kincardine North Substation Flood Risk Assessment itself as this will be accessed by the same track.

- 9.5.48 The **Kincardine North Substation Flood Risk Assessment** also examined pluvial flood risk and determined that KNW-02 posed a potential risk of this at some areas within the KINN platform site. However, an examination of the SEPA flood map (Ref 9.60) data shows some areas with a high likelihood (10% chance per year) of some pluvial water flooding, but these are within the channels and again are not in the locations of the towers. An assessment of the SEPA data showed there to be no risk of groundwater flooding, and whilst the underlying bedrock was deemed to have a low permeability, groundwater flooding is still considered unlikely at the Site based on available data.

### Importance of Water Features

- 9.5.49 The importances of each scoped in surface and groundwater feature are assessed based on the above baseline information and presented in **Table 9-13 Importance of Surface Water and Groundwater Features**. The criteria used to determine this importance is shown in **Table 9-6 Receptor Importance Descriptors**.

**Table 9-13 Importance of Surface Water and Groundwater Features**

| Water Feature                         | Water Quality Importance                                                                                                                                                                                                                                                                                                                                                            | Hydromorphology Importance                                                                                  |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Superficial Aquifers</b>           | <b>Low Importance</b><br>The clay-rich deposits present are likely to contain interbedded gravels and sands, which may host limited groundwater. As a result, the aquifer is expected to have a low productivity with some areas being essentially unproductive where no sand or gravel are deposited. There is no evidence to suggest that the aquifer supports any PWS or GWDTEs. | n/a                                                                                                         |
| <b>Scottish Coal Measures Aquifer</b> | <b>Medium Importance</b><br>Moderately productive aquifer which likely has some hydrogeological connection to the River Forth. However, no evidence to suggest that the aquifer supports any PWS or GWDTEs.<br>Is within the Alloa WFD Groundwater Body and Drinking Water Protected Area.                                                                                          | n/a                                                                                                         |
| <b>Upper Forth Estuary (KNW-01)</b>   | <b>Very High Importance</b><br>The Upper Forth Estuary has a WFD classification and is designated as a SSSI and SPA; the site is protected/designated under UK legislation.                                                                                                                                                                                                         | n/a (no physical impacts possible)                                                                          |
| <b>Canal Burn (KNW-02)</b>            | <b>Medium Importance</b><br>The Canal Burn is not classified as a WFD water body. It is a relatively small watercourse with an estimated Q95 between 0.001 m <sup>3</sup> /s and 1.0 m <sup>3</sup> /s. No                                                                                                                                                                          | <b>Low Importance</b><br>Substantially modified, likely artificial cross-section, channelised or realigned. |

|               |                                                                                                                                                                                                           |                                                                                                             |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|               | known socio-economic uses or ecological potential.                                                                                                                                                        |                                                                                                             |
| <b>KNW-04</b> | <b>Low Importance</b><br>No WFD classification and an estimated Q95 under 0.001 m³/s. Likely agricultural drainage but no other known socio-economic uses or ecological potential.                        | <b>Low Importance</b><br>Substantially modified, likely artificial cross-section, channelised or realigned. |
| <b>KNW-05</b> | <b>Low Importance</b><br>No WFD classification and an estimated Q95 under 0.001 m³/s. Likely agricultural drainage but no other known socio-economic uses or ecological potential.                        | <b>Low Importance</b><br>Substantially modified, likely artificial cross-section, channelised or realigned. |
| <b>KNW-06</b> | <b>Low Importance</b><br>No WFD classification and an estimated Q95 under 0.001 m³/s. Likely agricultural drainage and/or water reservoir but no other known socio-economic uses or ecological potential. | <b>Low Importance</b><br>Substantially modified, likely artificial cross-section, channelised or realigned. |
| <b>KNW-07</b> | <b>Low Importance</b><br>No WFD classification and an estimated Q95 under 0.001 m³/s. Likely agricultural drainage but no other known socio-economic uses or ecological potential.                        | <b>Low Importance</b><br>Substantially modified, likely artificial cross-section, channelised or realigned. |
| <b>KNW-08</b> | <b>Low Importance</b><br>No WFD classification and an estimated Q95 under 0.001 m³/s. Likely agricultural drainage and/or water reservoir but no other known socio-economic uses or ecological potential. | <b>Low Importance</b><br>Substantially modified, likely artificial cross-section, channelised or realigned. |
| <b>KNW-14</b> | <b>Low Importance</b><br>No WFD classification and an estimated Q95 under 0.001 m³/s. Likely agricultural drainage and/or water reservoir but no other known socio-economic uses or ecological potential. | <b>Low Importance</b><br>Substantially modified, likely artificial cross-section, channelised or realigned. |

### Future Baseline in the Absence of the Proposed Development

- 9.5.50 It is likely that through the action of new legislative requirements and ever more stringent planning policy and regulation, that the health of the water environment will continue to improve. The Environment Act 2021(Ref 9.61) and the Levelling-Up and Regeneration Act 2023 (Ref 9.62) both apply in part to Scotland and include measures to tackle storm sewage discharges and set new requirements relating to nutrient (nitrogen and phosphorous) pollution standards, respectively. There are, however, significant challenges such as adapting to a changing climate and pressures of population growth that could have a retarding impact. It is also difficult to forecast these changes with any certainty.

## 9.6 Embedded Mitigation

- 9.6.1 With mitigation, potential impacts can be avoided, minimised and/or reduced, and therefore the magnitude of residual impacts lowered. Mitigation measures that have been designed into

the Proposed Development are considered ‘embedded mitigation’. As these measures are secured through the actual design they are considered in the initial effects prediction, alongside standard mitigation (but not additional mitigation). Embedded mitigation measures relevant to this assessment are described in this section.

### **Access and Watercourse Crossings**

- 9.6.2 General access to the construction site will require upgrading an existing access track known as the Carse Road access track at the southern end of the Site. To do this, an existing culvert at approx. NS 92264 88894 allowing KNW-07 to flow beneath Carse Road - where the access track will emanate - will require reinforcement. Beyond this location, access tracks from the southern end of the Proposed Development will either follow existing farm tracks or be constructed across arable fields and will not require additional watercourse crossings. Where possible, temporary tracks will be used through the installation of wood, aluminium or composite matting on level ground. However, there may be instances where stone tracks are required to enable access of heavy vehicles over uneven ground. In these cases, tracks are expected to be formed using compacted granular material placed on top of a synthetic geotextile membrane or grid, which will result in low permeability due to compaction from construction traffic.
- 9.6.3 Access for abnormal loads only has been granted off the A876 at approx. NS 92234 89466. Again, this will require upgrading of existing tracks, including another existing watercourse crossing at NS 92344 89456, which allows KNW-08 to flow into KNW-02. It is assumed that an additional watercourse crossing will be included in the design to allow these loads to cross the KNW-02 and gain access to the Site. **9.7 Standard Mitigation** below details the approach that will need to be followed during the construction of this crossing to fully mitigate potential impacts to surface water and hydromorphology.
- 9.6.4 For both watercourse crossings, it is assumed that these will be permanent upgrades enabling access for maintenance during operation following construction. It is also assumed that the culvert dimensions will be maintained in accordance with SEPA guidance (Ref 9.1) where feasible beyond the 5 m like for like length extension to enable above road widening, so as to minimise potential flood risk.
- 9.6.5 Both access tracks originate alongside water bodies: KNW-07 for the main southern Carse Road access point; and KNW-02 and KNW-08 for the limited-use access point for abnormal loads. The access design layout of the Proposed Development has otherwise avoided further pathways for surface water contamination beyond the initial few meters of access track upgrades and single culvert upgrade.

### **Riparian Buffer Zone**

- 9.6.6 Riparian riverbank corridors are key components of nature networks and blue-green infrastructure, supporting biodiversity, water quality, and ecological connectivity. SEPA provides the following guidance on recommended buffer widths for riparian corridors based on channel size.
- For watercourses with a channel width of 2 m or less, a 10 m buffer is recommended.
  - For channels between 2 and 15 m wide, the recommended buffer is 15 m.
  - For channels 15 m wide or greater, a 30 m buffer should be maintained.
  - A 50 m buffer is recommended for all water features from any excavations.

- 9.6.7 Twelve new towers are to be constructed as part of the Overhead Line Works but only one is within 50 m of an identified watercourse. This is located at NGR NS 92437 89630, approximately 22 m west of KNW-04. KNW-04 is a straightened drainage channel with a consistent width of no more than 1.5 m between bank tops along its full length. Of the two towers to be removed, only one is within 50 m of an identified watercourse, at 14 m from KNW-02, a water feature which is also less than 2 m in width. Whilst these are outside the 10 m buffer recommended for such watercourses, they are still within the 50 m recommended for all excavations. However, the scale of excavations and earthworks is relatively minor. Furthermore, methods to be employed to prevent morphological damage and pollution are discussed in **9.7 Standard Mitigation**. The remaining eleven tower constructions and one tower removal are located over 50 m away from the nearest watercourse and so do not present any potential impacts on the riparian environment.
- 9.6.8 Both the Kincardine North Substation and the Hawkhill Road Access Improvements are located beyond the recommended buffer zones and so avoid potential impacts on the riparian environment of watercourses identified in the KINN Study Area.

#### **Tower Foundation Installation and Removal**

- 9.6.9 The Proposed Development will require the installation of 12 new towers, each of which will require dedicated foundations. Ground investigation works and ground conditions will inform the design as to whether a pad and column, piled or rock anchor solution will be selected. Some temporary scaffolding will also be erected to install the new overhead line and remove existing ones across KNW-02 and KNW-04. Scaffolding will be set back beyond the recommended buffer zones where feasible.
- 9.6.10 Foundations that are to be removed will be excavated to a minimum depth of approximately 3.5 m below ground level with the area around the base of the tower cleared and the ground reinstated. During excavation, groundwater ingress may occur. If encountered, it will be appropriately managed in accordance with the measures outlined within the project's Water Management Plan (WMP) (described in more detail under **Standard Mitigation**, below), to prevent contamination or uncontrolled discharge to the surrounding environment.

#### **Drainage**

- 9.6.11 Surface water runoff from the substation roof and hardstanding areas of the substation site will be conveyed via swales to a Sustainable Drainage System (SuDS) basin located in the south of the site. The exact design details of this basin are not currently known but plans at the time of writing indicate a basin approximately 140 m long and 100 m wide. The **Kincardine North Surface Water Management Strategy**, prepared and submitted as a standalone document with the planning application in support of the KINN plans states two smaller SuDS basins to be used, at the northwest and southwest corners of the site, but these have subsequently been replaced with the larger basin now described. The water will be attenuated here set to a discharge rate of 14.2 l/s before discharging at a controlled rate to KNW-07, the nearest watercourse via a surface water pipe. Pipe outfalls will be supported by sandbags and fitted with baffles to help dissipate energy and avoid erosion of the bed and bank. The exact discharge location and levels are to be confirmed during the detailed design phase. Swales will be constructed alongside permanent access tracks and the KINN site, where water will initially be conveyed before discharging to the SuDS basin, and ultimately KNW-07. A bunded oil containment system will be installed to collect potential fuel leaks from within the KINN platform and prevent its discharge into the surface water drainage system. Once operational,

the SuDS basin and swales will require regular inspection for litter and debris that may cause blockages and removal of such items during regular maintenance. A Maintenance Plan will be prepared as part of detailed drainage design to set out these requirements.

- 9.6.12 It is assumed that the KINN, SuDS basin and swales will be constructed on a foundation of gravel with a lining to protect runoff from entering the groundwater beneath, though further details of this are to be confirmed at the detailed design stage. It is also assumed that during operation, a fire protection system would be provided and operated in accordance with SEPA's requirements and standards for limitation of fire risk at electricity substations and other relevant operational sites (Ref 9.63) to prevent runoff into surface and groundwater of harmful pollutants following a fire. This includes the implementation of fire preventative and protective measures with the use of primary and secondary containment systems. Again, details of these systems are to be confirmed at the detailed design stage.

### **Underground Cable**

- 9.6.13 As part of the Scottish Power Distribution Works, OHL will be removed and replaced with UGC across the Proposed Development site, connecting these works with the KINN and then the existing Kincardine Substation to the south. Currently, the UGC scoped in for assessment is to travel south from Pole 17 to the west of the KINN away from any water features until it reaches the access track from Carse Road at the south of the site, where it will run parallel to the track and pass beneath KNW-07 at the point of the access track watercourse crossing. It then continues to the Kincardine Substation southwards with no further interaction with the surface water environment. Another length of UGC is to be laid between Broomknowe Farm and Tullian Poultry Farm to the east of the site and will also cross KNW-07 between these two points, though the exact location is to be determined. Dimensions of the cable trench are yet to be finalised but are expected to be 0.45 m to 0.91 m in depth and is unlikely to impact the groundwater environment at this very shallow depth (i.e. no further assessment is proposed). However, it is recommended that cables be encapsulated within plastic ducts to ensure they remain watertight and are at least 1.5 m deep below the bed to avoid exposure by erosion, and that this depth is maintained laterally due to risk of channel movement.
- 9.6.14 For laying the UGC beneath KNW-07, it is assumed that horizontal direct drilling (HDD) will be used to install the cable. HDD is a trenchless method of installing underground utilities along a prescribed path, which may encounter watercourses, main roads or landfalls. HDD involves the use of a drill to bore a route below the ground through which ducts will be pulled and cables installed. As the method is trenchless, the requirement for a dry working area is removed, and the associated impacts of over-pumping or channel diversion on water features is removed. With the HDD method, there is also a potential risk of accidental surface spillage and subsurface 'frac-out' of drilling fluids, caused by excessive drilling pressures, and contamination of both surface and groundwater bodies. The Construction Environmental Management Plan (CEMP), detailed in Standard Mitigation below, will include embedded measures to be taken by the Contractor to mitigate these risks.
- 9.6.15 If HDD is not to be used, then an open cut trench with temporary overland pump will be assumed for installation. The open cut trenching technique will involve first temporarily impounding the watercourse and over-pumping the flow to create a dry working area, before excavating a trench through the bed of the water feature and directly laying the underground cables into it. The trench will then be backfilled using a combination of locally excavated soils and Cement Bound Sand (CBS) and the land reinstated. Where possible intrusive watercourse

crossings will be carried out during drier periods of the year or during a period of dry weather where flows in the watercourse are low. This may be baseflow or, where the channels are very small and not well connected to groundwater, they may even be dry. However, this cannot be guaranteed and so any water flow within the watercourse will need to be over-pumped through the works area to maintain a dry trench and to reduce pollution risks.

### **Flood Risk**

- 9.6.16 The **Kincardine North Substation Flood Risk Assessment** states that other SP Energy Networks substation sites assessed previously have made use of small walls between 0.5-0.8 m in height around critical infrastructure or have constructed them at a similar elevation. If this construction method is used as part of the KINN design, this will be sufficient to protect from the maximum predicted flooding depth of 0.27 m.
- 9.6.17 The FRA also determined that, although over 300 mm of flooding is expected on the Hawkhill Road access track, the western route from the A876 does not experience flooding at the design event and provides safe emergency access to the entire site when flooding does occur, so upgraded and new access tracks can be retained within the development.
- 9.6.18 The **Kincardine North Surface Water Management Strategy** states that the substation platform is to be raised to an elevation of 7.5 mAOD, with a maximum elevation of 8.5 mAOD and lowest of 4.8 mAOD and levels varying across the site between 5.5 mAOD in the west and 6.5 mAOD in the east. This raising will prevent fluvial flooding and facilitate free drainage from the substation to the appropriate storage SuDS components.
- 9.6.19 Initially, two SuDS basins were planned for the southwest and north of the KINN site (as described in the **Kincardine North Surface Water Management Strategy**), and that as flooding was not experienced in these areas at a high regularity, no further mitigation was deemed necessary at this stage by the FRA, but it concluded that this should be examined at the design stage to ensure flood risk is not increased by their location or dimensions. Current designs have replaced these two smaller SuDS basins with one larger basin in the south of the site, in an area of low to zero flood risk, further mitigating this as a potential impact.

## **9.7 Standard Mitigation**

- 9.7.1 This section describes standard mitigation that is commonplace, and which is expected to be included as 'standard' on any infrastructure project in Scotland that is not embedded into the design elsewhere. Standard mitigation is therefore considered in the initial determination of effects alongside mitigation embedded in the design. This section is primarily concerned with managing the pollution risks to the water environment during construction works. Although considered standard, these measures will still need to be secured through the adoption of suitable planning conditions.
- 9.7.2 There are many ways in which construction pollution risks to the water environment can be dealt with and the following does not specify the absolute approach that any contractor should undertake but rather sets out the principles of the mitigation required, minimum expectations, and provides details of a range of measures that can be implemented to have the desired reduction in pollution risk. During construction, the contractor will need to maintain but also adapt measures to manage pollution risks in response to changing weather conditions or tasks on Site. Thus, it is important to retain this flexibility.

### **Construction Environmental Management Plan and Water Management Plan**

- 9.7.3 All works on Site are to be undertaken in accordance with a CEMP for the Proposed Development, which shall be developed in the detailed design phase and refined for the consented project in advance construction, and then as necessary as construction progresses. It is assumed that both the CEMP and WMP, which will be written as part of the overarching CEMP document, will be secured through the application of pre-commencement planning conditions on any successful planning application.
- 9.7.4 As described above, supporting the CEMP will be a WMP that provides greater detail with regards to the measures required to avoid, reduce and minimise adverse impacts on the water environment during construction. Like the CEMP, the WMP will be developed post consent and alongside detailed design and when the contractor(s) have been appointed. The WMP will also set out the scope of proposed water quality, flow and level monitoring of water features that are proposed, covering pre-construction, during construction, and post-construction phases.
- 9.7.5 Mitigation measures will accord with legal compliance and be in keeping with good practice. Measures relevant to this assessment include those that:
- Control and minimise the risk of pollution to surface waters and groundwater by managing construction site runoff and the risk of chemical spillages;
  - Control rates of discharge if required to ensure no unacceptable increase in flood risk;
  - Manage water removed from excavations to protect nearby water features from any pollution risk but also to support flows if there is a risk of reductions to baseflow; and
  - Avoid and minimise the risk of damage to physical form and processes of water features.
- 9.7.6 A summary of the key measures that may need to be implemented by the contractor(s) to manage the risk of pollution or physical damage to the water environment during construction works is summarised in the following sections. This includes a summary of what secondary consents may be required and good practice guidance.

### **Good Practice Guidance**

- 9.7.7 The contractor(s) will undertake all works in accordance with good practice methods and measures as set out in this chapter. The 'Guidance for Pollution Prevention' (GPP) series provides good practice advice in Scotland for how to manage the risk from pollution risks during construction works. The following GPPs are relevant:
- GPP 1: Understanding Your Environmental Responsibilities – Good Environmental Practices (Ref 9.64);
  - GPP 2: Above ground oil storage (Ref 9.65);
  - GPP 3: Use and Design of Oil Separators in Surface Water Drainage Systems (Ref 9.66);
  - GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (Ref 9.67);
  - GPP 5: Works and maintenance in or near water for construction or maintenance works near, in, or over water) (Ref 9.68);
  - GPP 6: Working at Construction and Demolition Sites (Ref 9.69);
  - GPP 8: Safe storage and disposal of used oils (Ref 9.70);

- GPP 13: Vehicle washing and cleaning (Ref 9.71);
- GPP 19: Vehicles: Service and Repair (Ref 9.72);
- GPP 21: Pollution Incident Response Plans (Ref 9.73);
- GPP 22: Dealing with Spills (Ref 9.74); and
- GPP 26: Safe Storage – Drums and Intermediate Bulk Containers (Ref 9.75).

9.7.8 Additional good practice guidance for mitigation to protect the water environment can be found in the following key Construction Industry Research and Information Association (CIRIA) documents:

- C811 (2023) Environmental good practice on site guide (Ref 9.76);
- C609 (2004) Sustainable Drainage Systems, hydraulic, structural and water quality advice (Ref 9.77);
- C624 (2004) Development and flood risk – Guidance for the construction industry (Ref 9.78);
- C753 (2015) Publication C753 SuDS manual (Ref 9.79);
- C523 (2001) Sustainable Urban Drainage Systems – Best practice manual for England, Scotland, Wales and Northern Ireland (Ref 9.80);
- C648 (2006) Control of Water Pollution from Linear Construction (Ref 9.81);
- C649 (2006) Control of Water Pollution from Linear Construction Projects (Ref 9.82); and
- C532 (2001) Control of water pollution from construction sites – Guidance for consultants and contractors (Ref 9.83).

9.7.9 SEPA has published the following documents to support the implementation of the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (Ref 9.23) and the subsequent Environmental Authorisations (Scotland) Regulations 2018 (Ref 9.1), which supersedes much of the previous WAT legacy guidance.

- Construction Regulatory Guide (Water), Version 1.1 (2021) (Ref 9.84);
- WAT-RM-02: Regulation of Licence-level Engineering Activities v8.0 (2022) (Ref 9.85);
- WAT-SG-93: Guidance for Transport Infrastructure Projects v3.0 (2018) (Ref 9.86); and
- WAT-SG-28: Good Practice Guide - Intakes and Outfalls (2019) (Ref 9.87).

#### **Management of Construction Site Run-Off**

9.7.10 Mitigation measures to manage run-off from construction areas will include:

- Avoidance of wet weather working where practical, especially Site clearance, earthworks and works to water features.
- Appropriate separate storage of topsoil/subsoil and materials, and at least 50 m from water features on flat ground, other than where works are necessary adjacent to water

features in which case a Site / works-specific risk assessment would be carried out and additional measures added if required.

- Any earth bund/ stockpile to be present for longer than two weeks will be either seeded, covered using geotextiles, or other measures provided to ensure it is not a source of excessive fine sediment in runoff to water features.
- The implementation of a temporary drainage system and other measures to manage pollution risk during construction (e.g., fabric silt fences, lagoons, bunds, straw bales, sandbags, lamella clarifiers or other proprietary measures etc. as may be required).
- Any dewatering of excavations will include measures where necessary to filter the water prior to discharge to a watercourse or ground (there shall be no discharge of any construction site runoff to existing ponds).
- The control of mud deposits at entry and exit points to the Proposed Development Site using wheel washing facilities and/ or road sweepers operating during earthworks or other times as considered necessary.
- All plant will be kept clean but washed in dedicated areas only where runoff can be captured and appropriately treated prior to discharge from the Site to watercourse or ground. Any contaminated water that cannot be treated on Site will be collected and disposed of at a suitable licenced wastewater facility.

#### **Management of Spillage Risk**

9.7.11 To prevent chemicals, fuels/oils and other such substances from entering the water environment, adequate measures to control the storage, handling and disposal of these substances will be put in place prior to and during construction. Mitigation measures to control of spillages and leaks during construction works will include:

- Storage of fuel and chemicals would be in accordance with GPP 2: Above ground oil storage.
- Surface water drains on local roads or within the Proposed Development Site will be identified by the contractor(s) and where there is a risk that fine particulates or chemical spillages could enter them, they would be protected (e.g. covers or sandbags).
- Any containers/tanks of contaminating substances (e.g. fuel) on-site would be leak-proof and kept in a safe and secure building or compound from which they cannot leak, spill or be open to vandalism. The containers would be protected by temporary impermeable bunds (or drip trays for small containers) with a capacity of 110% of the maximum stored volume. Areas for transfer of contaminating substances (including refuelling areas) would be similarly protected.
- Any permanent oil storage tanks and temporary storage of 201 litres or more of oil in drums and mobile bowers, and ancillary pipe work, valve, filters, sight gauges and equipment will have secondary containment (e.g. bunding or drip trays).
- No oil/chemical tanks will be stored within 50 m of a water feature and potentially further if ground is angled towards a water feature except for fixed/large plant associated with works that must occur close to water features or hand tools that must be placed in that location. Such chemical storage will be on flat, impermeable hard standing, and with an isolated drainage system.

- Care will be taken with the delivery and use of concrete and cement as these materials are highly corrosive and alkaline. It is assumed that no concrete batching will take place on site, with concrete being delivered ready mixed as and when required with only small-scale mixing of cementitious products done locally. Pre-fabricated concrete structures will be used where possible. If wet pouring of concrete is required, this will avoid days of wet weather. No washing out of delivery vehicles to take place on the Proposed Development Site without suitable provision for the washing out water and provision of a suitable location (e.g. geotextile wrapped sealed skip, container or earth-bunded area) that is lined with a geotextile to prevent infiltration to ground. Such washing would not be allowed to flow into any drain or over the edge of a floating barge. The CEMP/ WMP would contain a methodology for dealing with any washing out water, or wheel wash. Wash/ wheel wash water would be adequately contained, prevented from entering any water feature, and either treated by an on-site Water Treatment Plant or removed from the Proposed Development Site for appropriate disposal at a suitably licensed waste facility.
- Where possible re-fuelling will be undertaken in designated areas within main compounds or satellite compounds. It is possible that refuelling of mobile plant may be required by mobile fuel bowser. This will not be undertaken within 50 m of a water feature, and only on flat land (or otherwise a greater distance and other measures may be required subject to an on-site / works-specific risk assessment) and with a drip tray/plant nappy. Certain semi-mobile very large plant (e.g. cranes) may need to be located close to watercourses and potentially within 50 m. Due to the difficulties in moving plant such as this they may need to be refuelled in situ. Again, a Site/works-specific risk assessment will need to be undertaken by the contractor.
- Biodegradable hydraulic oils would be used where possible in all plant used during pre-construction and construction works, and only in plant and equipment working in or over water features.
- Spill kits and oil absorbent material will be available on the Site in watertight containers in compounds, areas of works, strategically near water receptors and carried on all mobile plant. They would be regularly checked and topped up, especially after use. Appropriate training would be given to all construction workers in their use and spillage response.
- The WMP will include a Pollution Prevention Plan.
- Any plant, machinery or vehicles would be regularly inspected and maintained to ensure they are in good working order and clean for use in a sensitive environment. This maintenance is to take place off-site if possible or only at designated areas in the Site compounds.
- All fixed plant used on the Proposed Development to be self-bunded.
- Mobile plant to be in good working order, kept clean and always fitted with plant 'nappies'.
- The Proposed Development Site is to be secure to prevent any vandalism that could lead to a pollution incident.
- Construction waste/debris are to be prevented from entering any surface water drainage or water feature.

### **Management of Groundwater Activities**

- 9.7.12 To minimise the impact of any groundwater control activities during construction on the water receptors, the contractor will undertake works in accordance with good practice as described earlier, as well as a project specific CEMP and WMP. The mitigation options deployed by the contractor will be informed by the findings from the ground investigation which will provide information of Site-specific ground conditions, including groundwater quality and quantity data. As a minimum the contractor will adhere to the following mitigation measures:
- Groundwater control would be implemented to ensure water levels in adjacent water features are maintained and any discharge is of a suitable quality.
  - If discharging water to a nearby watercourse, the rate of discharge will need to be agreed with the relevant authority to ensure that there is no unacceptable increase in flood risk or risk of scour. Any discharge will need to be undertaken with the agreement of the relevant statutory regulator and will need to comply with the pollution prevention requirements set out in the CEMP/WMP.
  - Managing the risk from groundwater flooding through appropriate working practices (during excavations) and with adequate plans and equipment in place for de-watering to ensure safe dry working environments.
  - Whilst no PWS are known within 1 km of the site boundary, it is still recommended that both local authorities are re-consulted to confirm any changes to known PWS prior to the commencement of any construction activities.

### **Management of Hydromorphological Impacts**

- 9.7.13 As identified above, one of the towers being constructed and another being removed as part of the Overhead Line Works are within SEPA's 50 m recommended buffer zone for excavations of KNW-04 and KNW-02 respectively. To minimise risk, a dynamic approach is proposed whereby temporary 50 m buffers will be applied until it is necessary to undertake works that physically impact KNW-04 and KNW-02.
- 9.7.14 There will be two culvert upgrades required for access track crossings over KNW-07 and KNW-08, and it is expected that a new watercourse crossing will be installed on KNW-02. Any modifications to culverts will be designed to maintain connectivity and will be set below bed level to allow sedimentation and a naturalised bed to form. Such works will then be undertaken in a dry working environment, where possible, with flow temporarily over-pumped or flumed or isolated from the working area using sand/ pea gravel bags or other similar and inert barrier to avoid increased flow that may scour or erode the morphological features of the watercourse.
- 9.7.15 Where open-cut crossing techniques are used, watercourses will be reinstated as found. A Pre-works Hydromorphological and Riparian Survey will be undertaken to provide the baseline against which reinstatement will be provided. Bank and bed sediments must be stored separately and in distinct layers as excavated on geotextile layers so they can be reinstated as found following completion of the works. The banks and the bed will need to be appropriately reprofiled with the inclusion of suitable geomorphic features with the aim to provide betterment on the original channel. Once the watercourses are reinstated, silt fences, geotextile matting or straw bales will be used initially to capture mobilised sediment until the watercourse has returned to a settled state. Regular observations of the watercourses will be

undertaken post-works during vegetation re-establishment of the banks, to ensure that no adverse impacts have occurred.

### **Management of Flood Risk**

9.7.16 Whilst the risk of flooding within the KINN site is considered low, the management of changes in flood risk during temporary works will still be achieved by applying good practice mitigation measures and construction methods as described below.

- The proposed CEMP will detail measures to prevent an increase in flood risk during the construction works, in addition to the provision of temporary settlement and drainage measures already proposed.
- Construction works undertaken adjacent to watercourses will be done undertaken in using suitable methods informed by relevant guidance, including SEPA guidance documents.
- The CEMP will incorporate measures aimed at preventing an increase in flood risk during the construction works. Examples of measures that could be implemented include:
  - o Construction materials will be stored outside areas of flood risk where feasible. If areas located within the functional floodplain are to be utilised for the storage of construction materials, this will be done in accordance with the applicable flood risk activity regulations, if required;
  - o Connectivity will be maintained between the floodplain and the adjacent watercourses, with no changes in ground levels within the floodplain as far as practicable;
  - o During the construction phase, the contractor will monitor weather forecasts on a monthly, weekly and daily basis, and plan works accordingly; and
  - o The construction laydown area site office and supervisor will be notified of any potential flood occurring by use of the Floodline Warnings Direct or equivalent service.
- The contractor will be required to produce an Emergency Response Plan prior to construction, which will provide details of the response to an impending flood. These actions will be hierarchical meaning that as the risk increases the contractor will implement more stringent protection measures and may include:
  - o A 24-hour availability and ability to mobilise staff in the event of a flood warning;
  - o The removal of all plant, machinery and material capable of being mobilised in a flood for the duration of any holiday close-down period where there is a forecast risk that the site may be flooded;
  - o Details of the evacuation and site close-down procedures; and
  - o Arrangements for removing any potentially hazardous material and anything capable of becoming entrained in floodwaters, from the temporary works areas.
- Safe egress and exits are to be always maintained when working in excavations. When working in excavations, a banksman is to always be present.

- Prior to any works being undertaken, Scottish Water and other third-party drainage assets will be identified following appropriate desk studies. Suitable construction method statements and mitigation will then be applied to avoid these assets or to undertake the works to minimise any risk to them.

## 9.8 Assessment of Effects

### Kincardine North Substation

#### Construction

##### Groundwater Quality

- 9.8.1 The KINN construction will involve earthworks and excavation for foundations, which may interact with groundwater and create temporary pathways through which contaminants from construction activities could migrate. A range of potential pollutants—including oils, hydrocarbons, inorganics, sulphates, sulphides, cement, concrete, waste materials, and wastewater—may be present on Site during these works.
- 9.8.2 The main potential impacts on groundwater receptors during construction are:
- Contamination from accidental spills; and
  - Reduced groundwater quality due to uncontrolled construction runoff.
- 9.8.3 There is a risk that accidental leaks or spills could allow pollutants to infiltrate superficial deposits, potentially reaching the water table and moving laterally into hydraulically connected surface water features. Contaminants could also penetrate the bedrock aquifer where exposed by excavation, reaching the water table and potentially affecting groundwater abstractions.
- 9.8.4 As noted in the baseline assessment, the superficial aquifers are expected to have low productivity due to the predominance of clay deposits, with groundwater likely confined to localised sand and gravel layers. As a result, any contamination is unlikely to spread widely because of limited hydraulic connectivity and the low permeability of the clay matrix. In addition, mitigation measures set out in the WMP, including standard and embedded controls, will reduce the risk to groundwater quality.
- 9.8.5 For both the superficial aquifers (low importance) and the Scottish Coal Measures Aquifer (medium importance), any effects on water quality are anticipated to be direct and certain but short-term, temporary, and of negligible adverse magnitude with standard mitigation applied. Overall, this corresponds to a **neutral (not significant) effect**.

##### Groundwater Flow and Level

- 9.8.6 Construction of the KINN foundations may require dewatering if groundwater seepage is encountered during excavation. Such dewatering could lead to localised alterations in groundwater levels and flow patterns, particularly within the superficial aquifers and the Scottish Coal Measures Aquifer.
- 9.8.7 However, no PWS nor GWDTEs have been identified within the KINN Study Area. Therefore, any effects would be confined to the aquifer systems themselves, with no impact on external groundwater receptors.
- 9.8.8 Any changes associated with dewatering would be temporary and limited to the foundation installation phase. For the superficial aquifer (low importance) and the Scottish Coal Measures

Aquifer (medium importance), potential impacts on groundwater quality are considered certain and direct, but short-term, temporary, and negligible adverse with standard mitigation applied. Overall, this results in a **neutral (not significant) effect**.

#### Surface Water

9.8.9 **Table 9-14 Impacts and Effects on Surface Water Quality during Construction of KINN and Access Tracks** lists the magnitude of impact and significance of the effects on each surface water feature potentially impacted by the KINN during the construction phase.

**Table 9-14 Impacts and Effects on Surface Water Quality during Construction of KINN and Access Tracks**

| Surface Water Feature               | Proximity to KINN (m) | Proximity to access tracks (m)                                        | Proximity to Hawkbill Road (m) | Importance | Magnitude of Impact                                                                                                                                                                                                   | Significance of Effect    |
|-------------------------------------|-----------------------|-----------------------------------------------------------------------|--------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>KNW-01 (Upper Forth Estuary)</b> | 1128                  | 649                                                                   | 522                            | Very High  | Indirect (via KNW-02 short-term, temporary negligible due to access track upgrade, KINN construction, drainage and watercourse crossing. This is considering the implementation of good practice mitigation measures. | Slight (not significant)  |
| <b>KNW-02 (Canal Burn)</b>          | 66                    | 0 (assumed crossing; precise location to be included in design stage) | 300                            | Medium     | Direct, short-term, temporary minor adverse due to access track upgrade, KINN construction, drainage and watercourse crossing. This is considering the implementation of good practice mitigation measures.           | Slight (not significant)  |
| <b>KNW-05</b>                       | 224                   | 45                                                                    | 380                            | Low        | Direct, short term, temporary negligible due to access track. This is considering the implementation of good practice mitigation measures.                                                                            | Neutral (not significant) |
| <b>KNW-06</b>                       | 420                   | 18                                                                    | 116                            | Low        | Direct, short term, temporary negligible due to access track. This is                                                                                                                                                 | Neutral (not significant) |

| Surface Water Feature | Proximity to KINN (m) | Proximity to access tracks (m) | Proximity to Hawkbill Road (m) | Importance | Magnitude of Impact                                                                                                                                                                                                                 | Significance of Effect    |
|-----------------------|-----------------------|--------------------------------|--------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                       |                       |                                |                                |            | considering the implementation of good practice mitigation measures.                                                                                                                                                                |                           |
| KNW-07                | 221                   | 0 (crossed at NS 92264 88894)  | 33                             | Low        | Direct, short term, temporary minor adverse due to drainage, access track upgrade and watercourse crossing upgrade. This is considering the implementation of good practice mitigation measures.                                    | Slight (not significant)  |
| KNW-08                | 165                   | 0 (crossed at NS 92234 89466)  | 683                            | Low        | Direct, short term, temporary minor adverse due to access track upgrade and assumed watercourse crossing. This is considering the implementation of good practice mitigation measures.                                              | Neutral (not significant) |
| KNW-14                | 290                   | 80                             | 600                            | Low        | Indirect (via KNW-02), short term, temporary minor adverse and indirectly via Canal Burn due to access track upgrade and assumed watercourse crossing. This is considering the implementation of good practice mitigation measures. | Neutral (not significant) |

- 9.8.10 Of the seven water features assessed, four are deemed to have a **neutral effect (not significant)**, and so do not present any potential concerns for water quality. The remaining three water features – KNW-01, KNW-02 and KNW-07 – are assessed as having a **slight effect (not significant)** with the use of the embedded and standard mitigation measures described above and so are also deemed to not pose any potential water quality concerns.

#### Hydromorphology

- 9.8.11 Permanent upgrades to existing culverts impacting KNW-07 and KNW-08, the installation of a surface water drainage pipe into KNW-07 from the SuDS basin, and the installation of a new

watercourse crossing on KNW-02, may cause moderate adverse impact to low importance watercourses based on the assumed designed parameters and embedded mitigation described in Assessment Methodology. This would result in a **slight effect (not significant)** with the use of embedded and standard mitigation. Whilst alterations to hydromorphology are considered as an operational issue, the works themselves will be done during the construction phase and so are assessed here.

- 9.8.12 As all other construction works relating to the KINN and Hawkhill Road Access Improvements are to occur beyond the Riparian Buffer Zones recommended by SEPA for all watercourses identified, no hydromorphological impacts are predicted and so a **neutral effect (not significant)** is assessed as the outcome for the remaining watercourses.

#### Operation

#### Groundwater

- 9.8.13 Once operational, the KINN will require low level maintenance only, with workings otherwise performed remotely and in a non-intrusive manner, and therefore are not expected to impact groundwater quality, flow, or levels. The foundations, swales and SuDS basin are expected to be gravel-based with lining to prevent contamination into groundwater of oils or other chemicals used in electrical infrastructure. Therefore, the presence and operation of the KINN does not have a pathway to groundwater and will not impact the local or regional groundwater quality, levels or flow, and no operational assessment is required.

#### Surface Water

- 9.8.14 **Table 9-15 Impacts and Effects on Surface Water Quality during Operation of KINN and Access Tracks** lists the magnitude of impact and significance of the effects on each surface water feature potentially impacted by the KINN during the construction phase.

**Table 9-15 Impacts and Effects on Surface Water Quality during Operation of KINN and Access Tracks**

| Surface Water Feature        | Proximity to KINN (m) | Proximity to access tracks (m)              | Proximity to Hawkhill Road (m) | Importance | Magnitude of Impact                                                                                                                                                                             | Significance of Effect   |
|------------------------------|-----------------------|---------------------------------------------|--------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| KNW-01 (Upper Forth Estuary) | 1128                  | 649                                         | 522                            | Very High  | Indirect (via KNW-02), long-term, temporary negligible due to access of maintenance vehicles and drainage of site. This is considering the implementation of good practice mitigation measures. | Slight (not significant) |
| KNW-02 (Canal Burn)          | 66                    | 0 (assumed crossing; precise location to be | 300                            | Medium     | Direct, long-term, temporary minor adverse due to access of maintenance vehicles and drainage of site. This is considering the                                                                  | Slight (not significant) |

| Surface Water Feature | Proximity to KINN (m) | Proximity to access tracks (m) | Proximity to Hawkbill Road (m) | Importance | Magnitude of Impact                                                                                                                                                                 | Significance of Effect    |
|-----------------------|-----------------------|--------------------------------|--------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                       |                       | included in design stage)      |                                |            | implementation of good practice mitigation measures.                                                                                                                                |                           |
| KNW-05                | 224                   | 45                             | 380                            | Low        | Direct, long-term, temporary negligible due to access of maintenance vehicles. This is considering the implementation of good practice mitigation measures.                         | Neutral (not significant) |
| KNW-06                | 420                   | 18                             | 116                            | Low        | Direct, long-term, temporary negligible due to access of maintenance vehicles. This is considering the implementation of good practice mitigation measures.                         | Neutral (not significant) |
| KNW-07                | 221                   | 0 (crossed at NS 92264 88894)  | 33                             | Low        | Direct, long-term, temporary minor adverse due to access of maintenance vehicles and drainage of site. This is considering the implementation of good practice mitigation measures. | Slight (not significant)  |
| KNW-08                | 165                   | 0 (crossed at NS 92234 89466)  | 683                            | Low        | Direct, long-term, temporary negligible adverse due to access of maintenance vehicles. This is considering the implementation of good practice mitigation measures.                 | Neutral (not significant) |
| KNW-14                | 290                   | 80                             | 600                            | Low        | Indirect (via KNW-02), long-term, temporary negligible adverse due to access of maintenance vehicles. This is considering the                                                       | Neutral (not significant) |

| Surface Water Feature | Proximity to KINN (m) | Proximity to access tracks (m) | Proximity to Hawkbill Road (m) | Importance | Magnitude of Impact                                  | Significance of Effect |
|-----------------------|-----------------------|--------------------------------|--------------------------------|------------|------------------------------------------------------|------------------------|
|                       |                       |                                |                                |            | implementation of good practice mitigation measures. |                        |

- 9.8.15 Of the seven water features assessed, four are deemed to have a **neutral effect (not significant)**. Due to the use of SuDS basins draining into KNW-07 and then into KNW-02 and KNW-01, these remaining watercourses are assessed as having a **slight effect (not significant)** with the use of the embedded and standard mitigation measures described earlier.

#### Hydromorphology

- 9.8.16 The presence of the KINN and Hawkbill Road Access will have no further impact on the hydromorphology of the assessed watercourses during operation beyond that assessed under construction, above.

### **Overhead Line Works (XL/ZCN/ZCS Uprating and Turn-ins)**

#### Construction

#### Groundwater Quality

- 9.8.17 The construction of the Overhead Line will require earthworks and excavations associated to installation of new towers and the removal of older towers which have the potential to interact with groundwater and create temporary pathways along which contaminants from construction works could pass. Potential pollutants including oils, hydrocarbons, inorganics, sulphates, sulphides, cement, concrete, waste, and wastewater associated with construction works would be present on the Site. The potential impacts to groundwater receptors during construction are assessed to be:
- Groundwater contamination from accidental spills; and
  - Deterioration of groundwater quality from uncontrolled construction runoff.
- 9.8.18 There is the potential that accidental leakages or spills could lead to pollutants leaching into superficial deposits present which may reach the water table and migrate laterally into connected surface water features. It is also possible that the pollutants may leach into the bedrock aquifer where exposed by excavation works and reach the water table, potentially migrating into groundwater abstractions.
- 9.8.19 As outlined in the baseline assessment, the superficial aquifers are expected to have low productivity due to the dominance of clay deposits, with groundwater likely localised within interbedded sands and gravels. Consequently, in the event of contamination, it is unlikely to be widespread due to the limited connectivity and low permeability of the clay matrix. Furthermore, the implementation of mitigation measures through the WMP, including both standard and embedded mitigation, will help to minimise potential risks to groundwater quality. For both the superficial aquifers (low importance) and the Scottish Coal Measures Aquifer (Medium Importance), any impact to water quality is expected to be certain and direct,

but short-term, temporary, and negligible adverse with standard mitigation applied, resulting in an overall **neutral effect (not significant)**.

Groundwater Flow and Level

- 9.8.20 The installation of new foundations may require localised groundwater dewatering if seepage is encountered during excavation. Dewatering activities have the potential to cause localised changes in groundwater levels and flow directions, particularly within the superficial aquifers and the Scottish Coal Measures Aquifer.
- 9.8.21 However, there are no identified PWS or GWDTEs within the KINN Study Area. As such, any impact would be limited to the aquifer systems themselves, with no effect on external groundwater receptors.
- 9.8.22 Importantly, any changes resulting from dewatering would be temporary, occurring only during the foundation installation phase. For the superficial aquifer, which is of low importance, and the Scottish Coal Measures Aquifer, classified as of medium importance, the impact on groundwater quality is expected to be certain and direct, but short-term, temporary, and negligible adverse with standard mitigation applied, resulting in an overall **neutral effect (not significant)**.

Surface Water

- 9.8.23 **Table 9-16 Impacts and Effects on Surface Water Quality during Construction of Overhead Line Works (XL/ZCN/ZCS Uprating and Turn-ins)** lists the magnitude of impact and significance of the effects on each surface water feature potentially impacted by the Overhead Line Works during the construction phase.

**Table 9-16 Impacts and Effects on Surface Water Quality during Construction of Overhead Line Works (XL/ZCN/ZCS Uprating and Turn-ins)**

| Surface Water Feature        | Proximity to Tower (m) | Importance | Magnitude of Impact                                                                                                                                                                                                                  | Significance of Effect   |
|------------------------------|------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| KNW-01 (Upper Forth Estuary) | 1022                   | Very High  | Indirect (via KNW-02), short-term, temporary negligible due to construction of one tower and removal of another within 50 m, and temporary scaffolding. This is considering the implementation of good practice mitigation measures. | Slight (not significant) |
| KNW-02 (Canal Burn)          | 58                     | Medium     | Direct, short-term, temporary minor adverse due to tower removal and temporary scaffolding. This is considering the implementation of good practice mitigation measures.                                                             | Slight (not significant) |
| KNW-04                       | 22                     | Low        | Direct, short term, temporary minor due to tower construction and temporary scaffolding. This is considering the implementation of good practice mitigation measures.                                                                | Slight (not significant) |

| Surface Water Feature | Proximity to Tower (m) | Importance | Magnitude of Impact                                                                                                                                                                          | Significance of Effect    |
|-----------------------|------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| KNW-08                | 91                     | Low        | Indirect (via KNW-02), short term, temporary minor adverse due to tower construction and temporary scaffolding. This is considering the implementation of good practice mitigation measures. | Neutral (not significant) |
| KNW-14                | 290                    | Low        | Indirect (via KNW-02), short term, temporary minor adverse due to tower construction and temporary scaffolding. This is considering the implementation of good practice mitigation measures. | Neutral (not significant) |

- 9.8.24 Of the five water features assessed, two are deemed to have a **neutral effect (not significant)**, and so do not present any potential concerns for water quality. The remaining watercourses – KNW-01, KNW-02 and KNW-04 – are assessed as having a **slight effect (not significant)** with the use of the embedded and standard mitigation measures described earlier.

#### Hydromorphology

- 9.8.25 As all construction works relating to the Overhead Line Works are to occur beyond the Riparian Buffer Zones recommended by SEPA for all watercourses identified, no hydromorphological impacts are predicted and so a **neutral effect (not significant)** is assessed as the outcome for the remaining watercourses.

#### Operation

- 9.8.26 Overhead lines require very little maintenance once operational. Regular inspections are undertaken to identify any unacceptable deterioration of components so that they can be replaced. From time to time, inclement weather, storms, or lightning can cause damage to either the insulators or the conductors. If conductors are damaged, short sections may have to be replaced. During the operation of the Proposed Development, it will be necessary to manage vegetation along the overhead line to maintain required safety clearance distances.

#### Groundwater

- 9.8.27 The activities outlined above are surface-level and non-intrusive, and therefore are not expected to impact groundwater quality, flow, or levels. Additionally, the towers are assumed to have an individual base area of between 14 m<sup>2</sup> and 20 m<sup>2</sup> (see Chapter 4 Project Description), compared the 62.3 km<sup>2</sup> area of the Alloa WFD groundwater body. Therefore, the presence of the twelve new towers will not impact the local or regional groundwater levels or flow, and no operational assessment is required.

#### Surface Water

- 9.8.28 Once operational, the overhead lines and towers pose very little risk of impact to surface water features associated with the Proposed Development. With due diligence to the standards and guidance laid out in **9.7 Standard Mitigation**, no risk of contamination is foreseen and therefore no operational assessment is required for these features.

### Hydromorphology

- 9.8.29 The presence of the overhead lines and the twelve new towers will have no impact on the hydromorphology of the assessed watercourses during operation.

### **Scottish Power Distribution Works**

#### Construction

#### Groundwater Quality

- 9.8.30 The works proposed for the Underground Cable including earthworks, excavations, and watercourse crossings have the potential to expose aquifers to potential pollutants. This could be from pollutants entering the aquifer from accidental spillages and construction runoff. However, due to the small scale of the trenching works, this is highly unlikely. Therefore, for all groundwater receptors a certain and direct short-term, temporary negligible adverse impact is expected with standard mitigation applied. Due to the low to medium importance of the groundwater features identified, this results in a **neutral adverse effect (not significant)**.

#### Groundwater Flow and Level

- 9.8.31 Where dewatering activities take place during trenching, small changes in groundwater levels and flow direction may occur. However, due to the small scale of the UGC works, this is expected to be a direct, certain, short-term and temporary negligible adverse impact. On the low to medium importance receptors, this results in a **neutral adverse effect (not significant)**.

#### Surface Water

**Table 9-17 Impacts and Effects on Surface Water Quality during Construction of Scottish Power Distribution Works** lists the magnitude of impact and significance of the effects on each surface water feature potentially impacted by the Scottish Power Distribution Works during the construction phase.

**Table 9-17 Impacts and Effects on Surface Water Quality during Construction of Scottish Power Distribution Works**

| Surface Water Feature               | Proximity to SPDL (m) | Importance | Magnitude of Impact                                                                                                                                                                                                  | Significance of Effect   |
|-------------------------------------|-----------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>KNW-01 (Upper Forth Estuary)</b> | 530                   | Very High  | Indirect (via KNW-07 and then KNW-02), short-term, temporary negligible due to undergrounding of cables through catchment watercourses. This is considering the implementation of good practice mitigation measures. | Slight (not significant) |
| <b>KNW-02 (Canal Burn)</b>          | 0                     | Medium     | Indirect (via KNW-07), short-term, temporary minor adverse due to undergrounding of cable beneath channel using an open-cut method. This is considering the implementation of good practice mitigation measures.     | Slight (not significant) |

| Surface Water Feature | Proximity to SPDL (m) | Importance | Magnitude of Impact                                                                                                                                                                                                                | Significance of Effect   |
|-----------------------|-----------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| KNW-07                | 0                     | Low        | Direct, short-term, temporary minor adverse due to twice undergrounding of cable beneath channel using an HDD method, and also alongside the channel. This is considering the implementation of good practice mitigation measures. | Slight (not significant) |

- 9.8.32 The three water features assessed are deemed to have a **slight effect (not significant)** with the use of the embedded and standard mitigation measures described above and so are also deemed to not pose any potential water quality concerns.

#### Hydromorphology

- 9.8.33 **Table 9-18 Impacts and Effects on Hydromorphology during Construction of Scottish Power Distribution Works** lists the magnitude of impact and significance of the effects on the hydromorphology of each surface water feature potentially impacted by the Scottish Power Distribution Works during the construction phase.

#### **Table 9-18 Impacts and Effects on Hydromorphology during Construction of Scottish Power Distribution Works**

| Surface Water Feature | Proximity to SPDL (m) | Importance | Magnitude of Impact                                                                                                                                                                                                                         | Significance of Effect   |
|-----------------------|-----------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| KNW-07                | 0                     | Low        | Direct, temporary, short term, minor adverse due to twice undergrounding of cable beneath channel using an HDD method. This is considering the implementation of good practice mitigation measures, including reinstatement of the channel. | Slight (not significant) |

- 9.8.34 For the intrusive open cut crossings of watercourse KNW-07 for the UGC there will be unavoidable adverse impacts on the channel morphology, the riparian habitats, and the hydrological and sediment regimes during construction. With the proposed mitigation measures, including reinstatement of the channel as found this would likely be a direct, temporary, short-term and minor adverse impact, resulting in a **slight effect (not significant)** with the use of the embedded and standard mitigation measures described above and so are also deemed to not pose any hydromorphological concerns.

#### Operation

#### Groundwater

- 9.8.35 No further impacts are expected to groundwater during the operation phase of the Scottish Power Distribution Works.

### Surface Water

- 9.8.36 No further impacts are expected to surface water quality during the operation phase of the Scottish Power Distribution Works.

### Hydromorphology

- 9.8.37 No further impacts are expected to hydromorphology during the operation phase of the Scottish Power Distribution Works.

## 9.9 Additional Mitigation

- 9.9.1 As there are no significant effects posed to the water environment, no additional mitigation nor water quality monitoring is proposed for the Proposed Development.

## 9.10 Residual Effects

### **Kincardine North Substation**

- 9.10.1 As no additional mitigations are required, the effects will be managed effectively by embedded and standard mitigation measures. A summary of the residual effects of the KINN and associated access tracks on the quality and quantity of groundwater bodies and on the water quality and hydromorphology of surface water features during construction is presented in **Table 9-19 Summary of Effects of KINN and Access Tracks - Construction**, and during operation in
- 9.10.2 **Table 9-20 Summary of Effects of KINN and Access Tracks - Operation.**

**Table 9-19 Summary of Effects of KINN and Access Tracks - Construction**

| Receptor                              | Description of Effects                                                 | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|---------------------------------------|------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>Superficial Aquifers</b>           | Groundwater Quality – Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|                                       | Groundwater flows and Levels                                           | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>Scottish Coal Measures Aquifer</b> | Groundwater Quality – Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|                                       | Groundwater flows and Levels                                           | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-01</b>                         | Surface Water Quality - Excess                                         | Slight (Not Significant)  | None Required         | Slight           | Not Significant |

| Receptor      | Description of Effects                                                   | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|---------------|--------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>KNW-02</b> | Fine Sediments and Chemical Spillage Risk                                |                           |                       |                  |                 |
|               | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|               | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
|               | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-05</b> | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|               | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-06</b> | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|               | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-07</b> | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
|               | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-08</b> | Surface Water Quality - Excess Fine Sediments                            | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |

| Receptor      | Description of Effects                                                   | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|---------------|--------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>KNW-14</b> | and Chemical Spillage Risk                                               |                           |                       |                  |                 |
|               | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|               | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|               | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |

**Table 9-20 Summary of Effects of KINN and Access Tracks - Operation**

| Receptor                              | Description of Effects                                                   | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|---------------------------------------|--------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>Superficial Aquifers</b>           | Groundwater Quality – Excess Fine Sediments and Chemical Spillage Risk   | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>Scottish Coal Measures Aquifer</b> | Groundwater Quality – Excess Fine Sediments and Chemical Spillage Risk   | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-01</b>                         | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
| <b>KNW-02</b>                         | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |

| Receptor      | Description of Effects                                                   | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|---------------|--------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>KNW-05</b> | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-06</b> | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-07</b> | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
| <b>KNW-08</b> | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-14</b> | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |

#### Overhead Line Works (XL/ZCN/ZCS Uprating and Turn-ins)

- 9.10.3 As no additional mitigations are required, the effects will be managed effectively by embedded and standard mitigation measures. A summary of the residual effects of the Overhead Line Works on the quality and quantity of groundwater bodies and on the water quality and hydromorphology of surface water features during construction is presented in **Table 9-21 Summary of Effects of Overhead Line Works (XL/ZCN/ZCS Uprating and Turn-ins) - Construction**.

**Table 9-21 Summary of Effects of Overhead Line Works (XL/ZCN/ZCS Upgrading and Turn-ins) - Construction**

| Receptor                              | Description of Effects                                                   | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|---------------------------------------|--------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>Superficial Aquifers</b>           | Groundwater Quality – Excess Fine Sediments and Chemical Spillage Risk   | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|                                       | Groundwater flows and Levels                                             | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>Scottish Coal Measures Aquifer</b> | Groundwater Quality – Excess Fine Sediments and Chemical Spillage Risk   | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|                                       | Groundwater flows and Levels                                             | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-01</b>                         | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
|                                       | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-02</b>                         | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
|                                       | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-04</b>                         | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |

| Receptor      | Description of Effects                                                   | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|---------------|--------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>KNW-08</b> | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|               | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-14</b> | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|               | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|               | Hydromorphology                                                          | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |

### Scottish Power Distribution Works

- 9.10.4 As no additional mitigations are required, the effects will be managed effectively by embedded and standard mitigation measures. A summary of the residual effects of the Scottish Power Distribution Works on the quality and quantity of groundwater bodies and on the water quality and hydromorphology of surface water features during construction is presented in **Table 9-22 Summary of Effects of Scottish Power Distribution Works - Construction**.

**Table 9-22 Summary of Effects of Scottish Power Distribution Works - Construction**

| Receptor                    | Description of Effects                                                 | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|-----------------------------|------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>Superficial Aquifers</b> | Groundwater Quality – Excess Fine Sediments and Chemical Spillage Risk | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|                             | Groundwater flows and Levels                                           | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |

| Receptor                              | Description of Effects                                                   | Effects                   | Additional Mitigation | Residual Effects | Significance    |
|---------------------------------------|--------------------------------------------------------------------------|---------------------------|-----------------------|------------------|-----------------|
| <b>Scottish Coal Measures Aquifer</b> | Groundwater Quality – Excess Fine Sediments and Chemical Spillage Risk   | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
|                                       | Groundwater flows and Levels                                             | Neutral (Not Significant) | None Required         | Neutral          | Not Significant |
| <b>KNW-01</b>                         | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
| <b>KNW-02</b>                         | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
| <b>KNW-07</b>                         | Surface Water Quality - Excess Fine Sediments and Chemical Spillage Risk | Slight (Not Significant)  | None Required         | Slight           | Not Significant |
|                                       | Hydromorphology                                                          | Slight (Not Significant)  | None Required         | Slight           | Not Significant |

## 9.11 Combined Effects

- 9.11.1 Several receptors were identified as having the potential for project-wide combined effects for the water environment. Groundwater bodies Scottish Coal Measures Aquifer and Superficial Aquifers, and surface water features KNW-01, KNW-02, KNW-04, KNW-07, KNW-08 and KNW-14 are all potentially impacted by two or more elements of the Proposed Development. The elements that impact on each of these are shown in **Table 9-23 Receptors with Potential Impacts from Two or More Elements of the Proposed Development**.

**Table 9-23 Receptors with Potential Impacts from Two or More Elements of the Proposed Development**

| Receptor | Kincardine North Substation | Overhead Line Works | Scottish Power Distribution Works |
|----------|-----------------------------|---------------------|-----------------------------------|
|----------|-----------------------------|---------------------|-----------------------------------|

|                                       |   |   |   |
|---------------------------------------|---|---|---|
| <b>Superficial Aquifers</b>           | x | x | x |
| <b>Scottish Coal Measures Aquifer</b> | x | x | x |
| <b>KNW-01</b>                         | x | x | x |
| <b>KNW-02</b>                         | x | x | x |
| <b>KNW-07</b>                         | x |   | x |
| <b>KNW-08</b>                         | x | x |   |
| <b>KNW-14</b>                         | x | x |   |

- 9.11.2 Scottish Coal Measures Aquifer and Superficial Aquifers occur across several components of the Proposed Development. The proposed works would involve some degree of dewatering, which may temporarily influence groundwater levels and flow. However, these effects are expected to be localised and short-term, confined to individual steel towers and the KINN location during construction. Once operational, the steel towers would not present a significant barrier to groundwater movement, as they occupy only a very small footprint within both extensive aquifer systems. The effects of both elements of the design have been assessed as neutral and consequently, the overall combined impact on groundwater is also predicted to be **neutral (not significant)**.
- 9.11.3 KNW-01, KNW-08 and KNW-14 are all potentially at risk of impact from surface runoff and pollution from the construction of both the KINN and OHL towers upstream and the construction and use of access tracks to do so. KNW-07 will be impacted by both the KINN drainage (including the installation of a surface water pipe) and the UGC crossing as part of the Scottish Power Distribution Works. KNW-02 is potentially impacted by all three elements of the Proposed Development.
- 9.11.4 KNW-08 and KNW-14 were both found to present a neutral (not significant) effect and so this is predicted for the combined effects here. KNW-02 will receive drainage from the SuDS basin via KNW-07 as part of the KINN aspect of the works and is also a receptor for potential runoff from the access track, UGC upstream beneath its tributary KNW-07, and watercourse crossing for abnormal loads and from the construction of steel towers and associated foundations and temporary scaffolding. KNW-01 is similarly a receptor for these same potential sources of contamination via KNW-02, which is a tributary of it. KNW-07 is to have UGC constructed beneath its channel at two different points as part of the Scottish Power Distribution Works. The effects are considered slight (not significant) for all elements for KNW-01, KNW-02 and KNW-07 during both construction and operation. With the implementation of standard mitigation measures as outlined in Section 9.7 to effectively manage these risks, the overall

combined effects are predicted as temporary, indirect, uncertain, short-term and negligible, resulting in a **slight adverse (not significant)** effect.

## 9.12 Monitoring

- 9.12.1 During pre-construction and construction phases it is proposed to undertake water quality monitoring to ensure that mitigation measures are operating as planned and managing the risk of pollution of water features during works effectively and appropriate action is taken in line with the Emergency Response Plan. Monitoring will help to ensure that should pollution occur it is identified as quickly as possible and appropriate action is taken. A Surface Water Monitoring Strategy (SWMS) and subsequent delivery of that monitoring, developed in consultation with SEPA and other relevant stakeholders, is proposed for any receptors considered at risk.
- 9.12.2 Surface water features assessed as at a potential risk of impact should be incorporated into the SWMS. As most of these receptors have been deemed to be at risk of a slight or neutral magnitude and not significant effect, daily visual observations upstream and downstream of active works close to or discharging into these watercourses (increasing in frequency during storms) would likely be sufficient if any monitoring is deemed necessary at all. In situ monitoring using a calibrated hand-held probe and potentially grab samples on a regular or ad hoc basis for analysis at an accredited laboratory are also options that may be considered.

## 9.13 Cumulative Assessment

- 9.13.1 The assessment of likely cumulative effects based on the cumulative schemes identified in Chapter 2 Approach to EIA (Section 2.5) is summarised in **Table 9-24 Cumulative Effects**.

**Table 9-24 Cumulative Effects**

| Development                                                          | Location                                                                                                                                       | Cumulative Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Kincardine Battery Energy Storage System (BESS) (ECU00004987)</b> | Located in Fife to the south / southwest of the Proposed Development south of Hawkhill Road. 470 m southeast and downstream of KNW-07.         | KNW-01 is a potential receptor for this development as it is located on the northern shoreline. Whilst KNW-01 has been assessed as High importance for surface water quality, with mitigation measures the effects of pollution risks during construction are not significant, especially considering the scale of the water feature. With similar standards of mitigation for the construction of this development, this significance of effects should be maintained. No clear pathway is observed to any other assessed surface water feature. No increase in groundwater, hydromorphology nor flood risk impacts are deemed likely as the implementation of appropriate mitigation is assumed for this development. |
| <b>Kincardine Grid Services Complex (ECU00003326)</b>                | Located in Fife to the immediate west of the Proposed Development adjacent and to the east of the A876. Located adjacent to KNW-05 and KNW-06. | KNW-05 and KNW-06 are potential receptors of surface water runoff from this development. A review of the published environmental literature associated with this development indicates that no impact is deemed likely on the water environment. With similar standards of mitigation for the construction of this development, this significance of effects should be                                                                                                                                                                                                                                                                                                                                                  |

| Development                                                                            | Location                                                                                                                   | Cumulative Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                        |                                                                                                                            | maintained. No increase in groundwater, hydromorphology nor flood risk impacts are deemed likely as the implementation of appropriate mitigation is assumed for this development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Aggregate Storage Building and associated hardstanding</b><br>(24/00979/FULL)       | Located in Fife south of Proposed Development south of Hawkhill Road at the disused railhead.                              | KNW-01 is a potential receptor for this development as it is located on the northern shoreline. Whilst KNW-01 has been assessed as High importance for surface water quality, with mitigation measures the effects of pollution risks during construction are not significant, especially considering the scale of the water feature. No published information on potential water impacts or mitigations is known, but with similar standards of mitigation for the construction of this development, this significance of effects should be maintained. No clear pathway is observed to any other assessed surface water feature. No increase in groundwater, hydromorphology nor flood risk impacts are deemed likely as the implementation of appropriate mitigation is assumed for this development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Underground Cable from KINN to existing Kincardine Substation</b><br>(25/02494/SCR) | Located in Fife within the Site and extending south to Hawkhill Road, crossing it into the existing Kincardine Substation. | KNW-07 is a potential receptor for this development as the underground cable will cross this when connecting the KINN to the existing Kincardine Substation to the south of the site. It should be noted here that this is a different cable to that assessed as part of the Scottish Power Distribution Works passing beneath KNW-07 above but will run in parallel to it. Fife Council's Screening Opinion for these works indicates that this would be achieved by " <i>open cut methods involving a temporary flume or bypass to enable the cable to be buried in the 'dry' bed of the watercourse. This would be temporary and the watercourse fully reinstated following installation of the cable. The risks of sedimentation and/or pollution are considered to be low and can be effectively mitigated through standard working practices.... Overall, it is considered the Underground Cable Route would not result in significant effects on water environment receptors.</i> " Assuming standard measures are applied during construction to mitigate risks to the water environment alongside this proposed method, no cumulative effects are predicted for KNW-07. No increase in groundwater, hydromorphology nor flood risk impacts are deemed likely as the implementation of appropriate mitigation is assumed for this development. |

| Development                                                                           | Location                                                                                                                             | Cumulative Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Temporary installation of transformers at Kincardine Substation (25/02355/SCR)</b> | Located in Fife within the footprint of the existing Kincardine Substation, approximately 1km south of the KINN substation platform. | KNW-01 is a potential receptor for this development as it is located on the northern shoreline within the site of the existing Kincardine Substation, south of the Proposed Development. Whilst KNW-01 has been assessed as High importance for surface water quality, with mitigation measures the effects of pollution risks during construction are not significant, especially considering the scale of the water feature. No published information on potential water impacts or mitigations is known, but with similar standards of mitigation for the construction of this development, this significance of effects should be maintained. No clear pathway is observed to any other assessed surface water feature. No increase in groundwater, hydromorphology nor flood risk impacts are deemed likely as the implementation of appropriate mitigation is assumed for this development. |
| <b>Kilbagie Battery Energy Storage System (BESS) (ECU00005240)</b>                    | Located in Clackmannanshire approximately 50-100m north of the Proposed Development.                                                 | KNW-02, KNW-03, KNW-04 and KNW-13 are potential receptors of surface runoff and chemical spillage from this development. KNW-03 and KNW-13 were both scoped out as potential receptors for the Proposed Development, but KNW-03 is an upstream tributary of KNW-02 and so may provide a pathway for a cumulative effect. KNW-04 was assessed to have a neutral impact from the Proposed Development. An Environmental Impact Assessment is being prepared but not yet published for this development, but assuming standard measures are applied during construction to mitigate risks to the water environment no cumulative effects are predicted for KNW-02 or KNW-04. No increase in groundwater, hydromorphology nor flood risk impacts are deemed likely as the implementation of appropriate mitigation is assumed for this development.                                                   |
| <b>Meadowend Battery Energy Storage System (BESS) (ECU00005178)</b>                   | Located in Clackmannanshire approximately 640m north of the Proposed Development.                                                    | KNW-11 and KNW-12 are potential receptors of surface runoff and chemical spillage from this development, but both were scoped out as potential receptors for the Proposed Development. However, they are both upstream tributaries of KNW-02 and so may provide a pathway for a cumulative effect. The development is currently undergoing public consultation and no published information on potential water impacts or mitigations is known, but with similar standards of mitigation for the construction of this development, this significance of effects should be maintained. No clear pathway is observed to any other assessed water feature. No                                                                                                                                                                                                                                        |

| Development | Location | Cumulative Effect                                                                                                                                                  |
|-------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |          | increase in groundwater, hydromorphology nor flood risk impacts are deemed likely as the implementation of appropriate mitigation is assumed for this development. |

## 9.14 Summary and Conclusions

9.14.1 This chapter assesses the potential effects of the Proposed Development on the water environment. This includes surface water features, hydromorphology, groundwater and flood risk. It presents the baseline conditions of the water environment and highlights the potential effects and their significance, considering embedded and standard mitigation measures. Additional mitigation measures were deemed unnecessary due to the limited impacts assessed and controlled already. The **Kincardine North Substation Flood Risk Assessment** was conducted to assess the potential flood risks posed by the KINN element of the development; a further Flood Risk Assessment was not deemed necessary for the OHL and additional elements based on modelling conducted for this document and the lack of any further risk from the proposed works.

9.14.2 The baseline was informed from several online sources described in Baseline conditions for the water environment were established using a comprehensive range of publicly available datasets, listed below, and supplemented by information obtained directly from SEPA and local authorities. The EIA Study Area and scope of assessment are also detailed in this section. The assessment scope excludes operational impacts due to the low-maintenance nature of the infrastructure.

9.14.3 The methodology by which the potential effects of the proposed works on surface water, groundwater and hydromorphology are assessed follows a qualitative source–pathway–receptor approach, with effects evaluated based on receptor sensitivity and impact magnitude, following established guidance.

Baseline Data Collection under 9.4 Methods, a SEPA data request received on 16 December 2025, and site walkover carried out on 15 November 2024. The importance of each water feature is presented within and was determined using the criteria presented **Table 9-6 Receptor Importance Descriptors**. The impact assessment is based on a qualitative source–pathway–receptor approach and magnitude of impact was determined using the criteria in **Table 9-7 Magnitude of Impacts** and overall significance of effect using the matrix presented in

### Table 9-8 Matrix for Assessment of *Significance*.

9.14.4 If different assumptions are applied to the design at a later stage, the impacts and effects on the water environment will need to be reviewed. However, it was found that with the adoption of embedded mitigation to avoid adverse impacts and standard mitigation and good working practices to manage the construction of the Proposed Development, all potential effects are **Not Significant**.

### Key Mitigation

9.14.5 Details on the requirements of culvert design, drainage, maintenance and a fire protection system will be prepared as part of the final design phase.

9.14.6 The following documents are required for works to commence:

- CEMP; (including a Pollution Prevention Plan);
- Maintenance Plan; and
- Emergency Response Plan.

## 9.15 Acronyms

AOD - Above Ordnance Datum

BGL – Below Ground Level

BGS - British Geological Society

CAR - Controlled Activities Regulations

CEMP - Construction Environmental Management Plan

CIRIA - Construction Industry Research and Information Association

DMRB - Design Manual for Roads and Bridges

EASR - Environmental Authorisations (Scotland) Regulations

EIA – Environmental Impact Assessment

FRA - Flood Risk Assessment

GPP - Guidance for Pollution Prevention

GWDTE - Groundwater Dependent Terrestrial Ecosystem

LDP - Local Development Plan

NGR – National Grid Reference

NPF3 - National Planning Framework 3

NPF4 - National Planning Framework 4

OHL – Overhead Line

PAN - Planning Advice Note

PCC - Pollution Prevention and Control

PWS - Private Water Supply

RBMP - River Basin Management Plan

SAC - Special Area of Conservation

SEPA - Scottish Environment Protection Agency

SNH - Scottish Natural Heritage

SPA - Special Protection Area

SSSI - Site of Special Scientific Interest

SuDS - Sustainable Drainage System

SUDS - Sustainable Urban Drainage System

SWMS – Surface Water Monitoring Strategy

UGC – Underground Cable

WEWS - Water Environment Water Services

WFD - Water Framework Directive

WMP - Water Management Plan

## 9.16 References

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- Ref 9.1 Scottish Government (2025) The Environmental Authorisations (Scotland) Amendment Regulations 2018. [online] Available at: [The Environmental Authorisations \(Scotland\) Amendment Regulations 2025](#) [Accessed 24 Nov. 2025].
- Ref 9.2 Scottish Parliament, 2011. The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) ('the CAR Regulations'). Available online: [The Water Environment \(Controlled Activities\) \(Scotland\) Regulations 2011](#)
- Ref 9.3 Scottish Parliament (2012a). Pollution Prevention and Control (Scotland) Regulations 2012 (PPC). (online) Available at: [The Pollution Prevention and Control \(Scotland\) Regulations 2012](#)
- Ref 9.4 Scottish Parliament Reservoirs (Scotland) Act 2011 (online). Available at: <https://www.legislation.gov.uk/asp/2011/9/contents>
- Ref 9.5 Scottish Parliament (2009) Climate Change (Scotland) Act 2009 (online). Available at: <https://www.legislation.gov.uk/asp/2009/12/contents>.
- Ref 9.6 Scottish Parliament (2009) Flood Risk Management (Scotland) Act 2009 (Online). Available at: <https://www.legislation.gov.uk/asp/2009/6/contents>
- Ref 9.7 Scottish Parliament (2004) Nature Conservation (Scotland) Act 2004 (online). Available at: <https://www.legislation.gov.uk/asp/2004/6/contents>
- Ref 9.8 Scottish Parliament (2003) Water Environment Water Services ('the WEWS Act') (Scotland) Act 2003 (online). Available at: <https://www.legislation.gov.uk/asp/2003/3/contents>
- Ref 9.9 Scottish Parliament (1997) Town and County Planning (Scotland) Act 1997 (online). Available at: <https://www.legislation.gov.uk/ukpga/1997/8/contents>
- Ref 9.10 Gov.uk (1989) Electricity Act 1989 (online). Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents>
- Ref 9.11 Scottish Parliament (1990) Environmental Protection Act (1990) (as amended) and Part 2A The Contaminated Land Regime (2006) (online). Available at: <https://www.gov.scot/publications/environmental-protection-act-1990-part-ia-contaminated-land-statutory-guidance/pages/17/>
- Ref 9.12 Electricity Works (EIA) (Scotland) Regulations (2017) (online). Available at: [The Electricity Works \(Environmental Impact Assessment\) \(Scotland\) Regulations 2017](#)
- Ref 9.13 Scottish Parliament (2015) The Construction (Design and Management) Regulation 2015 (online). Available at: <https://www.legislation.gov.uk/uksi/2015/51/contents/made>
- Ref 9.14 Scottish Parliament (2014) The Environmental Protection (Duty of Care) (Scotland) Regulations (online). Available at: <https://www.legislation.gov.uk/ssi/2014/4/contents/made>

- Ref 9.15 Scottish Parliament (2009) Environmental Liability (Scotland) Regulations 2009 (online). Available at: <https://www.legislation.gov.uk/ssi/2009/266/contents/made>
- Ref 9.16 Scottish Parliament (2005) The Contaminated Land (Scotland) Regulations 2005 (online). Available at: <https://www.legislation.gov.uk/sdsi/2005/0110697936>
- Ref 9.17 Scottish Parliament (2013) The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 (online). Available at: [The Water Environment \(Drinking Water Protected Areas\) \(Scotland\) Order 2013](#)
- Ref 9.18 The Private Water Supplies (Scotland) Regulations 2006 (online). Available at: <https://www.legislation.gov.uk/ssi/2006/209/contents>
- Ref 9.19 [The Water Intended for Human Consumption \(Private Supplies\) \(Scotland\) Regulations 2017](#) (online). Available at: <https://www.legislation.gov.uk/ssi/2017/282/contents>
- Ref 9.20 Environmental Authorisations (Scotland) Regulations (2018) (online). Available at: <https://www.legislation.gov.uk/sdsi/2018/9780111039014/contents>
- Ref 9.21 Gov.uk (2021) Environment Act (2021) (online). Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents>
- Ref 9.22 Gov.uk (2023) Levelling-up and Regeneration Act (2023) (online). Available at: <https://www.legislation.gov.uk/ukpga/2023/55>
- Ref 9.23 The Scottish Government (2023) National Planning Framework 4 (online). Available at: <https://www.gov.scot/publications/national-planning-framework-4/>
- Ref 9.24 The Scottish Government (2014) National Planning Framework 3 (online). Available at: <https://www.gov.scot/publications/national-planning-framework-3/>
- Ref 9.25 The Scottish Government (2015) Planning and Waste Management Advice (online). Available at: <https://www.gov.scot/publications/planning-and-waste-management-advice>
- Ref 9.26 Scottish Environment Protection Agency (SEPA) (2018) Flood risk and land use vulnerability guidance (Version 4). Available at: <https://www.sepa.org.uk/media/ht3bsekc/land-use-vulnerability-guidance.docx>
- Ref 9.27 Scottish Environment Protection Agency (SEPA) (2021) River Basin Management Plan for Scotland 2021-2027 (online). Available at: <https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf>
- Ref 9.28 Fife Council (2017) Local Development Plan (online). Available at: <https://www.fife.gov.uk/kb/docs/articles/planning-and-building2/planning/development-plan-and-planning-guidance/local-development-plan-fifeplan>
- Ref 9.29 Clackmannanshire Council (2015) Local Development Plan (online). Available at: [Local Development Plan \(adopted August 2015\)](#)
- Ref 9.31 Scottish Waters (2018) Sewers for Scotland - A technical specification for the design and construction of sewerage infrastructure (online). Available at: [Sewers for Adoption 7th Edition](#)
- Ref 9.32 SEPA (2009) SEPA Interim Position Statement on Planning, Energy and Climate Change (online). Available at: [SEPA Interim Position Statement on Planning, Energy and Climate Change](#)
- Ref 9.33 SEPA (2010). Engineering in the water environment: good practice guide River crossings (online). Available at: <https://www.confor.org.uk/media/246360/good-practice-guide-river-crossings.pdf>

- 
- Ref 9.34 SEPA (2024) Guidance on Assessing the Impacts of Development on Groundwater Abstraction (online). Available at: [guidance-on-assessing-the-impacts-of-developments-on-groundwater-abstractions.docx](#)
- Ref 9.35 Ordnance Survey (2024) Ordnance Survey Maps (online). Available at: [Ordnance Survey | Great Britain's national mapping service](#)
- Ref 9.36 Meteorological Office website (2024) (Online). Available at: <https://www.metoffice.gov.uk/public/weather/climate/gfhyzss9j>
- Ref 9.37 SEPA website (2024) (online). Available at: <https://www.sepa.org.uk/>
- Ref 9.38 Scottish Natural Heritage (2024) Standing Waters Database (online). Available at: <https://opendata.nature.scot/datasets/snh::standing-waters-database/explore>
- Ref 9.39 Scottish Government (2024) Scotland's Aquaculture website (online). Available at: <http://aquaculture.scotland.gov.uk/>
- Ref 9.40 Scottish Government (2024) Scotland's Environment website (online). Available at: <https://www.environment.gov.scot/maps/scotlands-environment-map/>
- Ref 9.41 UK Centre for Ecology and Hydrology (2024) National River Flow Archive website (online). Available at: <https://nrfa.ceh.ac.uk/>
- Ref 9.42 British Geological Survey (BGS) (2024) Online Mapping (online). Available at: <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>
- Ref 9.43 NatureScot (2024) (online). Available at: <https://www.nature.scot/>
- Ref 9.44 British Geological Survey (2024) Scotland's Aquifers and Groundwater Bodies (online) Available at: <https://www2.bgs.ac.uk/groundwater/waterResources/ScotlandsAquifers.html>
- Ref 9.45 National River Flow Archive (2024) Rainfall Statistics (online) Available at: <https://nrfa.ceh.ac.uk/rainfall-statistics>
- Ref 9.46 Scottish Government (2024) Scotland's Environment Map (online) Available at: <https://www.environment.gov.scot/maps/scotlands-environment-map/>
- Ref 9.47 SEPA National Flood Risk Assessment Maps (2018) Available at: <https://map.sepa.org.uk/floodmap/map.htm>
- Ref 9.48 Standards for Highways (2020) LA 113 - Road drainage and the water environment. Available at: [LA 113 - Road drainage and the water environment](#)
- Ref 9.49 Design Manual for Roads and Bridges (DMRB) LA104 Environmental assessment and monitoring (online). Available: <https://www.standardsforhighways.co.uk/search/0f6e0b6a-d08e-4673-8691-cab564d4a60a>
- Ref 9.50 James Hutton Institute, n.d. *Scotland's Soils - Soil Maps*. [online] Available at: [https://map.environment.gov.scot/Soil\\_maps/?layer=1](https://map.environment.gov.scot/Soil_maps/?layer=1)
- Ref 9.51 British Geological Survey (BGS) (2025) Online Mapping (online). Available at: [Geology of Britain viewer - British Geological Survey](#) [Accessed 27 Oct. 2025]
- Ref 9.52 British Geological Survey (BGS) (2020). *GeoIndex (onshore)*. Map viewer; British Geological Survey. Available at: <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> [Accessed 27 Oct. 2025]
- Ref 9.53 Scotland's aquifers and groundwater bodies (2015), Groundwater Science Program (Online). Available at: [Scotland's aquifers and groundwater bodies | Water resources and groundwater | British Geological Survey \(BGS\)](#) [Accessed 27 Oct. 2025].

- 
- Ref 9.54 British Geological Survey (BGS) (2020). *Hydrogeology 625K digital hydrogeological map of the UK*. [Dataset]. British Geological Survey. Available at: <https://www.bgs.ac.uk/datasets/hydrogeology-625k/> [Accessed 27 Oct. 2025].
- Ref 9.55 British Geological Survey (BGS) (2015). *Scotland's aquifers and groundwater bodies*. [Online]. British Geological Survey. Available at: <https://www2.bgs.ac.uk/groundwater/waterResources/ScotlandsAquifers.html> [Accessed 27 Oct. 2025].
- Ref 9.56 British Geological Survey (BGS) (2020) GeoIndex Onshore map of the UK (online). Available at: [https://mapapps2.bgs.ac.uk/geoindex/home.html?\\_ga=2.103587328.1418820010.1605515677-1433331289.1605515677](https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.103587328.1418820010.1605515677-1433331289.1605515677) [Accessed 27 Oct. 2025].
- Ref 9.57 Scottish Environment Protection Agency (SEPA). (n.d.). *Water Classification Hub*. [Online]. Available at: <https://www.sepa.org.uk/data-visualisation/water-classification-hub/> [Accessed 27 Oct. 2025].
- Ref 9.58 Environmental Authorisations (Scotland) Regulations (2018) (online). Available at: <https://www.legislation.gov.uk/sdsi/2018/9780111039014/contents>
- Ref 9.59 Scottish Environment Protection Agency (SEPA) (2024) *Guidance on assessing the impacts of developments on groundwater-dependent terrestrial ecosystems*. Edinburgh: SEPA. Available at: <https://www.sepa.org.uk/media/i2c9r03k/guidance-on-assessing-the-impacts-of-developments-on-groundwater-dependent-terrestrial-ecosystems.docx> (Accessed: 16 December 2025).
- Ref 9.60 SEPA Flood Maps (2026) (online). Available at: [SEPA Flood Maps](#)
- Ref 9.61 Gov.uk (2021) Environment Act (2021) (online). Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents>
- Ref 9.62 Gov.uk (2023) Levelling-up and Regeneration Act (2023) (online). Available at: <https://www.legislation.gov.uk/ukpga/2023/55>
- Ref 9.63 Scottish Environment Protection Agency (SEPA), Environment Agency & Environment and Heritage Service Northern Ireland (n.d.) *Managing fire water and major spillages: Pollution Prevention Guidelines (PPG18)*. Available at: <https://www.netregs.org.uk/media/1674/ppg-18.pdf>
- Ref 9.64 NetRegs (2020) GPP 1 Understanding your environmental responsibilities – good environmental practices (online). Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-1-understanding-your-environmental-responsibilities-good-environmental-practices/> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.65 NetRegs (2018) GPP 2 Above ground oil storage (online). Available at: <https://www.netregs.org.uk/media/1475/gpp-2-pdf-jan-2018.pdf> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.66 NetRegs (2022) GPP 3 Use and design of oil separators in surface water drainage systems (online). Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-3-use-and-design-of-oil-separators-in-surface-water-drainage-systems/> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland

- 
- Ref 9.66 NetRegs (SEPA) (2021) Treatment and disposal of wastewater where there is no connection to the public foul sewer: (Version 1.2) Available at: [guidance-for-pollution-prevention-4-2022-update.pdf](#)
- Ref 9.67 NetRegs (2018) GPP 5: Works and maintenance in or near water (online). Available at: <https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.68 NetRegs (2018) GPP 5: Works and maintenance in or near water (online). Available at: <https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.69 NetRegs (2023) GPP 6: Working on construction and demolition sites (online). Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-6-working-on-construction-and-demolition-sites/> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.70 NetRegs (2017) GPP 8: Safe storage and disposal of used oils (online). Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-8-safe-storage-and-disposal-of-used-oils/> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.71 NetRegs (2017) GPP 13 Vehicle washing and cleaning (online). Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-13-vehicle-washing-and-cleaning/> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.72 NetRegs (2017) GPP 19: Vehicles: Service and Repair (online). Available at: <https://www.netregs.org.uk/media/1417/gpp-19-vehicles-sevice-and-repair-no-e.pdf> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.73 NetRegs (2021) GPP 21: Pollution incident response planning (online). Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-21-pollution-incident-response-planning/> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.74 NetRegs (2018) GPP 22: Dealing with spills (online). Available at: <https://www.netregs.org.uk/media/1643/gpp-22-dealing-with-spills.pdf> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.75 NetRegs (2019) GPP 26 Safe storage - drums and intermediate bulk containers (online). Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-26-safe-storage-drums-and-intermediate-bulk-containers/> | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland
- Ref 9.76 Ciria (2023) Environmental good practice on site guide (fifth edition) (online). Available at: [https://www.ciria.org/ci/iCore/Store/StoreLayouts/Item\\_Detail.aspx?iProductCode=C811&Category=BOOK](https://www.ciria.org/ci/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=C811&Category=BOOK)
- Ref 9.77 Ciria (2004) Sustainable drainage systems. Hydraulic, structural and water quality advice (C609B) (online). Available at: [https://www.ciria.org/CIRIA/CIRIA/Item\\_Detail.aspx?iProductCode=C609B](https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C609B)

---

Ref 9.78 Ciria (2004) Development and flood risk - guidance for the construction industry (C624) (online). Available at:

[https://www.ciria.org/CIRIA/CIRIA/Item\\_Detail.aspx?iProductCode=C624](https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C624)

Ref 9.79 NBS (2015) Publication C753 SuDS manual (online). Available at:

<https://www.thenbs.com/PublicationIndex/documents/details?Pub=CIRIA&DocId=314088>

Ref 9.80 NBS (2001) Publication C523 Sustainable urban drainage systems - best practice manual for England, Scotland, Wales and Northern Ireland (online). Available at:

<https://www.thenbs.com/publicationindex/documents/details?Pub=CIRIA&DocId=261384>

Ref 9.81 Ciria (2006) Control of water pollution from linear construction projects. Technical guidance (C648) (online). Available at:

[https://www.ciria.org/CIRIA/CIRIA/Item\\_Detail.aspx?iProductCode=C648&Category=BOOK](https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C648&Category=BOOK)

Ref 9.82 Ciria (2006) Control of water pollution from linear construction projects. Site guide (C649) (online). Available at:

[https://www.ciria.org/CIRIA/CIRIA/Item\\_Detail.aspx?iProductCode=C649&Category=](https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C649&Category=)

Ref 9.83 Ciria (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532) (online). Available at:

[https://www.ciria.org/CIRIA/CIRIA/Item\\_Detail.aspx?iProductCode=C532](https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532)

Ref 9.84 Scottish Environment Protection Agency (SEPA) (2021) Construction Regulatory Guide (Water). Version 1.1. Available at:

<https://www.sepa.org.uk/media/535245/construction-regulatory-guide-ver-11-sept-2021-final.pdf>

Ref 9.85 Scottish Environment Protection Agency (SEPA) (2022) WAT-RM-02: Regulation of Licence-level Engineering Activities v8.0. Available at: <https://www.sepa.org.uk/library>

Ref 9.86 Scottish Environment Protection Agency (SEPA) (2018) Guidance for Transport Infrastructure Projects (WAT-SG-93) v.3.0. Available at: <https://www.sepa.org.uk/library>

Ref 9.87 Scottish Environment Protection Agency (SEPA) (2019) Engineering in the Water Environment: Good Practice Guide – Intakes and Outfalls (WAT-SG-28). Available at:

<https://www.sepa.org.uk/library>