

Red John Pumped Storage Hydro Scheme

Volume 2, Chapter 3: Evolution of
Design and Alternatives

ILI (Highlands PSH) Ltd.

November 2018

Quality Information

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Table of Contents

3	Evolution of Design and Alternatives.....	1
3.1	Introduction.....	1
3.2	Alternative Location.....	1
3.3	Alternative Technology	1
3.4	Design Evolution	1
3.5	Detailed Design and Optimisation	10
3.6	Embedded Mitigation.....	10

Tables

Table 3.1	Embedded Mitigation by Environmental Topic	13
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3 Evolution of Design and Alternatives

3.1 Introduction

- 3.1.1 This chapter sets out the alternatives considered by the Applicant and the evolution of the design that has led to the Development as it is described in Chapter 2: Project Description.
- 3.1.2 Under schedule 4, part 2 and 3 of the EIA Regulations, developers are required to provide *“a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”*

3.2 Alternative Location

- 3.2.1 The Development Site was identified as part of a Scotland-wide review of pumped storage hydro (PSH) potential conducted by the Applicant. The review showed that sites possessing suitable characteristics are rare, and that the Development Site favoured comparably with other potential sites by directly avoiding certain sensitive features such as National Parks and European designated sites. There is a precedent for PSH in the Highland region and in the Loch Ness area in particular as the topography of Loch Ness provides suitable conditions for such as development. Section 3.4 provides further detail about the spatial evolution of the Development, and its final orientation with respect to Loch Ness.

3.3 Alternative Technology

- 3.3.1 PSH schemes provide benefits by balancing the electricity supply and demand. Night-time recharge stores excess energy generated by baseload and intermittent power stations so that this energy can be re-released at peak times. This is especially beneficial in the Highlands where an increasing percentage of electricity is coming from wind power, the delivery of which is intermittent. Pumped storage can also provide ancillary services to the grid.
- 3.3.2 There are few, if any, energy storage technologies which can provide the grid scale services of pumped storage hydro, with proven life cycle costs and impacts. Alternative storage technologies are either too small (hydrogen, batteries), largely unproven (compressed air) or more carbon intense in the case of ancillary services such as fast response (for example, open cycle gas).

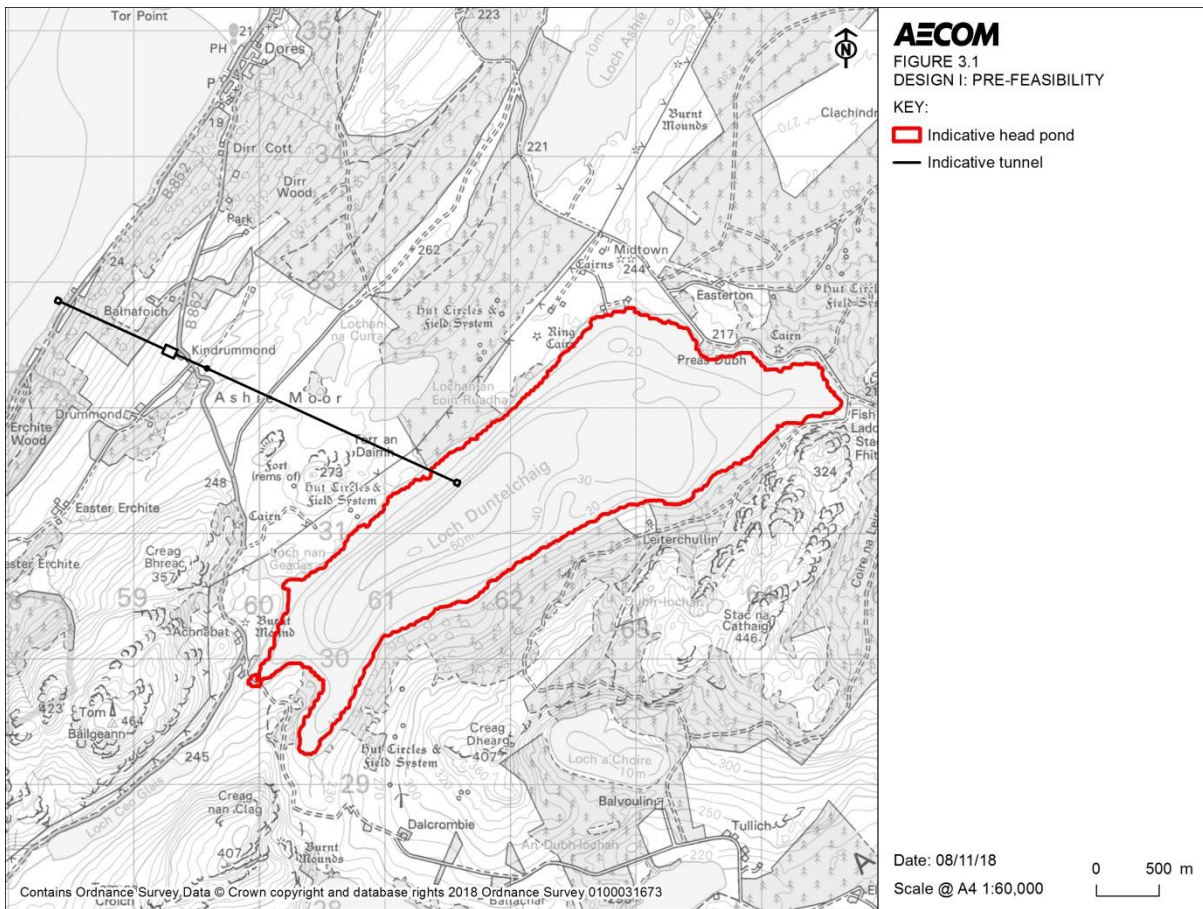
3.4 Design Evolution

- 3.4.1 The Development has evolved through an iterative design process where the design has been progressed in parallel with the EIA process through consideration of engineering feasibility, environmental constraints and consultation responses. This has resulted in the Submitted Design as presented in Chapter 2: Project Description. Where possible, mitigation has been integrated into the design to reduce any potential significant effects from the Development on identified receptors. The embedded mitigation is set out in Section 3.6 of this Chapter.
- 3.4.2 The evolution of the design of the Development is set out in the following sections. Embedded figures have been included for the ease of reference for the reader, but larger

sized A3 figures (using the same corresponding figure number) are available separately in Volume 3.

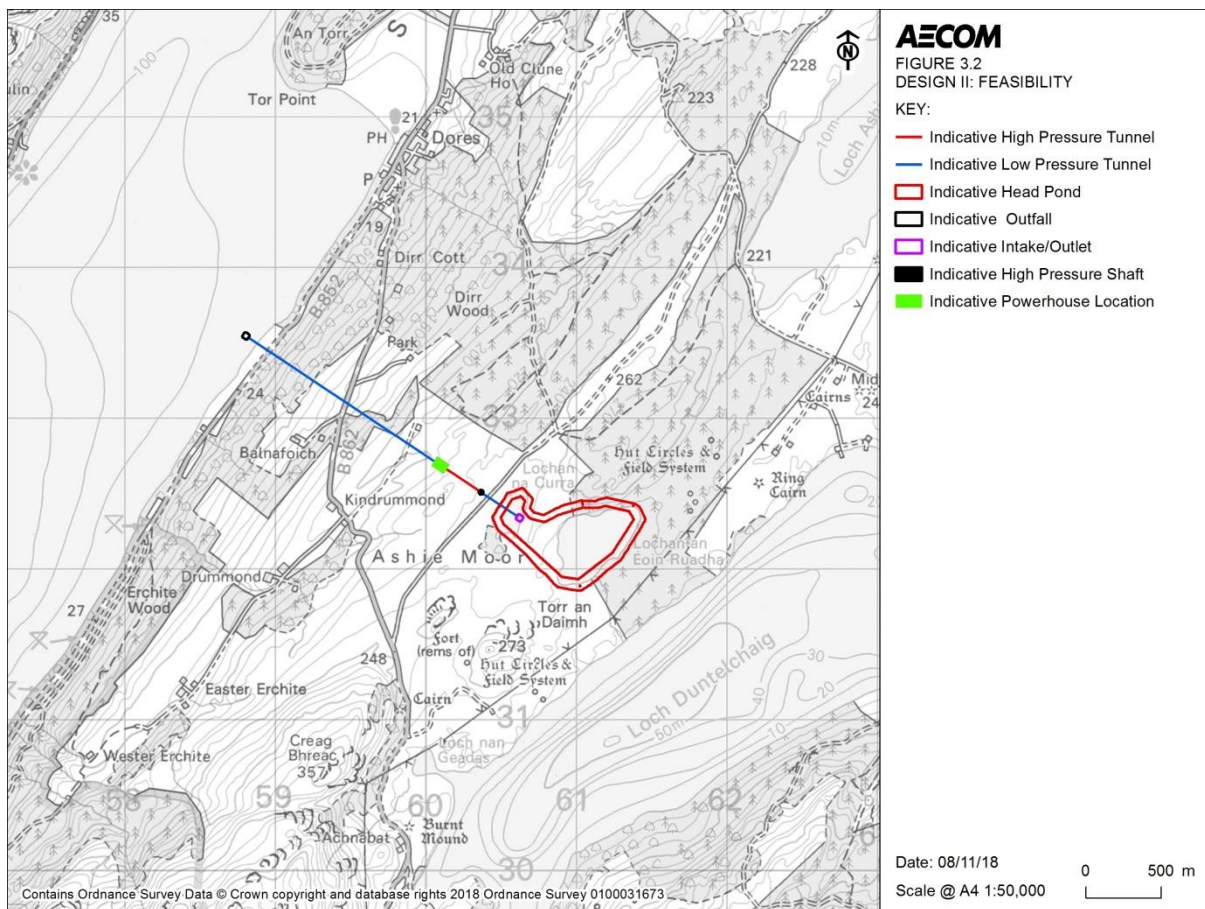
Design I: Pre-Feasibility

3.4.3 The Applicant reviewed potential PSH scheme locations within Scotland and the potential to develop a PSH scheme utilising Loch Ness with Loch Duntelchaig was identified. The proposed location had been previously considered for the development of a hydro scheme, initially by the former North of Scotland Hydro Electric Board in the 1940’s and latterly by Scottish Water. The Applicant developed a preliminary layout that utilised Loch Duntelchaig as the Headpond and Loch Ness as the Tailpond. An initial schematic was produced as shown in Figure 3.1: Design I: Pre-Feasibility (Volume 3).



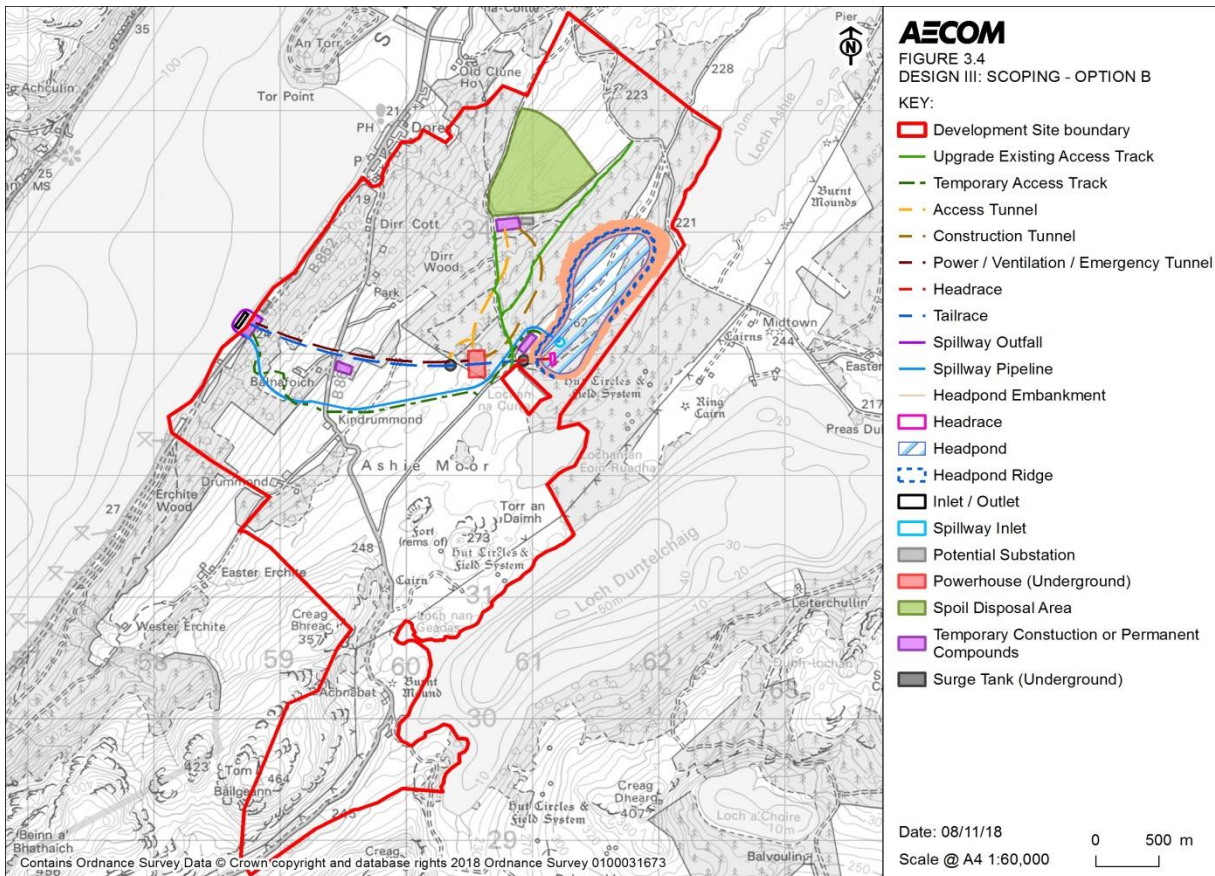
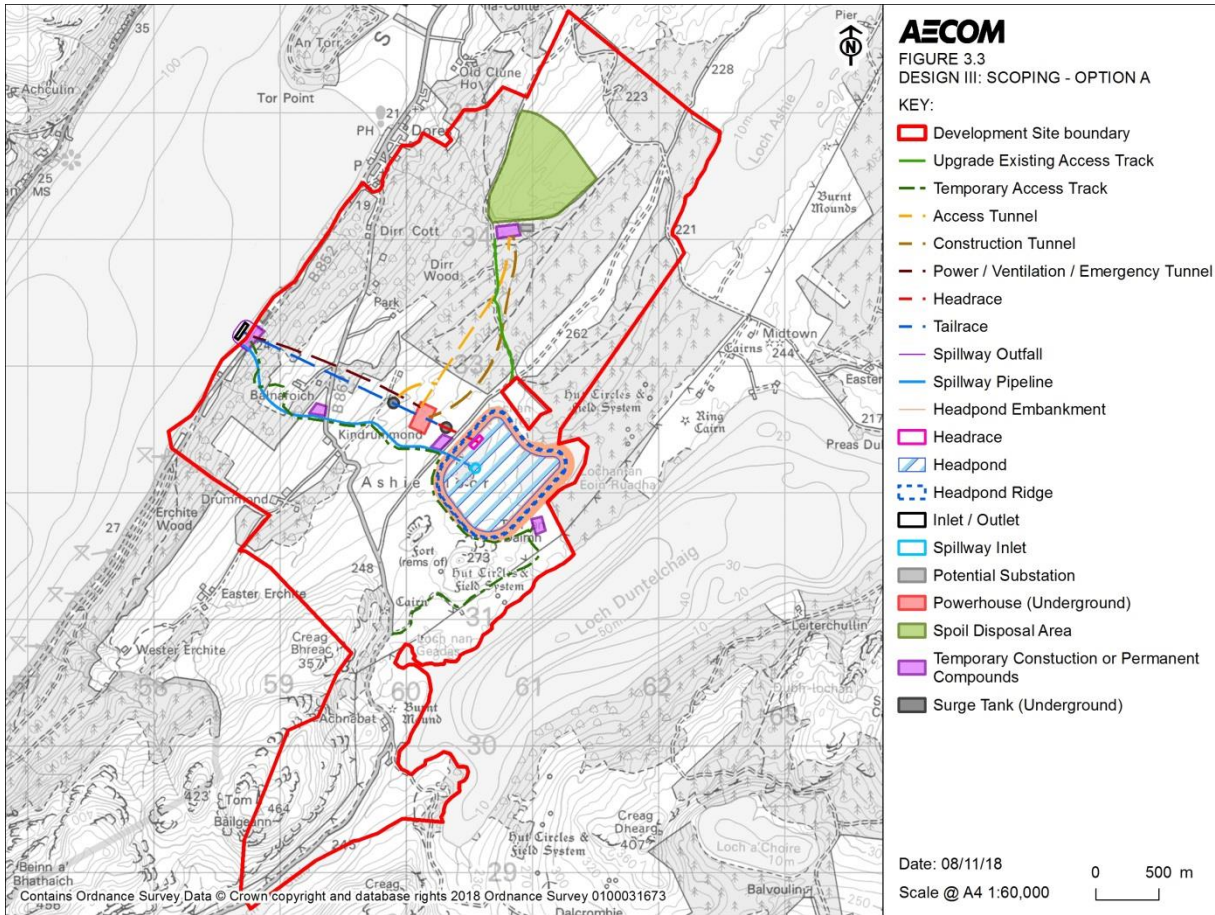
Design II: Feasibility

3.4.4 Following initial consultation with the Scottish Environment Protection Agency (SEPA) and Scottish Water, the presence of invasive non-native species (INNS) in Loch Ness and the risk of transfer between the two separate water catchments, one supplying Inverness' drinking water, was identified. Therefore it was determined that Loch Duntelchaig was not appropriate as a Headpond for the Development. Lochan an Eoin Ruadha and Loch na Curra were then identified as a potential suitable alternative Headpond to Loch Duntelchaig. A preliminary layout was developed incorporating the two small lochs into a Headpond. The Feasibility Design can be viewed on Figure 3.2: Design II: Feasibility (Volume 3).



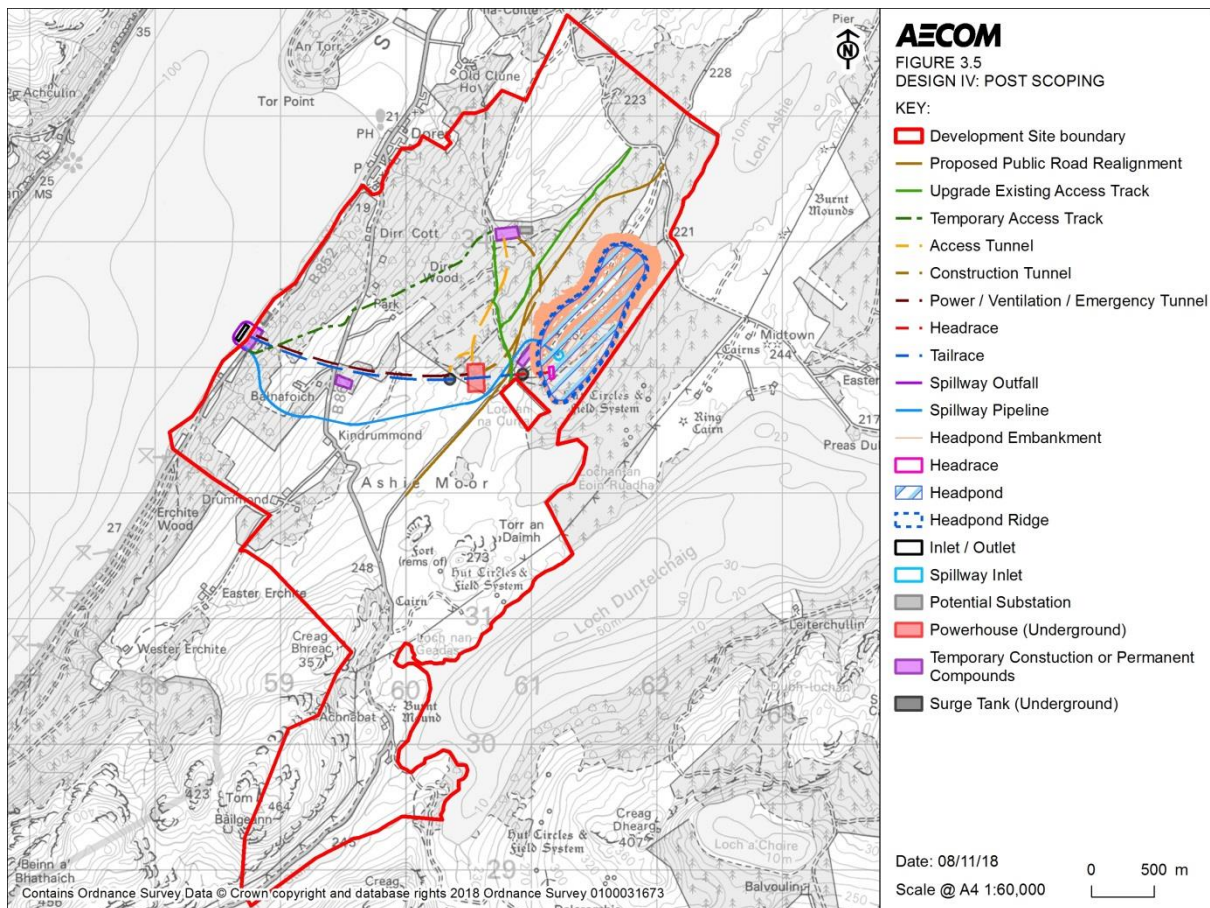
Design III: Scoping

- 3.4.5 As part of the design iteration, a high level environmental assessment was undertaken which included desk based review of environmental constraints and a Phase 1 habitat survey in addition to a bathymetric and topographical survey in and around the two lochs comprising of the proposed Headpond in the Feasibility Design.
- 3.4.6 The results of the desktop analysis identified the importance of permissive routes such as the Trail of the Seven Lochs and the South Loch Ness Trail, recreational activities and Caisteal an Dunriachaidh (a scheduled ancient monument), amongst other receptors that could be affected by the Development. In addition, the Phase 1 survey identified the presence of breeding red throated diver on Lochan an Eoin Ruadha and Loch na Curra. With respect to these findings, the design was amended as follows:
- An updated Headpond design utilising the two lochs (known as Option A) while directly avoiding the C1064 and Caisteal an Dunriachaidh;
 - An alternative Headpond location (known as Option B) located away from the two lochs and further from Caisteal an Dunriachaidh, but located on the C1064, further undesignated archaeological features and partially within Ancient Woodland Inventory (AWI) listed woodland;
 - To ensure no cross-catchment transfer of water, the underground Waterways for both Headpond options were designed as 'closed loop' systems. This is to mitigate the risk of operational transfer of INNS from the Ness to the Nairn water catchment. The design implications include the choice of a buried pipeline for the Spillway, which also reduces visual impacts.
 - Proposed access tracks that utilise the existing forest tracks and road network as much as possible and utilising the fire breaks in the ancient woodland towards Loch Ness to minimise loss;
 - Consideration of transforming any temporary compounds into a permanent visitor centre and to explore the potential for socio-economic and tourism opportunities such as a canoe landing point; and
 - A soil disposal area for any excess spoil generated during construction that utilises land of low ecological value.
- 3.4.7 The scoping design with the two Headpond options can be viewed on Figure 3.3: Design III: Option A and Figure 3.4: Design III: Option B (Volume 3



Design IV: Post Scoping

- 3.4.8 On receipt of the Scoping Opinion (Appendix 4.1, Volume 5), the Option B Headpond emerged as the favourable of the two options considering ecology, archaeology, water quality and water resources.
- 3.4.9 After selection of the favoured Headpond, the design was further progressed with the following amendments to the Scoping Design:
- To reduce the visual impact of the Headpond embankment, the Headpond was reoriented and the maximum height of the Embankment wall above ground level was lowered. The Embankment slope was softened and extended to help create a more natural form. There were also minor alterations to the Waterways, Powerhouse, and the access tunnels to accommodate the reorientation of the Headpond.
 - Excavated material will be used in the Landscape Embankment removing the requirement for permanent on-site spoil storage in the cleared woodland area shown on Figure 3.3 and Figure 3.4 (Volume 3).
 - Maximum area requirements for construction compounds were determined based on distribution of construction activities and corresponding equipment. Compounds were sited to minimise forest removal, limit visibility and to buffer watercourses as far as practically possible.
 - The Access Tracks, between the Headpond and the Tailpond were rerouted after consultation with the landowner in order to minimise loss of agricultural land. The updated Temporary Access Track traverses the Development Site from the Tailpond to Compound 1 and the Permanent Access Track then from Compound 1 to the Headpond. The route minimises the loss of Ancient woodland, but is constrained by the topography. The Temporary Access Track will be reinstated post-construction to minimise operational visual impacts.
 - The Spillway was rerouted to align with the proposed Access Tracks for ease of construction and maintenance and also to minimise the footprint of the project.
 - A proposed realignment of the C1064 road was set out avoiding areas of peat identified along the current alignment.
- 3.4.10 The Applicant engaged further with SEPA, THC and SNH in order to clarify responses made within the Scoping Opinion. Further detailed consultation with SEPA (meeting on the 27 April 2018) and SNH confirmed that screening for INNS would not be required following confirmation that the Development was a closed loop system, thereby potential for cross-catchment transfer was negligible. Therefore, a 2 millimetre (mm) aperture screen was selected for the Tailpond Inlet / Outlet to prohibit fish egress. In addition, an INNS risk assessment would be required to be submitted to confirm this agreement.
- 3.4.11 The updated Option B Headpond scheme was presented for feedback at the public consultation event held at the Dores Community Hall on the 27 and 28 June 2018, further details of the event are available in the Pre-application Consultation (PAC) Report that is submitted along with this EIA Report as part of the Section 36 Application. This design can be viewed on Figure 3.5: Design IV: Post Scoping (Volume 3).



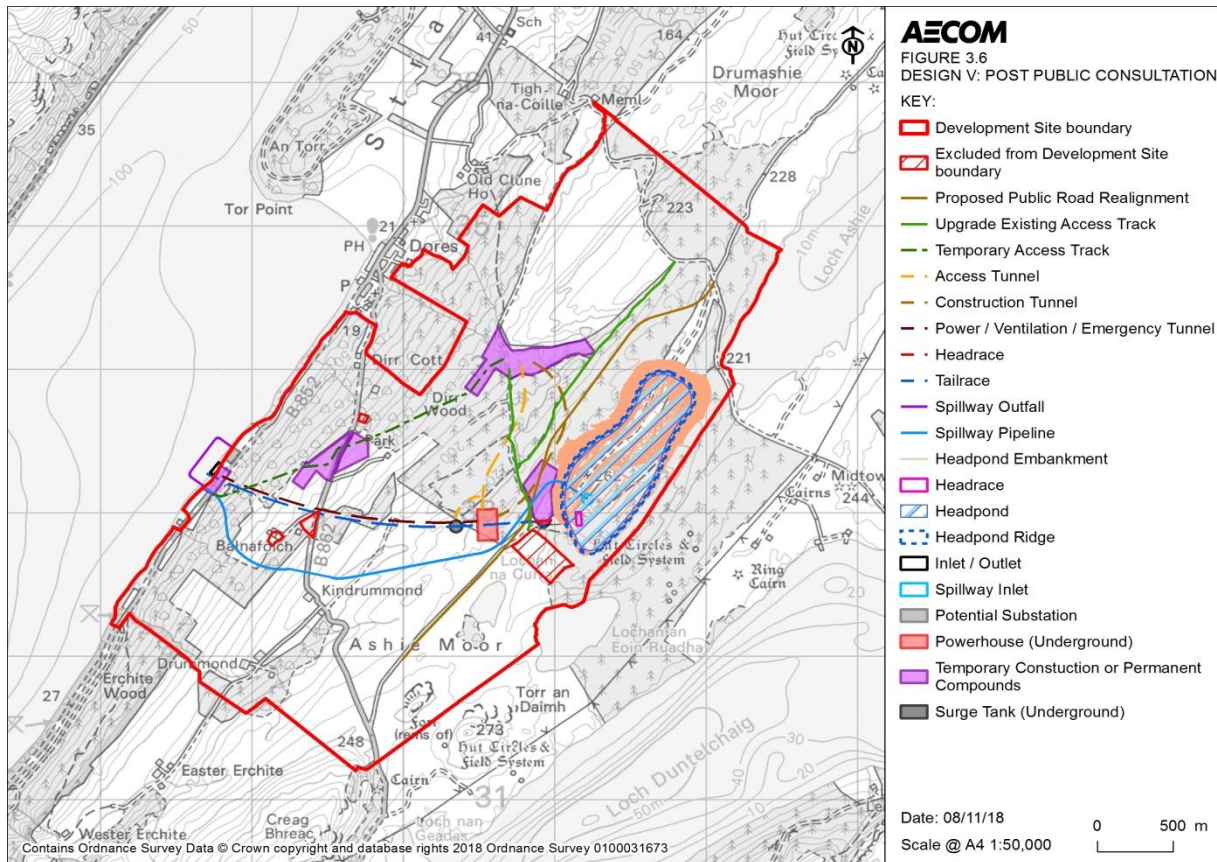
Design V: Post Public Consultation

3.4.12 Following public consultation, Design V was prepared based on the comments and feedback received from the local community and the landowner. A description of the public consultation conducted and a summary of the feedback received is available in the PAC Report, and in Appendix 4.4: Consultation Tracker (Volume 5).

3.4.13 The post public consultation design can be viewed on Figure 3.6: Design V: Post Public Consultation (Volume 3) with the following updates from Design IV:

- The red line boundary was updated to reflect the reduced area requirements of the progressed design. The Design V Development Site comprises a reduced area of 950 hectares (ha) and now excludes Lochan an Eoin Ruadha and the area to the south-east around Achnabat.
- The landownership within the Development Site was amended and in addition to the Ach na Sidhe Bed and Breakfast (B&B) on Ashie Moor, other private properties along the B862 and at Balnafoich have been excluded from the red line boundary. There has been some realignment of the below ground works in line with these exclusion areas.
- Realigned routes for core and local paths have been identified in order to retain public access across the Development Site.
- The Tailpond Inlet / Outlet structure has been moved northward to be located on a central grid reference of NH 58774 33328. This was to allow the landowner to retain access to and use of the field to the north of Baile-a-chladaich on the bank of Loch Ness.

- Based on landowner and public consultation, secondary uses of construction compounds for visitor centres or to facilitate recreation were decided against in favour of reinstating as much of the temporary area in order to retain tranquility of the area.



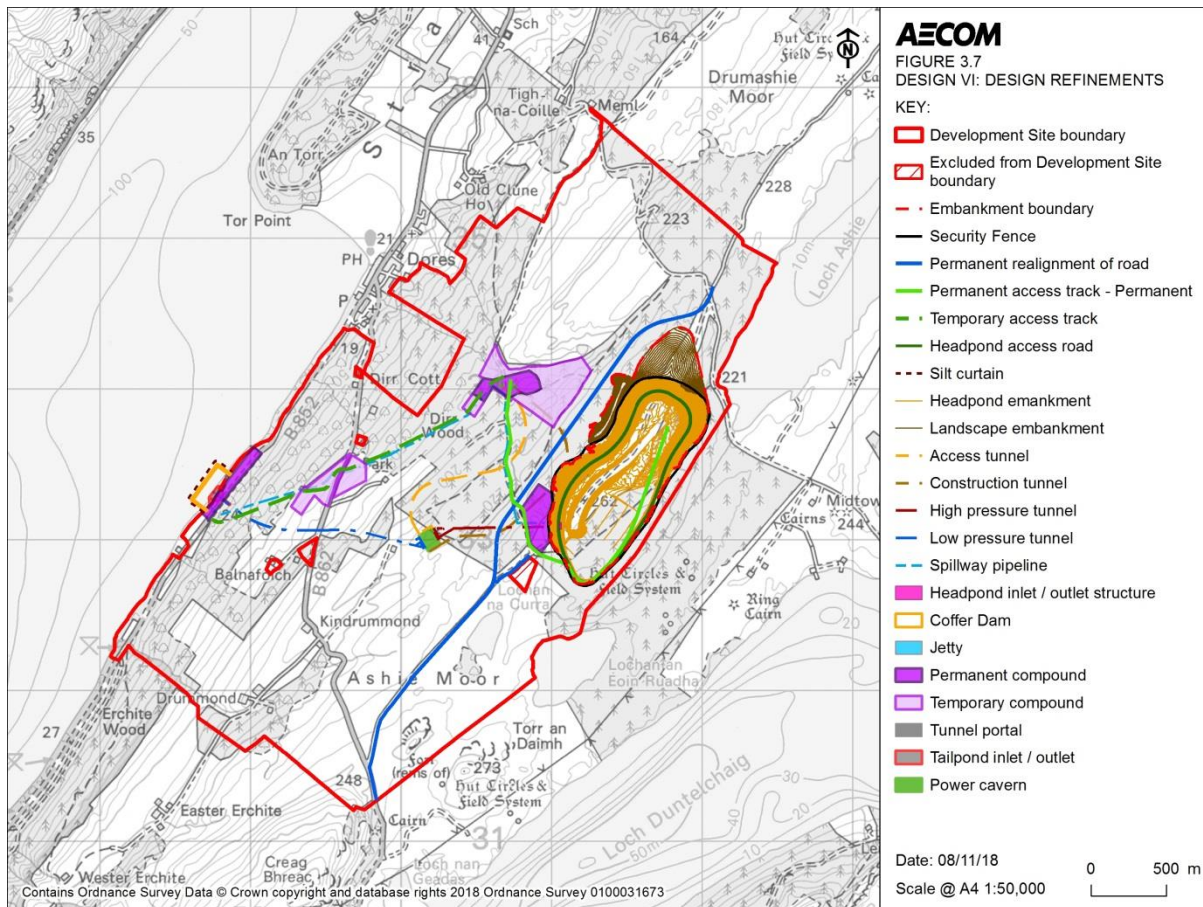
Design VI: Design Refinement

3.4.14 Following on from the public consultation event, a design day was held that brought together the environmental technical specialist relevant to the Development for a holistic review of the Development components. The following sets out the updates to the Post Public Consultation Design V as a result of refined engineering requirements and environmental constraints:

- The Landscape Embankment was reshaped, reducing the tail to the north and also extending to the west. The reshaping will provide a larger buffer between the edge of the Embankment and the realignment of the C1064 at the north of the Headpond as well as providing screening to the realigned road along the western side of the Headpond. The screening will be dual function, softening the angle of the incline of the Embankment and allowing trees to be reinstated between the realigned road and the Headpond. The Landscape Embankment will also soften the appearance of the north-western Headpond Embankment profile in wider views and assist with incorporating the Headpond into the existing landscape.
- The Spillway Inlet was incorporated within the design of the Headpond Inlet / Outlet structure, removing the need a separate Spillway Tower of up to 20 metres in height.
- Compounds were refined and reshaped taking into account topography.
- The maximum dimensions of the Tailpond Inlet / Outlet structure were identified along with the cofferdam required for the construction of the structure. A silt curtain or similar

to mitigate impacts from the construction of the Tailpond Inlet / Outlet structure on water quality has been incorporated into the design of the cofferdam.

3.4.15 This design was submitted with the Gate Check Report, as shown on Figure 3.7 (Volume 3).



Design VII: Section 36 Submission Design

- 3.4.16 Design VII: Section 36 Submission Design is the iteration of the Development design for which Section 36 consent is being sought and upon which the assessments contained in Chapters 5-16 of this EIA Report (Volume 2) have been based. Design VII can be viewed on Figures 2.3 – 2.5, which show the layout for the Development and the above ground and below ground components respectively (Volume 3).
- 3.4.17 Amendments from Design VI included further adjustment to the red line boundary and minor design changes to the underground arrangement of the power cavern and above ground access tracks near the Compounds.
- 3.4.18 A removable roof was included on the Tailpond Inlet / Outlet structure, which incorporates the screen cleaning system and limits the visibility of the screen.
- 3.4.19 In addition, the Applicant has been in discussions with the Marine Harvest fish farm regarding the location of the existing farm and its interaction with the construction of the Tailpond Inlet / Outlet. Whilst this has not amended the design of the Development, initial discussions have concluded that the fish farm could be moved away from the temporary construction area (subject to further discussions on planning permission) and therefore this is the assumption of the EIA Report.

3.5 Detailed Design and Optimisation

- 3.5.1 The engineering design process resulting in the Section 36 Submission Design has been undertaken in accordance with set design principles and engineering standards, therefore safety is inherent within the design of the Development. For instance, the design, construction and operation of the Embankment will be in accordance with the requirements of the Reservoirs (Scotland) Act 2011.
- 3.5.2 The design process has also been undertaken and refined where possible based on the environmental information gained to date. An overview of how environmental information is incorporated into the design is available in Section 4.5 of Chapter 4: Approach to the EIA.
- 3.5.3 There will be elements of the Development that will be subject to detailed design informed by further site investigation works, confirmed operational requirements and the working practices of the Construction Contractor. At this stage the construction materials and methods will be finalised.
- 3.5.4 During detailed design there is also the potential for engineering improvements and optimisation, such as a smaller Power Cavern or reducing the capacity of the Headpond itself.
- 3.5.5 The Development has the potential to generate more or even less unsuitable / excess material than is anticipated. Post consent, once further site investigation works have been undertaken, the detailed design will be undertaken which will look to balance the materials in the same way the preliminary design has done. The design of the Headpond can be optimised and manipulated as required as a result of insufficient or excess material potentially being generated, and this would be the primary method of managing the potential for excess material.

3.6 Embedded Mitigation

- 3.6.1 Mitigation which is implicit in the design of the Development, such as the measures described in Section 3.4: Design Evolution of this chapter (design measures), and mitigation implemented through standard control measures routinely used, such as working within good practice guidance during construction (management measures), are known as embedded mitigation.
- 3.6.2 This embedded mitigation has been assumed for the purposes of this EIA Report to be in place from the outset, as it is mitigation which the Development would employ in any event and without which the Development would be unlikely to be granted consent or allowed to commence. This EIA Report has therefore assessed the likely significant effects of the Development including embedded mitigation.
- 3.6.3 A comprehensive list of the embedded mitigation assumed within the assessments reported in Chapters 5-16 of this EIA Report is set out the Mitigation Register contained in Appendix 3.1, but is summarised below in Table 3.1.

Construction Environment Management Plan

- 3.6.4 An Outline Construction Environment Management Plan (CEMP) has been prepared as part of the Section 36 Application and is available in Appendix 3.1 (Volume 5).
- 3.6.5 The outline CEMP sets out the environmental management framework to be adopted during construction and measures to be implemented to minimise construction environmental impacts. The outline CEMP covers:
- Pollution prevention;

- Construction noise;
- Emergency response and flood risk management plan;
- Waste Management Plan;
- Ecological management plan;
- Biosecurity measures;
- Dust Management; and
- Tree Protection during construction

3.6.6 The standard good practice measures for the above topics, set out within the Outline CEMP, are considered to be embedded mitigation and assumed to be in place within the construction effects assessments contained within Chapters 5-16 of this EIA Report. Where applicable, specific measures may also have been identified within the EIA Report topic chapters and included in the Outline CEMP as additional mitigation.

3.6.7 The Outline CEMP will be updated post-consent on the appointment of the Construction Contractor and in consultation with THC and other relevant consultees. Throughout the construction of the Development, the CEMP will remain a live document being updated as circumstances, policies and best working practices change.

Construction Traffic Management Plan

3.6.8 In addition to the CEMP, a Framework Construction Traffic Management Plan (CTMP) has also been prepared as part of the Section 36 Application and is available in Appendix 15.1 (Volume 5). Following award of consent, the Framework CTMP will be further developed in consultation with THC, Transport Scotland (as necessary), Police Scotland and other stakeholders.

3.6.9 The CTMP sets out measures to be implemented to minimise adverse effects from construction traffic. Details to be provided in the Framework CTMP include as a minimum:

- The agreed route for construction traffic including any abnormal loads;
- The necessary agreements and timing restrictions for construction traffic, for example during works between Monday – Friday there may be timing restriction around school drop-off and pick-up times, and prohibition during loading times at commercial premises;
- Details of a proposed Condition Survey on access routes;
- Proposals for maintenance of the agreed routes for the duration of the construction phase;
- Proposals for monitoring and agreeing maintenance costs;
- Escort arrangements for abnormal loads;
- Route signing;
- Details of the advanced notification to the general public warning of any construction transport movements, specifically abnormal loads;
- Details of information road signage warning road users of forthcoming AIL transport and construction traffic movements;
- Arrangements for regular road maintenance and cleaning, e.g. road sweeping in the vicinity of the site access point as necessary, wheel cleaning / dirt control arrangements;

- Details of actions that must be taken by contractors to mitigate the traffic impact of site workers travelling to site;
- Contractor speed limits; and
- Community and emergency services liaison details.

3.6.10 Measures set out in the Framework CTMP are considered embedded and assumed to be in place within the construction effects assessments contained within Chapters 5-16 of this EIA Report. Where applicable, specific measures may also have been identified within the EIA Report topic chapters as proposals for inclusion within the CTMP post-consent.

Topic Specific Management Plans

3.6.11 As set out in Section 1.4 of Chapter 1: Introduction, the Section 36 Application will be accompanied by a number of other outline management plans, contained within Volume 5 of the EIA Report. , There include;

- Appendix 3.2: Outline Landscape and Ecology Management Plan (LEMP) – which outlines the holistic landscape and ecological reinstatement measures;
- Appendix 5.3: Outline Peat Management Plan (PMP) – which details the management of peat;
- Appendix 10.5: Outline Surface Water Management Plan (SWMP) – which outlines how water quality will be maintained, watercourse protection and the protection of private water supplies; and
- Appendix 14.3: Outline Access Management Plan – which outlines the diversions, closures and management of recreational and formal access routes and paths within the Development Site and connections to them outside the red line boundary.

3.6.12 As these are topic specific management plans, the embedded mitigation contained within them is summarised within Table 3.1 Embedded Mitigation by Environmental Topic.

Decommissioning Plan

3.6.13 Due to potential lifetime of the Development, it is proposed to prepare a Decommissioning Plan to confirm:

- Method of decommissioning;
- Extent of building removal;
- Extent and number of compounds required;
- Traffic movements;
- Arrangements for any secondary consents; and
- Overall measures for environmental protection.

Table 3.1 Embedded Mitigation by Environmental Topic

Environmental Topic	Enabling Works and Construction	Operation
Geology and Ground Conditions	<ul style="list-style-type: none"> • Post-consent site investigation works to confirm both geo-environmental and geotechnical properties to confirm detailed design. • The production of a Materials Management Appraisal (Appendix 5.2, Volume 5) to aid materials balance and reuse • The C1064 realignment has been routed to avoid areas of peat identified as part of the Phase 1 peat probing survey. • The Outline PMP (Appendix 5.3, Volume 5) contains potential re-use options and handling and storage methods to be used to minimise effects on peat and from peat disturbance. 	<ul style="list-style-type: none"> • Design of the tunnels and below ground infrastructure • Compliance with the Reservoirs Act
Terrestrial Ecology	<ul style="list-style-type: none"> • The Development Components have been sited to minimise the loss of habitat and minimise the disturbance to protected species. Further details are provided in Section 6.7 of Chapter 6: Terrestrial Ecology. • Ecological good practice will be secured during construction through the implementation of the CEMP, which will contain standard measures for the protection of habitat and species during works. 	<ul style="list-style-type: none"> • The implementation of ecological reinstatement and enhancement will be secured through the adoption of the LEMP, which will contain species specific measures for the optimal reinstatement of the Development Site post-construction. Proposed measures are set out in the Outline LEMP in Appendix 3.2.
Aquatic Ecology	<ul style="list-style-type: none"> • The Biosecurity Management Plan will set out the methods and procedures that will be implemented by the Construction Contractor to minimise potential effects on aquatic habitats and species due to INNS. • Works in Loch Ness (and other watercourses) will require a Controlled Activities Regulations (CAR) licence application to SEPA before the works can proceed. The CAR licence will likely specify restrictions on the timing of works that will minimise effects on aquatic ecology. • Features to control run-off into watercourse and lochs, and avoid contamination of these waterbodies have been incorporated into the design of the Development. Further details are available in Section 2.13 of Chapter 2: Project Description. • Good practice drainage and water management measures are contained within the Outline Surface Water Management Plan (Appendix 10.5). 	<ul style="list-style-type: none"> • The Development Waterways are a closed loop system transporting water between the Headpond and Tailpond without risk of cross-catchment water transfer of INNS. A description of the Waterways is available in Section 2.7 of Chapter 2: Project Description. • There will be a 2 mm aperture screen at the Tailpond Inlet / Outlet structure to protect against fish egress into the Development Waterways. Water velocity at the intake screen will also be lower than fish escape velocities to prevent fish being trapped against the screen.

Environmental Topic	Enabling Works and Construction	Operation
Ornithology	<ul style="list-style-type: none"> The Development Components have been sited to minimise the loss of habitat and minimise the disturbance to protected species. Further details are provided in Section 8.7 of Chapter 8: Ornithology (EIA Report, Volume 2). 	<ul style="list-style-type: none"> The implementation of habitat replacement and enhancement for ornithology will be secured through the LEMP. The LEMP will describe in detail the mitigation measures which are required to minimise the effects of the Development on important ornithological features. An Outline LEMP is available in Appendix 3.2 (Volume 5).
Flood Risk and Water Resources	<ul style="list-style-type: none"> Implementation of the CEMP. 	<ul style="list-style-type: none"> Operational Controlled Activities Regulations (CAR) Licence and operational arrangements around flood and drought conditions. Compliance with the Reservoirs Act
Water Environment	<ul style="list-style-type: none"> A silt curtain or similar will be installed around the Tailpond works prior to the construction of the Cofferdam commencing. The silt curtain will minimise sediment transfer into Loch Ness during the construction works and mitigate the associated impacts on water quality. In order to protect the water environment and minimise the risk of water pollution, a temporary drainage system will be implemented on-site. The drainage system will comprise appropriate treatment measures, potentially in a train to prevent run-off contaminated with particulates directly or indirectly entering watercourses. A description of the likely on-site measures is included within paragraph 2.13.17 of Chapter 2: Project Description. Good practice measures for the protection of water quality from run-off containing particulate will be secured through the implementation of the Surface Water Management Plan an outline of which is available in Appendix 10.5 (Volume 5). Monitoring requirements will also be set out within the Surface Water Management Plan. Good practice measures with regards to preventing chemical pollution will be set out within the CEMP (Appendix 3.1, Volume 5). 	<ul style="list-style-type: none"> A concrete apron will be installed on the bed of Loch Ness in front of the Tailpond Inlet / Outlet Structure to avoid any scour of the bed. The Screen 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 Loch Ness is stratified). The Spillway Outlet will also contain energy dissipation components to reduce the force of the water entering Loch Ness and minimise scour of the bed.
Landscape and Visual	<ul style="list-style-type: none"> The Landscape Embankment has been designed to soften and naturalise the profile of the north-western extent of the Headpond Embankment. 	<ul style="list-style-type: none"> Planting and habitat creation measures to integrate the Development into the landscape and its wider setting are set out within the LEMP.

Environmental Topic	Enabling Works and Construction	Operation
Landscape and Visual (cont)	<ul style="list-style-type: none">• Two earth bunds will be created and planted with woodland edge or native woodland to screen the Ach-na-Sidhe B&B. from views of construction plant and activity. Further details are contained with the Outline LEMP (Appendix 3.2).• The Temporary Access Track has been designed to minimise landscape and visual impacts, further details are available in Chapter 11: Landscape and Visual• Landscape and visual mitigation measures during the construction phase will be set out within the CEMP.	<ul style="list-style-type: none">• Temporary Access Road will be removed and the ground reinstated to minimise the operational visual impacts of the Development.• The height of the Embankment above ground level has been minimised through the orientation of the Headpond.• The design of the Development has minimised the requirement for additional structures, which has kept the Headpond and the Tailpond shoreline as uncluttered as possible.• The architectural design of the buildings and structures within the Development Site will seek to assimilate them into the surrounding landscape as much as possible by using simple, clean forms and a palette of materials and colour which lessens the contrast with the surrounding landscape.
Forestry	<ul style="list-style-type: none">• Tree protection measures such as dust screens and fencing to separate trees from working areas will be implemented along the Temporary Access Track within the area of Ancient Woodland on the slopes up from the bank of Loch Ness. Good practice tree protection measures expected to be implemented on-site are detailed within the outline CEMP (Appendix 3.1, Volume 3).• To minimise effects of soil erosion and water pollution as a result of stump removal during site clearance, works will take place in small fronts to minimise the extent and period of bare ground exposure.	<ul style="list-style-type: none">• Implementation of the Woodland Restructuring (Figure 12.6, Volume 3) and recommendations of Chapter 12: Forestry

Environmental Topic	Enabling Works and Construction	Operation
Archaeology and Cultural Heritage	<ul style="list-style-type: none"> The selection of Headpond Option B reduces the likely effects on the setting of the Caisteal an Dunriachaidh scheduled monument by increasing the distance between the asset and the Headpond. Due to the proximity of known archaeological assets to the construction work areas, it is envisaged that an Archaeological Watching Brief (AWB) will be conducted. The AWB will be conducted by a suitably qualified Archaeological Clerk of Works (ACoW) during site clearance. The AWB will be implemented when stripping in the vicinity of known assets and virgin ground. 	
Socio-economics and Tourism	<ul style="list-style-type: none"> Path diversions will be implemented to retain access and connectivity across the Development Site while also maintaining amenity for path users. Realignment will be conducted as part of Development enabling works and rerouted core paths will be open for use ahead of full construction starting on the Development. Further details are available in Appendix 14.3: Outline Access Management Plan. 	<ul style="list-style-type: none"> Post-construction local paths affected by the Development will be realigned and made good using appropriate materials for path use. Longer diversions on the core paths will be left insitu.
Traffic and Transport	<ul style="list-style-type: none"> To mitigate against the loss of the section of the C1064 under the Headpond, the road will be realigned during the enabling phase of the Development. The realigned route will be operational ahead of closure of the current road, retaining access along the C1064 during the Development construction. Further details of the design and construction of the C1064 realignment are available in Chapter 2: Project Description . Effects from construction traffic will be minimised through the adoption of a CTMP. Further details are provided in Chapter 15: Traffic and Transport and Appendix 15.1: Framework CTMP. 	

Environmental Topic	Enabling Works and Construction	Operation
Noise and Vibration	<ul style="list-style-type: none">• The best available construction methods shall be employed at all times, having regards to the principles of Best Practicable Means (BPM) to minimise noise and vibration impacts during the construction of the Development. Measures to achieve BPM will be adopted through the CEMP; proposed measures are set out in the Outline CEMP (Appendix 3.1, Volume 3).• The Outline CEMP (Appendix 3.1, Volume 3) and Framework CTMP (Appendix 15.1, Volume 3) have been prepared in accordance with good practice and relevant British Standards to help to minimise noise and vibration effects from construction works.• Consultation and communication with the local community will be covered in the CEMP and undertaken throughout the construction period. The proposed process is set out within the Outline CEMP (Appendix 3.1).• With regard to construction activities, agreement on working hours and working methods will be sought from THC to minimise noise effects at Noise Sensitive Receptors (NSRs). Working hours will be subject to agreement between the Construction Contractor and THC. In addition, adherence to working hours will be contractually implemented within any subsequent enforcement to be regulated by THC via planning conditions and also via the CEMP.	

