

**Technical Appendix 8.1: Hydrology, Hydrogeology and Geology Assessment Methodology**

Technical Appendix 8.1: Assessment Methodology

1.1 Introduction

1.1.1 The assessment methodology in relation to Hydrology, Hydrogeology, Geology and Soils, including the criteria for assessing sensitivity of receptors, magnitude of change and cumulative effects, as well as overall significance criteria is detailed below. The following methodology has formed the basis of **Chapter 8: Hydrology, Hydrogeology, Geology and Soils (EIAR Volume 2)**.

1.2 Methodology

Criteria for Assessing the Sensitivity of Receptors

1.2.1 Effects on water resources are described as beneficial, neutral or adverse and are considered with reference to the value or sensitivity of the receptor, as described in **Table 8.1.1**.

| Table 8.1.1: Sensitivity of Environmental Receptor |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensitivity of Receptor                            | Definition                                                                                                                                                              | Typical Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| High                                               | International or national level importance.<br>Receptor with a high quality and rarity, regional or national scale and limited potential for substitution/ replacement. | High likelihood of fluvial/ tidal flooding in the sub catchment – defined as 1:10 probability in a year.<br>European Commission (EC) Designated Salmonid/Cyprinid fishery.<br>Surface Water Framework Directive (WFD) class 'High'.<br>Scottish Government Drinking Water Protected Areas.<br>Aquifer providing regionally important resource such as abstraction for public water supply, abstraction for private water supply.<br>Supporting a site protected under EC or UK habitat legislation/species protected by EC legislation.<br>Protected Bathing Water Area.<br>Active floodplain.<br>Highly GWDTEs.<br>Average peat depth >1 m within the sub-catchment – near natural condition<br>Peat >2 m in depth that is drained, eroded or modified<br>Peat Landslide Hazard Risk Assessment shows High to Moderate Risk of peat landslides<br>Mining and/or exploration features are recorded in the vicinity with a high likelihood of additional features being present. There is a medium to high risk of ground instability from former mining activities’ and where there is ‘extensive mining recorded, and numerous mining features present are recorded and visible on Site. There is a high to very high risk of ground instability from former mining activities’. |
| Medium                                             | Regional, county and district level importance.<br>Receptor with a medium quality and rarity, regional scale and limited potential for substitution/ replacement.       | Medium likelihood of fluvial/tidal flooding in the sub catchment – defined as a 1:200 probability in a year.<br>Surface water WFD class ‘Good’ or ‘Moderate’.<br>Aquifer providing water for agricultural or industrial use.<br>Local or regional ecological status/locally important fishery.<br>Contains some flood alleviation features.<br>Moderately GWDTEs.<br>Average peat depth >0.5 m to 1.0 m within the sub catchment – mostly near natural condition.<br>Peat >1 m to 2 m that is drained, eroded or modified<br>Peat Landslide Hazard Risk Assessment shows Low Risk of peat landslides<br>There is potential for mineralisation and localised exploration features are present but more extensive mining is not recorded and not expected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Table 8.1.1: Sensitivity of Environmental Receptor |                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensitivity of Receptor                            | Definition                                                                                                                                                                                                                                                               | Typical Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                    |                                                                                                                                                                                                                                                                          | There is a low to medium risk of ground instability and contamination from former mining activities’                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Low                                                | Local importance<br>Receptor is on-site or on a neighbouring site with a low quality and rarity, local scale.<br>Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character. | Surface water WFD class ‘Poor’.<br>Unproductive strata/no abstractions for water supply.<br>Sporadic fish present.<br>No flood alleviation features.<br>Sewer.<br>No Peat or non-peat/organic rich soils <0.5 m within the sub catchment.<br>Peat <1m depth that is drained, eroded or modified<br>The presence of mineralisation is not expected and there is a very low likelihood of mining having taken place. There is a negligible to low risk of ground instability and contamination due to former mining activities’ |

Criteria for Assessing the Magnitude of Change

1.2.2 The size or magnitude of each impact is determined as a predicted deviation from the baseline conditions during construction, operation and decommissioning of the Proposed Development, as described in **Table 8.1.2**.

| Table 8.1.2: Magnitude of Impact on a Receptor |                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Magnitude of Impact                            | Criteria                                                                                                                                                                                                                                                                                                                                                                           |
| Large                                          | Large alteration/ change in the quality or quantity of and/or to the physical or biological characteristics of controlled waters.<br>Total or near total loss of peat resource.<br>Fundamental loss of integrity or function of the geological/soil/peat receptor.<br>Peat resource loss represents >50% of the peat resource present in the survey area.                          |
| Medium                                         | Medium alteration/change in the quality or quantity of and/or to the physical or biological characteristics of controlled waters.<br>Partial loss of peat resource.<br>Local to site wide disturbance to function of the geological/soil/peat receptor.<br>Peat resource loss represents >5% and <50% of the peat resource in the survey area.                                     |
| Small                                          | Small alteration/change in the quality or quantity of and/or to the physical or biological characteristics of controlled waters.<br>Localised excavation of peatland resource.<br>A detectable but non-material effect such that the integrity of the geological/soil/peat receptor is not affected.<br>Peat resource loss represents <5% of the peat resource in the survey area. |
| None                                           | No alteration/change detectable in the quality or quantity of and/or to the physical or biological characteristics of controlled waters.<br>No excavation peatland resource.                                                                                                                                                                                                       |

Criteria for Assessing Cumulative Effects

1.2.3 The potential for cumulative effects to occur as a result of the Proposed Development is assessed based on:

- The potential hydrological connection of other similar developments, which are the subject of a valid planning application;

- The potential for concurrent phases of construction with other similar developments with the potential for hydrological connection to the Site; and
- Applicable planning conditions with regards to the potential impact of other similar developments on the water environment including requirements for the implementation of drainage measures, pollution prevention and best practice working measures with regards to the water environment.

Criteria for Assessing Significance

1.2.4 **Table 8.1.3** illustrates how the significance of effects are determined by comparison of the sensitivity of receptors with the magnitude of impact (i.e. predicted change). For the purposes of this assessment, significant effects are **Major** or **Moderate**.

| Table 8.1.3: Significance Criteria |        |                     |            |          |          |
|------------------------------------|--------|---------------------|------------|----------|----------|
|                                    |        | Magnitude of Impact |            |          |          |
|                                    |        | None                | Small      | Medium   | Large    |
| Sensitivity of Receptor            | High   | None                | Minor      | Major    | Major    |
|                                    | Medium | None                | Minor      | Moderate | Moderate |
|                                    | Low    | None                | Negligible | Minor    | Minor    |

1.3 Legislation, Policy and Guidance

1.3.1 The hydrology, hydrogeology and soils assessment has been undertaken within the context of relevant legislative instruments, planning policies, and guidance documents, and these are and summarised below.

Legislation and Policy

- The Town and Country Planning (Scotland) Act<sup>1</sup>
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations<sup>2</sup>
- Water Environment and Water Services (Scotland) Act<sup>3</sup>
- The Water Environment (Controlled Activities) (Scotland) Regulations<sup>4</sup>
- The Water Environment (Miscellaneous) (Scotland) Regulations 2017<sup>5</sup>;
- Flood Risk Management (Scotland) Act 2009<sup>6</sup>;

- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017<sup>7</sup>;
- The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015<sup>8</sup>;
- The Public Water Supplies (Scotland) Regulations 2014<sup>9</sup>;
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013<sup>10</sup>
- Directive 2009/147/EC of the European Parliament and of the Council<sup>11</sup> - Conservation of Wild Birds
- Council Directive 92/43/EEC<sup>12</sup> - Conservation of Natural Habitats and of Wild Flora and Fauna
- Scottish Planning Policy (SPP)<sup>13</sup>
- National Planning Framework 4 (NPF4)<sup>14</sup>
- Technical Standards and Guidance
- GPP1 115: Understanding your environmental responsibilities - good environmental practices (June 2021);
- GPP 2<sup>16</sup>: Above ground oil storage tanks (January 2021);
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (June 2021);
- GPP 5: Works and maintenance in or near water (February 2018);
- PPG 6<sup>17</sup>: Working at construction and demolition sites (April 2023);
- GPP 13: Vehicle washing and cleaning (June 2021)
- GPP 21: Pollution incident response planning (June 2021)
- GPP 22: Incident response - dealing with spills (October 2018)
- PAN 79: Water and Drainage (September 2006);
- LUPS-GU4<sup>18</sup>: Planning guidance on on-shore wind farm developments (2025);
- LUPS-DP-GU2a: Development Plan Guidance on Flood Risk (July 2018);
- LUPS-GU19: Planning advice on wastewater drainage (2011);
- LUPS-GU31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (August 2024)
- WAT-G-025 EASR Guidance: Engineering: Activity Guide: Instream and In-loch structures
- WAT-G-028 EASR Guidance: Engineering: Activity Guide: In the vicinity, beyond the vicinity and affecting wetlands
- WAT-G-030 EASR Guidance: Engineering: Meeting Good Practice

<sup>1</sup> The Town and Country Planning (Scotland) Act (1997). Available at: <https://www.legislation.gov.uk/ukpga/1997/8/contents>. (Accessed December 2025).

<sup>2</sup> The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations (2017). Available at: <https://www.legislation.gov.uk/ssi/2017/102/contents>. (Accessed December 2025)

<sup>3</sup> The Water Environment and Water Services (Scotland) Act (2020). Available at: <https://www.legislation.gov.uk/asp/2003/3/contents>. (Accessed December 2025)

<sup>4</sup> The Water Environment (Controlled Activities) (Scotland) Regulations (2011). Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents>. (Accessed December 2025)

<sup>5</sup> Scottish Government (2017) The Water Environment (Miscellaneous) (Scotland) Regulations 2017. Available at: <http://www.legislation.gov.uk/ssi/2017/389/contents/made>

<sup>6</sup> Scottish Government (2009) Flood Risk Management (Scotland) Act 2009. Available at: <http://www.legislation.gov.uk/asp/2009/6/contents>

<sup>7</sup> Scottish Government (2017) the Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/282/note/made>

<sup>8</sup> Scottish Government (2015) the Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015. Available at: <https://www.legislation.gov.uk/ssi/2015/346/contents>

<sup>9</sup> Scottish Government (2017) The Public Water Supplies (Scotland) Regulations 2014 (as amended). Available at: <https://www.legislation.gov.uk/sdsi/2014/9780111024782/contents>

<sup>10</sup> Scottish Government (2013) The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 [Online] Available at: <http://www.legislation.gov.uk/ssi/2013/29/introduction/made>

<sup>11</sup> Directive 2009/147/EC of the European Parliament and of the Council (2020). Available at: <https://www.legislation.gov.uk/eudr/2009/147/contents>. (Accessed December 2025).

<sup>12</sup> Council Directive 92/43/EEC (2020). Available at: <https://www.legislation.gov.uk/eudr/1992/43/contents>. (Accessed December 2025).

<sup>13</sup> Scottish Planning Policy (2014). Available at: <https://www.gov.scot/publications/scottish-planning-policy/pages/2/>. (Accessed December 2025).

<sup>14</sup> National Planning Policy 4 (2023). Available at: <https://www.gov.scot/publications/national-planning-framework-4/>. (Accessed December 2025).

<sup>15</sup> Currently, review and replacement of Pollution Prevention Guidelines (PPGs) with Guidance for Pollution Prevention (GPPs). Current PPGs and GPPs are available online: [guidance-for-pollution-prevention-1-2022-update.pdf](#)

<sup>16</sup> Guidance for Pollution Prevention: Above Ground Oil Storage Tanks (2021). Available at: <https://www.netregs.org.uk/media/1890/guidance-for-pollution-prevention-2-2022-update.pdf>. (Accessed December 2025)

<sup>17</sup> Guidance provided in recent GPPs will be followed and take precedent over information provided in PPG 6, which was withdrawn on 14th December 2015, where there is overlap in the provision of advice. For example, guidance on the storage of handling of oils /fuels in GPP 2 will take precedent over guidance provided in Section 5 (Oil use, storage and refuelling) of PPG 6. Available at: [gpp6-working-on-construction-and-demolition-sites.pdf](#)

<sup>18</sup> SEPA Guidance and Advice Notes. Available at: [guidance-for-pollution-prevention-13-2022-update-v2.pdf](#)

- WAT-G-034 EASR Guidance: Construction works and silt/pollution mitigation
- WAT-SG-25: Good Practice Guide - River Crossings (November 2010) <sup>19</sup>;
- Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019), Good Practice During Wind Farm Construction (4th Edition)<sup>20</sup>; and
- Scottish Government (2012) River Crossings and Migratory Fish<sup>21</sup>.
- The Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (April 2017) (Second Edition)<sup>22</sup>
- Scottish Government, SNH, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland<sup>23</sup>;

- SNH (2016) Carbon and Peatland Map<sup>24</sup>;
- The Scottish Government (2009), The Scottish Soil Framework;
- The Construction Industry Research and Information Association (CIRIA) (2015), Environmental Good Practice on Site (C741);
- Scottish Renewables and SEPA (2012). Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste<sup>25</sup>; and
- SEPA (2011). Restoration Techniques Using Peat Spoil from Construction Works<sup>26</sup>.

<sup>19</sup> Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019), Good Practice During Wind Farm Construction (4<sup>th</sup> Edition). Available T: <https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction> [Accessed December 2025]

<sup>20</sup> Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019), Good Practice During Wind Farm Construction (4<sup>th</sup> Edition). Available T: <https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction> [Accessed December 2025]

<sup>21</sup> <http://www.scotland.gov.uk/Topics/marine/science/Publications/publicationslatest/rivercrossings>

<sup>22</sup> Proposed Electricity Generation Developments: Peat Landslide Hazard Best Practice Guide (2017). Available at: <https://www.gov.scot/publications/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/>. (Accessed December 2025).

<sup>23</sup> Scottish Government, Scottish Natural Heritage, SEPA. (2017). Peatland Survey. Guidance on Developments on Peatland, online version only.

<sup>24</sup> Scottish Natural Heritage. (2016). Carbon and Peatland 2016 Map (Carbon and peatland 2016 map | Scotland's soils ) [http://map.environment.gov.scot/soil\\_maps/](http://map.environment.gov.scot/soil_maps/) .

<sup>25</sup> Scottish Renewables and SEPA (2012). Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste.

<sup>26</sup> SEPA (2011). Restoration Techniques Using Peat Spoil from Construction Works.