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Red John Pumped Storage Hydro Scheme

Volume 5, Appendix 10.4 Preliminary Water Framework Directive Assessment (pWFD)

ILI (Highlands PSH) Ltd

November 2018

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	November 2018	Submission	CA	Catherine Anderson	Associate Director

Distribution List

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1 Introduction

1.1 Description of the Development

1.1.1 The Development is centred approximately on National Grid Reference (NH 60479 32531) and is located on Ashie Moor, Highland, South of Inverness. The Site is approximately 950 ha in area and the application boundary is shown on Figure 10.1 (Volume 3).

1.2 Structure of this Report

1.2.1 The remainder of this report is set out as follows:

- **Section 2** of this report provides a summary of the WFD requirements and screening process.
- **Section 3** describes the assessment methodology.
- **Section 4** describes the baseline conditions.
- **Section 5** describes the results of the assessment and provides details of possible mitigation and monitoring options to alleviate adverse impacts.
- **Section 6** presents the conclusions and recommendations.

1.2.2 In addition, this assessment is supported by the following figures:

- Figure 10.1 (Volume 3) Surface Water and Groundwater Receptors and Attributes – Wider Context;
- Figure 10.2 (Volume 3) Surface Water and Groundwater Receptors and Attributes – Study Area; and
- Figure 10.3 (Volume 3) Walkover Survey Photos.

1.2.3 Finally, the following technical appendices have been provided:

- **Annex 10.4.1** WFD Water Body Assessments Cycle 2; and
- **Annex 10.4.2** pWFD Assessment Sheets.

2 Overview of the Water Framework Directive

2.1 Legislative Context

2.1.1 The Water Framework Directive (WFD) (Ref 1) aims to protect and enhance the quality of the water environment across all European Union (EU) member states. It takes a holistic approach to the sustainable management of water by considering the interactions between surface water (including transitional and coastal waters, rivers, streams and lakes), groundwater and water-dependent ecosystems.

2.1.2 The WFD is transposed into environmental legislation in Scotland by the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act, SEPA 2003) (Ref 2).

2.1.3 Under the WFD, 'waterbodies' are the basic management units, defined as all or part of a river system or aquifer. Waterbodies form part of larger 'river basin districts' (RBD), for which 'River Basin Management Plans' (RBMPs) are used to summarise baseline conditions and set broad improvement objectives.

2.1.4 In Scotland, the Scottish Environment Protection Agency (SEPA) is the competent authority for implementing the WFD, although many objectives will be delivered in partnership with other relevant public bodies and private organisations (e.g. local planning authorities, water companies, Rivers Trusts, large private landowners and developers). As part of its regulatory role and statutory consultee on planning applications and environmental permitting, The Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended in 2013 (Ref 3), and more commonly known as the Controlled Activity Regulations (CAR), apply regulatory controls over activities which may affect Scotland's water environment. SEPA must consider whether proposals for new developments have the potential to:

- Cause a deterioration of a waterbody from its current status or potential; and/or
- Prevent future attainment of good status or potential where not already achieved.

2.1.5 In determining whether or not a development is compliant or not compliant with the WFD objectives for a water body, the Environment Agency must also consider the conservation objectives of any Protected Areas (i.e. Natura 2000 sites or water dependent Sites of Special Scientific Interest) and adjacent WFD water bodies, where relevant.

2.2 Surface Water Body Status

2.2.1 Under the WFD, surface water body status is classified on the basis of chemical and ecological status or potential. Ecological status is assigned to surface water bodies that are natural and considered by the EA not to have been significantly modified for anthropogenic purposes. The overall objective for natural surface waterbodies is to achieve Good Ecological Status and Good Chemical Status. Good Ecological Status represents only a small degree of departure from pristine conditions, which are otherwise known as High Ecological Status. All five status class definitions are provided in Diagram 10.2.1:

Status	Definition
High	Near natural conditions. No restriction on the beneficial uses of the water body. No impacts on amenity, wildlife or fisheries.
Good	Slight change from natural conditions as a result of human activity. No restriction on the beneficial uses of the water body. No impact on amenity or fisheries. Protects all but the most sensitive wildlife.
Moderate	Moderate change from natural conditions as a result of human activity. Some restriction on the beneficial uses of the water body. No impact on amenity. Some impact on wildlife and fisheries.
Poor	Major change from natural conditions as a result of human activity. Some restrictions on the beneficial uses of the water body. Some impact on amenity. Moderate impact on wildlife and fisheries.
Bad	Severe change from natural conditions as a result of human activity. Significant restriction on the beneficial uses of the water body. Major impact on amenity. Major impact on wildlife and fisheries with many species not present.

Diagram 10.2.1. Definition of status in the Water Framework Directive (Adapted from Ref 4)

2.2.2 Ecological potential is assigned to artificial and man-made water bodies (such as canals), or natural water bodies that have undergone significant modification; these are termed Heavily Modified Water Bodies (HMWBs). The term 'ecological potential' is used as it may be impossible to achieve good ecological status because of modification for a specific use, such as navigation or flood protection. The ecological potential represents the degree to which the quality of the water body approaches the maximum it could achieve and depends on the classification of WFD parameters and the implementation of mitigation measures identified by the Environment Agency.

2.2.3 Ecological status of waterbodies is classified according to relevant biological, physico-chemical, and hydromorphological parameters on a five point scale as either High, Good, Moderate, Poor or Bad Ecological Status. The classification system is based on a worst case system 'one-out all-out' system, meaning that the overall ecological status is based on the lowest individual parameter score. This general system is summarised below in Diagram 10.2.2.

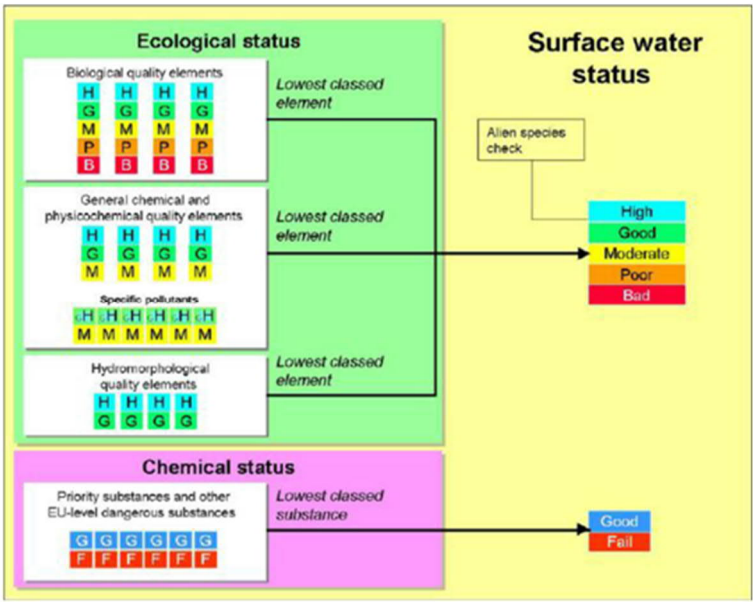

Diagram 10.2.2 WFD classification elements for surface water body status (Ref 5)

2.3 Chemical Status

2.3.1 Chemical status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Environmental Quality Standards Directive (2008/105/EC). This is assigned on a scale of good or fail. Surface water bodies are only monitored for priority substances where there are known discharges of these pollutants; otherwise surface water bodies are reported as being at good chemical status.

2.4 Ecological Status or Potential

2.4.1 Ecological status or potential is defined by the overall health or condition of the watercourse. This is assigned on a scale of High, Good, Moderate, Poor or Bad, and on the basis of four classification elements or 'tests' (Ref 6), as follows:

- Biological: This test is designed to assess the status indicated by a biological quality element such as the abundance of fish, invertebrates or algae and by the presence of invasive species. The biological quality elements can influence an overall water body status from Bad through to High.
- Physico-chemical: This test is designed to assess compliance with environmental standards for supporting physicochemical conditions, such as dissolved oxygen, phosphorus and ammonia. The physicochemical elements can only influence an overall water body status from Moderate through to High.
- Specific pollutants: This test is designed to assess compliance with environmental standards for concentrations of specific pollutants, such as zinc, cypermethrin or arsenic. As with the physico-chemical test, the specific pollutant assessment can only influence an overall water body status from Moderate through to High.
- Hydromorphology: For natural, non-HMWBs, this test is undertaken when the biological and physico-chemical tests indicate that a water body may be of High status. It specifically assesses elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or 'largely undisturbed' conditions. If the hydromorphological elements do not support High status, then the status of the water body is limited to Good overall status. For artificial or HMWBs, hydromorphological elements are assessed initially to determine which of the biological and physico-chemical elements should be used in the classification of ecological potential. In all cases, assessment of baseline hydromorphological conditions are an important factor in determining possible reasons for classifying biological and physico-chemical elements of a water body as less than Good, and hence in determining what mitigation measures may be required to address these failing water bodies.

2.5 Groundwater Body Status

2.5.1 Under the WFD, groundwater body status is classified on the basis of quantitative and chemical status. Status is assessed primarily using data collected from the EA monitoring network; therefore, the scale of assessment means that groundwater status is mainly influenced by larger scale impacts such as significant abstraction or widespread / diffuse pollution. The worst case classification is assigned as the overall groundwater body status, in a 'one-out all-out' system. This system is summarised in Diagram 10.2.3.

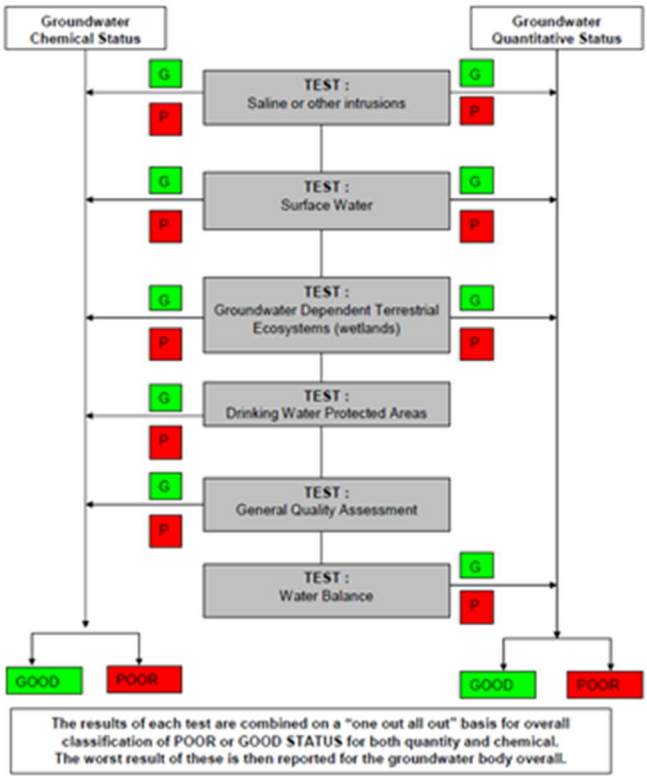

Diagram 10.2.3. WFD Classification Elements for Groundwater Body Status (Ref 5)

2.6 Quantitative Status

2.6.1 Quantitative status is defined by the quantity of groundwater available as baseflow to watercourses and water-dependent ecosystems, and as 'resource' available for use as drinking water and other consumptive purposes. This is assigned on a scale of Good or Poor, and on the basis of four classification elements or 'tests' as follows:

- Saline or other intrusions: This test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.
- Surface water: This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the ecological status of associated surface water bodies.
- Groundwater Dependent Terrestrial Ecosystems (GWDTEs): This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTEs (with respect to water quantity).
- Water balance: This test is designed to identify groundwater bodies where groundwater abstraction exceeds the 'available groundwater resource', defined as the rate of overall recharge to the groundwater body itself, as well as the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTEs.

2.7 Chemical Status

2.7.1 Chemical status is defined by the concentrations of a range of key pollutants, by the quality of groundwater feeding into watercourses and water-dependent ecosystems and by the quality of groundwater available for drinking water purposes. This is assigned on a scale of Good or Poor, and on the basis of five classification elements or 'tests' as follows:

- Saline or other intrusions: This test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.
- Surface water: This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the chemical status of associated surface water bodies.
- Groundwater Dependent Terrestrial Ecosystems (GWDTEs): This test is designed to identify groundwater bodies where groundwater abstraction is leading to 'significant damage' to associated GWDTEs (with respect to water quality).
- Drinking Water Protected Areas (DWPAs): This test is designed to identify groundwater bodies failing to meet the DWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.
- General quality assessment**:** This test is designed to identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.

3 Assessment Methodology

3.1 Introduction

3.1.1 Proposed developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the objectives defined for potentially affected water bodies. As part of its role, the Environment Agency must consider whether proposals for new developments have the potential to:

- Cause a deterioration of a water body from its current status or potential; and/or
- Prevent future attainment of Good status (or potential where not already achieved).

3.2 Defining No Deterioration

3.2.1 'No deterioration' was defined by SEPA (Ref 7, Ref 8 and Ref 9). Steps are required to prevent deterioration of the ecological status, ecological potential and chemical status of surface water and the qualitative status and quantitative status of groundwater.

3.2.2 Following a ruling by the Court of Justice of the European Union (CJEU) in July 2015 (Case C-461/13 on the 1st July 2016 (Bund für Umwelt und Naturschutz Deutschland eV v Bundesrepublik Deutschland), deterioration has been defined:

- 'Deterioration of the status' of the relevant water body includes a fall by one class of any element of the 'quality elements' even if the fall does not result in the a fall of the classification of the water body as a whole;
- 'Any deterioration' in quality elements in the lowest class constitutes deterioration; and
- Certainty regarding a project's compliance with the Directive is required at the planning consent stage; hence, where deterioration 'may' be caused, derogations under Article 4.7 of the WFD are required at this stage.

3.2.3 While deterioration within a status class does not contravene the requirements of the WFD, (except for Drinking Water Directive parameters in drinking water protected areas), the WFD requires that action should be taken to limit within-class deterioration as far as practicable. For groundwater quality, measures must also be taken to reverse any environmentally significant deteriorating trend, whether or not it affects status or potential.

3.2.4 The 'no deterioration' requirements are applied independently to each of the elements that come together to form the water body classification as required by Annex V of the Water Framework Directive and Article 4 of the Groundwater Daughter Directive.

- **Surface water:** To manage the risk of deterioration of the biological elements of surface waters, the 'no deterioration' requirements are applied to the environmental standards for the physico-chemical elements, including those for the Moderate / Poor and Poor / Bad boundaries.
- **Groundwater:** The 'no deterioration' requirements are applied to each of the four component tests for quantitative status and the five component tests for chemical status. The 'no deterioration' requirement may not apply to elements at High status and elements at High status may be permitted to deteriorate to Good status, provided that:
  - The water body's overall status is not High;
  - The RBMP has not set an objective for the water body of High status;

- The objectives and requirements of other domestic or European Community legislation are complied with; and
- Action is taken to limit deterioration within High or Good status or potential classes as far as practicable.

3.2.5 The 'no deterioration' baseline for each water body is the status that is reported in Annex 10.4.2.

3.3 Surface Water Assessment

3.3.1 Table 10.3.1 presents the matrix used to assess the impact of the Development on surface water status or potential class. It ranges from a major beneficial impact (i.e. a positive change in overall WFD status) through no impact to deterioration in overall status class. The colour coding used in Table 10.3.1 is applied to the spreadsheet assessment in Annex 10.4.1.

Table 10.3.1 Surface Water Assessment Matrix

Impact	Description / Criteria	Outcome
Major beneficial	Impacts that taken on their own or in combination with others have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire waterbody	Increase in status of one or more WFD element giving rise to a predicted rise in status class for that waterbody.
Minor / localised beneficial	Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the waterbody or any quality elements	Localised improvement, no change in status of WFD element
Green (no impact)	No measurable change to any quality elements.	No change
Yellow - Localised / temporary adverse Impact	Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary deterioration that does not affect the overall WFD status of the waterbody or any quality elements or prevent improvement. Consideration will be given to mitigation measures such as habitat creation or enhancement measures.	Localised deterioration, no change in status of WFD element when balanced against mitigation measures embedded in the scheme.
Orange - Adverse Impact on class of WFD element	Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the WFD status class of one or more biological	Decrease in status of WFD element when balanced against positive measures embedded in

Impact	Description / Criteria	Outcome
	quality elements, but not in the overall status of the waterbody. Consideration will be given to mitigation measures such as habitat creation or enhancement measures.	the scheme.
Red – Adverse Impact on overall WFD class of waterbody	Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the ecological status or potential of a WFD quality element, which then lead to a deterioration of status / potential of waterbody.	Decrease in status of overall WFD waterbody status when balanced against positive measures embedded in the scheme.

3.3.2 The assessment has considered all water bodies that may be directly or indirectly affected (i.e. adjacent water bodies). It also considered any Protected Areas as defined by other European Directives such as Special Areas of Conservation (SAC) and Special Protection Areas (SPAs), and water dependent Sites of Special Scientific Interest (SSSI). Where more stringent (than WFD) standards apply (such as conservation objectives) these have also been considered.

3.4 Groundwater Assessment

3.4.1 Table 10.3.2 presents the matrix used to assess the impact of the Development on groundwater status class. It ranges from a beneficial impact through no impact to deterioration in overall status class. The colour coding used in Table 10.3.2 is applied to the spreadsheet assessment in Annex 10.4.1.

Table 10.3.2 Groundwater Assessment Matrix

Magnitude of Impact of Scheme Element on WFD Element i.e. in individual cells	Impact on WFD Element within the assessment boundary i.e. at end of row	Impact on Status of WFD element at the Groundwater Body Scale
Impacts lead to beneficial impact	Combined impacts have the potential to have a beneficial impact on the WFD element.	Improvement but no change to status of WFD element
No measurable change to groundwater levels or quality.	No measurable change to WFD elements.	No change and no deterioration in status of WFD element
Impacts when taken on their own have the potential to lead to a minor localised or temporary impact	Combined impacts have the potential to lead to a minor localised or temporary adverse Impact on the WFD element.	Combined impacts have the potential to lead to a minor localised or temporary Impact on the WFD element. No change to status of WFD element and no significant deterioration at groundwater

Magnitude of Impact of Scheme Element on WFD Element i.e. in individual cells	Impact on WFD Element within the assessment boundary i.e. at end of row	Impact on Status of WFD element at the Groundwater Body Scale
		body scale.
Impacts when taken on their own have the potential to lead to a widespread or prolonged impact.	Combined impacts have the potential to have an adverse impact on the WFD element.	Combined impacts have the potential to have an adverse Impact on the WFD element, resulting in significant deterioration but no change in status class at groundwater body scale.
Impacts when taken on their own have the potential to lead to a significant impact.	Combined impacts in combination with others have the potential to have a significant adverse impact on the WFD element.	Combined impacts in combination with others have the potential to have an adverse Impact on the WFD element AND change its status at the groundwater body scale

3.5 Future Status Objectives

3.5.1 RBMPs are used to outline water body pressures and the actions that are required to address them. The future status objective assessment considers the ecological potential of a surface water body and the mitigation measures that defined the ecological potential. Assessments in this project are based on mitigation measures defined in the 2015 RBMP (Ref 10). Information on WFD measures provided by SEPA has also been reviewed. The assessment considers whether the Project has the potential to prevent the implementation or potentially compromise the effectiveness of the defined measures.

3.6 General Approach and Scheme Assumption

3.6.1 The following provides a description of the scope of works. The assessment is qualitative and based on readily available data and information, and site survey. It appraised the potential for non-compliance with the core WFD objectives of no deterioration or failure to improve.

3.7 Scope of Works

3.7.1 The assessment is based on a desk study and a site walkover survey. These are described in more detail in Chapter 10 Water Environment (EIA Report Volume 2) and summarised below.

3.7.2 A desk study has been undertaken to:

- Review online aerial, historic and Ordnance Survey maps to review historical land uses, channel planform, notable morphological features and any changes to the channel;
- Review WFD classifications, SEPA investigation reports, and any mitigation measures proposed to meet Good Ecological Potential; and

- Review background water quality and biological data from online sources and provided directly by the SEPA.

3.7.3 The scope of surveys and monitoring was to provide baseline information on the hydromorphological status of Loch Ness, Loch Ashie, Big Burn and Loch Duntelchaig so WFD compliance of the current masterplan and future scheme changes could be evaluated. Survey will detail the impact and response of the significant change to the regime of the brook generating a process based response model. Desk and field based Fluvial Audit of all possible impact sites and general sub-catchment assessment will be used to determine wider impacts.

3.7.4 The desk study and site survey have been used as the basis for a qualitative review of the Development and to identify scheme components that require assessment of WFD compliance, or where mitigation or further investigation and assessment will be required.

3.8 WFD Surveys and Assessment

3.8.1 A walkover survey of the Study Area was carried out on the 9th May 2018 during cool, dry weather following a period of heavy rain. The survey was carried out by a team of surveyors consisting of a water quality specialist, a hydromorphologist and a hydrogeologist. The purpose of the survey was to identify and characterise surface water receptors, to consider the flow pathways between water bodies and across the Development Site, and to make general observations about the character of the landscape and other relevant features that could influence the sensitivity of water bodies and the prediction of potential impacts from the Development. Pictures and locations of the studied waterbodies are presented in Figure 10.3 Walkover Survey Photos.

3.8.2 The purpose of the Catchment Walkover was to gain a better understanding of catchment processes and pressures so that these may be taken into consideration during the development of the masterplan, as well as identifying restoration options to bring about habitat improvements where reasonably practical.

3.8.3 The Catchment Walkover survey was undertaken with reference to the best practice guidance set out in ‘Catchment Walkovers for River Basin Management Operational Instruction 356_12’ (Ref 11) and ‘The Sediment Matters Handbook: A Practical Guide to Sediment’ (Ref 12) and included a combination of making observations whilst walking along each watercourse in an upstream direction, as well as spot observations for the more inaccessible areas. Finally, during the Catchment Walkover, suitable water quality and flow monitoring sites were identified taking into account factors such as accuracy and reliability of results, access and health and safety.

4 Baseline Information

4.1 Consultation

4.1.1 Detailed information about consultation can be found in Appendix 4.4 Consultation Tracker (Volume 5). The key issues from the consultation process are summarised below with respect to water resources and water quality:

4.2 THC Pre-Application Consultation

4.2.1 Marine Scotland Science (MSS) (18/09/2017) refers to the need for including fish assessment in the EIA Report, because of the potential for impacts on the River Moriston SAC, (designated for Atlantic salmon and Freshwater pearl mussel), and the range of important fish species present in Loch Ness. It also mentioned the need for suitable screens in the Inlet / Outlet structure to prevent fish being drawn into the system, as well as to consider the potential introduction of invasive species.

4.3 Scoping Consultation

4.3.1 The Scottish Government and other interested consultees, state the need to include mitigation measures and the schedule of their implementation in tabular form at the end of each chapter, with the reported conclusions of likelihood or significance of impacts.

4.3.2 The Highland Council scoping response (6/11/2017) refers to the HwLDP that requests assessments of protected sites (Policy 57), protected species (Policy 57) and of the relation of the project with the RBMP for the Scotland River Basin District and the North Highland RBMP (Policy 63).

4.3.3 The Ness District Salmon Fishery Board (Ness DSFB) (11/10/2017) noted that it recognises the importance of Loch Ness and tributaries for Atlantic salmon and Sea trout (migratory salmonids). In this sense, Ness DSFB is concerned about the potential impacts on salmonids derived from entrain and/or impingement of salmon and Sea trout smolts at the Loch Ness Inlet; cumulative impacts with other existing or planned developments; prevention of fish pass at Ness Weir due to water level reductions in Loch Ness derived from the water intake; and disruption of their migratory behaviour resulting from the outlet discharge. Therefore, Ness DSFB considers that “the spatial extent of the studies to inform the EIA should cover the entire area of the catchment accessible to salmon, rather than be limited to the Proposed Development area and ‘nearby watercourses’ as stated in the scoping document. Also, EIA should include an assessment of the likely impacts on other key fish species including Brown trout, Arctic charr, European eel and lamprey species”.

4.3.4 SEPA (11/10/2017) advised of the presence of invasive species in the Ness catchment, as well as requesting information about the design, potential impacts and mitigation of the different elements of the scheme to the water environment (temporary and permanent infrastructure, watercourse crossings and diversions or other engineering activities).

4.3.5 Scottish Water (SW) (20/09/2017) requested details about the drainage system, headpond and associated infrastructure, as well as assessment of the associated impacts during construction, operation and decommissioning in the catchment areas of the surrounding lochs. Also stated that the impacts of the Development on drinking water abstractions and hydrology need to be discussed in the EIA.

4.3.6 Considerations from Scottish Natural Heritage (SNH) (31/10/2017) refer to salmon and Slavonian grebe (protected species) and presence of non-native invasive species, highlighting the need to consider them for potential impacts.

4.4 Study Area

4.4.1 The Development Site is situated between the River Ness and River Nairn water catchment areas. The Site lies on Ashie Moor, a ridge of land between Loch Ness to the north-west, Loch Duntelchaig to the south-east (including the connected small Loch nan Geadas basin and the upstream Loch Ceo Glais), and Loch Ashie to the north-east. In the south-east of the site, there are two small lochs, Loch na Curra and Lochan an Eoin Ruadha. Details about topography and land uses are covered in Chapter 2: Project and Site Description (Volume 2)

4.4.2 The Water Environment Study Area considered is a 1 km buffer from the Development Site boundary, as shown on Figure 10.1 and 10.2 (Development Site boundary –1km buffer).

4.4.3 Due to the nature of the Development and the size of the lochs mentioned in paragraph 4.4.1, it is unlikely that any significant adverse effects will propagate to any other water body beyond these lochs.

4.5 Catchment Characteristics

4.5.1 The shore of Loch Ness is the lowest point of the Development Site at approximately 16 metres (m) Above Ordnance Datum (AOD). The terrain climbs steeply from the banks of Loch Ness and then gradually plateaus towards the C1064, which runs south-west to north-east through the Development site, with a high point of 262 m AOD. From the C1064 the land generally dips down again to the shore of Loch Duntelchaig at approximately 217 m AOD. There are three small peaks at the southern and eastern side of the Proposed Development Site, the highest of which is 278 m AOD.

4.5.2 Roughly 58 % of the Development site is woodland, the majority of which is Ancient Woodland Inventory (AWI) listed. The woodland is comprised of a mix of commercial coniferous plantation, semi-natural broad-leaved and mixed woodland. The remaining unwooded area is predominantly shrub heathland with some agricultural and grazing land.

4.5.3 There is a Meteorological Office weather station at Inverness, NH668452, 11 km north of the Development Site but close to sea level. Based on the available data from this weather station it is estimated that the Study Area experiences an average of only 733 mm of rainfall per year, with it raining more than 1 mm on around 143 days per year. For more details please see Appendix 9.1: Flood Risk Assessment (Volume 5).

4.5.4 On the National River Flow Archive website, the nearest catchment with rainfall statistics is the Ness at Ness Castle Farm (NH639410), approximately 7 km north of the Development Site. Standard Annual Average Rainfall (SAAR) for the period 1961-1990 is 1779 mm per year, considerably greater annual average rainfall than that registered by the Met Office at the Inverness weather station. It is expected that due to the higher elevation of the Development Site rainfall totals are more likely to be comparable to those recorded at Ness Castle Farm.

4.6 WFD Water Bodies

4.6.1 The attributes presented in Figures 10.1, Figure 10.2 and Figure 10.3 are based on desk study and field observations made during a site walkover survey on the 9th May 2018 (undertaken in dry cold conditions but following a period of heavy rainfall) and online data

sources as described earlier. These figures show the location of the existing water bodies within the study area.

4.6.2 There are a number of named and unnamed watercourses within and in the surroundings of the Proposed Development, one WFD designated watercourse (Big Burn) and three WFD designated waterbodies (Loch Ness, Loch Ashie and Loch Duntelchaig). The WFD designation for a WFD waterbody applies to all watercourses within their catchments, and therefore, impacts in all watercourses present have been considered in the assessment (Table 10.4.1).

4.6.3 There is also one WFD groundwater body underlying the Site, the Inverness Groundwater Body (ID: 150670). It is 413.7 square kilometres (km^2) in area. Based on the results of the NVC survey and the site walkover, several Groundwater Dependent Terrestrial Ecosystems (GWDTEs) have been identified within the Development site. These include areas of blanket sphagnum bog on Ashie Moor on either side of the C1064 road in the south of the Development area, and areas of flush and spring in the north of the Development Site in the vicinity of Clune Wood.

Table 10.4.3: WFD water bodies located within the study area

Type	WFD Classification	Waterbody Name / ID	Associated water bodies not designated in their own right	Location
Surface WFD Waterbodies	Lake	Loch Ness / 100156	Allt a' Mhinisteir and tributaries (S2), Allt a' Chnuic Chonaisg, Allt a' Chruineachd, Allt Dailinn and tributaries (S8-S11), and S3-S7.	West of the Development. Most of the small watercourses in the study area drain to this loch.
	Lake, heavily modified	Loch Ashie / 100159	None	East of the Development
	Lake, heavily modified	Loch Duntelchaig / 100161	Loch nan Geadas	South-east of the Development
	River	Big Burn / 20261	None	Located to the east of the Development, flowing to Loch Ashie in the north-east.
Groundwater WFD Waterbodies	Groundwater	Inverness Groundwater Body / 150670)		Underlying the Development

10.4.1 The following water bodies are within the Study Area but are not hydrologically connected to the Development, are upstream of the works, or will not be impacted. As there is no pathway for impacts to occur no further assessment of them has been undertaken:

- Watercourse S1, S2 and S7 (as shown on Figure 10.1);
- Allt Dailinn and tributaries (S8-S11);
- Loch nan Geadas;

- Loch Ceo Glais;
- Loch na Curra;
- Lochan an Eoin Ruadha; and
- Loch Ruthven.

4.6.4 The following provides a description of the WFD water bodies in the Study Area.

Loch Ness

4.6.5 Loch Ness is a large glacially eroded freshwater loch covering approximately 55 km^2. It lies close to sea level (water level is around 16 m Above Ordnance Datum (AOD)) and is approximately 22.5 km long with a north-east to south-west axis along the Great Glen Fault. It is very deep with a maximum depth of around 230 m. Due to its physical characteristics the loch is likely to be dimictic, meaning that it overturns twice each year, typically during the spring and autumn, which will exert a strong control on water quality and habitat conditions.

4.6.6 Loch Ness is oligotrophic meaning that it is characterised by low primary productivity and low biomass associated with low concentrations of nutrients (i.e. nitrogen and phosphorus) and generally well oxygenated water that is likely to support fish species such as Atlantic salmon (Salmo salar), Sea trout (Salmo trutta), Brown / Ferox trout (Salmo trutta / ferox), and Arctic charr (Salvelinus alpinus). Other fish species that may be found in the loch include European eel (Anguilla anguilla), Northern pike (Esox lucius), Three-spined stickleback (Gasterosteus aculeatus), Brook lamprey (Lampetra planeri) and Eurasian minnow (Phoxinus phoxinus), as raised in the Scoping Opinion report (Appendix 4.2). Atlantic salmon and Brook lamprey are Annex II species designated under the EC Habitats Directive (92/43/EEC) as implemented in Scotland through the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Unusually for an oligotrophic water body, water clarity is very poor due to the presence of humic acids leached from the peat rich soils in the surrounding catchment.

4.6.7 Loch Ness is a water source for the northern section of the Caledonian Canal and provides a location for various recreational activities. Please see Chapter 9 Hydrology and Flood Risk in Volume 2 for further details, including water resources and water balance in Loch Ness and a discussion of any future changes to local water supply arrangements.

4.6.8 Since 1999, the 600 m long gravel / sandy beach at Dores has been designated as a bathing water under the original Bathing Waters Directive (76/160/EC) and the current Revised Bathing Waters Directive (2006/7/EC). According to SEPA's online Bathing Water Profile for Dores (Ref 26), the beach is very popular with tourists, particular in the summer season. SEPA monitor the quality of water (for faecal indicator organisms) throughout the bathing water season (May to September) from NH 59671 35000 and the current bathing water quality at Dores is Good (period 2017/18). The Bathing Water Profile also shows the location of a small sewage treatment works discharging to Loch Ness to the south of Dores at approximately NH 59640 34450 including a sewage outfall, combined sewer and emergency overflows). It also states that algal blooms have occurred on the loch, including those formed of cyanobacteria (i.e. blue-green algae) that can be toxic, although the loch is not considered sensitive to an overproduction of filamentous algae or phytoplankton.

4.6.9 Finally, there are also existing hydro-electric schemes in operation on Loch Ness, located at the south-western end of the loch nearer to Fort Augustus – Foyers pumped storage scheme, and Glendoe and Glenmoriston conventional hydro schemes.

Loch Duntelchaig

4.6.10 Loch Duntelchaig (NH 61122 30774) is a freshwater loch approximately 5 km long and approximately 1.75 km wide at its widest point, with a surface area of approximately 5.55 km^2. According to Ordnance Survey data, Loch Duntelchaig has a maximum depth of around 60 m, which despite being significantly shallower than Loch Ness is still considered deep and seasonal stratification is expected. Loch Duntelchaig is connected to Loch Ceo Glais further upstream by the WFD designated Feith Ghlas watercourse (ID 20314), although both Loch Ceo Glais and Feith Ghlas water bodies will not be affected and are not considered any further.

4.6.11 Loch Duntelchaig forms part of the upper catchment of the River Nairn. Loch Duntelchaig feeds into an area that is classed as being a Potentially Vulnerable Area with regard to flood risk – PVA 01/18 Nairn Central. Loch Duntelchaig is at the upper part of the catchment and the contributing area feeding the loch is small relative to the surface area of the loch resulting in significant attenuation of any flood flows from the upper catchment.

4.6.12 Loch Duntelchaig in conjunction with Loch Ashie (both Drinking Water Protected Areas (DWPA)) is the main potable water supply loch for Inverness. The loch is also important for local recreational activity and water sports.

4.6.13 Loch nan Geadas (NH 60004 30691), is located on the west of Loch Duntelchaig, to which is connected through a water channel. The small freshwater body has an ellipsoidal shape of about 120-172 m diameter, with a surface area of 0.0173 km^2.

4.6.14 Loch Ceo Glais (NH 58868 28817) is a freshwater body of around 1.4 km long and 130-180 m wide, with a surface area of approximately 0.1935 km^2. The outflow from this loch travels north-east around 800 m to Loch Duntelchaig.

Loch Ashie

4.6.15 Loch Ashie is a freshwater body of around 2.5 km long and 500-700 m wide, with a surface area of approximately 1.4 km^2. It forms part of the upper catchment of Big Burn, a tributary of the River Ness that joins upstream of Inverness.

4.6.16 Loch Ashie is at the upper part of the catchment and the contributing area feeding the reservoir is small relative to the surface area of the loch, which is likely fed from groundwater, resulting in significant attenuation of any flood flows from the upper catchment.

4.6.17 Loch Ashie is included within a Drinking Water Protected Zone and provides a secondary supply to Inverness. A water treatment works is located at the bottom of the loch close to the overflow to Allt Mor.

Big Burn

4.6.18 The Big Burn (ID 20261) is a first order stream which rises to the south-west of Loch Ashie and has a length of just approximately 0.9 km, with a small heavily wooded catchment upstream of Loch Ashie. The channel is small (< 1 m across), flowing through a fire break in an area of commercial forestry. Due to its small size the Bug Burn upstream of Loch Ashie is unlikely to be capable of transporting coarse sediments or supporting significant fish populations. Big Burn is currently classified as at High Ecological Status but this is not

based on any site specific surveys and has been determined with reference to similar small and largely unmodified watercourses within the wider catchment area.

Other Minor Watercourses

4.6.19 From a review of online Ordnance Survey maps and aerial imagery, and based on observations on Site, the watercourses and standing water bodies within the study area, or affected by the study area are described below. These features are shown on Figure 10.1 and Figure 10.2.

4.6.20 Loch na Curra overflows into the headwaters of the Allt a' Mhinisteir stream. This stream flows northwards through Dirr Wood and into Loch Ness at Dores. In the upper reaches, the watercourse is characterised by a low gradient, with in-channel vegetation, overgrown banks, sluggish flow in places and coarse sediment forming steps and pools. The burn is culverted in a number of locations across forestry roads by corrugated metal pipes (NGR NH 60748 33291, NH 60764 33338, NH 60965 34017 and NH 60631 34289). Material in the channel is likely to be a mixture of eroded bank material (glacial till and alluvium) and material from construction of the forestry road. The gradient becomes steeper around NGR NH 61034 33957, with woody debris forming pools and causing accumulations of gravel. There are pronounced bedrock and boulder steps in this reach and the material is predominantly cobble to boulder sized and angular in nature with moss and lichen on some upper surfaces, indicating that it has come from local sources and flows are not competent of transporting it downstream. However in high flows, some of the smaller material may be moved to some degree, and therefore clean surfaces were observed. Downstream of the third forestry road crossing at NGR NH 60965 34017 the channel is incised, with bedrock exposed in the banks. This area has been recently felled, with woody debris in the channel. In the section downstream of the inflow from Pond 1 (see paragraph below), the channel morphology is similar to the previous reach, with bedrock exposed in the channel and gravel-cobble steps formed. This continues downstream of the fourth forestry road crossing to Dores, where the gradient becomes shallower and the channel has been historically realigned as part of a mill dam and sluice system (outwith the red line boundary).

4.6.21 Two other first order streams (the headwaters of the Allt Dailinn watercourse and stream S8) rise a short distance to the west of Loch na Curra either side of Kindrummond and flow west coalescing in Drummond as the Allt Dailinn stream that eventually discharges to Loch Ness within Erchite Wood. Upstream of Kindrummond, these watercourses rise from boggy ground, and once they become distinct channels they have low gradient, are straightened and overwide in places, with poaching by livestock evident. Between Kindrummond and Drummond, the channel is smaller but remains straightened and sluggish. Downstream of Drummond the gradient steepens as the burn flows to Loch Ness. There is a waterfall in this reach and the morphology is likely to be a range of step pool and cascade.

4.6.22 Other minor watercourses drain the immediate slopes to Loch Ness (e.g. Allt a' Chnuic Chonaisg and Allt a' Chruineachd). An unnamed watercourse rises around NGR NH 60633 34137 and flows steeply towards Dores, where it discharges to Loch Ness. The upper reaches have been impacted by recent felling of the forestry area (observed during walkover survey in May 2018) and the channel was choked with fine sediment and soil from adjacent slopes. This are of felling continues for the majority of the catchment, to the crossing at the B862 road. The Allt a' Chnuic Chonaisg has a small catchment, draining the steep slope above Loch Ness from Park farm. The channel is small (<1 m across) and is likely to have step pool morphology for much of its length. The Allt a' Chruineachd drains a small

catchment between the B862 road and Loch Ness. It is likely to have step pool morphology for much of its length, with a steep gradient. Close to the crossing with B852, there is a good supply of gravel, with some accumulations around fallen trees and at the existing track crossing at NGR NH 59001 33205 and NH 60245 33049 (gravel ford).

4.7 WFD Surface Water Bodies Classification

4.7.1 Loch Ness, Loch Ashie, Loch Duntelchaig and Big Burn are included in the Scotland River Basin District (Ref 10). The River Basin Management Plan (RBMP) for the Scotland River Basin District: 2015–2027 (as amended, 2017) and additional documents establish the guidelines for compilation of WFD objectives in the Scotland River Basin District.

4.7.2 Annex 10.4.1 provides a summary of the most updated (2016) WFD classifications for Loch Ness, Loch Ashie, Loch Duntelchaig and Big Burn based on SEPA information (Catchment Hub). None of the small watercourses flowing through the Site are designated under the WFD. Upstream and downstream of these three lochs, principle feeder / overflow channels are designated under the WFD, but their impacts have been affected together with the WFD waterbody to which they discharge.

Loch Ness

4.7.3 The Loch Ness is designated as water body ID: 100156 of the Scotland RBMP. It is included in the WFD typology of deep and large lowland lake of low alkalinity, and is currently classified as at Good Ecological Status and passing Good Chemical Status (2016). The future target is to maintain Good Status through ensuring that deterioration does not occur, unless caused by a new activity providing significant specified benefits to society or the wider environment.

Loch Ashie

4.7.4 Loch Ashie is also a WFD waterbody (ID 100159) characterised by being a mid-altitude, large, medium alkalinity and deep lake (with water depths greater than 10 m according to Ordnance Survey maps). Loch Ashie may exhibit a different seasonal stratification pattern to both Loch Ness and Loch Duntelchaig due to its shallower water depth. Like Loch Duntelchaig the loch is heavily modified (water supply) and is currently at Bad Ecological Potential but passing Good Chemical Status. SEPA have set a target of Poor Ecological Potential by 2021, and Good Ecological Potential by 2027. Mitigation measures have been implemented in this loch, including control of abstraction and flow regulation, and improvement to condition of channel / bed and shoreline.

4.7.5 A list of pressures contributing to this waterbody's failure to meet good ecological potential has been identified by SEPA (personal communication):

- Flow regulation, morphological alterations and abstraction as a result of water collection, purification and distribution; and
- Morphological alterations as a result of road transport Impounding - weir / dam.

Loch Duntelchaig

4.7.6 Loch Duntelchaig is designated under the WFD as a mid-altitude, large, medium alkalinity and deep lake water body (ID 100161). It is heavily modified (due to water supply) and currently at Good Ecological Potential and Pass Chemical Status (2016), as all mitigation measures have been implemented (control pattern / timing of abstraction), despite its overall

ecological status being Poor because of Poor overall hydrology. Loch Duntelchaig is also within a salmonid water catchment.

Big Burn

4.7.7 Big Burn is designated as river waterbody under the WFD (ID 20261). It is currently at High Ecological Status under the WFD and flows into Loch Ashie. However, this classification has been calculated from data measured in a similar WFD watercourse in the catchment (Allt Breineag Whitebridge, ID 232776), according to information provided by SEPA. This is so because Big Burn is a WFD waterbody of only 0.4 km long and low entity. As SEPA does not have the resources to monitor every water body in Scotland, some waterbodies are "grouped" with others that have similar typology and pressures.

Aquatic ecology

4.7.8 SEPA has provided data on fish for Loch Duntelchaig and Loch Ashie, phytoplankton and macrophytes for Loch Ness, and diatoms and macroinvertebrates for Loch Duntelchaig and Loch Ness. Ecological attributes in the study area and their potential impacts and mitigation are covered in Chapter 7: Aquatic Ecology (EIA Report Volume 2).

4.7.9 The only fish ecology sampling that has been carried out on Loch Duntelchaig and Loch Ashie is eDNA sampling (draft reports following on from eDNA sampling in 2017/18 by SEPA).

4.7.10 The following species were found in Loch Duntelchaig: European eel (*Anguilla anguilla*), Northern pike (*Esox lucius*), Three-spined stickleback (*Gasterosteus aculeatus*), European River Lamprey (*Lampetra fluviatilis*), European perch (*Perca fluviatilis*), Sea / Brown trout (*Salmo trutta*), and Arctic charr (*Salvelinus alpinus*). In Loch Ashie the following species were found: European eel, Three-spined stickleback, European perch, Sea / Brown trout, and Arctic charr. SEPA was unable to provide any data for any other water body.

4.7.11 Several of the present fish species are protected by European and Scottish legislation: Sea trout under The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 (Commencement) Order 2005, while eel in the European Council Regulation No 1100/2007 and River lamprey is listed on Schedule 3 of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

4.7.12 Consultation with Marine Scotland Science and Ness District Salmon Fishery (Chapter 7: Aquatic Ecology (EIA Report Volume 2)) advised the presence of priority species salmon, Arctic charr, European eel and pike and Brown trout in Loch Ness, this last one also found in Loch na Curra.

4.7.13 Most updated records of phytoplankton in Loch Ness were obtained in July 2016, where a very diverse community was recorded, with a low presence of cyanobacteria (Ecological Quality Ratio (EQR) normalised 0.8) and a general EQR of 1.02, corresponding with High Status communities.

4.7.14 Regarding cyanobacteria presence, Anabaena sp. was found in Loch Duntelchaig in August 2011 in a concentration of 14,980 cells/ml. Anabaena sp. Cyanobacteria can produce neurotoxins that can be harmful to wildlife and recreation users. The World Health Organisation guidelines for safe-practice in managing recreational waters indicate that at cyanobacterial concentrations of 20,000 cyanobacterial cells/ml there may be short-term adverse health outcomes: e.g. skin irritations and gastrointestinal illness. This is further detailed in the Scottish Executive revised guidance document 'Blue-green algae

(Cyanobacteria) in inland waters: assessment and control of risks to public health' Scottish Executive, 2007).

4.7.15 Macrophyte survey data was available for Loch Duntelchaig and Loch Ness. The latest survey in Loch Duntelchaig was undertaken in 2017. This had a Lake Macrophyte Nutrient Index (LMNI) score of 3.85, meaning presence of species sensitive to nutrient pollution. Diversity was relatively high, with 12 truly aquatic taxa present, 6 out of a total of 18 functional groups present and low presence of filamentous algae (0.24). In Loch Ness, the latest results are from 2015, with a LMNI value of 4.55, 17 truly aquatic taxa present, seven functional groups and 0.65 for Green Filamentous Algae (ALG) – See Chapter 7: Aquatic Ecology for more details on aquatic species counts. These results indicate a slightly higher nutrient enrichment and presence of algae with respect to Loch Duntelchaig, although diversity is higher in Loch Ness.

4.7.16 Benthic invertebrates were assessed through the Chironomid Pupal Exuviae (cast-off skins of the pupae of non-biting midges) Technique (CPET). Results for Loch Ness in 2016 show an average EQR of 0.87, which corresponds with High quality. CPET value for Loch Duntelchaig in 2017 shows similar results, with an EQR of 0.97. Also Biological Monitoring Working Party (BMWP), a procedure for assessing water quality by examining macroinvertebrate communities, was calculated for Loch Ness, with an annual average score of 127 in 2016, indicating presence of species very sensitive to pollution and so un-impacted loch character.

4.7.17 The most recent survey for diatoms in Loch Ness was in 2012, with an annual EQR average value of 0.9, which corresponds with Good quality.

4.7.18 No ecological data about species present were available for Loch Ashie.

4.7.19 Information about invasive non-native species present in the study area is presented in Chapter 7: Aquatic Ecology (Volume 2). Neither *Phagocata woodworthi* nor *Crangonyx pseudogracilis* were recorded in the desk study within the Loch Ness catchment. However, these species are likely to be under-recorded and *Crangonyx* in particular is a relatively widespread and established species. Nuttall's waterweed *Elodea nuttallii* has been recorded 6.3 km to the west of the Development Site boundary in Loch Ness, and therefore there is the potential for this species to occur within the area of the Development Site, notably at the Inlet / Outlet location on the shore of Loch Ness.

4.7.20 With respect to the non-WFD designated watercourses and waterbodies, Pond 7 was covered in the ecological survey. No protected or notable macrophyte or macroinvertebrate species, or potential habitat to support protected or notable fish species were present and therefore it was considered of negligible value. Also, no rare or notable species were recorded in the small watercourses during ecological survey (more details in Chapter 7: Aquatic Ecology (EIA Report Volume 2)).

4.8 WFD Groundwater Bodies Classification

4.8.1 There is one WFD groundwater body underlying the Site, the Inverness Groundwater Body (ID: 150670). Information on the status of this water body is available in the SEPA Water Classification Hub (https://www.sepa.org.uk/data-visualisation/water-classification-hub/) and summarised as follows:

- It is classified as Good for water quality, water flows and levels, and overall; and
- Future objectives for 2021, 2027 and long term are Good for each criteria.

4.8.2 A summary of the 2016 Cycle 2 assessment is reproduced in Table 10.4.3.

Table 10.4.3: Groundwater body assessment in 2016, Cycle 2

Parameter		Inverness
Water Body ID		150670
Water Body Type		Groundwater Body
Groundwater area		413.7 km^2
Overall Status		Good
Quantitative Status		Good
Chemical Status		Good
Quantitative Elements	Saline or other intrusions	Good
	Dependent Surface Water Body Status	Good
	Water Balance	Good
Chemical Elements	Dependent Surface Water Body Status	Good
	Specific pollutants	Good
	Priority substances	Good
	Drinking Water Protected Area	Good
	Chemical General Test	Good

4.9 Water Resources and Known Pollution Incidents

4.9.1 Loch Duntelchaig and Loch Ashie are both Drinking Water Protected Areas that supply Inverness Water Treatment Works (WTW), while Loch Ness supplies Invermoriston WTW.

4.9.2 According to the data provided by SEPA, there is one licenced surface water abstraction in Loch Ness (fish farm freshwater cage), and 11 discharge licences in the vicinity of the Proposed Development, which are summarised in Appendix 10.2 of the EIA Report (Volume 5). These include several Waste Water Treatment Plants (WwTP) and private sewage discharges in Loch Ness, several small watercourses and groundwater in the vicinity of the development (less than 2 km). Also a bridging culvert and bank top embankment works have been carried out in Allt a' Mhinisteir stream. Information from THC and public consultation about presence of Private Water Supplies (PWS) is summarised in Appendix 10.3. These include mainly well / borehole and two spring abstractions for domestic use.

4.9.3 According to the information provided by SEPA, there is record of eight pollution events for the study area. However, procedure does not allow it to provide additional information.

4.10 Protected Areas

4.10.1 There are no statutory ecological designations within the Development Site. However, there are two statutory nature conservation designations covering water bodies within the Study Area and just outside of the Development Site boundary.

4.10.2 Loch Ashie Site of Special Scientific Interest (SSSI) and Special Protection Area (SPA) which is designated for its importance as a passage habitat for the Slovenian grebe (*Podiceps auritus*), borders the Development site to the north. The Joint Nature Conservation Committee website describes Loch Ashie as "*a large, open, mesotrophic loch located south-east of the Great Glen in the Scottish Highlands. Much of the shoreline is stony and exposed, with only small patches of emergent vegetation. Where the shore is*

more sheltered, small beds of Bottle Sedge Carex rostrata have developed. The loch is the most important site in Britain for Slavonian Grebe Podiceps auritus gathering during the pre- and post-breeding periods. In addition, the loch supports a population of breeding Slavonian Grebe of European importance";

- Loch Ruthven, which is approximately 3 km south of the Development site, is designated as a SSSI, SPA, Special Area of Conservation (SAC) and under the RAMSAR convention for its breeding Slavonian grebe population, SAC freshwater habitat and otter population; and
- The River Moriston SAC, although located 22 km south-west of the Development, is important for supporting Atlantic salmon and Freshwater pearl mussel (which depend on the juvenile salmon for part of their lifecycle) travelling through Loch Ness in their migration to the sea. The most recent monitoring for the River Moriston SAC considers Atlantic salmon to be 'at Unfavourable, No Change' condition.

4.11 Future Good Status

Construction (2020-2026)

4.11.1 The future baseline has been determined qualitatively by considering the possibility of changes in the attributes that are considered when deciding the importance of water bodies in the Study Area.

4.11.2 It is assumed that no other development within the Study Area will commence between now and the commencement of the Proposed Development. It is not expected that the baseline conditions will be significantly different by the time the development commences or when it opens in 2026.

4.11.3 Generally, there is an improving trend in water quality and the environmental health of waterways in the UK since the commencement of significant investment in sewage treatment in the 1990's, the adoption of the WFD from 2003, and the application of ever more stringent planning policies. In terms of water quality impacts, the future baseline assumes that all WFD water bodies achieve their final target status.

4.11.4 It is likely that through the action of new legislative requirements and ever more stringent planning policy and regulation, that the health of the water environment will continue to improve post-2027, although there are significant challenges such as adapting to a changing climate and pressures of population growth that could have a retarding impact. However, it is difficult to forecast these changes with any certainty, and in any case the way the importance of the water environment is determined takes into account a wide range of attributes, some of which are unlikely to change. It is also assumed that Scottish Water (potable water supply and sewage services) has taken future impacts of climate change into account.

4.11.5 Under the WFD, Loch Ness and Loch Duntelchaig have already achieved the objective of Good Ecological Status / Potential, and it has been assumed that this status will maintain after the implementation of the Development.

4.11.6 Loch Ashie has the objective of achieving Good Ecological Potential by 2027. This includes potential improvements in flow regulation, morphological alterations and abstractions through water collection, purification and distribution.

4.11.7 The Inverness Groundwater Body has already achieved a Good Status for water flows and levels, water quality and overall under the WFD, and It is assumed this status will be retained following implementation of the Development.

4.11.8 The way that the importance of water bodies is assessed takes into account a large range of attributes and does not focus on water quality (i.e. just because a waterbody has poorer water quality does not mean a greater impact can be allowed). This assessment takes into account other attributes such as scale, nature conservation designations, fish habitat type, the presence of protected species, social and economic uses. For some of these attributes it is unlikely that they will change in the future (e.g. water body size, whether a river is likely to support cyprinid or salmonid fish populations).

Operation (2025)

4.11.9 The same baseline conditions expected during construction will be maintained during operation, provided all the pollution control measures are put in place.

Decommissioning

4.11.10 It is unknown when the Development may be decommissioned, but in any case, given the size of the water bodies within and close to the Site, it is unlikely that there would be any significant change in their importance.

4.12 Proposed SEPA Mitigation Measures

4.12.1 Information on proposed mitigation measures to improve the status of these water bodies was requested from SEPA and is included in the assessment tables in Annex 10.4.1.

5 Preliminary Assessment

5.1 No Deterioration Assessment

5.1.1 The preliminary assessment considers the likely impact of the Development on WFD parameters (and whether this could lead to deterioration) and whether or not the proposed development may prevent SEPA mitigation measures from being implemented. The appraisal of these two WFD objectives is considered in detail in Annex 10.4.2 and summarised in the following sub-sections.

5.2 Potential Construction Impacts

Loch Ness

5.2.1 Ecological and physicochemical WFD parameters may be adversely impacted by excessive levels of fine sediment contained within construction site run-off, dewaters or from works directly affecting water bodies (such as works within Loch Ness). Generally, excessive fine sediment in run-off is chemically inert and affects the water environment through smothering the beds and plants within water bodies, temporarily changing water quality (e.g. increased turbidity and reduced photosynthesis), and causing physical and physiological adverse impacts on aquatic organisms (e.g. abrasion, irritation etc.). However, where powdered grouts and cements are used this may also contaminate site run-off if not carefully used and may result in significant changes in pH and have other toxic impacts on fauna and flora. Sediment in run-off may also be associated with other chemicals or construction run-off could be contaminated with small spillages of toxic chemicals spilt on Site. Finally, where larger quantities of potentially polluting substances are stored (such as fuel storage or where cement is being batched) there is a risk of a large chemical spillage occurring that could contaminate a watercourse or water body, and potentially propagate downstream causing wider acute adverse impacts.

5.2.2 The Development requires an Inlet / Outlet structure within Loch Ness and other above- and below-ground structures related to the Development. The risk to the water environment is greatest where these activities occur close to and within Loch Ness, although it is proposed to undertake all works behind a silt curtain and a coffer dam that will allow a dry working area to be created. There is also a greater risk of adverse impacts to the Allt a' Mhinisteir watercourse as the main construction compound (Compound 1) will be located on either side of it. However, potential impacts would be temporary and short term and can be readily managed by the implementation of appropriate mitigation measures.

5.2.3 There will be temporary disturbance to the shoreline and margins of Loch Ness related to the construction of the cofferdam which will extend approximately 130 m out into the loch and 300 m along the shoreline. However, due to the small area to be temporarily impacted, this is considered to represent only a low magnitude impact, is not predicted to result in non-compliance with any WFD objectives.

5.2.4 Two temporary crossings of the Allt a' Mhinisteir (draining to Loch Ness) at Compound 1 could result in altered sediment transport process with potential increase in deposition of material upstream. The channel of the burn in this location is dominated by bedrock and therefore has a low sensitivity to modifications such as crossings. The banks are likely to be

stable and the channel is capable of conveying coarse sediment at high flows in this reach due to the channel type and steep gradient. Therefore, no significant adverse impact is predicted or non-compliance with any WFD objectives.

5.2.5 The migratory route of salmon through Loch Ness is not known specifically, but it is likely that salmon will be present in the vicinity of the cofferdam during their migration: late spring and early summer for smolt migration; late autumn or early winter for adult migration. Potential impacts on salmon and other important species such as lamprey, Arctic charr and Brown trout include: direct mortality or physical injury, disruption of their migratory pathway and avoidance reaction, potentially disrupting the migratory pathway (Please refer to Chapter 07 Aquatic Ecology of the EIA Report, Volume 2 for further details).

5.2.6 There is potential for INNS to be spread through or introduced to the Site during construction with the movement of barges through the loch. INNS have been shown to be present in the form of Nuttall's waterweed, Crangonyx pseudogracilis and an invasive flatworm. Only Crangonyx was found to be present in the cofferdam area through baseline survey. A Biosecurity Management Plan is contained in the CEMP to ensure appropriate measures are implemented to avoid INNS spreading.

5.2.7 Mitigation measures have been proposed to avoid, minimise and reduce the potential adverse impacts from high concentrations of suspended sediments in construction site run-off on receiving watercourses. These measures are described in detail in Chapter 10: Water Environment and include the implementation of a Construction Environmental Management Plan (CEMP) and Surface Water Management Plan (SWMP) in accordance with SEPA guidance and other best practice. Measures will include the implementation of a temporary drainage system, construction SuDS, filtration barriers (e.g. fabric silt fences) etc., programming works to avoid the wettest periods of forecast wet weather, water quality monitoring, the implementation of an Emergency Response Plan, bunded fuel tanks, the use of spill kits and plant nappies, staff training etc. Works in Loch Ness will be carried out under the supervision of an Aquatic Ecological Clerk of Works (ECoW). Temporary and permanent works affecting watercourses and Loch Ness will require a CAR Licence from SEPA. Providing these measures are implemented only minor adverse impacts are predicted and no non-compliance with any WFD objectives is predicted, taking into account relevant Protected Areas.

Loch Ashie

5.2.8 As stated for Loch Ness, suspended sediments and chemical spillages from construction site run-off have the potential to affect ecological and chemical WFD elements of watercourses draining the Site. However, there are no direct flow pathways between the Site and Loch Ashie and the land in between is heavily wooded. Overall, no impact from construction site run-off or spillage risk is predicted.

Loch Duntelchaig

5.2.9 Same as per the assessment for Loch Ashie.

Big Burn

5.2.10 Disturbance to water quality due to potential chemical spillages and excess fine sediments during construction works (including clear felling of trees), can affect biological communities, smothering habitat and physically impacting aquatic organisms. However, there will be no

direct impacts and the watercourse is at least 125 m from the Development and surrounded by dense woodland.

Inverness Groundwater Body

Waterways, Power Cavern, Access and Construction Tunnels

5.2.11 The High-Pressure and Low-Pressure Tunnels are to be constructed using a Tunnel Boring Machine (TBM). The tunnels will be lined as the TBM progresses. This will prevent groundwater from entering the tunnels. Once constructed, the tunnel lining and the circular cross-sectional shape of the tunnels will allow groundwater to flow smoothly around them. The depth of the Low-Pressure Tunnel below existing ground level will range between approximately 20 mAOD at the Tailpond Inlet / Outlet end and approximately 240 mAOD at the Power Cavern with the High-Pressure Tunnel then rising to approximately 20 mAOD at the Headpond. Therefore, the construction and ongoing presence of the tunnels have the potential to affect both shallow and deeper groundwater.

5.2.12 The Power Caverns will be constructed using drill and blast techniques from the point when the TBM reaches depth (approx. 240 m below ground level). Their construction may affect deeper groundwater, although it is expected that at depth the amount of fracturing will reduce and so inflow will reduce also. Where individual fissures result in inflows, then spray concrete will be used to seal the cavern walls.

5.2.13 The portals for the construction and access tunnels are to be located within the Compound 1 area. The portals will be constructed by excavation into the bedrock, and as such, it is not envisaged that sheet piling will be required and so, minor adverse impacts to the Inverness Groundwater Body status are predicted.

5.2.14 Areas of flush and spring are present between 500 m and 1 km north-east of the proposed tunnel portal locations. Based on the relative positions with respect to topography and distances between these GWDTEs and the tunnel portals, low impact to GWDTE status is predicted.

5.2.15 The construction of the Headpond will require excavations down to bedrock, with the potential to interact with shallow groundwater and also surface watercourses. Any effects are likely to be temporary until the Headpond has been lined and filled, when the system will become ‘effectively closed’. It is also likely that the main temporary effect will be on water quality.

General Construction Activities

5.2.16 The general construction activities as summarised in Section 10.5 of Chapter 10: Water Environment, have the potential to introduce contaminative substances to groundwater if such substances are lost to ground (e.g. a spill), or mobilised (e.g. earthworks and excavation). This has the potential to detrimentally affect groundwater quality locally.

5.2.17 A CEMP is proposed including a SWMP describing measures to manage the risk of pollution on Site. The implementation of embedded mitigation measures will be in accordance with construction best practice (e.g. prevention of accidents and spills, storage and containment, housekeeping, incident response, etc.). With the proper implementation of these measures no effect on Inverness Groundwater Body status is predicted.

5.3 Permanent Impacts

Loch Ness

5.3.1 The main pathway for permanent impacts to the water environment during operation of the Development will be derived from the movement of water between the Headpond and Loch Ness. For more details about the operation process see Chapter 10 (EIA Report Volume 2) and Annex 10.4.1.

Loss of Habitat

5.3.2 The construction of the Inlet / Outlet structures including concrete apron, rock armour, jetty and spillway outfall will result in the permanent loss of littoral habitat. The risk of further scouring of the bed is avoided by the provision of a concrete apron in front of the outlet. No concrete apron will be provided in front of the spillway outfall, although this is expected to be rarely used and energy dissipation measures will be implemented. Overall, the area lost as a proportion of the total area of the loch is only <0.05%. Given the size of Loch Ness, the loss of littoral shoreline area as a percentage of the total littoral shoreline area of Loch Ness is considered to be very small and insignificant and will not lead to non-compliance with WFD objectives.

Variation in Water Level

5.3.3 Operation of the Development may lead to water level changes of approximately 87 mm across Loch Ness, which is extremely small compared to the natural variation in water levels. It is also unlikely to result in any change in water quality given the depth and very large volume of water stored within Loch Ness. Therefore, no impact is predicted.

Impact on Water Temperature

5.3.4 There is a risk of changed water temperature in Loch Ness around the Inlet / Outlet during discharges from the Headpond. The risk is greatest when water is held within tunnels underground for longer periods of time, which could result in warming of this water by approximately 5.5 °C. It is not anticipated that water held in the Headpond will be at a significantly different temperature to that in the surface layers of Loch Ness. Smooth finishes to the surfaces of tunnels will minimise any increase in water temperature from friction. The discharge would be above the thermocline in the well-mixed zone (when Loch Ness is thermally stratified) where water with a slightly different temperature can be quickly assimilated. During the winter, should the water temperature within the pumped storage scheme be elevated above what would be expected naturally, the relatively low rate and volume of any discharge will be effectively buffered by the much large volume of water within Loch Ness, which would be unstratified and more mixed. Overall, a localised negligible adverse impact is predicted on Loch Ness.

Risk of concrete residues

5.3.5 Immediately after construction during the commissioning period there may be a concrete residue left on the basin forming the Headpond that might cause a very small increase in the pH of the water initially held in the basin. However, this water would be rapidly diluted and dispersed in Loch Ness. Water quality in Loch Ness is believed to be slightly alkaline and thus this is unlikely to have any significant impact. This impact would also be temporary and would not persist following a number of operations of the Development.

Risk of algal blooms

5.3.6 There is a risk for an algal bloom to occur in Loch Ness if water is not frequently renovated in the Headpond and stagnation occurs, as well as by impacts on stratification with continuous pumping / discharges. Reduced water quality through algal development could affect biological and physiochemical WFD elements. However, these are unlikely to occur due to continuous maintenance of the Headpond and the same reasons mentioned under 'Water Stratification'. Overall, no adverse impacts are predicted.

Spillage risk during operation

5.3.7 During operation there is a low risk that small quantities of oil or fuel may be spilt from service vehicles and routine maintenance of fixed plant, especially at the Outlet / Inlet structure. All maintenance operations would be carried out in accordance with the Operator's Environmental Management System, which will include measures to avoid spillages of chemical substances.

Surface water run-off from the Development

5.3.8 Surface water run-off from the realigned public road where the Headpond is proposed will flow as it does currently over the edge to a new ditch. As the traffic flows along this minor road are very low, no impact on water quality is predicted.

5.3.9 Surface water run-off from the permanent Compound 1 (Allt a' Mhinisteir) watercourse will be passed through purpose built SuDS to treat run-off and provide spillage containment, and so, no impact is predicted either in this watercourse or Loch Ness.

Permanent impacts on fish migration

5.3.10 The main migration pathway is likely to be on the far side of the loch, downstream of which the River Ness flows out via Loch Dochfour. Therefore, given the sporadic operation of the Inlet, its design to prevent the entrapment of fish and the evidence that even the weaker swimming fish species swim sufficiently fast to escape the Inlet velocity, together with the very small size of the Inlet structure in the context of the size of Loch Ness, no impact is predicted or non-compliance with any WFD objectives.

Potential impacts from INNS

5.3.11 There is no risk of introduction of INNS during operation as long as prevention control measures are followed, which include following 'Check, Clean, Dry' principles and regular monitoring surveys for the presence of aquatic and terrestrial INNS for a period of five years after the completion of construction.

Potential impact from new permanent watercourse crossings

5.3.12 Upgraded crossing on Allt a' Mhinisteir and Allt a' Chruineachd will have minimal impact as this will only extend current crossings and any additional morphological impact will be minor. A new road crossing on Allt a' Chnuic Chonaisg will have a minimal impact as the channel is very small and is close to the top of the catchment therefore any inhibition of sediment mobilisation will only affect this upper reach. Reduction in flows in the Allt a' Mhinisteir due to loss of catchment could result in reduced conveyance of coarse sediment. However, the size (cobble) of material currently within the channel is such that conveyance is slow and impacted by road crossings. The majority of material is currently transported only at high flows and a slight reduction in catchment area is unlikely to significantly impact this.

Loch Ashie

5.3.13 Surface water run-off from the Landscape Embankment will be intercepted by catch drains and the run-off directed to Loch Ashie. Risk of chemical spillages and from surface water run-off from minor roads is very low and it is unlikely to contain any pollutants in significant quantities.

5.3.14 No impacts are predicted on loch hydromorphology as there will be no direct impacts or works on this waterbody and the loss of upstream catchment will be compensated for by draining the new Landscape Embankment to the loch.

5.3.15 Loch Ashie overflows into Big Burn, which has a separate WFD designation to the upstream reach (ID 20260). The loss of catchment area along Big Burn downstream of Loch Ashie will be approximately 2.6 %, which is not considered to be significant. This will also be buffered by the water stored in Loch Ashie, which may have other important sources (e.g. groundwater). Therefore, no significant impact on the flow regime downstream of Loch Ashie (and corresponding existing / proposed SEPA mitigation measures) is predicted and therefore no impact on the WFD status of ecological and physicochemical parameters.

Loch Duntelchaig

5.3.16 Loss of catchment through reservoir embankment construction is approx. 0.1% of the catchment upstream of Loch Duntelchaig, which is very minor. This will also result in a minor flow reduction in Allt a' Chlachain. Therefore, no significant adverse impacts are predicted in terms of compliance with WFD objectives.

Big Burn

5.3.17 No run-off or risk of chemical spillages from the Development is predicted as there will be no direct discharges to Big Burn.

5.3.18 Although changing the land use could affect the hydrology of Big Burn by increasing the rate and volume of run-off reaching this watercourse, much of the area to be clear felled will become part of the new Headpond that will not drain to the Big Burn. The overall impact is therefore likely to be a net reduction in water supply to the Big Burn. However, this is unlikely to be significant as it is expected that baseflow to the watercourse is likely to be a more important contribution to flow and the dense woodland will exert a high evapotranspiration factor. The ground investigation has encountered groundwater at a higher elevation than the channel, and this is likely to be a significant source of flow. The loss of catchment area will partly be compensated by surface water run-off from the new Landscape Embankment along the southern boundary of the Development Site.

5.3.19 Reduced flow from loss of catchment in the Big Burn could also impact the transport of sediment in the channel. However, due to the existing small catchment and channel size, it is unlikely that there is significant erosion, deposition and transport of material within the channel.

Inverness Groundwater Body

5.3.20 The key factors identified affecting groundwater during the operation phase are the ongoing presence of the headpond, waterways, access and construction tunnels. As the headpond and waterways are lined, the risk of groundwater entering the tunnels or pumped water leaking to ground is minimal. The magnitude of impact on all groundwater receptors is considered to be minor only.

5.3.21 At the depth of the Power Cavern, the amount of fracturing will reduce and so inflow will reduce also (especially with spray concrete and/or other forms of lining to be used during construction). During operation, any changes in ingress will be monitored.

5.4 No Prevention of Improvement Assessment

5.4.1 In order to fulfil the WFD objective of meeting Good Ecological Status or Good Ecological Potential (for modified water bodies) for water bodies not already meeting that target status, SEPA will identify the mitigation (or enhancement) measures needed to be implemented. Information provided about water body specific mitigation measures was summarised in Annex 10.4.2. With the available information about the pressures and reasons for not being at Good Ecological Status or Good Ecological Potential, no potential non-compliance with the WFD objective 'failure to prevent improvement' is predicted.

5.5 Mitigation

Embedded Mitigation

5.5.1 Where possible, the design has sought to site new infrastructure to avoid water bodies or to minimise the potential for adverse impacts by careful positioning, the depth and design of temporary and permanent Inlet / Outlet structures, the design of watercourse crossings, and surface water management and spill containment for a new substation at Compound 1.

5.5.2 The Development has been designed to avoid any cross catchment transfer of any water by having both the inlet / outlet and spillway pipe to Loch Ness.

5.5.3 To avoid fish and debris entrainment, the Inlet / Outlet structures where the waterways terminate into Loch Ness, will incorporate a screen with 2 mm apertures. The screen also acts as an energy dissipation measure to reduce the velocity of the water discharging from the Development, and therefore limits the potential impacts on water thermal stability (especially when stratified).

5.5.4 A concrete apron is to be provided on the bed of Loch Ness in front of the intake / outlet structure. The area will depend on site specific bathymetry survey to be undertaken at a later stage. The purpose of the apron is to avoid any scour of the bed. Also, the spillage outlet will contain energy dissipation components to reduce the force of the water entering the loch and causing scour of the bed, although it is considered that the infrequent operation of the spillway means a concrete apron is not required.

5.5.5 A CEMP (Appendix 3.1, Volume 5) is proposed to set out the measures and commitments on the Contractor to avoid impacts from construction works to the water environment. These will be defined in more detail in a Surface Water Management Plan (SWMP). Please refer to Section 10.7 of Chapter 10: Water Environment 'Mitigation and Monitoring' and the outline SWMP presented in Appendix 10.5 (Volume 5) for further details.

5.5.6 A temporary cofferdam will be built out into Loch Ness around the location of the tailpond Inlet / Outlet structure. The type of cofferdam will be determined by the Construction Contractor post-consent, although a silt curtain will be installed around it for the duration of any works in the loch environment to prevent the propagation of any chemical spillage (should one occur) or suspended fine sediments (and to provide a quiescent area for them to resettle quickly).

5.5.7 A temporary drainage system will be implemented during construction using sustainable drainage systems where possible to manage the risk of flooding and to treat run-off. Measures may include temporary earth ponds / settlement lagoons, ditches, silt fences, the

use of silt busters or lamella clarifiers, dewatering / sediment bags (e.g. silt tubes), silt curtains, and measures to manage spoilage risks such as designated bunded refuelling areas.

5.5.8 Certain regulatory processes will also apply to the Development and will influence the way pollution risks during construction and operation are managed. Temporary and permanent works affecting watercourses will require a CAR Licence from SEPA under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended). Temporary and permanent abstractions and discharges will also require an Abstraction Licence and CAR Licence from SEPA. Through consultation with SEPA, appropriate treatment measures for construction site run-off, conditions on operational discharges, limits and conditions on abstractions will be determined.

Fine sediment run-off and chemical spillages

5.5.9 To avoid fine sediments and chemicals getting into the local watercourses and waterbodies, measures to control the storage, handling and disposal of such substances will need to be in place prior to and during construction. This will include:

- Measures to manage formation of excessive sediment in run-off and to provide treatment prior to discharge under permit to Controlled Waters to be described in a Surface Water Management Plan;
- Measures to reduce the risk of chemical spillages such as bunded fuel tanks, spill kits, plant nappies on static plant, and the implementation of an Emergency Response Plan; and
- Pre-construction and construction phase water quality monitoring.

5.5.10 Construction works directly affecting water bodies will require careful management and the implementation of stringent working practices and mitigation. This applies to the construction of the Inlet / Outlet structures within Loch Ness, and to other minor watercourses that may be crossed by new or upgraded access tracks. Please refer to Chapter 10 Water Environment for further details.

Water Quality Monitoring

5.5.11 During construction, it is proposed to undertake a water quality monitoring programme to ensure that mitigation measures are operating as planned and preventing pollution. The purpose of the monitoring programme will also be to ensure that should pollution occur it is identified as quickly as possible and appropriate action is taken in line with the Emergency Response Plan. With regard to the identified private water supplies sourced from groundwater, water levels should be monitored to identify any reduction in supply. Please refer to Chapter 10 Water Environment for further details.

Operation Phase Water Quality Monitoring

5.5.12 During operation it is proposed that the water quality within the Headpond is monitored on a routine basis including observations, in situ measurements using a probe and/or Secchi disk for turbidity, and regular water samples for laboratory analysis. The purpose of the monitoring is to build up an understanding of how water quality changes whilst stored in the Headpond, in comparison to background water quality in Loch Ness. Some monitoring in observation boreholes around the Headpond may be required if more water is encountered during its construction. This preventative measure will support decisions about operation to ensure that unforeseen water quality impacts on Loch Ness are avoided. If water quality

monitoring results remain stable and operation of the Development is consistent, it may be possible to reduce or even stop routine water quality monitoring. Please refer to Chapter 10 Water Environment for further details.

5.5.13 The monitoring of water ingress to Power Cavern may also be required during the operation phase, to ensure no effects in groundwater occur.

5.6 Environmental Enhancement Opportunities

5.6.1 None have been identified.

6 Conclusion and Recommendations

6.1.1 The Preliminary WFD assessment indicates that, based on the current understanding of the Development and availability of data, only localised or temporary adverse impacts to WFD relevant water bodies may occur to Loch Ness and associated undesignated waterbodies (ID 100156) and the Inverness Groundwater Body (ID 150670), with no significant impact to any other water body as long as mitigation measures are implemented. Therefore, the Proposed Development is compliant with the WFD objectives for the Loch Ness, Loch Ashie, Loch Duntelchaig, Big Burn and the Inverness Groundwater Body.

6.1.2 New infrastructure has been sited to avoid water bodies where possible. The position, depth and design of temporary and permanent inlet / outlet structure and the design of watercourse crossings have been selected to minimise adverse impacts on water bodies. For example, the overflow from the Headpond returns water back to Loch Ness instead of taking the shorter route to Loch Duntelchaig. This therefore avoids any cross catchment transfer as it operates as a closed loop system as described in Chapter 3: Design Evolution and Alternatives (in Volume 2). Surface water management will use a combination of SuDS and proprietary measures (e.g. spill containment for a new substation at Compound 1) to treat surface water run-off from the Development during operation. The Development has been designed to avoid any cross-catchment transfer of water by having a Spillway pipe that runs from the Headpond to Loch Ness. This will convey any excess water that is collected in the Headpond back down to Loch Ness and will also prevent the Headpond from filling up and over topping. It is also a one way directional pipe and so no water transfers back to the Headpond once discharged in to Loch Ness in a spill situation.

6.1.3 To avoid fish and debris entrainment, the Inlet / Outlet structures where the Waterways terminate into Loch Ness, will incorporate a screen with 2 mm apertures. The screen also acts as an energy dissipation measure to reduce the velocity of the water discharging from the Development, and therefore limits the potential impacts on water thermal stability, especially when stratified. Also, the Spillway outlet will contain energy dissipation components to reduce the force of the water entering the loch causing scour of the bed.

6.1.4 A concrete apron will be installed on the bed of Loch Ness in front of the Intake / Outlet structure. The area will depend on site-specific bathymetry survey to be undertaken at a later stage. The purpose of the apron is to avoid any scour of the bed.

6.1.5 Continuous water quality monitoring of Loch Ness and the Headpond is also proposed to develop an understanding of any changes in water quality in the Headpond and to ensure that any episodic deterioration either from the Development not being used for a lengthy period of time or in the longer term is identified.

6.1.6 Mitigation measures during construction will be managed through the implementation of a SWMP prepared as part of a CEMP (see Appendix 3.1, EIA Report Volume 5 for a copy of the Outline CEMP) to describe the measures to be adopted to manage construction pollution risks. Please refer to Appendix 10.5 of the EIA Report for a copy of the Outline SWMP.

6.1.7 A temporary cofferdam and silt curtain will be built and erected in Loch Ness around the location of the Tailpond Inlet / Outlet structure construction area. The type of cofferdam will be determined by the Construction Contractor post-consent. The coffer dam and silt curtain will be installed for the duration

of any works in the loch environment to prevent the propagation of any chemical spillage, should one occur, or suspended fine sediments and to provide a quiescent area for them to resettle quickly.

6.1.8 A temporary drainage system will be implemented during construction using sustainable drainage systems where possible to manage the risk of flooding and to treat run-off. Measures may include temporary earth ponds / settlement lagoons, ditches, silt fences, the use of silt busters or lamella clarifiers, dewatering / sediment bags e.g. silt tubes, silt curtains, and measures to manage spillage risks such as designated bunded refuelling areas.

6.1.9 Certain regulatory processes will also apply to the Development and will influence the way pollution risks during construction and operation are managed. A CAR Licence from SEPA under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) will be required for the construction site and for temporary and permanent works to water bodies (e.g. abstractions and discharges). Through consultation with SEPA, appropriate treatment measures for construction site run-off, conditions on operational discharges, limits and conditions on abstractions will be determined.

6.1.10 This is a qualitative preliminary WFD appraisal, and although it has not identified any potential non-compliance with WFD objectives for water bodies that may be impacted by the construction or operation of the Development, further assessment may be required as the scheme is developed and alongside applications for CAR licences.

6.2 References

REF 1 Water Framework Directive 2000/60/EC

REF 2 SEPA 2003. Water Environment and Water Services (Scotland) Act 2003 (WEWS Act)

REF 3 Scottish Statutory Instruments. (2013). The Water Environment (Controlled Activities)(Scotland) Amendment Regulations 2013

REF 4 SEPA website [Online]. Available: https://www.sepa.org.uk/environment/water/aquatic-classification/ [Accessed 15/10/2018]

REF 5 Environment Agency. (2015). Rules for assessing Surface Water Body Status and Potential, version 2.0

REF 6 Natural Scotland (2015). Appendices to the river basin management plan for the Scotland river basin district: 2015 – 2027

REF 7 SEPA (2017). Regulatory Method (WAT-RM-34) Derogation Determination - Adverse Impacts on the Water Environment

REF 8 SEPA (2017). WAT-SG-67: Assessing the Significance of Impacts - Social, Economic and Environmental

REF 9 SEPA (2017). WAT-SG-68: Assessing Significantly Better Environmental Options

REF 10 SEPA. (2017). The River Basin Management Plan for the Scotland River Basin District: 2015–2027 (updated)

REF 11 Environment Agency (2013). Catchment Walkovers for River Basin Management Operational Instruction 356_12

REF 12 Environment Agency (2011). The Sediment Matters Handbook: A Practical Guide to Sediment

REF 13 Meteorological Office website. [Online]. Available: https://www.metoffice.gov.uk/public/weather/climate/gfhyzzs9j [Accessed 28/08/2018]

REF 14 National River Flow Archive, station record for River Ness at Ness Castle Farm - https://nrfa.ceh.ac.uk/data/station/info/6001. Accessed 21/06/2018

Annex 10.4.1

WFD Water Body Assessments Cycle 2

RBMP Parameter	Loch Ness (Cycle 2 2016)	Loch Ashie (Cycle 2 2016)	Loch Duntelchaig (Cycle 2 2016)	Big Burn (Cycle 2 2017)
RBMP	Scotland River Basin District	Scotland River Basin District	Scotland River Basin District	Scotland River Basin District
Waterbody Name and ID	Loch Ness, ID100156	Loch Ashie, ID100159	Loch Duntelchaig ID100161	Big Burn - Loch Ashie to source ID 20261
Water Body Type	Lake	Heavily modified	Heavily modified	River
Size (Area, Length)	Area 55.3 km^2	Area 1.4 km^2	Area 5.6 km^2	0.4 km long
Overall Ecological Status/Potential	**Good**	**Bad**	**Poor**	**High**
Chemical Status	**Pass**	**Pass***	**Pass**	N/A
Downstream Waterbody	River Ness	River Ness	River Nairn	Loch Ashie
Biological Quality Elements	**Good**	**High***	**Good**	**High***
Invertebrates	High	N/A	N/A	High
Aquatic plants	High	N/A	Good	N/A
Other aquatic plants	High (Phytobenthos)	N/A	Good (macrophytes)	N/A
Alien Species	Good	N/A	N/A	N/A
Fish barrier	High	High	High	High
Fish	N/A	N/A	N/A	High*
Phytoplankton	High	N/A	N/A	N/A
Phytobenthos	High	N/A	N/A	N/A
Physico-Chemical Parameters	***High***	***High****	***High***	***High****
Acid Neutralising Capacity	High	High*	High	High**
Dissolved Oxygen	High	N/A	High	High*
Total Phosphorus	High	High*	High	N/A
Reactive Phosphorus	N/A	N/A	N/A	High*
Salinity	High	High*	High	N/A
Temperature	N/A	N/A	N/A	High*
pH	N/A	N/A	N/A	High*
Hydromorphological Parameters	*High*	*Bad**	*Poor*	*High**
Morphology	High	Poor*	Good	High*
Overall hydrology	High	Bad*	Poor	High*
Specific pollutants	Pass	N/A	Pass	N/A

* Calculated, data from a similar WFD waterbody in the catchment

** Default status, no data available

Annex 10.4.2 pWFD Assessment Sheet

Surface Water Body (name/ID/RBMP):	**Big Burn Upstream Loch Ashie (ID 20261)**	**Current status or potential: High status**	
Water body length:	**0.9 km**	**Target status or potential (2027): High status**	
Water body catchment area:	**0.5 km^2**	**Protected Areas:** Loch Ashie - Drinking Water Protection Zone, Site Special Scientific Interest (SSSI) and Special Protected Area (SPA)	
Heavily modified?	**No**		

Summary of scheme components: Big Burn is a small watercourse flowing in a northeast direction just to the south of the Development, upstream of Loch Ashie. The new Headpond will encroach into the catchment area of this small watercourse plus there will be some tree removal and ground disturbance, but not within 125 m.

WFD Parameter	Current Status/Potential	Target Status/ Potential	Description of other Protected Areas objectives	Brief description of impact		Brief description of mitigation measures		Residual impacts and WFD compliance	Consideration of impact to adjacent waterbodies
				Construction	Operation	Construction	Operation		
Biological status	**High (**Calculated, data from a similar watercourse**)**	**High**							
Benthic Invertebrates	High	High		Disturbance to water quality due to potential spillages and excess fine sediments during construction works, can affect biological communities, smothering habitat and physically impacting aquatic organisms. However, there will be no direct impacts and the watercourse is at least 125 m from the Development and surrounded by dense woodland. Please see under 'hydrology' for consideration of impacts to flow regime.	No runoff or risk of chemical spillages from the Development is predicted as there will be no discharges to Big Burn. Please see under 'hydrology' for consideration of impacts to flow regime. Although the Development may reduce surface water flows to Big Burn, this will be offset by runoff from the Embankment plus it is anticipated that groundwater makes a significant contribution to baseflows. Therefore, no impact to the status of biological quality elements is predicted.	Measures to manage formation of excessive sediment in runoff, its interception and treatment to be described in a Surface Water Management Plan. Measures to reduce the risk of chemical spillages such as bunded fuel tanks, spill kits, plant nappies on static plant, and the implementation of an Emergency Response Plan will also be implemented. Please refer to Chapter 10 Water Environment of the Environmental Statement for further details.	None proposed	No significant residual impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives	Loch Ashie WFD water body is located downstream. Effects to this waterbody are covered separately.
Fish	High (calculated, not measured)	High		Not applicable as the watercourse is too small to support significant fish populations.	Not applicable as the watercourse is too small to support significant fish populations.	N/A	N/A	N/A	N/A
Continuity for fish	High	High							
General physicochemical status	**High** (Default, no data available)	**High**							
Acid Neutralising Capacity	High (default)	High		Disturbance to water quality due to potential spillages and excess fine sediments during construction works may affect physicochemical status of Big Burn. However, this watercourse will not be impacted directly and is at least 125 m from the nearest works with dense woodland in between. As a result no significant adverse impacts are predicted.	Please see under 'hydrology' for consideration of impacts to flow regime. Although the Development may reduce surface water flows to Big Burn, this will be offset by runoff from the Embankment plus it is anticipated that groundwater makes a significant contribution to baseflows. Therefore, no impact to the status of biological quality elements is predicted.	Measures to manage formation of excessive sediment in runoff, its interception and treatment to be described in a Surface Water Management Plan. Measures to reduce the risk of chemical spillages such as bunded fuel tanks, spill kits, plant nappies on static plant, and the implementation of an Emergency Response Plan will also be implemented. Please refer to Chapter 10 Water Environment of the Environmental Statement for further details.	None proposed	No significant residual impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives	Loch Ashie WFD water body is located downstream. Effects to this waterbody are covered separately.
Dissolved Oxygen	High (calculated, not measured)	High							
Phosphate	High (calculated, not measured)	High							
Temperature	High (calculated, not measured)	High							
pH	High (calculated, not measured)	High							
Specific pollutants	**N/A**	**N/A**							
Chemical status-priority substances	**N/A**	**N/A**							
Chemical status-priority hazardous substances	**N/A**	**N/A**							
Hydromorphological status	**High (**Calculated**)**	**High**							
Hydrological Regime	High (calculated, not measured)	High		Potential adverse impacts on the hydrology of Big Burn may start during construction and continue from there after as a permanent change. The assessment therefore considered both the construction and operation phases together. Approximately 25% of the catchment area upstream of Loch Ashie may be deforested as part of the Development, and approximately 32% may be lost to the new embankment, and some of this area will drain towards Big Burn upstream of the Loch. Although changing the land use can affect hydrology of Big Burn by increasing the rate and volume of runoff reaching this watercourse, much of the area to be clear felled will become part of the new Headpond, that will not drain to the Big Burn. The overall impact is therefore likely to be a net reduction in water supply to the Big Burn. However, this is unlikely to be significant as it is expected that baseflow to the watercourse is likely to be a more important contribution to flow and the dense woodland will exert a high evapotranspiration factor. The ground investigation has encountered groundwater at a higher elevation than the channel, and this is likely to be a significant source of flow. The loss of catchment area will also be compensated by surface water runoff from the new Landscape Embankment along the southern boundary of the Development Site. Reduced flow from loss of catchment in the Big Burn could also impact the transport of sediment in the channel. However, due to the existing small catchment and channel size, it is unlikely that there is significant erosion, deposition and transport of material within the channel.		The Development has been designed to allocate new catchment areas (created by the embankment) to offset to an extent the loss of an area if catchment.		No significant residual impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives	Loch Ashie WFD water body is located downstream. Effects to this waterbody are covered separately.
Morphology	High (calculated, not measured)	High		None anticipated	Flow reduction would not affect transport of materials as the channel is small and 'V-shaped' with a low capacity to transport sediment.	None required	None required		Loch Ashie WFD water body is located downstream. Effects to this waterbody are covered separately.

Groundwater Body (name/ID/RBMP):	**Inverness 150670**	**Current status or potential: Good Status (2014)**
Water body length:	**N/A**	**Target status or potential (2027): Good Status**
Water body catchment area:	**413.7 sq km**	**Protected Areas: None identified**
Heavily modified?	**N/A**	

Summary of scheme components: Potential impacts from boring of High-Pressure and Low-Pressure tunnels, access and construction tunnels, and general construction activities. The underlying groundwater body is of a very large size and spatial extent. GWDTEs areas of blanket sphagnum bog on Ashie Moor on either side of the C1064 road in the south of the Development area, and areas of flush and spring in the north of the Development area Site in the vicinity of Clune Wood.

WFD Parameter	Current Status/Potential	Target Status/ Potential	Description of other Protected Areas objectives	Brief description of impact		Brief description of mitigation measures		Residual impacts and WFD compliance	Consideration of impact to adjacent waterbodies
				Construction	Operation	Construction	Operation		
Quantitative Status Element									
Quantitative Saline Intrusion	Good	Good	None identified	Minor adverse impacts on groundwater levels anticipated during tunnel boring of the High-Pressure, Low-Pressure, access and construction tunnels, and Power Cavern. No impacts to GWDTEs anticipated based on depth of tunnelling and positions of construction activities with respect to GWDTE locations. The headpond construction will require excavations down to bedrock, with the potential to interact with shallow groundwater and also surface watercourses. Any quantitative effects are likely to be temporary until the headpond has been lined and filled.	The ongoing presence and operation of the tunnels is anticipated to have a negligible impact on groundwater levels as the tunnel design prevents migration of groundwater between the tunnels and the surrounding bedrock. The headpond will be a 'closed' system and will not effect groundwater resources.	Tunnel construction methodology - the tunnels will be progressively lined as boring progresses, minimising the potential to disrupt groundwater flows and levels. A CEMP including a SWMP describing measures to manage the risk of pollution on Site will be implemented. A monitoring programme is to be implemented, including groundwater level and quality monitoring, linked to a predefined Action Plan. The drill & blast techniques used to construct the Power Cavern will aim to stem water ingress using spray concrete and/or other lining techniques. At the headpond, monitoring of groundwater levels in observation boreholes around the headpond may be required if more groundwater is encountered during its construction.	Some monitoring of water ingress to Power Cavern may also be required during the operation phase. Possible continued monitoring of observation boreholes for water levels around the headpond.	Minor adverse impacts during the construction phase are predicted. No non-compliance with WFD objectives predicted.	Due to the size of the groundwater body and the size and position of this scheme within it, impacts to adjacent groundwater bodies are considered to be extremely unlikely.
Quantitative Water Balance	Good	Good							
Quantitative GWDTEs test	No status	None							
Quantitative Dependent Surface Water Body Status	Good	Good							
Chemical Status Element									
Chemical Drinking Water Protected Area	Good	Good	None identified	Minor adverse impacts on groundwater quality anticipated during tunnel boring of the High-Pressure, Low-Pressure, access and construction tunnels, and Power Cavern. No impacts to GWDTEs anticipated based on depth of tunnelling and positions of construction activities with respect to GWDTE locations. The headpond construction will require excavations down to bedrock, with the potential to interact with shallow groundwater and also surface watercourses. Any qualitative effects are likely to be temporary until the headpond has been lined and filled.	The ongoing presence and operation of the tunnels is anticipated to have a negligible impact on groundwater quality as the tunnel design prevents migration of groundwater between the tunnels and the surrounding bedrock. The headpond will be a 'closed' system and will not effect groundwater quality.	Tunnel construction methodology - the tunnel will be progressively lined as boring progresses, minimising the impacts to surrounding groundwater. A monitoring programme is to be implemented, including groundwater level and quality monitoring, linked to a predefined Action Plan. The steming of water ingress at the Power Cavern will minimise any qualitative changes. At the headpond, monitoring in observaton boreholes of groundwater quality around the headpond may be required.	Possible continued monitoring of observation boreholes for water quality around the headpond.	Minor adverse impacts during the construction phase are predicted. No non-compliance with WFD objectives predicted.	Due to the size of the groundwater body and the size and position of this scheme within it, impacts to adjacent groundwater bodies are considered to be extremely unlikely.
General Chemical Test	Good	Good							
Chemical GWDTEs test	Good	Good							
Chemical Dependent Surface Water Body Status	Good	Good							
Chemical Saline Intrusion	Good	Good							
Supporting Elements (groundwater)									
Trend assessment									

Surface Water Body (name/ID/RBMP):	**Loch Ashie (ID: 100159)**	**Current status or potential: Bad Potential**	
Water body surface:	**1.37 km^2**	**Target status or potential (2027): Good Potential**	
Water body catchment area:	**5.5 km^3**	**Protected Areas:** Loch Ashie - Drinking Water Protection Zone, Site of Special Scientific Interest (SSSI) and Special Protected Area (SPA)	
Heavily modified?	**Yes** (physical alterations that cannot be addressed without a significant impact on water storage for public drinking water and protected habitats and species)		

Summary of scheme components: No direct impacts to Loch Ashie are proposed. However, Loch Ashie may be indirectly impacted by the reduction in catchment area. Loch Ashie forms part of the upper catchment of Big Burn, and the contributing area feeding the reservoir is small relative to the surface area of the loch (which may be more dependent on groundwater flows). Loch Ashie in conjunction with Loch Duntelchaig forms the main portable water supply for Inverness.

WFD Parameter	Current Status/Potential	Target Status/ Potential	Description of other Protected Areas objectives	Brief description of impact		Brief description of mitigation measures		Residual impacts and WFD compliance	Consideration of impact to adjacent waterbodies
				Construction	Operation	Construction	Operation		
Biological status	**High** (Calculated from Loch Duntelchaig)	**High**							
Continuity for fish	High (Calculated from Loch Duntelchaig)	High	This waterbody is within a Drinking Water Protection Zone. It is also designated as a SSSI and SPA for its importance as a passage habitat for the Slovenian Grebe (Podiceps auritus)	Suspended sediments and chemical spillages from construction site runoff may occur but would be unlikely to discharge to Loch Ashie due to the distance from the works and the dense woodland in between	Surface water runoff from the new Landscape Embankment and possibly some new Site roads will be intercepted by catch drains and the runoff directed to Loch Ashie. However, this water is unlikely to contain any significant concentration of any potential pollutant, which would in any case be rapidly and effectively diluted in Loch Ashie.	Measures to manage the formation of excessive sediment in runoff and to provide treatment prior to discharge under permit to Controlled Waters to be described in a Surface Water Management Plan. Measures to reduce the risk of chemical spillages such as bunded fuel tanks, spill kits, plant nappies on static plant, and he implementation of an Emergency Response Plan will be provided. Please refer to Chapter 10 Water Environment of the Environmental Statement for further details.	No comment	No significant residual impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives.	Big Burn Downstream Loch Ashie (ID 20260). No effects arte predicted as water quality will not be affected.
General physicochemical status	**High** (Calculated from Loch Duntelchaig)	**High**							
Acid Neutralising Capacity	High (Calculated from Loch Duntelchaig)	High	Same as above	Runoff from construction works is unlikely to affect the acid neutralising capacity of Loch Ashie.	Only surface water runoff will be discharged to Loch Ashie during the Operation phase. Therefore, no adverse impact is predicted.	None proposed or required	None proposed or required	No impact	Same as above
Total Phosphorus	High (Calculated from Loch Duntelchaig)	High	Same as above	Potential of excessive levels of fine sediment contained within construction site runoff and dewaters that may contain natural sources of phosphorous may be released. However, the form that the phosphorous is in may not be bioavailable and the effect would be temporary.	Surface water runoff from the new Landscape Embankment and possibly some new Site roads will be intercepted by catch drains and the runoff directed to Loch Ashie. However, this water is unlikely to contain any significant concentration of any potential pollutant, which would in any case be rapidly and effectively diluted in Loch Ashie.	Measures to manage the formation of excessive sediment in runoff and to provide treatment prior to discharge under permit to Controlled Waters to be described in a Surface Water Management Plan. Measures to reduce the risk of chemical spillages such as bunded fuel tanks, spill kits, plant nappies on static plant, and he implementation of an Emergency Response Plan will be provided. Please refer to Chapter 10 Water Environment of the Environmental Statement for further details.	None proposed or required	No significant residual adverse impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives.	
Salinity	High (Calculated from Loch Duntelchaig)	High	Same as above	Runoff from construction works is unlikely to affect the background salinity of Loch Ashie.	Only surface water runoff will be discharged to Loch Ashie during the Operation phase. Therefore, no adverse impact is predicted.	None proposed or required	None proposed or required	No impact	Same as above
Specific pollutants	**N/A**	**N/A**							
Chemical status-priority substances	**Pass**	**Pass**							
Not specified			Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
Chemical status-priority hazardous substances	**N/A**	**N/A**							
Hydromorphological status	**Bad (**calculated, not measured**)**	**Good**							
Morphology	Poor (Calculated)	Good	None identified	No impacts are predicted as no direct works will take place to this waterbody	No impacts are predicted as there will be no direct impacts or works to this waterbody and the lost of upstream catchment will be compensated for by draining the new Landscape Embankment to the loch	None proposed or required	None proposed or required (other than the proposed drainage of the Landscape Embankment to the loch)	No impact	Big Burn Downstream Loch Ashie (ID 20260): The loss of catchment area along Big Burn downstream of Loch Ashie will be approximately 2.6 %,which is not considered to be significant. This will also be buffered by the water stored in Loch Ashie, which may have other important sources (e.g. groundwater).
Overall hydrology	Bad (Calculated)	Good	None identified						
Mitigation measures									
Provide appropriate baseline flow regime downstream of impoundment.	Projected, Scottish Water (31/03/2024)		This waterbody is within a Drinking Water Protection Zone.	No impacts in proposed / existing mitigation measures are predicted	No impacts are predicted. The loss of catchment area along Big Burn downstream of Loch Ashie will be approximately 2.6 %,which is not considered to be significant. This will also be buffered by the water stored in Loch Ashie, which may have other important sources (e.g. groundwater)	None proposed or required	None proposed or required (other than the proposed drainage of the Landscape Embankment to the loch)	No impact on the delivery of proposed/existing mitigation measures	Same as above
Improvement to condition of channel/bed and/or banks/shoreline	Projected, Scottish Water (31/03/2024)								
Control Abstraction	Neither Agreed nor Projected, Scottish Water (31/03/2024)								
Removal of barriers or provision of mechanisms to enable fish migration	Projected, Highland Council (31/12/2013) and Landowner(s) (31/12/2014)								

Surface Water Body (name/ID/RBMP):	**Loch Duntelchaig**	**Current status or potential: Poor Potential**
Water body surface area:	**5.55 km^2**	**Target status or potential (2027): Good Potential**
Water body catchment area:	**Not known**	**Protected Areas:** Loch Duntelchaig - Drinking Water Protection Zone
Heavily modified?	**Yes** (physical alterations that cannot be addressed without a significant impact on water storage for public drinking water and protected habitats and species)	

Summary of scheme components: Loch Duntelchaig forms part of the upper catchment of the River Nairn, and is located south east of the Development. Main predicted impacts are related to reduction in catchment area. Loch Ashie in conjunction with Loch Duntelchaig forms the main portable water supply for Inverness.

WFD Parameter	Current Status/Potential	Target Status/ Potential	Description of other Protected Areas objectives	Brief description of impact		Brief description of mitigation measures		Residual impacts and WFD compliance	Consideration of impact to adjacent waterbodies
				Construction	Operation	Construction	Operation		
Biological status	**Good**	**Good**							
Macrophytes	Good	Good	This waterbody is considered as Drinking Water Protection Zone	Non identified as there are no direct flow pathways and a large area of woodland between the nearest area of works and this water body.	Non identified as there will be no discharges to this water body or impact on water balance.	Not applicable	Not applicable	Non identified	No impact is predicted on the Allt a Chlachain waterbody (ID: 20313) immediately downstream
Aquatic plants	Good	Good							
Fish barrier	High	High							
General physicochemical status	**High**	**High**							
Acid Neutralising Capacity	High	High	This waterbody is considered as Drinking Water Protection Zone	Same as above	Same as above	Same as above	Same as above	No significant residual impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives.	No impact as above
Dissolved Oxygen	High	High							
Total Phosphorus	High	High							
Salinity	High	High							
Specific pollutants	**Pass**	**Pass**							
			Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	No impact as above
Chemical status-priority substances	**N/A**	**N/A**							
Chemical status-priority hazardous substances	**N/A**	**N/A**							
Hydromorphological status	**Poor**	**Poor**							
Hydrological Regime	Poor	Poor	No relevant Protected Areas identified	Same as above	Loss of catchment through reservoir embankment construction is approx. 0.1% of the catchment upstream of Loch Duntelchaig, which is very minor.	None proposed	None proposed	No impact	No impact as above
Morphology	Good	Good	None identified	None anticipated	Flow reduction is unlikely to be detectable in Allt a' Chlachain as only 0.1% of the upper catchment may be lost.	None required	None required	No impact	No impact as above
Mitigation measures									
Provide appropriate baseline flow regime downstream of impoundment.	Agreed, Scottish Water (31/12/2007)		None identified	None identified	None identified	None identified	None identified	No impact on existing/proposed SEPA mitigation measures	No impact
Control pattern/timing of abstraction (Hands off flow/utilisation of storage (new/existing)	Agreed nor Projected, Scottish Water (31/12/2007)								

Surface Water Body (name/ID/RBMP):	**Loch Ness (ID: 100156)**	**Current status or potential: Good Status**	
Water body surface area:	**55.3 km^2**	**Target status or potential (2027): Good Status**	
Water body catchment area:	**1,700 km^2**	**Protected Areas:** Loch Ness - Drinking Water Protection Zone, River Moriston - Special Area Of Conservation (22 km south-west of the Development), Dores - EC Bathing Water (there are other SACs within the wider Study Area but as they are not water dependent they have not been considered any further).	
Heavily modified?	**No**		

Summary of scheme components: Key scheme components considered include the risk of pollution during construction, the loss of littoral habitat, and the abstraction and discharge of water to and from Loch Ness during operation. Two potential operation scenarios: (1) Frequent operation with regular abstraction/discharge (i.e. Scenario 1); and (2) Abstraction and long term storage in the Headpond - potentially for many weeks to months (i.e. Scenario 2). Minor watercourses draining to Loch Ness but not designated under the WFD in their own right are also considered. Principle impacts on them include the upgrade or new engineered crossing, construction site runoff and runoff from new areas of hardstanding and loss of catchment area during Operation. Small watercourses considered include: Allt a' Mhinisteir, Allt Dailinn and other minor watercourses.

WFD Parameter	Current Status/Potential	Target Status/ Potential	Description of other Protected Areas objectives	Brief description of impact		Brief description of mitigation measures		Residual impacts and WFD compliance	Consideration of impact to adjacent waterbodies
				Construction	Operation	Construction	Operation		
Biological status	**Good**	**Good**							
Phytoplankton	High	High		Suspended sediments and chemical spillages from construction site runoff have the potential to affect ecological WFD elements in Loch Ness including those coming from the small watercourses draining to the Loch and during works within the loch itself.	Loss of Habitat The construction of the inlet/outlet structures including concrete apron, rock armour, jetty and spillway outfall will result in the permanent loss of littoral habitat. However, the area lost as a proportion of the total area of the loch is only <0.05%. No bathymetry data was available so we are unable to calculate the % of littoral shoreline that would be lost to this Development, However, given the size of Loch Ness this area would still be considered to be very small and insignificant. Variation in Water Level Operation of the Development may lead to water level changes of approximately 87 mm across Loch Ness, which is small compared to the natural variation in water levels. It is also unlikely to result in any change in water quality given the depth and very large volume of water stored within Loch Ness. Therefore, no impact is predicted. Impact on Water Temperature There is a risk of varying water temperature around the Outlet during discharges from the Headpond. The risk is greatest when water is held within tunnels underground for longer periods of time, which could result in warming of this water by approximately 5.5°C. It is not thought that water held in the Headpond will be at a significantly different temperature to that in the surface layers of Loch Ness. Smooth finishes to the surfaces of tunnels will also minimise any increase in water temperature from friction. The discharge would be above the thermocline in the well-mixed zone (when Loch Ness is thermally stratified) where water with a slightly different temperature can be quickly assimilated. During the winter, should the water temperature within the pumped storage scheme be elevated above what would be expected naturally, the relatively low rate and volume of any discharge will be effectively buffered by the much large volume of water within Loch Ness, which would be unstratified and more mixed. Overall, a localised negligible adverse impact is predicted on Loch Ness Risk of concrete residues When first constructed there may be a concrete residue left on the basin forming the Headpond that might slightly increase the pH of the water initially held in the basin. However, this water would be rapidly diluted and dispersed in Loch Ness. Water quality in Loch Ness is believed to be slightly alkaline and thus this is unlikely to have any significant impact. This impact would also be temporary and would not persists following a number of operations of the Development. Risk of Algal Blooms There is a risk for an algal bloom to occur in Loch Ness if water is not frequently renovated in the Headpond and stagnation occurs, as well as by impacts on stratification process with continuous pumping/discharges. However, these are unlikely due to continuous maintenance of the Headpond and the same reasons mentioned under "Water Stratification". Reduced water quality through algal development could affect the rest of the biological elements. As this is not expected to occur as mentioned above, no adverse impacts are predicted. Spillage risk during operation During operation there is a low risk that small quantities of oil or fuel may be spilt from service vehicles and routine maintenance of fixed plant, especially at the outlet / inlet structure. All maintenance operations would be carried out in accordance with the Operators Environmental Management System, which will include measures to avoid spillages of chemical substances.	Implementation of a Construction Environmental Management Plan (CEMP) and Surface Water Management Plan (SWMP). Measures to reduce the risk of chemical spillages such as bunded fuel tanks, spill kits, plant nappies on static plant, and the implementation of an Emergency Response Plan. Temporary and permanent works affecting watercourses will require a CAR Licence from SEPA. Control measures in Allt a Mhinisteir watercourse and Pond 4, both draining to Loch Ness. Installation of a temporary Cofferdam and with an outer site specific silt curtain to prevent spillages and runoff from the construction works in Loch Ness. Works in Loch Ness should be carried out under the supervision of an Aquatic Ecological Clerk of Works (ECoW). Please refer to Chapter 10 Water Environment and Chapter 7 Aquatic Ecology of the EIA for further details.	Water quality monitoring of the Headpond and Loch Ness is proposed to further reduce the risk of an algal bloom occurring. All maintenance operations would be carried out in accordance with the Operators Environmental Management System, which will include measures to avoid spillages of chemical substances. The inlet/outlet structures will incorporate a screen with 2 mm apertures as an energy dissipation measure to reduce the velocity of the water discharging from the Development, and therefore limits the potential impacts on water thermal stability (especially when stratified). Also, the spillage outlet will contain energy dissipation components to reduce the force of the water entering the loch and causing scour of the bed. A concrete apron will be provided in front of the main outlet to prevent scour of the bed.	Minor adverse impacts are predicted only. Therefore, the proposed development would be compliant with all WFD objectives.	River Ness - Inverness Firth to Loch Ness (ID: 23394), no impact predicted as water levels are maintained , dilution of substances will occur in Loch Ness, and mitigation measures implemented. River Moriston SAC - potential impacts on fish migration not expected with mitigation.
Invertebrates	High	High							
Aquatic plants	High	High							
Other aquatic plants	High (Phytobenthos)	High (Phytobenthos)							
Phytobenthos	High	High							
Alien Species	Good	Good		Potential for INNS to be spread through or introduced to the Site during construction - factors such as inter-species competition and displacement	No risk of introduction of INNS during operation as water will only be circulated between Loch Ness and the Headpond. However, prevention control measures should still be followed (See Chapter 7 Aquatic Ecology of the EIA Report).	Spoil management, ECoW supervision, and strict biosecurity measures to be implemented. Please refer to Chapter 7 Aquatic Ecology of the EIA Report for further details. Survey of the extent of the proposed cofferdam and temporary pier works in Loch Ness for the presence of INNS, notably Nuttall's waterweed, will be required prior to any works and appropriate site specific remediation measures implemented in agreement with SEPA.	Biosecurity measures implemented throughout the operation of the Development, following 'Check, Clean, Dry' principles. These will be set out in a Biosecurity Management Plan. Annual monitoring surveys for the presence of aquatic and terrestrial INNS for a period of five years after the completion of construction are to be undertaken.	No significant residual adverse impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives.	
Fish barrier	High	High		It is likely that salmon will be present in the vicinity of the cofferdam during their migration. Potential impacts on salmon and other important species such as lamprey, Arctic char and brown trout include: direct mortality or physical injury, disruption of their migratory pathway and avoidance reaction. Please refer to Chapter 07 Aquatic Ecology of the EIA for further details. Watercourse crossings for temporary access roads and temporary site compounds, including diversion and culverting of watercourses flowing to Loch Ness, can affect resident brown trout populations.	Inlet / Outlet structure on Loch Ness shoreline could result in the abstraction or entrainment of fish. However, these adverse impacts will be minimised by the construction of a screen with suitable mesh size resulting in a negligible impact. Rheotactic (the tendency of fish to face into an oncoming current) distraction by attracting migratory fish such as salmon from their migration path could also occur but the impact would be negligible.	Works in Loch Ness and culverting of watercourses should be carried out under the supervision of an Aquatic Ecological Clerk of Works (ECoW). A fish rescue will be required during de-watering of the cofferdam as it is highly likely that fish will congregate in these sheltered areas during construction and then become trapped as the cofferdam is sealed. Electric fishing surveys of the Glaic na Ceardaich watercourse, Allt a' Chruineachd, Allt a' Chnuic Chonaisg and Allt a' Mhinisteir to inform mitigation for permanent and temporary watercourse crossings. Please refer to Chapter 7 Aquatic Ecology of the EIA for further details.	To avoid fish and debris entrainment, the inlet/outlet structures where the waterways terminate into Loch Ness, will incorporate a screen with 2 mm apertures.	No significant residual adverse impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives.	
General physicochemical status	**High**	**High**							
Acid Neutralising Capacity	High	High	Loch Ness - Drinking Water Protection Zone	Same as above. Discharges of construction site runoff and temporary disturbance to the shoreline and margins of Loch Ness around the cofferdam, including the disruption and removal of substrate, including dredging after removal of the cofferdam, and de-watering of this area could result in temporary changes to physicochemical parameters. Potential for the Allt a' Mhinisteir watercourse to receive runoff from the area of Headpond and Embankment construction, and suffer associated impacts on water quality.	Physicochemical quality elements around the Outlet could be affected in summer (risk of algal blooms and when Loch Ness is stratified) as mentioned for the Biological elements above. In the longer term, it would be expected that inorganic and organic sediment derived from the water abstracted from Loch Ness, the immediate surrounds to the Headpond, and windblown leaf matter, will accumulate within the Headpond. However, it is not expected that the rate of accumulation would be rapid as the water from Loch Ness has a relatively low turbidity and productivity, there is limited direct runoff into the Headpond, and although there are areas of dense woodland nearby, they do not overhang the Headpond and would be downslope.	Same as above	The Headpond water quality will be routinely monitored so that over time an understanding of how water quality may change with storage time and to ensure that operation of the Development only takes place when the Headpond water quality is good (i.e. an algal bloom is not occurring or there has been significant deterioration in water quality). Sediment build up would also be monitored and when necessary sediment would be removed for appropriate disposal in accordance with waste legislation. A concrete apron will be provided to prevent scouring of the loch bed and the suspension of matter and release of nutrients etc. into the water column. All maintenance operations would be carried out in accordance with the Operators Environmental Management System, which will include measures to avoid spillages of chemical substances.	No significant residual adverse impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives.	Same as above
Dissolved Oxygen	High	High							
Salinity	High	High							
Total Phosphorus	High	High							
Specific pollutants	**Pass**	**Pass**							
Not specified				Same as above	Same as above	Same as above	Same as above	No significant residual adverse impacts are predicted. Therefore, the proposed development would be compliant with all WFD objectives.	Same as above
Chemical status-priority substances	**N/A**	**N/A**							
Chemical status-priority hazardous substances	**N/A**	**N/A**							
Hydromorphological status	**High**	**High**							
Hydrological Regime	High	High		Fine sediment runoff from working areas and as a result of tree felling, could affect channel capacity of the small watercourses present in the area draining to Loch Ness and lead to increased flooding locally. Increased hardstand area and loss of trees in the catchment could result in increased flows in these watercourses.	Water Level and Flow in Loch Ness and Feeder Streams Reduction in catchment area of the Allt a' Mhinisteir could lead to reduced flow. This is approx. 7% of the catchment area. Water uptake and storage in the Headpond may reduce water level in Loch Ness by approx. 87 mm. This is within natural variation and will be only temporal, as water will be discharged back to Loch Ness. Operation will only be permitted when water levels are not too low (i.e. drought) or too high (i.e. flood risk) Impact on Water Stratification The risk to thermal stratification would only occur during the summer, and would increase with more frequent operation which would have the potential of inducing greater turbulence and mixing in Loch Ness in the locality of the outlet. However, due to the relative size of Loch Ness, the expected depth of the thermocline relative to the elevation of the intake/outlet structure, the relatively slow rate of discharge, and since the water temperature of the discharged water is not expected to have increased significantly above background that this would lead to any breakdown of thermal stratification	Measures should be put in place to minimise fine sediment runoff and may include silt traps on slopes or drainage channels.	Minimum and maximum water levels for energy generation in Loch Ness are defined to avoid impacts on water levels and resources (taking into account ecological receptors, flood risk and third party users).	No impact	No downstream impacts predicted.
Morphology	High	High		Two temporary crossings of the Allt a' Mhinisteir at Compound 1 could result in altered sediment transport process with potential increase deposition of material upstream. Temporary disturbance to the shoreline and margins of Loch Ness, with the temporary cofferdam extending approximately 100m out into the loch and 280m along the shoreline.	Upgraded crossing on Allt a' Mhinisteir and Allt a' Chruineachd will have minimal impact as this will only extend current crossings and any additional morphological impact will be minor. A new road crossing on Allt a' Chnuic Chonaisg will have a minimal impact as the channel is very small and is close to the top of the catchment therefore any inhibition of sediment mobilisation will only affect this upper reach. Reduction in flows in the Allt a' Mhinisteir due to loss of catchment could result in reduced conveyance of coarse sediment. However the size (cobble) of material currently within the channel is such that conveyance is slow and impacted by road crossings. The majority of material is currently transported only at high flows and a slight reduction in catchment area is unlikely to significantly impact this. Loss of lake bed in the bank where construction of Inlet/Outlet Structure will occur but scour risk will be minimised by the provision of a concrete apron in front of the outlet.	Design of any channel crossings should allow free transport of coarse sediment. Designs will minimize impacts to loch bed from Outlet Structure construction.	A concrete apron will be provided to prevent scouring from loch bed close to the Outlet	Minor adverse impacts are predicted only. Therefore, the proposed development would be compliant with all WFD objectives.	No impact downstream impacts predicted.

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