

Environmental Impact Assessment Report

Beinneun 2 Wind Farm

Volume 1

Chapter 12: Hydrology, Hydrogeology and Peat

Document prepared by Raincloud Consulting Ltd and Envams Ltd for Beinneun 2 Ltd

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12 HYDROLOGY, HYDROGEOLOGY AND PEAT

12.1 INTRODUCTION

This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Beinneun 2 Wind Farm ('the Development') on the hydrology, hydrogeology and soil resources.

This Chapter includes the following elements:

- Introduction;
- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Embedded Measures;
- Assessment of Potential Effects;
- Mitigation Measures and Residual Effects;
- Cumulative Effect Assessment;
- Summary of Effects; and
- Statement of Significance.

12.1.1 Assessment Scenarios and Potential Effects

This assessment includes consideration of potential effects on aspects of the environment related to hydrology, hydrogeology and soils, where these are not considered in other chapters of this EIA Report. Categories of receptors considered in this assessment include:

- Watercourses and water bodies;
- Protected resources (designations) dependent on water;
- Private Water Supplies (PWS);
- Public Water Supplies (PuWS); and
- Peat.

The scope of the assessment is set out in Section 12.3.1.

The Development is described in Chapter 4, Development Description, of this EIA Report. Where there is flexibility or uncertainty in the definition of aspects of the Development, a worst-case approach has been taken. This includes assuming that all the "areas of search for borrow pits" shown on Figure 4.1 are developed.

12.1.2 Supporting Information

This Chapter of the EIA Report is supported by the following Technical Appendix (TA) documents provided in Volume 3 Technical Appendices:

- TA A4.2: Outline Construction Environmental Management Plan (oCEMP);
- TA A12.1: Watercourse Crossings Inventory (WCI);
- TA A12.2: Peat Landslide Hazard and Risk Assessment; and
- TA A12.3: Shadow Habitats Regulations Appraisal for the River Moriston SAC.

This Chapter of the EIA Report is supported by the following figure provided in Volume 2, Figures:

- Figure 4.1: Site Layout;
- Figure 12.1: Hydrology Study Areas;
- Figure 12.2: PWS Study;
- Figure 12.3: Watercourse Buffer;
- Figure 12.4: Drainage Basin Catchments; and
- Figure 12.5: DWPA Catchments.

12.1.3 Competence

This assessment was undertaken by Liam Nevins, director of Raincloud Consulting Ltd, a water and environmental consultancy. Liam has over 18 years of experience of assessing the effects of developments on the water environment, specialising in renewable energy developments in the UK. Liam is a Chartered member of CIWEM.

12.1.4 Scoping Responses and Consultations

Consultation for this EIA Report topic was undertaken with the organisations shown in Table 12.1.

Table 12.1 Consultation Responses

| Consultee, Type and Date | Summary of Consultation Response | Response to Consultee |
|--|---|--|
| <p>The Highland Council (THC)</p> <p>Pre-application advice for major developments pack</p> <p>December 2024</p> | <p>The proposals should demonstrate how impacts on local hydrology have been minimised and the site layout designed to minimise watercourse crossings and avoid other direct impacts on water features.</p> <p>Measures should be put in place to protect any downstream sensitive receptors. The submission must include a set of drawings showing:</p> <ul style="list-style-type: none"> • All proposed temporary or permanent infrastructure overlain with all lochs and watercourses; • A minimum buffer from excavation of 50m around each loch or watercourse. If this minimum buffer cannot be achieved each breach must be numbered on a plan with an associated photograph of the location, dimensions of the loch or watercourse and drawings of what is proposed in terms of engineering works; • A map showing the location, size, depths and dimensions of all borrow pits overlain with all lochs and watercourses within 250m and showing a site-specific buffer around each loch or watercourse proportionate to the depth of excavations. The information provided needs to demonstrate that a site-specific proportionate buffer can be achieved. <p>In this instance it appears that the development will likely result in a large number of new watercourse crossings. If a commitment is made that all crossings will be oversized bottomless culverts or traditional style bridges SEPA is content that only limited baseline</p> | <p>A figure showing Development infrastructure and watercourses / loch is provided as Figure 12.3. A 50 m buffer has been applied to watercourses and there are no incursions from turbine bases or borrow pits.</p> <p>Borrow pits are proposed as part of the Development, however the detail of these depends on the rock requirements, which in turn depends on the detailed design of the infrastructure. This occurs post-consent, when the turbine model is selected. At this stage, Figure 4.1 identifies areas of search for borrow pits, which are expected to be sufficient to meet the stone requirements for the Development. Detail on borrow pits will be provided at detailed design stage, and specific requirements in relation to borrow pit detail is expected to be subject to a planning condition.</p> <p>Watercourse crossings are outlined in TA A12.1: WCI. All watercourse crossings will be designed to the 0.5%</p> |

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| | <p>information is required on crossings at the EIA Report stage.</p> <p>Development or landraising within any flood plain should be avoided and proposals should generally follow SEPA's Standing Advice for Flood Risk. Should any permanent infrastructure be located within close proximity to a watercourse, a Flood Risk Assessment should be submitted to demonstrate that the development is not at risk from flooding and will not increase flood risk elsewhere.</p> <p>Small watercourse crossings should be oversized and larger scale watercourse crossings should be demonstrated to be adequately designed to accommodate the 1 in 200 year flow (including an allowance for climate change and freeboard) to avoid increasing the risk of flooding, or information provided to justify smaller structures.</p> <p>A Drainage Impact Assessment (DIA) for the development is required. The DIA should include details relating to any existing field drains and the management of surface water drainage, which should be designed in line with general Sustainable Drainage Systems (SuDS) principles. The Applicant should demonstrate, within the proposals submitted, any mitigation measures to manage the residual risk of overland flow/pluvial flooding.</p> <p>Natural flood management techniques should also be applied to reduce the rate of runoff where possible.</p> <p>Tracks should not act as preferential pathways for runoff and efforts should be made to retain the existing drainage network. Appropriate drainage is required to restrict runoff to pre-development rates and to minimise erosion to existing watercourses. The DIA should ensure that post development runoff rate is no greater than pre-development runoff rate (i.e. greenfield runoff) for all return periods up to the 1 in 200 year event including an allowance for climate change.</p> <p>Runoff from all events up to and including the 1 in 200 year plus climate change event should be managed within the site boundary, with no flooding to critical roads or buildings, and evidence as to how this will be achieved should be included within the DIA.</p> | <p>annual exceedance probability (AEP) plus 42% climate change event.</p> <p>No landraising within the floodplain is proposed.</p> <p>Watercourse crossings are outlined in TA A12.1: WCI. All watercourse crossings will be designed to the 0.5% AEP plus 42% climate change event.</p> <p>SuDS measures are outlined in the oCEMP.</p> <p>The principles of access track drainage are outlined the oCEMP and these measures will limit the potential for access tracks to act as preferential drainage pathways.</p> |
| <p>Marine Directorate – Science Evidence Data and Digital (MD-SEDD) Scoping September 2023</p> | <p>In relation to water quality, fish populations and fisheries for incorporation into planning consents MD-SEDD require:</p> <ol style="list-style-type: none"> 1. No development shall commence unless a Water Quality and Fish Monitoring Plan (WQFMP) has been submitted to and approved in writing by the Planning Authority in consultation with Marine Directorate – Science Evidence Data and Digital (MD-SEDD) and any such other advisors or organisations. 2. The WQFMP must take account of the Scottish Government's MDSEDD guidelines and standing advice and shall include: | <ol style="list-style-type: none"> 1. A programme of Water Quality Monitoring (WQM) is outlined in Section 7.10 of the oCEMP. 2a. The programme of WQM outlines that 12 months of baseline data would be obtained prior to the construction phase and that sampling would occur during the construction and partly |

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| | <p>a. water quality sampling should be carried out at least 12 months prior to construction commencing, during construction and for at least 12 months after construction is complete. The water quality monitoring plan should include key hydrochemical parameters, turbidity, and flow data, the identification of sampling locations (including control sites), frequency of sampling, sampling methodology, data analysis and reporting etc.;</p> <p>b. the fish monitoring plan should include fully quantitative electrofishing surveys at sites potentially impacted and at control sites for at least 12 months before construction commences, during construction and for at least 12 months after construction is completed to detect any changes in fish populations; and</p> <p>c. appropriate site specific mitigation measures detailed in the Environmental Impact Assessment and in agreement with the Planning Authority and MD-SEDD.</p> <p>3. Thereafter, the WQFMP shall be implemented within the timescales set out to the satisfaction of the Planning Authority in consultation with MD-SEDD and the results of such monitoring shall be submitted to the Planning Authority on a 6 monthly basis or on request.</p> | <p>into the operational phase of the Development. The detailed WQM plan should be secured as part of an appropriately worded planning condition.</p> <p>2b. The fish monitoring plan will be provided as part of the CEMP and agreed with MD-SEDD.</p> <p>2c. The oCEMP, Section 7, outlines the proposed good practice measures and site-specific mitigation measures required to limit the potential for effects on the hydrological environment.</p> <p>3. A programme of Water Quality Monitoring (WQM) is outlined in Section 7.10 of the oCEMP.</p> |
| <p>SEPA Scoping (November 2023)</p> | <p>In relation to the Site Layout, SEPA require maps to visually represent the area.</p> <p>1.1 All maps must be based on an adequate scale with which to assess the information. This could range from OS 1: 10,000 to a more detailed scale in more sensitive locations. Each of the maps below must detail all proposed upgraded, temporary and permanent infrastructure. This includes all tracks, excavations, buildings, borrow pits, pipelines, cabling, site compounds, laydown areas, storage areas and any other built elements. Existing built infrastructure must be re-used or upgraded where possible. The layout should be designed to minimise the extent of new works on previously undisturbed ground. For example, a layout which makes use of lots of spurs or loops is unlikely to be acceptable. Cabling must be laid in ground already disturbed such as verges. A comparison of the environmental effects of alternative locations of infrastructure elements, such as tracks, may be required.</p> <p>In relation to planning and building watercourse crossings to minimise adverse effects on the water environment, SEPA require:</p> <p>2.1 The submission must include a map showing:</p> <ul style="list-style-type: none"> a) A map showing all proposed temporary or permanent infrastructure overlain with all lochs and watercourses. b) A map showing a minimum buffer of 50m around each loch or watercourse. If this minimum buffer cannot be achieved each breach must be numbered on a plan with an associated photograph of the location, dimensions of the loch or watercourse and drawings of what is proposed in terms of engineering works. Measures should be put in | <p>1.1. All maps provide a suitable basemap / OS map based on the scale of the map. Relevant Development infrastructure will be shown on the appropriate maps.</p> <p>2.1. a) The Development layout, Figure 4.1 provides all temporary and permanent infrastructure associated to the site and OS mapping which shows all lochs and watercourses.</p> <p>b) A map showing a 50 m buffer from all watercourses is provided in Figure 12.3.</p> <p>2.3 All watercourse crossings will be designed to the 0.5% AEP (1:200 year) plus 42% climate change</p> |

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| | <p>place to protect any downstream sensitive receptors.</p> <p>2.3 Crossings must be designed to accommodate the 0.5% Annual Exceedance Probability flows (with an appropriate allowance for climate change), or information provided to justify smaller structures. If it is considered the development could result in an increased risk of flooding to a nearby receptor then a Flood Risk Assessment (FRA) must be submitted.</p> <p>3.1 Where proposals are on peatland or carbon rich soils the following should be submitted to address the requirements of NPF4 Policy 5:</p> <ul style="list-style-type: none"> • layout plans showing all permanent and temporary infrastructure, with extent of excavation required, which clearly demonstrates how the mitigation hierarchy outlined in NPF4 has been applied. These plans should be overlaid on: <ul style="list-style-type: none"> I. peat depth survey (showing peat probe locations, colour coded using distinct colours for each depth category and annotated at a usable scale) II. peat depth survey showing interpolated peat depths III. peatland condition mapping IV. National Vegetation Classification survey (NVC) habitat mapping. • an outline Peat Management Plan (PMP). • an outline Habitat Management Plan (HMP) <p>Excavations and other construction works can disrupt groundwater flow and impact on GWDTE and existing groundwater abstractions. The layout and design of the development must avoid impacts on such areas. A National Vegetation Classification survey which includes the following information should be submitted:</p> <p>4.1 Groundwater Dependent Terrestrial Ecosystems (GWDTE) are protected under the Water Framework Directive. Excavations and other construction works can disrupt groundwater flow and impact on GWDTE and existing groundwater abstractions. The layout and design of the development must avoid impacts on such areas. A National Vegetation Classification survey which includes the following information should be submitted:</p> <p>a) A map demonstrating all GWDTE and existing groundwater abstractions are outwith a 100m radius of all excavations shallower than 1m and outwith 250m of all excavations deeper than 1m and proposed groundwater abstractions. The survey needs to extend beyond the site boundary where the distances require it.</p> <p>b) If the minimum buffers cannot be achieved, a detailed site specific qualitative and/or quantitative risk assessment will be required.</p> <p>In relation to forest removal and forest waste. SEPA require:</p> <p>5.1 If forestry is present on the site, we prefer a site layout which avoids large scale felling as this can result in large amounts of waste material and a peak in</p> | <p>event. The Development will incorporate SuDS within the detailed design and, as such, flood risk is considered within Section 12.6.1.7 of this Chapter rather than as a standalone document.</p> <p>3.1 All relevant peat data is provided in Technical Appendix A12.2. Outline measures for peat management are provided in Technical Appendix A12.2 (Section 4.2). These will be developed into a Peat Management Plan post-consent.</p> <p>4.1 The Development layout has sought to avoid GWDTEs where possible and an NVC survey is provided within Technical Appendix A6.1 of Chapter 6: Ecology.</p> <p>4.1 a) A map of GWDTE communities is provided within Technical Appendix A6.4 and Figure 6.6 of Chapter 6: Ecology.</p> <p>4.1 b) Whilst the Development cannot be located outwith the buffers outlined within LUPS-GU31, observations from both the Hydrology and Ecology site walkovers indicate that communities classed as GWDTEs within the Site are ombrotrophic and not fed by groundwater.</p> <p>5.1 No forestry is present on the Site and no felling is proposed as part of the Development.</p> |

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| | <p>release of nutrients which can affect local water quality. The submission must include a map with the boundaries of where felling will take place and a description of what is proposed for this timber in accordance with Use of Trees Cleared to Facilitate Development of Afforested Land – Joint Guidance from SEPA, SNH and FCS.</p> <p>In relation to borrow pits. SEPA request: 6.1 The following information should also be submitted to each borrow pit:</p> <ul style="list-style-type: none"> • A map showing the location, size, depths and dimensions. • A map showing any stocks of rock, overburden, soils and temporary and permanent infrastructure including tracks, buildings, oil storage, pipes and drainage, overlain with all lochs and watercourses to a distance of 250m. You need to demonstrate that a site-specific proportionate buffer can be achieved. On this map, a site-specific buffer must be drawn around each loch or watercourse proportionate to the depth of excavations and at least 10m from access tracks. • Sections and plans detailed how restoration will be progressed including the phasing, profiles depths and types of material to be used. <p>A schedule of mitigation including pollution prevention measures and construction techniques must be submitted. 7.1 A schedule of mitigation supported by the above site specific maps and plans must be submitted. These must include reference to best practice pollution prevention and construction techniques (for example, limiting the maximum area to be stripped of soils at any one time) and regulatory requirements. They should set out the daily responsibilities of Ecological Clerk of Works, how site inspections will be recorded and acted upon and proposals for a planning monitoring enforcement officer.</p> | <p>6.1 Borrow pits are proposed as part of the Development, however the detail of these depends on the rock requirements, which in turn depends on the detailed design of the infrastructure. This occurs post-consent, when the turbine model is selected. At this stage, Figure 4.1 identifies areas of search for borrow pits, which are expected to be sufficient to meet the stone requirements for the Development. Detail on borrow pits will be provided at detailed design stage, and specific requirements in relation to borrow pit detail is expected to be subject to a planning condition.</p> <p>7.1 A schedule of mitigation is provided in Chapter 15. This refers to measures set out in various documents and plans, including TA A4.1 oCEMP.</p> |
| <p>The Highland Council Scoping Response 12th January 2024</p> | <p>In relation to peat, the Scottish Highland council advises: 3.38 The EIAR should include a full assessment on the impact of the development on peat. The assessment of the impact on peat must include peat probing for all areas where development is proposed. The Council are of the view this should include probing not just at the point of infrastructure as proposed by the scheme but also covering the areas of ground which would be subject to micro-siting limits. 3.39 SEPA can provide detailed advice on methodology for peat probing and the peat assessment. 3.40 Carbon balance calculations should be undertaken and included within the EIAR with a</p> | <p>3.38 and 3.39 A Peat Landslide Hazard and Risk Assessment is provided in Technical Appendix A12.2. Peat probing details are described in Section 2 of TA A12.2. 3.40 Carbon balance calculations are provided in Chapter 10.</p> |

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| | summary of the results provided focussing on the carbon payback period for the wind farm. | |
| | <p>Proposals must demonstrate construction practices, and the effects on geology:</p> <p>3.41 The EIAR should fully describe the likely significant effects of the development on the local geology including aspects such as borrow pits, earthworks, site restoration and the soil generally including direct effects and any indirect.</p> <p>Proposals should demonstrate construction practices that help to minimise the use of raw materials and maximise the use of secondary aggregates and recycled or renewable materials. Where borrow pits are proposed the EIAR should include information regarding the location, size and nature of these borrow pits including information on the depth of the borrow pit floor and the borrow pit final reinstated profile. This can avoid the need for further applications.</p> | <p>3.41 Technical Appendix A12.2 provides an assessment of the Development on peat, with relevant summaries of this in Section 12.6 of this Chapter. Technical Appendix A4.1 oCEMP provides construction practices including relating to borrow pits, earthworks, site restoration and soils.</p> |
| | <p>Proposals must demonstrate the effects on hydrology and hydrogeology:</p> <p>3.42 EIAR needs to address the nature of the hydrology and hydrogeology of the site, and of the potential impacts on water courses, water supplies including private supplies, water quality, water quantity and on aquatic flora and fauna. Impacts on watercourses, lochs, groundwater, other water features and sensitive receptors, such as water supplies, need to be assessed. Measures to prevent erosion, sedimentation or discolouration will be required, along with monitoring proposals and contingency plans. Assessment will need to recognise periods of high rainfall which will impact on any calculations of run-off, high flow in watercourses and hydrogeological matters. You are strongly advised at an early stage to consult SEPA as the regulatory body responsible for the implementation of the Controlled Activities (Scotland) Regulations 2005 (CAR), to identify if a CAR license is necessary and the extent of the information required by SEPA to assess any license application.</p> <p>3.43 If culverting should be proposed, either in relation to new or upgraded tracks, then it should be noted that SEPA has a general presumption against modification, diversion or culverting of watercourses. Schemes should be designed to avoid crossing watercourses, and to bridge watercourses where this cannot be avoided.</p> <p>The EIAR will be expected to identify all water crossings and include a systematic table of watercourse crossings or channelising, with detailed justification for any such elements and design to minimise impact.</p> <p>The table should be accompanied by photography of each watercourse affected and include dimensions of the watercourse. It may be useful for the applicant to demonstrate choice of watercourse crossing by means of a decision tree, taking into account factors including catchment size (resultant flows), natural habitat and environmental concerns.</p> | <p>3.42 Section 12.6 assesses the potential impacts of the development on the water environment including PWS, water quality, watercourses, lochs, groundwater and other sensitive receptors. Measures to prevent erosion, sedimentation or discolouration are provide in TA A4.1 oCEMP.</p> <p>An assessment on surface water runoff is included in Section 12.6.1.7.</p> <p>3.43 All watercourse crossing types are provided in TA A12.1 Watercourse Crossings Inventory.</p> |
| | <p>The Highland Council identifies that there are a number of watercourses and waterbodies on the site, therefore the following applies:</p> <p>3.45</p> | <p>3.45</p> <ul style="list-style-type: none"> • A 50 m buffer from watercourses is |

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| | <ul style="list-style-type: none"> • A minimum of a 50m buffer of all watercourses / bodies and turbines/crane hardstandings, which should be shown on a suitably scaled drawing; • All tracks should be kept a minimum 10m away from any waterbody except water crossings; • Access tracks not acting as preferential pathways for runoff and efforts being made to retain existing natural drainage wherever possible; • Natural flood management techniques should be applied to reduce the rate of runoff where possible; use of SuDS to achieve pre-development runoff rates and to minimise erosion on existing watercourses; • Water crossings in the form of culverts or bridges, or upgrades to existing crossings must be designed to accommodate to 1 in 200 year flood event, plus climate change; • Land rising within any floodplain to be avoided; if ultimately required, compensatory storage must be provided; and, • The EIAR should be informed by the Council's Flood Risk and Drainage Impact Assessment SG. | <p>provided in Figure 12.3.</p> <ul style="list-style-type: none"> • Tracks are designed to minimise the number of crossings and are 10 m from watercourses, except crossings. • Measures to provide the minimal disturbance to flow path ways are outlined in Section 12.6.1.3and TA A4.1 oCEMP. • The BESS and substation compound will utilise a formal SuDS to manage surface water runoff generated from the BESS development. • Water crossings will be designed to the 0.5 % AEP (1:200 year) plus 42 % climate change event, as per SEPA climate change allowances. • No land rising within the floodplain is proposed. |
| | <p>In relation to private water supplies, the Highland Council requires the applicant to:</p> <p>3.46 The need for, and information on, abstractions of water supplies for concrete works or other operations should also be identified. The EIAR should identify whether a public or private source is to be utilised. If a private source is to be utilised, full details on the source and details of abstraction need to be provided.</p> <p>3.47 The applicant will be required to carry out an investigation to identify any private water supplies, including pipework, which may be adversely affected by the development and to submit details of the measures proposed to prevent contamination or physical disruption. Highland Council has some information on known supplies but it is not definitive. An onsite survey will be required.</p> | <p>3.46 Water for the construction phase will be imported and not a private source.</p> <p>3.47 No PWS are located within 1 km of the Development infrastructure and therefore potential effects on PWS have been scoped out of this assessment.</p> |

12.2 LEGISLATION, POLICY AND GUIDANCE

The following guidance, legislation and information sources have been considered in carrying out this assessment:

- The Water Framework Directive (WFD) (2000/60/EC)¹;
- (Scotland) Act 2003² and subsidiary Regulations;

¹ European Commission (2000) The Water Framework Directive (2000/60/EC) [Online] Available at: https://ec.europa.eu/environment/water/water-framework/index_en.html [Accessed 13/05/2025].

² Scottish Government (2003) The Water Environment and Water Services (Scotland) Act 2003 [Online] Available at: <http://www.legislation.gov.uk/asp/2003/3/contents> [Accessed 13/05/2025].

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, as amended ('the EIA Regulations')³;
- The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003⁴;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017⁵; and
- The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2017⁶.

12.2.1 Scottish Planning Policy and Guidance

National Planning Framework 4 ('NPF4') was adopted in February 2023 and sets the long-term context for development planning in Scotland.

It contains policies with relevance to this Water Resources assessment, including Policy 22 (Flood risk and water management – including in relation to sustainable drainage systems ('SuDS')), and provides support for renewable technologies such as wind farms via Policy 11 (Energy).

Local policy context is set out in the Planning Statement, which accompanies the application for Section 36 consent for the Development.

12.2.2 Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs)

GPPs give advice on statutory responsibilities and good environmental practice. Each PPG and GPP addresses a specific industrial sector or activity. SEPA and Northern Ireland Environment Agency (NIEA) are in the process of replacing the PPGs with GPPs. The following guidance are of relevance principally to surface water, however as surface water has the potential to affect groundwater, they are also of relevance to the assessment of groundwater.

Netregs PPGs were replaced by GPPs⁷:

- GPP1: Understanding your environmental responsibilities – good environmental practices (October 2020);
- GPP2: Above ground oil storage tanks (January 2018);
- GPP3: Use and design of oil separators in surface water drainage systems (March 2022);
- GPP4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (November 2017);
- GPP5: Works and maintenance in or near water (January 2017);
- GPP6: Working at construction and demolition sites (April 2023);
- GPP8: Safe storage and disposal of used oils (July 2017);
- GPP13: Vehicle washing and cleaning (April 2017);
- GPP21: Pollution incident response planning (July 2017); and
- GPP22: Dealing with spills (October 2018).

12.2.3 Other Guidance

Other relevant guidance comprises the following:

- The Scottish Government (2001), PAN 61: Planning and Sustainable Urban Drainage Systems⁸;

³ Scottish Government. (2017) The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations). Available at: <https://www.legislation.gov.uk/ssi/2017/101/made>. [Accessed 13/05/2025].

⁴ Scottish Government (2003) Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 [Online] Available at: http://www.opsi.gov.uk/legislation/scotland/acts2003/asp_20030015_en_1 [Accessed 13/05/2025].

⁵ Scottish Government (2017) the Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 [Online] Available at: <https://www.legislation.gov.uk/ssi/2017/282/note/made>. [Accessed 13/05/2025].

⁶ Scottish Government (2017) the Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2017 [Online] Available at: <http://www.legislation.gov.uk/ssi/2017/321/made> [Accessed 13/05/2025].

⁷ Guidance for Pollution Prevention (GPPs) – Full List [Online] Available at: <https://www.netregs.org.uk/environmentaltopics/pollution-prevention-guidelines-ppgs-and-replacement-series/> [Accessed: 22/01/2025].

⁸ The Scottish Government (2001) PAN61 Planning and Sustainable Urban Drainage Systems [Online] Available at: <https://www.gov.scot/publications/pan-61-sustainable-urban-drainage-systems/> [Accessed: 27/01/2025].

- SEPA (2010) Land Use Planning System Guidance Note 2, Version 8 (LUPS-GU2)⁹;
- SEPA (2010) Engineering in the water environment: good practice guide: River crossings¹⁰;
- SEPA (2015) Culverting of watercourses: position statement and supporting guidance¹¹;
- SEPA (2017) Land Use Planning System Guidance Note 31, Version 3, (LUPS-GU31)¹²;
- SEPA (2024) Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems¹³;
- SEPA (2024) Climate change allowances for flood risk assessment in land use planning (Version 5)¹⁴;
- SEPA (2002) Managing River Habitats for Fisheries¹⁵;
- The Water Environment (Controlled Activities) (Scotland) Amended Regulations 2021 (the CAR Regulations)¹⁶;
- SEPA (2024), CAR - A Practical Guide, Version 9.4¹⁷;
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013¹⁸;
- SEPA (2021), The River Basin Management Plan for Scotland¹⁹;
- Scottish Water (SW) List of Precautions for Drinking Water and Assets – Wind Farms EdE²⁰;
- NatureScot (2024), Good Practice During Wind Farm Construction²¹;
- The Construction Industry Research and Information Association (CIRIA) (2023), Environmental Good Practice on Site guide (Fifth edition) (C811)²²;
- CIRIA (2001) Control of Water Pollution from Construction Sites (C532)²³; and
- CIRIA (2015) The SuDS Manual (C753)²⁴.

⁹ SEPA (2010) Land Use Planning System Guidance Note 2, Planning advice on Sustainable Drainage Systems (SUDS), Version 8 [Online] Available at: <https://geosmartinfo.co.uk/wp-content/uploads/2023/01/lups-qu2-planning-guidance-on-sustainable-drainage-systems-suds.pdf> [Accessed: 27/01/2025].

¹⁰ SEPA (2010) Engineering in the water environment good practice guide: River Crossings, WAT-SG-25 [Online] Available at: <http://www.sepa.org.uk/regulations/water/engineering/engineering-guidance/> [Accessed 25/01/2025].

¹¹ SEPA (2015) Culverting of watercourses: position statement and supporting guidance WAT-PS-06-02, Version 2.0 [Online] Available at: https://www.sepa.org.uk/media/150919/wat_ps_06_02.pdf [Accessed: 27/01/2025].

¹² SEPA (2017) Land Use Planning System Guidance Note 31. Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Version 3 [Online] Available at: https://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf [Accessed: 27/01/2025].

¹³ <https://www.sepa.org.uk/media/a1yh0blq/guidance-on-assessing-the-impacts-of-developments-on-groundwater-dependent-terrestrial-ecosystems.docx>

¹⁴ SEPA (2024) Climate change allowances for flood risk assessment in land use planning. Version 5 [Online] Available at: https://www.sepa.org.uk/media/ijwpxuso/climate-change-allowances-guidance_v6.pdf [Accessed: 27/01/2025].

¹⁵ SEPA (2002) Managing River Habitats for Fisheries: a guide to best practice [Online] Available at: https://www.sepa.org.uk/media/151323/managing_river_habitats_fisheries.pdf [Accessed: 27/01/2025].

¹⁶ Scottish Government (2021) the Water Environment (Controlled Activities) (Scotland) Amened Regulations 2021 [Online] Available at: <https://www.legislation.gov.uk/ssi/2021/412/contents/made> [Accessed 27/01/2025].

¹⁷ Scottish Government (2013) The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 [Online] Available at: <https://www.legislation.gov.uk/ssi/2013/29/made> [Accessed 27/01/2025].

¹⁸ Scottish Government (2013) The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 [Online] Available at: <https://www.legislation.gov.uk/ssi/2013/29/made> [Accessed: 27/01/2025].

¹⁹ SEPA (2021) River Basin Management Plan [Online] Available at: <https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf> [Accessed: 27/01/2025].

²⁰ Scottish Water List of Precautions for Drinking Water and Assets – Wind Farms EdE [Online] Available at: <https://www.scottishwater.co.uk/-/media/ScottishWater/Document-Hub/Key-Publications/Energy-and-Sustainability/Sustainable-Land-Management/091120SWListOfPrecautionsForDrinkingWaterAndAssetsWindFarmsEdE.pdf> [Accessed 27/01/2025].

²¹ NatureScot (2024) Good Practice during Wind Farm Construction [Online] Available at: <https://www.nature.scot/doc/good-practice-during-wind-farm-construction> [Accessed: 27/01/2025]

²² 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 [Accessed 27/01/2025].

²³ CIRIA (2001), Control of Water Pollution from Construction Sites (C532) [Online] Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532 [Accessed: 27/01/2025].

²⁴ CIRIA (2015) The SuDS Manual (C753) [Online] Available at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C753 [Accessed 27/01/2025].

12.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

12.3.1 Scope of Assessment

The key issues for the assessment of potential hydrological effects relating to the Development include both short-term (construction and decommissioning) and long-term (operation) effects.

Short-term effects arising from the construction and decommissioning phases such as:

- Chemical pollution and sedimentation of watercourses and the wider hydrological environment as a result of construction works;
- Impediments to watercourse and near-surface water flow from turbine foundations and shallow excavation works, including changes in soil and peat inflow patterns;
- Potential changes to quality and / or quantity of Private Water Supplies (PWS) or Public Water Supplies (PuWS);
- Potential effects on the hydrological function of groundwater dependent terrestrial ecosystems (GWDTEs);
- Potential changes to the groundwater body;
- Acidification of watercourses as a result of construction works and related tree felling;
- Increased run-off and flood risk from increased hardstanding including access tracks; and
- Compaction of soils and superficial deposits and reduction in ability of such deposits to store water.

Long-term effects arising from the operation phase potentially include:

- Increased run-off and flood risk from increased hardstanding including permanent access tracks; and
- Severance or reduced quantity of water supplying users of surface water (e.g. hydro schemes and PWS).

The key sensitive receptors are considered to be:

- Surface water watercourses hydrologically connected to designated receptors, such as the West Inverness-shire Lochs Site of Special Scientific Interest (SSSI) and River Moriston Special Area of Conservation (SAC);
- Groundwater receptors;
- Near-surface water;
- PWS; and
- PuWS.

Effects during construction, operation and decommissioning have been assessed in Section 12.6, as well as potential cumulative effects in Section 12.8.

12.3.2 Study Area

The hydrology and hydrogeology study area ('the Core Study Area') is defined by the Application boundary as shown on Figure 4.1.

A study area of 1 km from the Core Study Area has been defined to assess the potential effects on PWS ('the PWS Study Area'), and a wider study area of 10 km from the Core Study Area to assess potential effects on the downstream water environment ('the Wider Study Area').

All three study areas are shown in Figure 12.1.

At distances greater than 10 km within upland catchments, it is considered the Development is unlikely to contribute to a hydrological effect, in terms of chemical or sedimentation effects, due to dilution and attenuation of potentially polluting chemicals.

12.3.3 Baseline Survey Methodology

A desk-based assessment, consultation, and site walkover have been conducted to inform the hydrology and hydrogeology assessment.

12.3.4 Desk-based Assessment

The desk-based assessment included:

- Identification of watercourses, surface water catchments and springs;
- Identification of underlying geology and hydrogeology and connectivity to the Development;
- Assessment of topography and slope to inform drainage patterns;
- Collation of data provided through consultation, including details on PWS and their sources; and
- Assessment of flood risk data and mapping.

The following sources of information were used to inform the desk-based assessment:

- The Ordnance Survey (OS) 1:50,000 (Digital);
- OS 1:25,000 Map (Digital);
- National River Flow Archive (NRFA)²⁵;
- SEPA Flood Map 2025²⁶;
- Meteorological Office Rainfall Data²⁷;
- Scotland's Environment web-based maps²⁸; and
- The British Geological Survey (BGS) GeoIndex onshore geology viewer²⁹.

12.3.5 Consultation

In addition to the Scoping consultation outlined in Section 12.1.1. The following consultees were contacted to inform this assessment:

- THC Environmental Health Officer (EHO) via email to obtain information on registered PWS within the PWS Study Area;
- THC Major Pre-Application meeting on 06/10/2024, where key aspects of the Development were discussed with stakeholders, including SEPA; and
- THC Pre-Application report.

12.3.6 Site Walkover

A site walkover was conducted on 12th February 2025 to visually inspect watercourses, surface water features, obtain an understanding of the local topography and drainage patterns and to ground-truth the information reviewed and collated in the desk-based assessment.

The site walkover focussed on hydrological receptors within the Core Study Area and, specifically and surface hydrology. The findings of the site walkover are detailed in Section 12.4.1.

No PWS were visited as the nearest PWS is located 2.6 km from the Core Study Area, as shown in Figure 12.2, and as a result an assessment of effects on PWS was scoped out, as set out in Section 12.4.10.

12.3.7 Methodology for the Assessment of Effects

The significance of the potential effects of the Development has been classified by professional consideration of the sensitivity of the receptor and the magnitude of the potential effect.

The assessment follows the systematic approach outlined in Chapter 2: EIA.

The methodology outlined in Sections 12.3.7.1 to 12.3.7.3 has been developed by the authors of this chapter in consultation with SEPA, MD-SEDD, and various Councils across

²⁵ Centre for Ecology and Hydrology (undated) National River Flow Archive [Online] Available at: https://nrfa.ceh.ac.uk/data?qad_source=1&qclid=CjwKCAiAneK8BhAVEiwAoy2HYypgf0dYLWsefVxpqnc7zvnNVq4F2T_goJ9d_o0WxrQWq2Q3ksL8zRhoCljsQAvD_BwE [Accessed 28/01/2025].

²⁶ SEPA (2019) Flood Maps [Online] Available at: <https://map.sepa.org.uk/floodmaps> [Accessed 19/05/2025]

²⁷ Met Office (2019) Climate Data [Online] Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/location-specific-long-term-averages> [Accessed 13/05/2025].

²⁸ Scotland's Environment (n.d.) [Online] Available at: <https://www.environment.gov.scot/legal/terms-and-conditions/> [Accessed: 13/05/2025]

²⁹ BGS (2019) GeoIndex Onshore [Online] Available at: <https://mapapps2.bgs.ac.uk/geoindex/home.html> [Accessed 13/05/2025].

Scotland. The assessment is based on a source-pathway-receptor methodology, where the sensitivity of the receptors and the magnitude of potential change upon those receptors identified within the study areas outlined in Section 12.3.2.

Not all attributes need to be met for a sensitivity category to be defined.

12.3.7.1 Sensitivity of Receptors

The sensitivity of the baseline conditions – including the importance of environmental features on or near to the Site, or the sensitivity of potentially affected receptors – has been assessed in line with best practice guidance, legislation, statutory designation assessment guidance and / or professional judgement. A framework for this is set out in Table 12.2.

Table 12.2 Framework for Determining Sensitivity of Receptors

| Sensitivity of Receptor | Definition |
|-------------------------|---|
| High | <ul style="list-style-type: none"> • A large, medium or small waterbody with a SEPA water quality classification of 'High' or 'Good'. • A SSSI or the hydrological receptor is of high environmental importance or is designated as national or international importance, such as a Special Area of Conservation (SAC), SPA or Wetland of International Importance (Ramsar). • The hydrological receptor and downstream environment have no / limited capacity to attenuate natural fluctuations in hydrochemistry and cannot absorb further changes without fundamentally altering its baseline characteristics / natural processes. • The receptor acts as an active or future floodplain or other flood defence, in accordance with NPF4. • The hydrological receptor is used for recreational use (e.g. bathing waters). • The hydrological receptor will support abstractions for public water supply or private water abstractions for more than 25 people and / or 100 livestock. • The hydrological receptor will support abstractions for public water supply or private water abstractions for the production of mass-produced food and drinks. • Areas containing geological or geomorphological features considered to be of national environmental importance (e.g. geological SSSIs and NNRs). • Groundwater body is classified by the BGS as a 'high / moderately productive aquifer', with high / moderate quality and yield. Aquifer(s) of local or regional value. Areas of nature conservation known to be sensitive / dependent on groundwater. • Groundwater vulnerability class 5: vulnerable to most pollutants, with rapid impact in many scenarios. • Groundwater vulnerability class 4a – 4b: vulnerable to those pollutants not readily adsorbed or transformed. • Soil type and associated land use are highly sensitive to hydrological change (e.g. peat/blanket bog). • Class 1 or 2 priority peatland, carbon-rich and peaty soils and covers > 20% of the Site. • GWDTs which are classified by SEPA as 'highly groundwater dependent' have no / minor (1 – 25 %) functional impairment by man-made influence (such as drainage or forestry). • Receptor contains areas of regionally important economic mineral deposits. |
| Medium | <ul style="list-style-type: none"> • A large, medium or small waterbody with a SEPA water quality classification of 'Moderate'. • The hydrological receptor is of regional environmental importance (such as Local Nature Reserves), as defined by SEPA. • The hydrological receptor and downstream environment will have some capacity to attenuate natural fluctuations in hydrochemistry but cannot absorb certain changes without fundamentally altering its baseline characteristics / natural processes. • The hydrological receptor does not act as an active floodplain or other flood defence but is considered to provide some degree of natural flood management (e.g. peat soils). • The hydrological receptor supports abstractions for public water supply of private water abstractions for up to 25 people. • Areas containing geological features of designated regional importance including Regionally Important Geological / geomorphological Sites (RIGS), considered worthy of protection for their historic or aesthetic importance. • Aquifer of limited value (less than local) as water quality does not allow potable or other quality sensitive uses. Exploitation of local groundwater is not far-reaching. Local areas of nature conservation known to be sensitive to groundwater effects. • Groundwater vulnerability class 2-3: vulnerable to some pollutants. |

| Sensitivity of Receptor | Definition |
|-------------------------|---|
| | <ul style="list-style-type: none"> Soil type and associated land use are moderately sensitive (e.g. commercial forestry) Class 1 or 2 priority peatland, carbon-rich peaty soils cover <20% of the site, or Class 3 and 5 peatlands areas, carbon rich and peaty soils. GWDTes which are classified by SEPA as 'highly groundwater dependent' but have moderate (25 % - 50 %) functional impairment by man-made influence (such as drainage or forestry). GWDTes which are classified by SEPA as 'moderately groundwater dependent' but have functional impairment by man-made influence (such as drainage or forestry). Receptor contains areas of locally important economic mineral deposits. |
| Low | <ul style="list-style-type: none"> A large, medium or small waterbody within a SEPA water quality classification of 'Poor' or 'Bad'. The hydrological receptor is not of regional, national or international environmental importance. The hydrological receptor and downstream environment will have capacity to attenuate natural fluctuations in hydrochemistry but can absorb any changes without fundamentally altering its baseline characteristics / natural processes. The hydrological receptor does not act as an active floodplain or other flood defence. The hydrological receptor is not used for recreational use. The hydrological receptor does not support abstractions for public water supply or private water abstractions. Geological features or geology not protected and not considered worthy of specific protection. Poor groundwater quality and / or very low permeability make exploitation of groundwater unfeasible. Changes to groundwater not expected to affect local ecology. Groundwater vulnerability class 1: vulnerable to conservative pollutants. Soil type and associated land use not sensitive to change in hydrological regime (e.g. intensive grazing). Receptor contains Class -2, -1, 0 and 4 non-peatland areas, with no carbon-rich and/or peaty soils. GWDTes which are classified by SEPA as "highly groundwater dependent" but have major (>50%) functional impairment by manmade influence (such as drainage or forestry). GWDTes which are classified by SEPA as 'highly or moderately groundwater dependent' but are observed by an ecologist and hydrologist as ombrotrophic. GWDTes which are classified by SEPA as 'moderately groundwater dependent' but have functional impairment by man-made influence (such as drainage or forestry). The hydrological receptor is not designated for supporting freshwater ecological interest. Renewable energy schemes utilising water (e.g. Hydro schemes). |
| Negligible | The receptor is resistant to change and is of little environmental value. |

12.3.7.2 Magnitude of Effect

The magnitude of potential effects has been identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

The criteria for assessing the magnitude of an effect are provided in Table 12.3.

Table 12.3 Framework for Determining Magnitude of Effects

| Magnitude of Effects | Definition |
|----------------------|--|
| High | <ul style="list-style-type: none"> A short or long-term major shift in hydrochemistry or hydrological conditions sufficient to negatively change the ecology of the receptor. This change will equate to a downgrading of a SEPA water quality classification by two classes e.g. from 'High' to 'Moderate'. A sufficient material increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with NPF4). |

| Magnitude of Effects | Definition |
|--------------------------|---|
| | <ul style="list-style-type: none"> • A major (greater than 50 %) or total loss of a geological receptor or peat habitat site, or where there will be complete severance of a site such as to fundamentally affect the integrity of the site (e.g. blocking hydrological connectivity). • A major loss of (greater than 50 % of study area) or total loss of highly dependent and high value GWDTE, or where there will be complete hydrological severance which will fundamentally affect the integrity of the feature. • A major permanent or long-term negative change to groundwater quality or available yield. • A major permanent or long-term negative change to geological receptor, such as the alteration of pH or drying out of peat. • Changes to groundwater quality or water table level that will negatively alter local ecology or will lead to a groundwater flooding issue. |
| Moderate | <ul style="list-style-type: none"> • A short or long term non-fundamental change to the hydrochemistry or hydrological environment, resulting in a change in ecological status. This change will equate to a downgrading of a SEPA water quality classification by one class e.g. from 'High' to 'Good.' • A moderate increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with NPF4). • A loss of part (approximately 5 % to 50 %) of a geological receptor or peat habitat site, major severance, major effects to its integrity as a feature, or disturbance such that the value of the site will be affected but could still function. • A loss of part (approximately 10 % to 50 % of study area) of a moderately dependent and moderate value GWDTE – significant hydrological severance affects the integrity of the feature, but it could still function. • Changes to the local groundwater regime that may slightly affect the use of the receptor. • The yield of existing PWS or PuWS may be reduced or quality slightly deteriorated. • The yield of existing Hydro schemes may be reduced or quality slightly deteriorated. • Fundamental negative changes to local habitats may occur, resulting in impaired functionality. |
| Low | <ul style="list-style-type: none"> • A detectable non-detrimental change to the baseline hydrochemistry or hydrological environment. This change will not result in a downgrading of the SEPA water quality classification. • A marginal increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water (in accordance with NPF4). • A detectable but non-material effect on the receptor (up to 5 %) or a moderate effect on its integrity as a feature or where there will be a minor severance or disturbance such that the functionality of the receptor will not be affected. • A detectable effect on a GWDTE (loss of between 5 % - 10 % of study area) or a minor effect on a GWDTE's integrity as a feature or where there will be a minor severance or disturbance such that the functionality of the receptor will not be affected. • Changes to groundwater quality, levels or yields do not represent a risk to existing baseline conditions or ecology. |
| Negligible ³⁰ | <ul style="list-style-type: none"> • No perceptible changes to the baseline hydrochemistry or hydrological environment. • No change to the SEPA water quality classification. • No increase in the probability of flooding onsite and offsite. • A slight or negligible change from baseline condition of geological resources. • Change hardly discernible, approximating to a 'no change' in geological condition. • Minimal detectable effect on a GWDTE (between to 0.1 % - 5 % of study area) or no discernible effect on its integrity as a feature or its functionality. |

12.3.7.3 Significance of Effect

The sensitivity of the asset and the magnitude of the predicted effects has been used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 12.4 summarises guideline criteria for assessing the significance of effects. Effects

³⁰ Negligible magnitude of change also includes magnitude of effects that are assessed as no change to the baseline scenario

predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations and are shaded in light grey in the table.

Table 12.4 Framework for Assessment of the Significance of Effects

| Magnitude of Effect | Sensitivity of Resource or Receptor | | | |
|---------------------|-------------------------------------|------------|------------|------------|
| | High | Medium | Low | Negligible |
| High | Major | Moderate | Moderate | Minor |
| Moderate | Moderate | Moderate | Minor | Negligible |
| Low | Minor | Minor | Negligible | Negligible |
| Negligible | Negligible | Negligible | Negligible | Negligible |

An oCEMP (provided as Technical Appendix A4.1) accompanies the EIA Report and forms part of the embedded Development design. The oCEMP comprises methods and works that are established and effective measures to which the Applicant will be committed through the development consent. Accordingly, the assessment of significance of effects of the Development are considered with the inclusion of the oCEMP as standard mitigation procedure and are based on good construction practice outlined in the guidance documents set out in Section 12.2.

The conclusions of the assessment, therefore, state whether the significance will be major, moderate, minor or negligible, before appropriate mitigation (beyond measures specified in the oCEMP) has been implemented. This assessment relies on professional judgement to ensure that the effects are appropriately assessed.

A residual effect is considered to be a likely significant effect in accordance with the EIA Regulations if assessed as moderate or major following the preceding methodology.

12.3.8 Assessment Limitations

All data considered necessary to identify and assess the potential significant effects resulting from the Development was available and was used in the assessment reported in this Chapter.

12.4 BASELINE CONDITIONS

12.4.1 Topography and Land Use

The Core Study Area is located northwest of Invergarry, east and north of the A87, as shown on Figure 1.1. Upland moorland is present north of the A87 and falls within the Core Study Area.

The Core Study Area has a topographical high of approximately 665 m Above Ordnance Datum (AOD) at the northeastern section of the Core Study Area. The topographical low is 250 m AOD located in the northwestern section of the Core Study Area, where the A87 runs meets the Core Study Area.

12.4.2 Climate

The closest SEPA gauging station³¹ to the Core Study Area is on the River Garry at Craigard (Station 234189), which is located at National Grid reference NG 892414, approximately 5.4 km southeast. The station is located at an elevation 49 m AOD, on the River Garry, south of Invergarry.

Precipitation data from the Meteorological Office is reviewed for the nearest climate station to the Site, which is located at Fort Augustus, approximately 12.1 km east of the Core Study Area. The Average Annual Rainfall (SAAR 1961 – 1990) is recorded at 1185.89 mm. The climate station provides the average annual rainfall in the period 1991 - 2020 as 1359.4 mm.

Table 12.5 summarises the average annual rainfall for the Fort Augustus climate station.

³¹ SEPA (2020) Water Level Data [Online] <https://waterlevels.sepa.org.uk/Map> [Accessed 13/05/2025].

Table 12.5 Average rainfall for Fort Augustus climate station.

| Month | Jan | Feb | Mar | Ap | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|----------------------------|-------|-------|-------|------|------|------|------|------|-------|-------|-------|-------|
| Average precipitation (mm) | 190.6 | 132.5 | 112.2 | 66.8 | 68.4 | 67.4 | 71.3 | 93.2 | 104.9 | 140.3 | 136.0 | 175.8 |

12.4.3 Surface Hydrology

The Core Study Area lies within the primary catchment of the River Ness.

The River Moriston catchment covers the northern section of the Site, River Loyne catchment north-west, and the catchment of Loch Garry, which connects to River Garry, drains the majority of the Site.

It should also be noted that flows within the River Loyne and the River Garry will be influenced by the impounding effects of the lochs which have retaining walls.

Watercourse catchments are shown in Figure 12.4.

Allt a' Chaorainn, Allt a' Bheithe and Allt a' Bhiora flow south into Loch Garry, with confluences approximately 2 km, 1.5 km and 1.8 km south of the Site, respectively.

Allt Dubh flows south and connects into Allt Daingean approximately 1.3 km south of the Site before connecting to Loch Garry approximately 1.5 km south of the Site. Allt Achaidh Luachraich and Allt a' Clachain flows south into the River Garry approximately 1.9 km, 2.2 km south of the Site, respectively. Allt Coire a' Bhainne flows south into Loch a' Bhainne followed by Eas a' Bhainne and Aldernaig Burn before connecting into the River Garry, approximately 5 km southeast of the Core Study Area.

Named and unnamed watercourses rise within the western section of the Core Study Area and flow south/east to north/west and ultimately discharge into Loch Loyne and River Moriston which border the north boundary of the Core Study Area. Caochan Riabhach and Feith Ghrianach and Allt Leac a' Phollain flow west into the Loch Loyne approximately 380 m, 1 km and 1.1 km west of the Site, respectively.

There are no watercourses located within the Core Study Area that have a SEPA water quality classification. Instead, SEPA water quality classification is given to watercourses and waterbodies which receive water drained from the Core Study Area.

River Moriston, River Garry, Loch Garry and Loch Loyne all have Good ecological potential and are heavily modified.

The River Loyne has Bad ecological potential and is heavily modified.

Plate 1 shows Allt Daingean, Plate 2 shows Allt Achaidh Luachraich, while Plate 3 shows Allt a' Bhiora.

Plate 1: Allt Daingean



Plate 2: Allt Achaidh Luachraich

Plate 3: Allt a' Bhiora



Higher ground in the southern section of the Core Study Area drains initially by overland flow, small, incised streams / channels in the peaty soils and very occasional flushes within eroded peat / soil channels, as shown in Plate 3.

Plate 3: Channels in the peaty soils across the Core Study Area



Peaty deposits may act as a store of water and release rainwater for a considerable time after significant rainfall. Observations made during the site walkover noted that some areas of the Development, principally within peat hags, were heavily saturated following the precipitation events preceding and during the site visit.

12.4.4 Hydrogeology and Geology

The BGS groundwater vulnerability³² for the Core Study Area ranges between 4b to 5, defining some areas with underlying rocks as vulnerable to most pollutants and other areas vulnerable to pollutants not readily absorbed.

Groundwater vulnerability classes range from 1 to 5, with 5 being most vulnerable. Class 4 is subdivided into 4a, 4b, 4c and 4d. It is the hydrogeological characteristics within the pathway rather than the 'importance' of a particular aquifer that results in the final vulnerability classification. The methodology behind the classification assumes that where contaminants move through unsaturated fractured bedrock, no attenuation of pollutants can take place. Large parts of Scotland show areas of Classes 4 and 5, reflecting the widespread occurrence of rocks dominated by fracture flow. Rocks which are not exposed at the surface and are overlain by superficial deposits have a reduced potential for attenuation of contaminants.

The BGS Geology Viewer identifies Psammite bedrock of the Upper Garry Psammite Formation covering much of the Core Study.

³² BGS (2015) Groundwater Vulnerability (Scotland) GIS dataset, Version 2 [Online] Available at: <http://nora.nerc.ac.uk/id/eprint/509618/1/OR15002.pdf> [Accessed: 16/05/2025].

Igneous bedrock is located centrally of the Core Study Area and comprises of granodiorite, diorite, and leucogranite.

Superficial glacial deposits comprise hummocky mounded glacial deposits of peat, diamiction, sand, and gravel.

12.4.5 Soils and Peat

The Carbon and Peatland 2016 Map³³ indicates the carbon-rich soils and peatland importance categories to be:

- Class 1 – Nationally important carbon rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value;
- Class 2 – Nationally important carbon-rich soils, deep peat and priority peatland habitats. Areas of potentially high conservation value and restoration potential;
- Class 3 – Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat;
- Class 4 – Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils;
- Class 5 – Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat; and
- Class 0 – Mineral soil – Peatland habitats are not typically found in such soils.

The Carbon and Peatland mapping shows the Core Study Area is located within multiple classifications of peat. The majority of the Core Study Area is located within Class 2 except turbine 2 which is located within Class 0 and turbines 3 and 4 which area located within Class 3.

A Phase 1 peat probe survey was undertaken in winter 2025 and includes probes at 989 locations across the turbine and track areas. The data shows the majority (68.1 %) of the peat depths within the Core Study Area are <0.5 m. Table 12.6 provides a breakdown of the peat probe depths recorded.

Table 12.6: Summary of Phase 1 Peat Probe Investigations

| Peat Depth Range (m) | Number of Peat Probes | Percentage of Total (%) |
|----------------------|-----------------------|-------------------------|
| 0 – 0.50 | 653 | 68.1 |
| 0.51 – 1.00 | 186 | 19.4 |
| – 1.50 | 44 | 4.6 |
| 1.51 – 2.00 | 47 | 4.9 |
| 2.01 – 2.50 | 13 | 1.4 |
| 2.51 – 3.00 | 9 | 0.9 |
| 3.01 – 3.50 | 4 | 0.4 |
| 3.51 – 4.00 | 2 | 0.2 |
| 4.01 – 4.50 | 1 | 0.1 |
| Total | 989 | 100 |

A Phase 2 peat probe investigation was undertaken in spring 2025 and covered the areas not included in Phase 1, covering the entirety of the Core Study Area, and at a higher probe density in areas proposed for Development infrastructure. The investigation included probes at 1,892 locations. The data shows the majority (66.6 %) of the peat depths within the Core Study Area are <0.5 m. Table 12.7 provides a breakdown of the peat probe depths recorded.

³³Scottish Government (2025) Scotland Soils - Carbon and Peatland 2016 Map [Online] Available at: https://map.environment.gov.scot/Soil_maps/?layer=10 (Accessed 26/06/2025).

Table 12.7: Summary of Phase 2 Peat Probe Investigations

| Peat Depth Range (m) | Number of Peat Probes | Percentage of Total (%) |
|----------------------|-----------------------|-------------------------|
| 0 – 0.50 | 1,260 | 66.6 |
| 0.51 – 1.00 | 310 | 16.4 |
| 1.00 – 1.50 | 168 | 8.9 |
| 1.51 – 2.00 | 92 | 4.9 |
| 2.01 – 2.50 | 37 | 2.0 |
| 2.51 – 3.00 | 19 | 1 |
| >3.0 | 6 | 0.3 |
| Total | 1,892 | 100 |

Details regarding the peat survey are provided in TA A12.2. A plan showing the peat probe locations and depths recorded is provided in Drawing 162008-9203 in Appendix A of TA A12.2. The pattern of peat depth across the Core Study Area is one of many small pockets of deeper peat (typically c. 2 m) surrounded by areas of shallower peat (less than 0.5 m). There were not extensive areas of deeper peat that could be readily avoided by design of the Development layout (other than the slightly higher concentration of probe locations showing greater peat depths to the south of T19); conversely, whilst the Development layout could not entirely avoid areas of deeper peat, these areas are small.

Table 12.8 shows the maximum peat depth at each turbine location and maximum depth within a 150 m buffer from each turbine location. As is evident from Table 12.8, the turbines are generally sited in locations where peat is shallower than it is in surrounding areas, as a result of the careful design to minimise impacts on peat.

Table 12.8: Peat Depth Data

| Turbine number | Location (Eastings & Northings) | Max Peat Depth (m) | Max Peat Depth within 150 m (m) |
|----------------|---------------------------------|--------------------|---------------------------------|
| 1 | E 220661 N 806534 | 2.0 | 2.0 |
| 2 | E 220767 N 805955 | 1.4 | 1.4 |
| 3 | E 220182 N 805374 | 0.8 | 1.2 |
| 4 | E 220196 N 804821 | 0.2 | 0.8 |
| 5 | E 220633 N 804335 | 1.8 | 3.3 |
| 6 | E 221378 N 804594 | 0.3 | 1.8 |
| 7 | E 222090 N 804595 | 0.9 | 1.4 |
| 8 | E 222736 N 804789 | 0.05 | 1.5 |
| 9 | E 222945 N 804299 | 0.1 | 1.9 |
| 10 | E 223449 N 805199 | 1.0 | 1.0 |
| 11 | E 224176 N 805530 | 2.0 | 4.0 |
| 12 | E 224483 N 805104 | 2.0 | 2.0 |
| 13 | E 224850 N 805801 | 0.2 | 1.5 |
| 14 | E 225412 N 805717 | 0.8 | 1.5 |
| 15 | E 225764 N 805397 | 0.5 | 2.8 |
| 16 | E 225607 N 806484 | 0.6 | 0.6 |
| 17 | E 226228 N 806492 | 0.3 | 0.6 |
| 18 | E 226530 N 806045 | 0.5 | 1.0 |
| 19 | E 226530 N 806045 | 0.7 | 4.5 |

124.5.1 Borehole Records

Six BGS borehole records are located approximately 1.9 km northeast of the Core Study Area (BGS ID: 19909924, 19978761-19978765 BGS reference: NH20NW13-NH20NW18)³⁴.

It identifies ground water level to a depth of 6 – 12 m below ground level (BGL). Sand, and gravel with clay was found approximately 5 m BGL, psammite approximately for 70 m, and quartz and granite at 70 – 80 m BGL.

Given the distance from the Core Study Area, the borehole records may not fully represent the underlying strata at the Core Study Area.

Desk studies have not identified any areas of contaminated land within the Development.

12.4.6 Designated Hydrological Receptors

The statutory designated sites relating to water within the Wider Study Area were identified through the use of NatureScot³⁵ and SEPA GIS³⁶ datasets.

The Statutory designations that are considered hydrologically connected to the Core Study Area are listed in Table 12.9.

Table 12.9 Statutory Designated Sites within 10 km of the Core Study Area

| Designation | Approximate Distance from the Development | Qualifying Interest | Hydrologically Connected to the Core Study Area |
|---------------------------------|--|---|--|
| River Moriston SAC | 2.78 km north from nearest point of proposed access track | Atlantic salmon (<i>Salmo salar</i>), Freshwater pearl mussel (<i>Margaritifera margaritifera</i>) Latest Assessed Condition ³⁷ Atlantic salmon – Unfavourable, no change (2015) Freshwater pearl mussel – Unfavourable, no change (2019) | Yes – Multiple watercourses located on the Site discharge into Loch Loyne, which releases to the River Loyne which discharges to the River Moriston, approximately 2 km downstream |
| West Inverness-shire Lochs SSSI | Loch Loyne – 250 m from nearest point on proposed access track Loch Garry – 1.8 km from nearest point on proposed access track Loch Cluanie – 3 km from nearest point on proposed access track | Black-throated diver (<i>Gavia arctica</i>), common scoter (<i>Melanitta nigra</i>) Latest Assessed Condition ³⁸ Black-throated diver – Favourable maintained (2011) | Yes – Multiple watercourses located on the site flow into the lochs |

³⁴ BGS Borehole Records, BGS ID: 19978761 [Online] Available at: <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/19978761> [Accessed 16/05/2025]

BGS Borehole Records, BGS ID: 19978762 [Online] Available at: <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/19978762> [Accessed 16/05/2025]

BGS Borehole Records, BGS ID: 19978763 [Online] Available at: <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/19978763> [Accessed 16/05/2025]

BGS Borehole Records, BGS ID: 19978764 [Online] Available at: <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/19978764> [Accessed 16/05/2025]

BGS Borehole Records, BGS ID: 19978765 [Online] Available at: <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/19978765> [Accessed 16/05/2025]

BGS Borehole Records, BGS ID: 19909924 [Online] Available at: <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/19909924> [Accessed 16/05/2025]

³⁵ NatureScot Open Data [Online] Available at: <https://opendata.nature.scot/> [Accessed 13/05/2025].

³⁶ SEPA (2019) Datasets [Online] Available at: <https://informatics.sepa.org.uk/WaterClassificationHub/> [Accessed 13/05/2025].

³⁷ NatureScot, River Moriston SAC [Online] Available at: <https://sitelink.nature.scot/site/8361> [Accessed 13/05/2025].

³⁸ NatureScot, West Inverness-shire Lochs SSSI [Online] Available at: <https://sitelink.nature.scot/site/9189> [Accessed 13/05/2025].

| Designation | Approximate Distance from the Development | Qualifying Interest | Hydrologically Connected to the Core Study Area |
|-----------------------|--|---|--|
| | Loch Lundie – 3.2 km from nearest point on proposed access track Lochan Bad an Losguinn – 3.9 km from nearest point on proposed access track Lich Poulary – 7.5 km from nearest point on proposed access track | Common scoter – Unfavourable declining (2018) | |
| South Laggan Fen SSSI | 8 km from nearest point on proposed access track | Transition open fen Latest Assessed Condition ³⁹ - Favourably maintained (2014) | No – Separated by the Caledonian Canal. Outside the Core Study Area watershed. |

12.4.7 Private and Public Water Supplies

12.4.7.1 Public Water Supplies

Aldernaig Burn Drinking Water Protection Area (DWPA) is located on the eastern boundary of the Core Study Area. As shown within Figure 12.5, no development infrastructure is located within the DWPA catchment.

The Garbh Allt DWPA is located approximately 1 km west of the Core Study Area.

Scottish Water identified in their Scoping response that Loch Ness, located approximately 13 km northeast of the Core Study Area, supplies Invermoriston Water Treatment Works (WTW).

12.4.7.2 Private Water Supplies

No PWS were identified within 1 km of the Core Study Area, as shown in Figure 12.2.

The closest PWS is located approximately 3.6 km south of wind turbine 9.

12.4.8 Impoundments and Abstractions

No abstractions have been identified within the Core Study Area.

One impoundment of surface water, Intake 1 associated with a run-of river Munerigie Hydropower Scheme on Allt Achaidh Luachraich, is located in the east of the Core Study Area, approximately 360 m southeast of Turbine 15. Intakes 2 and 3 are located outside the catchment of the Development.

12.4.9 Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

A GWDTE Assessment was conducted by Gavia in March 2025 and identifies GWDTEs within the Core Study Area. Technical Appendix A6.4 and Figure 6.6 identifies potential 'high', 'moderate' or 'low' GWDTEs. Five 'moderate' and 'high' GWDTE communities as per SEPA designation are located within 250 m of the turbines and potential borrow pit locations, and 100 m of the access track, in accordance with SEPA LUPS-GU31:

- M6;
- M10;
- M15;
- M16; and

³⁹ NatureScot, South Laggan Fen SSSI [Online] Available at: <https://sitelink.nature.scot/site/1454> [Accessed 13/05/2025].

- M25.

Further details regarding GWDTEs can be found in TA A6.4, GWDTE.

Observations from the Hydrology site walkover indicated surface water pooling in flatter areas of the Core Study Area, while areas with steeper topography were well drained, suggesting the potential GWDTE communities are not fed by baseflow.

Additionally, water chemistry analysis undertaken by Gavia (see TA6.4) indicates that no obvious evidence of groundwater influence was found in the water chemistry results. Once water chemistry was considered along with the habitat data, the peat depths at the sample locations and the underlying geology, it was determined that no significant groundwater outflows were present within the survey area, based on the sample locations tested. As such, most of the water present is considered to be either ombrotrophic or telluric in nature.

Notwithstanding the low potential for these habitats to be groundwater fed, an assessment of potential hydrological effects on them is included in Section 12.6.1.9

12.4.10 Flood Risk

12.4.10.1 Fluvial sources

The SEPA Flood Map indicates the majority of the Site is located outside the fluvial scenarios, except an area of the access track located between turbine 15 and 19, which is located within the High, Medium and Low likelihood fluvial scenarios. The same area is also located within the future medium likelihood scenario.

The area of the track located within the flood extents will be a crossing of the Allt Achaidh Luachraich watercourse. The watercourse crossings will be designed to 0.5% AEP plus climate change return period, as outlined in TA A4.1 oCEMP, and therefore will not have an impact on flooding.

12.4.10.2 Pluvial sources

The SEPA Flood Map indicates there is surface water flood risk on site associated within the number of smaller watercourses present within the Core Study Area.

The access track is shown to be located within the medium risk (1 in 200-year return period) plus climate change event. Turbines 2, 5, 6, 10, 11, 13 and 17 are partly located within medium risk plus climate change event to a depth <0.3 m.

The Battery Energy Storage System (BESS) and adjacent substation compound is partly located within the medium plus climate change event to a depth < 0.3 m. The BESS compound will have a surface water management strategy utilising SuDS features designed to a 1 in 200-year plus 42 % climate change event, as set out in Section 12.5.3.

12.4.10.3 Tidal sources

The Core Study Area is located at a minimum elevation 135 m AOD and is not located near any tidally influenced watercourses.

Therefore, tidal flooding has been scoped out of this assessment.

12.4.10.4 Groundwater sources

The Core Study Area is located on elevated terrain and therefore groundwater is unlikely to rise significantly to emerge at the surface. The Development will be located at ground level or slightly raised and therefore is unlikely to interact or impact groundwater levels.

Therefore, groundwater flooding has been scoped out of this assessment.

12.4.10.5 Reservoir and artificial sources

The Core Study Area is shown to be located outside the extent of flooding from reservoirs based on the SEPA reservoirs flood map.

Therefore, reservoir flooding has been scoped out of this assessment.

12.4.10.6 Sewer and drainage sources

The Core Study Area is located within a rural area and does not require a sewer connection and has therefore been scoped out of this assessment.

12.4.11 Elements Scoped Out of Assessment

The following effects are scoped out of the assessment:

- Private Water Supplies (PWS) – no PWS are located within 1 km of the Development infrastructure. The nearest PWS to the Core Study Area is 1.8 km; and
- Flood risk from fluvial, tidal, groundwater, reservoir/artificial and sewer/drainage sources.

12.4.12 Sensitivity of Receptors

The sensitivities of the identified receptors and their relationship to the potential effects from the construction of the Development, are outlined below in Table 12.10.

Table 12.10 Sensitivity of Receptors

| Receptor | Potential Effects | Sensitivity | Sensitivity Description |
|--|---|-------------|--|
| Surface watercourses and Lochs | Increased run-off, erosion and sedimentation, stream flow impediments and pollution as a result of construction groundworks and chemical handling and storage. | High | River Moriston and River Garry have a SEPA water quality classification of 'Good' so are considered High sensitivity. Surface watercourses are hydrologically linked to designated hydrological receptors (SSSI and SAC). |
| Groundwater | Pollution as a result of erosion and sedimentation from construction activities and uncontained spills from chemical handling and storage. | High | Pollution from hydrocarbons have a lengthy attenuation period in bedrock fissures so is considered a High sensitivity. Groundwater vulnerability is classified as 4b to 5. |
| Near-surface water | Diversion of near-surface flow as a result of track construction and the installation of turbine foundation / hardstanding. | High | Considered High sensitivity as near-surface water supplies flow to watercourses of High sensitivity. |
| Soils / Superficial geology (excluding peat) | Pollution as a result of track construction and chemical handling / storage. | Moderate | Over time the receptor can filter and attenuate the most polluting chemicals so is considered Moderate sensitivity. |
| Peat | Pollution as a result of track construction and uncontained spills from chemical handling / storage. Drying out or destabilisation of peat as a result of construction activities. | High | Over time the receptor can filter and attenuate the most polluting chemicals. Construction activities or chemical impacts could permanently alter the receptor function so is considered a High sensitivity. |
| GWDTES | Pollution as a result of track upgrades and contained spills from vehicles, and chemical handling / storage. | Low | Observations from Hydrology and Ecology site walkovers indicate that GWDTES within the Core Study Area are ombrotrophic and not fed by groundwater. |
| PuWS | Pollution as a result of track upgrades and contained spills from vehicles, and chemical handling / storage. Drying out or changes to quantity as a result of upgrades to access track | High | The hydrological receptor will support abstractions for public water supply. |
| Hydropower schemes | Reduced run-off / yield as a result of impediments to flow. Sedimentation as a result of construction groundworks. | Low | Considered Low sensitivity as the receptor has a relatively high resistance to sedimentation and only has a small intake within the catchment of the Development. |

12.5 EMBEDDED MEASURES

12.5.1 Environmental Management Plans

For the construction phase, embedded control measures are set out within the Outline Construction Environmental Management Plan (oCEMP; provided as TA A4.1) which sets out specific measures which relate to this Development. The oCEMP describes water management measures to control surface water run-off and drain hardstanding and other structures during the construction and operation of the Development. Good practice will be followed in all aspects of construction, operation and decommissioning, specifically through a PPP. The development will be subject to a Construction Site Licence, for which a site-specific PPP and incident response plan will be detailed by the Construction Contractor. The PPP will be incorporated into the CEMP.

The PPP will set out measures to be employed to avoid or mitigate potential effects for all phases of the Development and will also include an Incident Plan to be followed should a pollution event occur. This plan will be produced following consultation and agreement with SEPA and all appropriate personnel working on the construction site will be trained in its use. The construction Project Manager will have specific responsibility for implementation of the PPP.

Method statements will also be applied, which will follow the principles laid out in relevant SEPA Pollution Prevention Guidelines.

Measures outlined in the oCEMP comprise good practice methods and works that are established and effective measures to which the Developer will be committed through the development consent.

Measures outlined in the oCEMP will be adopted and incorporated into a detailed CEMP to be agreed with statutory consultees and the planning authority following consent, and this is expected to be secured through an appropriately worded planning condition. For ease of reference through this Chapter, reference to specific sections in the oCEMP, detailing the appropriate embedded mitigation measures, are provided.

Accordingly, the identification and assessment of likely significant effects from the Development is considered following implementation of the measures in TA A4.1: oCEMP.

Although the oCEMP will evolve to take account of consultee feedback and detailed design, there is sufficient confidence in the effectiveness of the measures set out in the oCEMP for them to be treated as part of the Development for the purposes of this assessment. The measures discussed in the oCEMP are inherently part of all wind farm development design and should be treated as embedded mitigation. This approach has received positive comments from consultees for proposing appropriate embedded mitigation on a project specific basis.

A comparable Decommissioning CEMP (DCEMP) will be prepared for the decommissioning stage in advance of decommissioning commencing, and this is anticipated to be secured by planning condition.

An Operation Environmental Management Plan (OEMP) will be developed in advance of the operation phase. This will provide detail on the retained drainage and new drainage design for the Development, soft engineering and measures proposed to reduce surface water run-off rates from areas of hardstanding. This is anticipated to be secured by planning condition.

Storage of fuels during operation of the Development will follow good practice guidance and the OEMP will detail the location of fuel storage and location of emergency spill kits.

12.5.2 Battery Safety

The Outline Battery Safety Management Plan (BSMP), provided as TA A14.2, sets out measures to minimise the risk of a fire occurring and minimise the consequences of a fire should it occur. A final BSMP will be prepared prior to commencement of construction of the BESS element of the Development, and this is expected to be secured by a suitably worded planning condition.

12.5.3 Drainage

The BESS and substation compounds will have a Sustainable Drainage System (SuDS) designed to a 0.5 % AEP plus 42 % climate change event to manage runoff generated from the compound.

This is expected to be secured through a planning condition requiring the detailed design to be submitted and approved by THC prior to construction.

12.5.4 Avoidance and Construction Methods

The requirement for access tracks crossing watercourses has been minimised during the design stage.

Avoidance of areas of deep peat deposits (>3 m) have been established for the turbine laydown areas and proposed infrastructure has been located on shallower peat as far as practicable.

No Development infrastructure is located within or near areas identified at medium or high risk of peat landslides.

On areas with peat depths are greater than 1 m, floating road is proposed. In a floating road, the weight of the road is supported by the peat beneath as such avoiding the requirement for foundations extending through to the underlying solid stratum. The floating road will be constructed in line with the good practice guidance provided by Scottish Natural Heritage / Forestry Commission Scotland (2010)⁴⁰ and Scottish Renewables et al (2019)⁴¹ and would include the use of geogrids and geotextiles (where applicable).

Peat Management, storage and reuse is outlined in the oCEMP as well as A12.2 (Section 4.2), Peat Management During Construction.

No felling is proposed as part of the Development and therefore effects associated with acidification, impediments to flow (brash build up) and increases in run-off rates are reduced accordingly.

12.5.5 Buffers

A buffer distance of 50 m has been established between watercourses shown on the 1:50,000 OS mapping and Development infrastructure (except for necessary track crossings of watercourses), shown in Figure 12.3.

A buffer zone distance of 250 m has been established between turbine bases and groundwater abstractions via boreholes, in accordance with LUPS-GU31. Beyond this, the separation of construction groundworks from watercourses has been maximised.

The 250 m buffer between turbine bases and boreholes, and the 50 m buffer zone around watercourses, in conjunction with the measures set out in the oCEMP, will be sufficient to avoid potential effects on the hydrological and hydrogeological resource, as their effectiveness has been demonstrated on several wind farm construction sites for which Raincloud Consulting Ltd (the authors of this chapter) have provided technical advice.

Proposed access tracks have been designed to avoid crossing watercourses, where possible.

12.6 ASSESSMENT OF POTENTIAL EFFECTS

The potential effects of the Development on hydrological receptors have been considered for the construction, operation and decommissioning phases. Effects occurring during construction and decommissioning are considered to be short-term effects, with those occurring as a result of the operational phase of the Development being considered to be long term effects.

Effects associated with peat are assessed as follows:

⁴⁰ Scottish Natural Heritage & Forestry Commission Scotland (2010) Floating Roads on Peat [Online] Available at: <https://www.roadex.org/wp-content/uploads/2014/01/FCE-SNH-Floating-Roads-on-Peat-report.pdf> [Accessed 26/06/2025].

⁴¹ Scottish Renewables et al (2019) Good Practice during Wind Farm Construction [Online] Available at: https://www.scottishrenewables.com/assets/000/000/453/guidance_-_good_practice_during_wind_farm_construction_original.pdf?1579640559 [Accessed 26/06/2025].

- Erosion: assessed in Section 12.6.1.2, 12.6.2 and 12.6.3;
- Slide risk: assessed in TA A12.2;
- Indirect effect of a peat slide on watercourses: assessed in Section 12.6.1.8;
- Ecological aspects of peat: assessed in Chapter 6: Ecology; and
- Carbon storage aspects of peat: assessed in Chapter 10: Climate.

12.6.1 Potential Construction Phase Effects

The nature and magnitude of effects that could result from the following construction activities, described further in Chapter 4: Development Description, are assessed in the following paragraphs:

- Construction of new access tracks, turbines and associated infrastructure, watercourse crossings, hardstandings, substation, BESS compound, temporary construction compound and borrow pits for the Development.

The potential for micro-siting, as set out in Section 4.2.9 of Chapter 4, Development Description, to alter effects has been included in the assessment of effects in this chapter.

12.6.1.1 Chemical Pollution

Potential effects from construction are a risk management issue, with effects being assessed should the risk be realised. Should the Development proceed as described in Chapter 4: Development Description i.e. with no spills, there would be no effects.

Potential risks include the spillage or leakage of chemicals, fresh concrete, foul water, fuel or oil, during use or storage onsite. These pollutants have the potential to adversely affect soils, subsurface water quality, peat, surface water quality, and groundwater; and hence effects on the biodiversity of receiving watercourses.

The transportation, storage and use of potentially polluting chemicals at a wind farm is limited. The greatest use of such chemicals is of fresh concrete, used in foundations and hardstandings, which may be created on-site or transported onto site.

Surface Hydrology and Designated Hydrological Receptors.

Watercourses could be at risk from a pollution incident during construction. Surface watercourses and surface water bodies are considered to be of High sensitivity.

Buffer distances between proposed construction works and watercourses have been implemented to reduce the potential for chemical pollutants to be transferred to the water environment. A minimum 50 m buffer for natural watercourses from infrastructure (excluding watercourse crossings and access tracks) has been adopted.

Micro-siting of infrastructure will not encroach within the 50 m buffer except for access tracks and crossings, as detailed in Chapter 4: Development Description.

Construction good practice methods, as outlined in Section 7 of TA A4.1: oCEMP, include the use of impermeable membranes and bunding of the construction compound which will safeguard water quality.

Measures such as absorbent spill pads / kits and other measures highlighted within the oCEMP, found in Section 7.7.2 of TA A4.1 oCEMP, will effectively limit the uncontained release of chemicals to small fugitive releases. These would be minimised through best practice construction methods such as vehicle speed limits and regular vehicle and machine maintenance. Routine training practices such as staff inductions and toolbox talks will be conducted throughout the construction phase of the Development. Information regarding staff training is detailed in the oCEMP.

The majority of watercourses draining the Core Study Area discharge to Loch Loyne and Loch Garry, which have retaining walls which control the flow to the receiving watercourses, meaning there is substantial potential for dilution and dissipation of chemical inputs through impoundment.

For these reasons, the magnitude of change on surface water receptors of High sensitivity is considered to be Negligible, and therefore effects are assessed to be of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

Groundwater and Near Surface Water

Pollutants coming into contact within bedrock also have the potential to indirectly alter the quality of the groundwater resource. PH and chemical alterations to groundwater are difficult to rectify due to the fractured nature of the rock and the lengthy attenuation and dispersal of chemicals.

As noted in Section 12.4.4, due to the underlying superficial geology being dominated by glacial deposits of low permeability and bedrock of Psammite being dominated by fracture flow there will be limited potential for contaminants to migrate to groundwater.

Measures such as spill pads, impermeable geotextile membranes and measures described within the oCEMP (TA A4.1, Section 7.7) will effectively limit the uncontained release of chemicals to small fugitive releases.

For these reasons, the magnitude of change on groundwater receptors of High sensitivity is considered to be Negligible, and therefore effects are assessed to be of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

126.1.2 Erosion and Sedimentation

Erosion and sedimentation can occur from excavations, ground disturbance and overburden stockpiling. Sediment entering watercourses has the potential to affect water quality, ecology and flood storage capacity.

Surface Hydrology and Designated Hydrological Receptors

The three main construction activities which could give rise to sedimentation effects are the creation of borrow pits, creation of turbine pads and foundations and creation of access tracks.

The closest potential borrow pit to a watercourse is BP2 (as shown on Figure 4.1) which is approximately 240 m north east of Feith Ghrianach.

All turbine crane pads and working areas are located at least 50 m from watercourses.

Access tracks have been designed to avoid watercourses where possible.

Given the overland distance between construction areas and watercourses, as a result of the embedded buffers of watercourses, any silt or other materials carried by overland flow as a result of construction are likely to be entrained in vegetation and before reaching watercourses.

Measures such as borrow pit drainage, check dams, silt traps, settlement lagoons and buffer strips will minimise sedimentation and erosion; further details of these measures are detailed in the oCEMP (Section 7.6 of TA A4.1 oCEMP).

Other SuDS measures, such as the use of swales and interception bunds, will effectively prevent sediment entering watercourses via drainage ditches adjacent to access tracks. As such, there will be limited potential for sediment or erosion effects on watercourses in the Core Study Area, including the hydrology and water quality of onsite watercourses.

The majority of watercourses draining the Core Study Area discharge to Loch Loyne and Loch Garry, which have retaining walls which control the flow to the receiving watercourses, meaning there is substantial potential for dilution and dissipation of chemical inputs through impoundment. Additionally, as a result of the embedded mitigation detailed in the oCEMP, the magnitude of change on surface hydrology, including watercourses (High sensitivity), hydropower scheme (Low sensitivity), and Designated Hydrological Receptors (High sensitivity), is of Negligible magnitude and therefore will have a Negligible significance of effect.

This is **Not Significant** in terms of the EIA Regulations.

Groundwater and Near Surface Water

Sediment also has the potential to change near surface water flow in superficial geology deposits and peaty soils characteristics by creating a physical barrier within naturally occurring drainage micropores. Sediment entering near-surface water in superficial deposits also has the potential to impact on groundwater quality within bedrock deposits / fissures.

Measures described in Section 7.6 of TA A4.1 oCEMP, such as impermeable ground membrane layers and bunded areas, will effectively prevent sediment entering sub-surface water in superficial deposits and groundwater which are of High sensitivity. For these reasons, the magnitude of change on groundwater and near surface water will be of Negligible magnitude and therefore to have a Negligible significance of effect.

This is **Not Significant** in terms of the EIA Regulations.

126.1.3 Impediments to Surface Water Flow

Access tracks will require the installation of 23 watercourse crossings across all section of the Development, as shown in TA A12.1. No existing tracks are present on site and therefore no existing tracks can be utilised. The Development has been designed to minimise the number of watercourse crossings.

Measures described in Section 7.8.4 of TA A4.1: oCEMP, such as the use of wide bottomless-arched culverts, where appropriate, are likely to prevent impediments to flow being created.

Where flow pathways interact with the access track, drainage matting and cross drainage will be installed to convey flows under the track i.e. regular cross drains would be used to take the flow towards the down-slope side and out to silt control devices and back onto the downslope of the hillside.

Where flow pathways interact with wind turbine areas, specifically wind turbines 6, 10, 12, 13 and 17, they will be diverted around the working area.

Therefore, given the embedded mitigation, the magnitude of change on watercourses (High sensitivity), hydropower scheme (Low sensitivity) and Designated Hydrological Receptors (High sensitivity) is considered to be Negligible magnitude and therefore to have a Negligible significance of effect.

This is **Not Significant** in terms of the EIA Regulations.

126.1.4 Changes in Groundwater Interflow Patterns

Groundwater and near Surface Water

Some wind turbine base excavations may need temporary sub-surface water controls, such as physical cut offs or de-watering. This could temporarily divert flows away from the excavation and lower the local water table and sub-surface water levels. Localised temporary changes to groundwater and near surface water interflow patterns may therefore arise.

Turbine foundations and crane hardstandings also have the potential to change sub surface water flow by creating physical barriers within naturally occurring drainage macropores in superficial deposits, however it is anticipated that near-surface water will migrate around the turbine foundation, directly downslope of the turbine location under gravity, as new pathways within the peat are created (through macropores etc). Subsurface water controls are outlined in Section 7.8.5 of TA A4.1 oCEMP.

Some infiltration of surface water through the access tracks and turbine foundation hardstanding is expected in this habitat, but the majority of the water will enter the surface water drainage system and will be discharged downslope of the access track at specified points.

It is also likely that there will be temporary localised lowering of the water levels within the soil layers downslope of the access track and turbine foundations immediately after construction, due to a reduction in the quantity of near-surface water into these areas.

Drainage ditches on the upslope of the road are likely to be required on side-long ground. If required, the ditches will be constructed with small dams and cross drains where necessary in order for water to drain below the road at regular intervals and that concentrated discharges to soil / peat on the down slope side of the road are avoided.

The drying out of peaty soil can result in alterations to the natural drainage regime. Measures set out in Section 9.2 of TA A4.1 oCEMP, such as the rewetting of peat through controlled irrigation techniques, are considered sufficient and sufficiently reliable to avoid substantial alterations to the natural drainage regime, particularly given the shallow peat

recorded within the Core Study Area. As a result, peat is not expected to dry out, beyond what would be the case in the baseline scenario.

No substantial impediments to near-surface water flow will be created as the detailed site drainage design will take into account any severance of saturated areas to ensure hydrological connectivity is maintained, in accordance with SEPA / NatureScot 'Good practice during wind farm construction'.

Therefore, given the embedded measures detailed in the oCEMP, the magnitude of change on groundwater and near surface water (High sensitivity receptors) are considered to be of Negligible magnitude and therefore to have a Negligible significance of effect.

This is **Not Significant** in terms of the EIA Regulations.

126.15 Migration of Pollutants from Contaminated Land

The site is previously undeveloped, with the only up-slope development being the construction of the existing Beinneun Wind Farm. Desk studies have not identified any areas of contaminated land within the Development and no effects are anticipated.

Should potentially contaminated land be encountered during excavations, however, this would be tested and appropriate action taken in accordance with The Environmental Protection Act 1990. Effects associated with contaminated land are therefore considered to be of Negligible magnitude for surface water and ground water receptors of High sensitivity and therefore will have a Negligible significance of effect.

This is **Not Significant** in terms of the EIA Regulations.

126.16 Acidification of Watercourses

The construction of the Development will involve the movement of heavy machinery across a soft ground surface and hence will lead to soil disturbance which could have the potential to lead to acidification and sedimentation.

Good construction practice, as outlined in the oCEMP, will reduce the potential for sediment to wash out into watercourses and peat flushes.

Effects associated with acidification are therefore considered to be of Negligible magnitude for surface water and groundwater receptors of High sensitivity and therefore will have a Negligible significance of effect.

This is **Not Significant** in terms of the EIA Regulations.

126.17 Increase in runoff and flood risk

Increase in run-off

The increase in hardstanding area associated with construction and operation of the Development could increase the volume and rate of localised surface run-off, although a large proportion of the proposed infrastructure hardstanding, including access tracks and crane hardstanding, would be permeable to some extent. The impermeable nature of the till and peat soils onsite means that, in the baseline scenario, there will be relatively low infiltration and relatively high run-off rates, and hence the addition of the Development would have minimal effect on the existing run-off scenario.

Measures, including SuDS measures, to attenuate run-off and intercept sediment prior to run-off entering watercourses, including from borrow pits, are described in Section 7.5 of TA A4.1 oCEMP and form a part of the Development good construction practice.

As such, the magnitude of change as a result of increased run-off due to felling is considered to be Negligible. Given the High sensitivity of watercourses, the residual effect is of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

Flooding

No construction compound, substation, BESS compound or other Development infrastructure (except access track) is located within areas described as having 0.5 % or greater annual risk of fluvial flooding.

The design of the Development layout has incorporated a buffer zone between watercourse and turbine bases of 50 m to watercourse shown in 1:50,000 OS mapping. Overtopping of small watercourses are unlikely to reach infrastructure.

The BESS and substation compounds will have a Sustainable Drainage System (SuDS) designed to a 0.5 % AEP plus 42 % climate change event to manage runoff generated from the compound.

Watercourse crossings will be designed to a 0.5 % AEP plus 40 % climate change event to not impeded flows within the watercourse.

Where flow paths interact with the access track, drainage matting and cross track drainage will be installed minimise the potential to impede flow pathways. For these reasons, the magnitude of change of watercourses of High sensitivity is considered to be Negligible, and therefore effects are assessed to be of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

126.1.8 Peat landslide impact on Watercourses

Construction on peat soils can result in destabilisation of peat deposits on slopes and lead to slope failure which has the potential to enter watercourse downslope and cause pollution and sedimentation and change fluvial geomorphology. A detailed assessment of peat landslide risk has been undertaken as is provided in TA A12.2 Peat Landslide Hazard and Risk Assessment. The report identifies low peat landslide risk for all turbine areas, following proposed mitigation measures.

Proposed turbines and hardstanding areas will not be constructed directly on peat, rather any peat within the footprint of turbine and hardstanding areas will be excavated to allow construction on a suitable stratum or bedrock.

For these reasons, the magnitude of effect from peat landslide on watercourses of High sensitivity is considered to be Negligible, and therefore effects are assessed to be of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

126.1.9 Effects on the Hydrological Function of GWDTEs

SEPA guidance requires GWDTEs to be identified in relation to distance from infrastructure and potential effects on the hydrological function of GWDTEs to be assessed.

The NVC survey undertaken indicated a presence of species that potentially have groundwater dependency (59 areas in total). These have been identified as having actual low groundwater dependency as outlined in Section 12.4.8 (the assessment leading to these conclusions is presented in TA A6.4, GWDTE).

Notwithstanding that the potential for sensitive habitats to be groundwater-dependent is low, as identified in the GWDTE report, the potential hydrological effects on these habitats has been assessed here.

M15 is the most abundant NVC across the Development, including within the vicinity of the proposed substation and BESS compound, and its associated tracks. Excavations for this infrastructure are likely to be less than 1 m in depth. Where M15 is present within the footprint of the proposed turbines or borrow pits, excavations may reach up to 3 m in depth, with the potential for direct loss to the GWDTE communities. Indirect loss to the surrounding communities may also occur. Approximately 9.2 ha of M15 or communities containing M15 is present within the Site. There is an approximate 2.3% decrease in GWDTE communities containing M15 through the proposed development. The direct hydrological effect will equate to a 'minimal effect on a GWDTE (loss of between 0.1 % - 5 %)', in accordance with Table 12.3. Therefore, the magnitude of the loss of this community will result in a negligible effect. Given the low sensitivity (as set out in Table 12.2) and negligible magnitude of effect, the significance of effects associated with the loss of M15 GWDTE community is Negligible. This is **Not Significant** in terms of the EIA Regulations.

M6, M16 and M25 are also present within the proposed footprint of turbines, where excavations may reach 3 m in depth. There is a direct loss of 2.6 % of M6 and communities containing M6. M16 would experience a direct loss of 3.72% from infrastructure of the Development, and communities containing M25 will experience a 1.7 % direct loss to its

GWDTE communities. Indirect loss to their surrounding communities may also occur. The direct hydrological effect for all will equate to a 'minimal effect on a GWDTE (loss of between 0.1 % - 5 %)', in accordance with Table 12.3. Therefore, the magnitude of the loss of these communities will result in a negligible effect. Given the low sensitivity (as set out in Table 12.2) and negligible magnitude of effect, the significance of effects associated with these GWDTE communities is Negligible.

This is **Not Significant** in terms of the EIA Regulations.

In summary, the potential moderate and high GWDTE communities have been assessed as being not actually sustained by groundwater. Therefore, the specified SEPA guidance for 100 m and 250 m buffers for GWDTE communities does not need to be applied, and effects on GWDTEs are **Not Significant** in terms of the EIA Regulations.

12.6.1.10 Effects on Public Water Supplies

No Development infrastructure is located within the Aldernaig Burn and Garbh Allt DWPA's.

Additionally, Loch Ness, located approximately 13 km northeast of the CSA, supplies Invermoriston Water Treatment Works WTW.

Given the distance between the Development and the PuWS source (Loch Ness) allowing for attenuation and dilution of chemicals / sediment, and the suite of good construction practice measures in the oCEMP, there will be minimal potential for hydrological effects on the resource.

For these reasons, the magnitude of change of PuWS of High sensitivity is Negligible and of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

12.6.2 Potential Operation Phase Effects

The majority of potential effects associated with the operation of the Development are similar to those assessed for the construction phase, above:

- Increased run-off rates and volume;
- Continued erosion and sedimentation from runoff from areas of hardstanding;
- Alterations to natural flow pathways from runoff from areas of hardstanding; and
- Risk of a pollution event from small spills from maintenance vehicles.

The nature of these effects has been discussed in relation to the construction phase. As there would be substantially less activity during operation, and as there is unlikely to be any significant ground disturbance during operation, the magnitude of these effects is similarly reduced.

There will be a reduction in the potential for increased surface water run-off during the operational phase due to the reduction in hardstanding areas used during the construction phase, such as the restoration of the construction compound.

Whilst alterations to natural flow pathways will not be introduced during the operational phase, any changes during construction will continue through operation, as the majority of infrastructure will remain in place. Alterations to natural flow pathways will be reduced through adopting good practice design and construction, as set out in TA A4.1 oCEMP, such as cross drainage, use of shallow drainage ditches and prevention of blockages.

Other potential effects during the operation

- Contamination as a result of BESS fire;
- A risk of a pollution event from small spills from maintenance vehicles; and
- Changes to hydrology affecting GWDTEs.

The risk from onsite battery storage is a battery fire, which could result in contamination of the hydrological environment via surface water runoff into watercourses or infiltration into groundwater, and this is assessed below.

126.21 Contamination from a BESS Fire

Chemical pollution will only become a risk when the battery storage is operational. The batteries will be brought onto the Site prior to installation.

As set out in Section 12.5.2, the Outline Battery Safety Management Plan (BSMP), provided as TA A14.2, sets out measures to minimise the risk of a fire occurring and minimise the consequences of a fire should it occur.

Measures to minimise the risk of contamination to surface water receptors in the event of a fire are detailed in TA A14.2 oBSMP. These include an automatic fire suppression system with a shut-off mechanism to prevent spread of polluted water. This system would include a valve and bunded area from which contaminated water can be pumped out and removed from the Development by licenced contractor.

For these reasons, the magnitude of change on surface water receptors of High sensitivity is considered to be Negligible, and therefore effects are assessed to be of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

GWDTEs

There is no anticipated long-term effect on sub-surface flows during operation, as a result the magnitude and significance of effects on GWDTEs associated with operation of the Development are assessed as being Negligible, and not significant in terms of the EIA Regulations.

As a result, the magnitude and significance of all effects associated with operation of the Development are assessed as being Minor to Negligible, and not significant in terms of the EIA Regulations.

126.22 Risk of a pollution event from minor spills from maintenance vehicles

An OEMP will be developed and agreed with SEPA and THC and implemented during infrequent maintenance visits. The OEMP will detail the location of fuel storage and location of emergency spill kits.

Storage of fuels during operation will follow best practice guidance.

The risk of chemical to occur during operation is considered to be lower than during the construction phase and therefore the magnitude of change on surface water receptors of High sensitivity is considered to be Negligible, and therefore effects are assessed to be of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

12.6.3 Potential Decommissioning Phase Effects

Potential effects of decommissioning the Development are similar in nature to those during construction, as some ground-work would be required to remove turbine foundations and hardstanding to 1 m below ground level. These effects would be substantially lesser in magnitude than during construction and would be controlled by a PPP which would be incorporated into a detailed DCEMP. Where infrastructure would be left in place, drainage features would also be left in place, where this is compatible with the PPP.

As a result, the magnitude and significance of all effects associated with decommissioning are assessed as being Negligible, and **Not Significant** in terms of the EIA Regulations.

12.7 MITIGATION MEASURES AND RESIDUAL EFFECTS

With the embedded design measures described in Section 12.5 in place, all identified potential effects have been assessed as being of negligible significance, and therefore not significant in terms of the EIA Regulations.

No further mitigation is proposed, and all residual effects would be as assessed in Section 12.6.

12.8 CUMULATIVE EFFECT ASSESSMENT

A cumulative effect is considered to be an additional effect on hydrological resources (within the same hydrological catchment) arising from the Development in addition to the combination of other developments likely to affect the hydrological environment.

At distances greater than 10 km, it is considered that schemes are unlikely to contribute to a cumulative hydrological effect due to attenuation and dilution over distance of potentially polluting chemicals. Therefore, for the purposes of the assessment of potential cumulative effects on the immediate catchment and hydrological regime, only proposed developments, which requires large construction / excavation, e.g., onshore wind farm developments, within approximately 10 km of the Development have been considered.

Data searches have identified three wind farm proposals within 10 km of the Development which are consented developments or subject to a valid planning application within the same catchments i.e. are hydrologically connected to the Development:

- Bunloinn, approximately 3 km northwest of the Core Study Area;
- Millenium East, approximately 4.4 km north east of the Core Study Area; and
- Tomchrasky, approximately 8 km north of the Core Study Area.

Operational wind farms are considered part of the baseline.

The greatest potential for cumulative effects arises when the construction phase of another development overlaps with the construction phase of the Development. Cumulative effects are considered to have the potential to be significant only where such an overlap may exist, as activities that could be potentially detrimental to the hydrological environment are greatly reduced during the operational phase of developments (e.g. excavation works, concrete pouring, etc.).

Assuming commencement of the construction of the Development in 2030, lasting for approximately 18 months, this is unlikely to coincide with the construction phases of Bunloinn and Tomchrasky, as they are consented developments with a 5 year time limit on construction commencing, meaning they are likely to operational before the construction phase for the Development commences and therefore is unlikely to be potential for cumulative effects between the developments.

Millenium East was registered with the ECU at a similar time to the Development and therefore it is assumed that the construction phase could overlap with the Development.

Given their respective locations, close to each other, the primary cumulative impact is likely to be increase in flow rates associated within increased run-off from new hardstanding areas of the additional wind farm. Notwithstanding this, potential effects of the Development on a baseline that includes the cumulative developments is assessed below.

12.8.1 Construction Phase

The increase in flow rates is considered to be of Negligible magnitude for the Development. Water management measures will be implemented at Millenium East (Technical Appendix 2.1: Outline Construction Environmental Management Plan), Bunloinn (Chapter 10⁴² refers to a CEMP) and Tomchrasky (Chapter 8⁴³ refers to a CEMP) similar to those described in the oCEMP for the Development, as these are in line with standard practice as required by SEPA. No infrastructure associated with Millenium East drains to the minor watercourses draining the Development. The southern section of Millenium East drains to the River Garry via minor watercourses, bypassing the compounding effects of Loch Garry, for which the majority of the Development drains to. The northern section of Millenium East drains to the River Moriston via minor watercourses, which do not drain the Development. Only small section of the Development lies within the catchment of the River Moriston and is afforded attenuation / impounding effects from Loch Loyne, meaning effects associated with increased runoff will not have a perceptible effect on flows within watercourses which drain Millenium East and the Development.

⁴² <https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00003304&T=5>

⁴³ <https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00004663>

Given this, even if the construction phases overlap with that of the Development, the magnitude of cumulative impacts during the construction phase will be Negligible for all receptors (High to Medium sensitivity) and, therefore, of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations.

12.8.2 Operational Phase

It is anticipated that there will be a minor reduction in the potential for increase in flow rates during the operational phase of the Development and three cumulative wind farms, when compared to the construction phase, due to the reduction in overall hardstanding areas post-construction. Therefore, the magnitude of cumulative effects during the operational phase will be Negligible for all receptors (High to Medium sensitivity), and the significance of these effects will also be Negligible.

This is **Not Significant** in terms of the EIA Regulations.

12.8.3 Decommissioning Phase

The increase in flow rates is considered to be of Negligible magnitude for the Development. It is assumed that any water management measures required at decommissioning, in addition to those already in place, will be implemented at Millenium East, Bunloinn and Tomchrasky wind farms, similar to those described in Section 12.5 for the Development, as these are in line with standard practice as required by SEPA.

Given this, the magnitude of cumulative impacts during the decommissioning phase will be Negligible for all receptors (High to Medium sensitivity) and, therefore, of Negligible significance.

This is **Not Significant** in terms of the EIA Regulations

12.8.4 Residual Cumulative Effects

No additional mitigation is proposed; therefore, residual cumulative effects are as assessed in Sections 12.8.1 to 12.8.3 above and are **Not Significant**.

12.9 SUMMARY OF EFFECTS

Table 12.11 provides a summary of the effects detailed within this Chapter.

Table 12.11: Predicted effects of the Development

| Receptor | Potential Effect | Significance of Effect | Mitigation Proposed (beyond oCEMP) | Residual Effect |
|--|---------------------------------------|------------------------|------------------------------------|-----------------|
| Construction Phase | | | | |
| Surface hydrology (watercourses) and designated hydrological receptors | Chemical Pollution | Negligible | None | Negligible |
| | Erosion and Sedimentation | Negligible | None | Negligible |
| | Pollution from contaminated land | Negligible | None | Negligible |
| | Impediments to surface water flow | Negligible | None | Negligible |
| | Acidification | Negligible | None | Negligible |
| | Increase in runoff and flood risk | Negligible | None | Negligible |
| | Peat Landslide impact on watercourses | Negligible | None | Negligible |
| Groundwater and near Surface Water | Chemical pollution | Negligible | None | Negligible |
| | Erosion and sedimentation | Negligible | None | Negligible |

| Receptor | Potential Effect | Significance of Effect | Mitigation Proposed (beyond oCEMP) | Residual Effect |
|--|--|------------------------|------------------------------------|-----------------|
| | Changes in groundwater interflow pattern | Negligible | None | Negligible |
| GWDTes | Effects on the hydrological function of GWDTes | Negligible | None | Negligible |
| PuWS | Effects on Public Water Supply | Negligible | None | Negligible |
| Hydropower schemes | Impediments to surface water flow | Negligible | None | Negligible |
| Operational Phase | | | | |
| Surface hydrology (watercourses) and Designated Hydrological Receptors | Increased run-off rates and volume | Negligible | None | Negligible |
| Surface hydrology (watercourses) and Designated Hydrological Receptors | Continued erosion and sedimentation from runoff from areas of hardstanding | Negligible | None | Negligible |
| Groundwater and near Surface Water | Alterations to natural flow pathways from runoff of hardstanding | Negligible | None | Negligible |
| Surface hydrology (watercourses) and Designated Hydrological Receptors | Risk of a pollution event from minor spills from maintenance vehicles | Negligible | None | Negligible |
| Surface hydrology (watercourses) and Designated Hydrological Receptors | BESS contamination / occasional turbine maintenance | Negligible | None | Negligible |
| GWDTes | Continued degradation of GWDTes | Negligible | None | Negligible |
| Decommissioning | | | | |
| Surface hydrology (watercourses) and designated hydrological receptors | Chemical Pollution | Negligible | None | Negligible |
| | Erosion and Sedimentation | Negligible | None | Negligible |
| Superficial Geology including Peat | Pollution from contaminated land | Negligible | None | Negligible |
| GWDTES | Impediments to surface water flow | Negligible | None | Negligible |
| PuWS | Effects on Public Water Supply | Negligible | None | Negligible |

12.10 STATEMENT OF SIGNIFICANCE

This Chapter has assessed the likely significance of effects of the Development on hydrology, hydrogeology and soils. The Development has been assessed as having the potential to result in effects of Negligible significance.

Given that only effects of moderate significance or greater are considered significant in terms of the EIA Regulations, the potential effects on hydrology and hydrogeology are assessed as being **Not Significant**.