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Chapter 9:

Water Resources and Flood Risk

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INDEX

9 WATER RESOURCES

9.1 Introduction

9.1.1.1 This Chapter presents an assessment of the potential significant effects to water resources associated with the construction, operation, and decommissioning of the Proposed Development as described in **Chapter 3: Description of Development**.

9.1.1.2 The Chapter will:

- Describe the hydrological and hydrogeological baseline;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including direct, indirect, and cumulative effects;
- Describe the mitigation measures proposed to address potential significant effects; and
- Assess the residual effects remaining following implementation of mitigation.

9.1.1.3 This Chapter is supported by the following figures and technical appendices:

- Figures:
  - Figure 9.1: Water Resources and Flood Risk Study Area;
  - Figure 9.2: Surface Watercourses and Waterbodies;
  - Figure 9.3: Hydrogeology;
  - Figure 9.4: SEPA Flood Maps;
  - Figure 9.5: Private Water Supplies;
  - Figure 9.6: Protected Bathing Water Areas;
  - Figure 9.7: Watercourse Crossings; and
  - Figure 9.8: Designated Sites.
- Technical Appendix:
  - Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy.

9.1.1.4 Figures and Technical Appendices are referenced in the text where relevant.

9.2 Methodology

9.2.1 Scope of Assessment

9.2.1.1 This Chapter considers the potential effects on:

- Water quality including impacts from pollution and sedimentation;
- Flood risk both to the Proposed Development and the direct and indirect effects of the Proposed Development on off-site flood risk;
- Water resources which includes impacts to water quantity, flowpaths, and geomorphological changes to watercourses as a result of proposed watercourse crossings;
- Private water supplies (PWS) which are within 250 m of the Proposed Development or in hydrological connectivity to the Site;
- Groundwater Dependent Terrestrial Ecosystems as a result of changes to flow regimes (note direct impact to habitats are covered in **Chapter 8: Ecology and Conservation**); and
- Cumulative effects to hydrological resources as a result of the Proposed Development in combination with other developments.

9.2.2 Legislation, Policy, and Guidance

9.2.2.1 The national, regional, and local legislation and policy that provides the context for this EIA Chapter is summarised below.

Legislation

9.2.2.2 Any legislation referred to in this Environmental Impact Assessment (EIA) Report (EIAR) is as subsequently amended and as currently in force at the date of this EIAR.

9.2.2.3 The Water Framework Directive (WFD 2000/60/EC) established a framework for the protection, improvement and sustainable use of the water environment. It is transposed to Scottish law through The Water Environment and Water Services (Scotland) Act 2003 and subsidiary Regulations.

9.2.2.4 Other relevant legislation includes:

- The Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- Pollution Prevention and Control (Scotland) Regulations 2012;
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017;
- The Water Environment (Miscellaneous) (Scotland) Regulations 2017;
- The Flood Risk Management (Scotland) Act 2009; and
- The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015.

National Policy

- National Planning Framework 4.

Local Policy

- East Lothian Council Local Development Plan 2018[1]; and
- East Lothian Council Local Development Plan Strategic Flood Risk Assessment[2].

Guidance and Advice

- Planning Advice Note 61: Planning and Sustainable Urban Drainage Systems[3];
- Construction Industry Research and Information Association (CIRIA) Control of Water Pollution from Construction Sites (C532)[4];
- CIRIA Development and flood risk: guidance to the construction industry, C624D[5];
- Planning Advice Note 79: Water and Drainage[6];
- SEPA Engineering in the Water Environment Good Practice Guide: River Crossings[7];
- SEPA Controlled Activities Regulations (CAR) – A Practice Guide, Version 9.4[8];
- SEPA Guidance on assessing the impacts of development on groundwater abstractions[9];

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[1] East Lothian Council Local Development Plan 2018 adopted 270918. Available online at: Local Development Plan 2018 adopted 270918 | East Lothian Council Accessed February 2025.
[2] East Lothian Council Local Development Plan Strategic Flood Risk Assessment (2018). Available online at: SFRA___LDP_2018.pdf Accessed March 2015.
[3] Scottish Government (2001). Planning Advice Note 61: Sustainable urban drainage systems. Available online at: https://www.gov.scot/publications/pan-61-sustainable-urban-drainage-systems/ Accessed February 2025.
[4] CIRIA (2001). Control of water pollution from construction sites. Guidance for consultants and contractors (C532). Available online at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532&Category=BOOK
[5] CIRIA (2004). Development and flood risk – guidance for the construction industry (C624D). Available online at: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C624&Category=BOOK
[6] Scottish Government (2006). Planning Advice Note 79: Water and Drainage. Available online at: https://www.gov.scot/publications/planning-advice-note-pan-79-water-drainage/ Accessed at February 2025.
[7] SEPA and Natural Scotland (2010). Engineering in the Water Environment Good Practice Guide: River Crossings, Second edition. Available online at: https://www.sepa.org.uk/media/151036/wat-sg-25.pdf Accessed at February 2025.
[8] SEPA (2024). The Water Environment (Controlled Activities) (Scotland) Regulations. A Practical Guide v9.4. Available online at: car-a-practical-guide.docx Accessed February 2025.
[9] SEPA (2024) Guidance on assessing the impacts of development on groundwater abstractions. Available online at: guidance-on-assessing-the-impacts-of-developments-on-groundwater-abstractions.docx Accessed March 2025.

- CIRIA The SuDS Manual (C753)[10];
- CIRIA Environmental Good Practice on Site (C741)[11];
- Highways Agency's Design Manual for Roads and Bridges (DMRB) LA 113 – Road drainage and the water environment, Revision 1, 2020[12];
- SEPA Supporting Guidance (WAT-SG-75) Sector Specific Guidance: Water Runoff from Construction Sites[13];
- SEPA Guidance for Pollution Prevention[14];
- SEPA Engineering guidance - SEPA supporting guidance: good practice guides[15] including WAT-SG-25: River Crossings and WAT-SG-26: Sediment Management;
- SEPA Planning Background Paper. Flood Risk[16];
- SEPA Development Management Guidance: Flood Risk[17]; and
- SEPA Recommended Riparian Corridor Layer for use in Land Use Planning[18].

9.2.3 Study Area

9.2.3.1 The Study Area is based on professional judgement and comprises the Site plus a 1 km buffer around it. Watercourses or water resources outside the 1 km buffer but which are considered to be hydrologically connected to the Site and therefore have the potential to be impacted by the Proposed Development, are also included. The Study Area is shown on **Figure 9.1**.

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[10] CIRIA (2015). The SuDS Manual (C753). Available online at: https://www.susdrain.org/resources/SuDS_Manual.html
[11] CIRIA (2015). C741 Environmental good practice on site guide. 4th edition. Available online: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductcode=C741&Category=BOOK
[12] Highways Agency (2020). Design Manual for Roads and Bridges (DMRB) LA 113 – Road drainage and the water environment, formerly HD45/09, Revision 1. Available online at: https://www.standardsforhighways.co.uk/dmrb/search/d6388f5f-2694-4986-ac46-b17b62c21727 Accessed February 2025.
[13] SEPA (2021). Supporting Guidance (WAT-SG-75) Sector Specific Guidance: Water Runoff from Construction Sites. Available online at: https://www.sepa.org.uk/media/340359/wat-sg-75.pdf Accessed February 2025.
[14] NetRegs. Guidance for Pollution Prevention (various). Available online at: Guidance for Pollution Prevention (GPP) documents | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland Accessed February 2025.
[15] SEPA supporting guidance: Good practice guides (various). Available online at: Engineering guidance | Scottish Environment Protection Agency (SEPA) Accessed February 2025.
[16] SEPA Planning Background Paper. Flood Risk. 2018. Available online at: FR Background Paper Accessed March 2025.
[17] SEPA Development Management Guidance: Flood Risk. Land use planning system (LUPS) SEPA Development Plan Guidance Note 2a. Available at: Development management guidance on flood risk Accessed March 2025.
[18] SEPA Recommended Riparian Corridor Layer for use in Land Use Planning (2024). Available at: recommended-riparian-corridor-note.docx Accessed March 2025.

9.2.4 Baseline Characterisation

Desk Study

9.2.4.1 The methodology for the desk top baseline characterisation of the Site is as follows:

- Identify and describe the surface water hydrology including watercourses, waterbodies, and other hydrological features within the Study Area;
- Describe the geomorphology of the watercourses and their conditions;
- Identify the nature of the hydrogeology of the Study Area and any groundwater protected areas;
- Identify flood risks;
- Identify water resources within the Study Area including drinking water protected areas (DWPA), private water supplies (PWS), public water assets, and protected bathing water areas in the Study Area;
- Identify any designated conservation areas within the Study Area;
- Hydrologically analyse ecological survey data which indicates the presence of groundwater dependent terrestrial ecosystems to determine if these habitats are groundwater or ombrotrophic (rainwater) fed; and
- Identify all existing and proposed watercourse crossings that will form part of the Proposed Development.

9.2.4.2 Data sources used for the assessment are outlined in **Table 9.1**.

TABLE 9.1 DATA SOURCES

TOPIC	SOURCES OF INFORMATION
Surface Water Hydrology	OS Open Rivers Vector data[19] OS Mapping 1:25,000 scale Aerial Imagery[20]
Water Quality	SEPA Water Environment Hub[21]
Designated Conservation Sites	NatureScot SiteLink[22]

[19] OS Open Rivers. Available at: OS Open Rivers | Vector Map Data for GIS | Free OS Data downloads Accessed February 2025.
[20] Google Earth. Available online at: earth.google.com/static/multi-threaded/versions/10.73.0.1/index.html? Accessed February 2025.
[21] SEPA Water Environment Hub. Available online at: RBMP3 Accessed February 2025.
[22] NatureScot Map Search. Available online at: SiteLink - Map Search Accessed February 2025.

TOPIC	SOURCES OF INFORMATION
Water Resources	Private Water Supply data supplied directly by East Lothian Council and surveys from local residents Scottish Government Drinking Water Protected Areas – Scotland river basin district: Maps[23] SEPA Drinking Water protected areas (catchments)[24] Scottish Water asset maps[25]
Flood Risk	SEPA Flood Maps (river, coastal, and surface)[26,30] ECU Scoping Opinion

Field Survey

9.2.4.3 A Site walkover was conducted by ERM in March 2025. The purpose of the walkover was to:

- Ground truth the desktop data;
- Check the condition and geomorphology of watercourses on-Site;
- Identify any additional hydrological features to the desktop data; and
- Characterise watercourses at the proposed crossing locations.

9.2.5 Criteria for the Assessment of Effects

Receptor Sensitivity

9.2.5.1 The sensitivity of receptors is defined using the criteria set out in **Table 9.2.**

TABLE 9.2 DERIVATION OF SENSITIVITY OF RECEPTOR

SENSITIVITY OF RECEPTOR	CRITERIA	EXAMPLE
High	International or national level importance. Receptor with a high quality or rarity, has very limited capacity to tolerate changes to hydrology, water quality, or	• Surface water bodies with a High overall status as defined by the WFD. • There is a high likelihood (1 in 10 year probability) of flooding in the catchment. Active floodplain. Waterbody or associated

[23] Scottish Government. Available online at: Drinking water protected areas - Scotland river basin district: maps - gov.scot.
[24] SEPA Environmental data (various). Available at: Environmental data | Scottish Environment Protection Agency (SEPA) Accessed February 2025.
[25] Supplied to ERM by Scottish Water.
[26] SEPA Flood Maps. Available online at: SEPA Flood Maps Accessed February 2025.

SENSITIVITY OF RECEPTOR	CRITERIA	EXAMPLE
	flood risk, and has limited potential for substitution or replacement.	defences which serve a defined flood risk function. • Scottish Government Drinking Water Protected Area (DWPA). • Regulated Private Water Supplies (PWS) (serving >50 people or are commercial use). • Sites of Special Scientific Interest (SSSI) Ramsar sites, Special Areas of Conservation (SAC), and Special Protection Areas (SPA). • Principal aquifers within groundwater protection zones. • Protected Bathing Water Area. • High Groundwater Dependent Terrestrial Ecosystems (GWDTE).
Medium	Receptor with a high quality or rarity at a local scale, or medium quality or rarity at a regional scale. Receptor has limited capacity to tolerate changes to hydrology, water quality, or flood risk.	• Surface water bodies with a Good or Moderate overall status as defined by the WFD. • There is a medium likelihood (1 in 200 year probability) of flooding in the catchment. Some flood alleviation features. • Aquifer providing water for agriculture or industrial use. • Type B PWS (<50 people served and domestic use only). • Locally or regionally important status or designation. • Moderate GWDTE.
Low	Receptor of local important with a low quality or rarity. Receptor has a moderate capacity to tolerate changes to hydrology, water quality, or flood risk.	• Surface water bodies with a Poor overall status as defined by the WFD. • There is a low likelihood (1 in 1000 year probability) of flooding in the catchment. Waterbody serves a limited flood risk function. • Aquifer defined by the British Geological Survey (BGS) as being of low productivity. • GWDTE which is not groundwater dependent.

Magnitude of Impact

9.2.5.2 The magnitude of impact is the predicted change and associated deviation from baseline conditions of receptors as defined in **Table 9.3.**

TABLE 9.3 DERIVATION OF MAGNITUDE OF IMPACT

IMPORTANCE	CRITERIA	EXAMPLE
High	Results in substantial impact on water resources.	• Increases flood risk to highly vulnerable receptors or nationally important infrastructure. • Impacts that would cause a change in the WFD status of a waterbody. • Impacts that would impact water quality or quantity in a DWPA or Bathing Water Protected Area.
Medium	Results in impacts on water resources.	• Increases flood risk to vulnerable receptors or locally important infrastructure. • Impacts that may cause a change to a WFD category of a waterbody. • Impacts which could impact water quality or quantity to a PWS.
Low	Results in minor impacts on water resources.	• Limited impact to flood risk. • Impacts which are not likely to change WFD status.
Negligible	Impacts on water resources are insufficient to affect their integrity or use.	• Almost imperceptible changes to water quality, quantity, and flood risk.

Significance of Effect

9.2.5.3 **Table 9.4** illustrates how residual effects are determined by comparison of the sensitivity of receptors with the magnitude of impact. For the purposes of this assessment significant effects are **Major** or **Moderate**.

TABLE 9.4 SIGNIFICANCE OF EFFECT

		MAGNITUDE OF IMPACT			
Sensitivity of Receptor		Negligible	Low	Medium	High
	High	None	Minor	Major	Major
	Medium	None	Minor	Moderate	Moderate
	Low	None	Negligible	Minor	Minor

9.2.6 Cumulative Effects

9.2.6.1 The potential for cumulative effects to occur during the construction and operational phases of the Proposed Development in combination with other developments is assessed based on:

- the potential hydrological connectivity of the Proposed Development to other developments which are the subject of valid consented applications for consent;
- developments that are subject to planning conditions related to the water environment and are in hydrological connectivity to the Site; or
- there is the potential for concurrent phases of construction between the Proposed Development and others in the same hydrological catchment.

9.2.6.2 The assessment includes consented developments not yet under construction and developments in planning. Current operational sites and those under development are considered part of the baseline.

Limitations and Assumptions

9.2.6.3 This assessment refers to and uses publicly available data sources and relies upon the accuracy of the data.

9.2.6.4 At the time of writing this report, East Lothian Council stated they had no records of known PWSs within the Study Area. However, PWS survey responses would indicate otherwise. A limited number of PWS questionnaires have been returned, therefore information on PWSs is limited to the residents and / or landowners who responded to the survey. The Applicant will therefore be required to conduct a further PWS screening assessment to identify PWSs in possible hydrological connectivity to the Site and implement appropriate mitigation measures where required as detailed throughout this Chapter. The need for further assessment will be secured through a planning condition to the deemed planning permission.

9.2.6.5 A Flood Risk Assessment (FRA) has been completed as part of this assessment, the assumptions and limitations of which are discussed in further detail in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**. The results of the FRA are discussed at a high level within this Chapter. Following submission of the EIAR additional detailed modelling will be undertaken to inform the final detailed design.

9.2.6.6 An Outline Drainage Strategy has been completed as part of this assessment, the assumptions and limitations of which are discussed in further detail in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**. The design principles for Site drainage are discussed at a high level within this Chapter and is based on attenuation, volume, and runoff calculations.

9.3 Consultation

9.3.1.1 **Table 9.5** summarises the consultation responses received regarding Hydrology and Hydrogeology and provides information on where and / or how they have been addressed in this assessment.

TABLE 9.5 CONSULTATION RESPONSES

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	CONSULTEE RESPONSE	RESPONSE / ACTION TAKEN
Energy Consents Unit (ECU) 29 January 2025	Scoping	Scottish Ministers request that the company contacts Scottish Water and makes further enquires to confirm whether there any Scottish Water assets which may be affected by the development, and includes details in the EIAR of any relevant mitigation measures to be provided.	Scottish Water datasets were requested and are discussed in **Section 9.4.4** of this Chapter.
		Scottish Ministers request that the Company investigates the presence of any private water supplies which may be impacted by the development. The EIAR should include details of any supplies identified by this investigation, and if any supplies are identified, the Company should provide an assessment of the potential impacts, risks, and any mitigation which would be provided.	PWS data was requested from East Lothian Council and surveys were issued to local residents. The baseline PWS conditions are discussed in **Section 9.4.4** of this Chapter, and an assessment of potential impacts and mitigation required are addressed throughout the remainder of this Chapter.
		The Scottish Ministers request that the company assess the impact of the Proposed Development on existing and/or planned infrastructure. In particular, the company should carry out the necessary assessments to confirm if any part of the Proposed Development is within the consultation zone water pipes.	Scottish Water datasets were requested and are discussed in **Section 9.4.4** of this Chapter.
East Lothian Council 7 January 2024	Scoping	Flood risk and effect on water resources have been scoped out for the operational stage as the applicant has committed to all land temporarily disturbed during construction will be restored to pre-construction condition. The Council considers this may be premature. It appears that there could be changes to the speed at which water leaves the Site due to the presence of solar panels, tracks and surface treatment for the Battery Energy Storage, and potential changes to topography.	A detailed Flood Risk Assessment (FRA) has been included with this Chapter as **Technical Appendix 9.1** and is discussed in **Section 9.6.3** of this Chapter. In addition, **Technical Appendix 9.1** includes an Outline Drainage Strategy and is discussed in **Section 9.6.4**.

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	CONSULTEE RESPONSE	RESPONSE / ACTION TAKEN
		East Lammermuir Community Council has noted in a response copied to us that fields within the area flood annually in winter and affect road infrastructure.	This has informed the inclusion of a detailed FRA, **Technical Appendix 9.1**.
		East Lammermuir Community Council also raise concerns about proximity of the BESS to a watercourse with regard to potential accidental pollution, and the Council agrees such matters should be considered.	Chemical pollution effects are discussed in **Section 9.7.2** and **Section 9.7.3** of the Chapter, and the mitigation required in **Section 9.6**.
		There is anecdotal evidence that peak flow has increased in recent years in watercourses draining the eastern Lammermuirs. The applicant should show, in line with NPF4 policy, that there is no increase in risk of surface water flooding to others, and that all rain and surface water is managed through SUDS. Information on how this will be done should be included in the description of development. If there is potential for the scheme to alter the amount or rate of water leaving the Site in the operational stage assessment of this should be included in the EIAR.	Flood Risk is considered in greater detail in **Technical Appendix 9.1**. Surface water drainage at the Proposed Development will be based on SuDS principles, and designed to prevent an increase in surface water runoff up to and including a 1 in 200-year (plus climate change allowance) scenario, as set out in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**. The measures set out in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy** will be incorporated into the final detailed design of the Proposed Development which will be developed by the appointed contractor. This is outlined in **Section 9.6** of this Chapter.
		The locations of private water sources is not public information for health and safety reason, however the Council's Environmental Health Service can supply this separately. The impact on private water sources and supplies should be considered. There are some properties on private water supply in the general area though due to topography these appear to be unlikely to be affected by the	PWS data was requested from East Lothian Council and surveys were issued to local residents. The baseline PWS conditions are discussed in **Section 9.4.4** of this Chapter, and an assessment of potential impacts and

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	CONSULTEE RESPONSE	RESPONSE / ACTION TAKEN
		proposal. This should be checked with the Council's Environmental Health and Protection Service however, as no response has been received from the officer on this matter.	mitigation required are addressed throughout the remainder of this Chapter.
		The Council notes that the applicant will consult further with SEPA and Scottish Water for details of any water supplies that could be impacted by the Proposed Development.	Scottish Water datasets were requested and are discussed in **Section 9.4.4** of this Chapter. SEPA environmental databases have also been consulted and are discussed in **Section 9.4** of this Chapter.
		The identification of potential groundwater dependent terrestrial ecosystems through NVC survey is also noted.	The UKHab Survey identified that the Site was largely arable land, with some small areas of broadleaved woodland, none of these habitats are likely to be of moderate or high potential as GWTDEs, and so an NVC Survey was not considered necessary. A GWDTE assessment is not therefore required.
		Thorntonloch is a designated Bathing Water. Given there is some connectivity to this via the Ogle Burn and potentially Dunglass Burn, this should be referenced.	This is discussed in **Section 9.4.4** of this Chapter.
		The Scoping Report states that a Construction Environmental Management Plan (CEMP) would be produced prior to the construction phase. This is welcomed. However, where the CEMP is relied upon to avoid an effect which may be significant either on its own or cumulatively, the methods to be used should be included in the EIAR so they can be fully considered. For example, if silt traps are needed to avoid risk to the water environment, proposals for them should be included in the EIAR.	Construction mitigation measures to be used will be in accordance with industry standard guidance as outlined in **Section 9.6.3** of this Chapter. The Site-specific methods to be implemented will be developed during the detailed design phase, and preparation of the final CEMP to be completed by the Appointed Contractor. The CEMP will be secured through a planning condition.

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	CONSULTEE RESPONSE	RESPONSE / ACTION TAKEN
Scottish Water 25 November 2024	Scoping	A review of our records indicates that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.	Noted.
		Scottish Water records indicate that there is live infrastructure in the proximity of your development area that may impact on existing Scottish Water assets. The applicant must identify any potential conflicts with Scottish Water assets and contact our Asset Impact Team via our Customer Portal for an appraisal of the proposals. The applicant should be aware that any conflict with assets identified will be subject to restrictions on proximity of construction.	Scottish Water were contacted to request asset data. This is discussed in **Section 9.4.4** of this Chapter.
		For reasons of sustainability and to protect our customers from potential future sewer flooding, Scottish Water will not accept any surface water connections into our combined sewer system.	Noted. The final design will not rely on surface water being discharged into the Scottish Water surface water network.
SEPA 10 December 2024	Scoping	To avoid delay and potential objection the EIA submission must contain a series of scale drawings of sensitivities, for example Groundwater Dependent Terrestrial Ecosystems (GWDTE), proximity to watercourses, overlain with Proposed Development.	Supporting figures have been included with this Chapter.
		Groundwater Dependent Terrestrial Ecosystems. We note that a Phase 1 habitat survey will be carried out. We have no specific view on the conversion to UkHab, however please note that if the Phase 1 habitat survey results indicate that there may be relevant habitats present, a National Vegetation Classification (NVC) survey should be provided as part of the EIAR. Due to discrepancies in habitat	A UK Habitat Classification Survey was completed to inform this assessment, the results of these surveys found no habitats that are associated with NVC communities that are indicative of potential GWTDEs; therefore, an NVC was not required.

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	CONSULTEE RESPONSE	RESPONSE / ACTION TAKEN
		definition and ambiguity in correspondence with NVC types we do not accept the use of the UK Habitat Classification System (UKHab) as an alternative to NVC.	
		Private Water Supplies (PWS). We agree that impacts on PWS should be assessed further.	PWS data was requested from East Lothian Council and surveys were issued to local residents. The baseline PWS conditions are discussed in **Section 9.4.4** of this Chapter, and an assessment of potential impacts and mitigation required are addressed throughout the remainder of this Chapter.
		We agree there is no obvious need for a standalone FRA. The Site layout shows that the Bilsdean Burn and a couple of small watercourses flow through the Site. The small watercourses are named the Dunglass Burn/Old Hamstocks. Burn and Ogle Burn in the Scoping Report. The land area around all watercourses appears to be free from development and is generally marked as Fields on the Site layout. There is no evidence of land raising near the burn and we hold no records of flooding at the Site.	A detailed Flood Risk Assessment has been included as part of this EIA (**Technical Appendix 9.1**) based on the scoping opinion from ELCC, which indicated the Site does regularly flood in contrast to what is shown on the SEPA Flood Maps.
		We would recommend that any new watercourse crossing is designed in accordance with the principles of National Planning Framework 4, will have a better or neutral effect on flood risk and should be properly maintained to reduce the potential risk from structure blockage. The crossing should therefore be designed so that it can convey the 0.5% annual probability flood plus an appropriate allowance for climate change and freeboard, should have a minimal afflux (backwater effect) and a clear span structure where possible.	The final design of watercourse crossings will adhere to this policy and guidance. Details of watercourse crossings would usually be provided as part of Construction Method Statement secured through the final CEMP.

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	CONSULTEE RESPONSE	RESPONSE / ACTION TAKEN
		We would strongly advise that any water course crossings follow good practice guidelines without causing constriction of flow or exacerbation to flood risk elsewhere. A Good Practice Guide for River Crossings and guidance on Culverting of Watercourses can be found on the SEPA website.	
		We also recommend adoption of appropriate buffer strip distances between Proposed Development and the open channel in order to allow for access and maintenance. Recommended widths can be found in SEPA's Recommended riparian corridor note.	SEPA's Riparian Corridor dataset has been consulted (as shown in **Figure 9.2**) and is discussed in **Section 9.4.1** and **Section 9.7.1** of this Chapter.
		The proposals should demonstrate how impacts on local hydrology have been minimised and the Site layout designed to minimise watercourse crossings and avoid other direct impacts on water features. Measures should be put in place to protect any downstream sensitive receptors.	This is discussed in **Section 9.4.7 and 9.5.1.1** of this Chapter.
		Groundwater Dependent Terrestrial Ecosystems (GWDTE) are protected under the Water Framework Directive. Excavations and other construction works can disrupt groundwater flow and impact on GWDTE and existing groundwater abstractions. The layout and design of the development must avoid impacts on such areas. A National Vegetation Classification (NVC) survey should be submitted which includes the following information: a) A set of drawings demonstrating all GWDTE and existing groundwater abstractions are outwith a 100 m radius of all excavations shallower than 1m and outwith 250 m of all excavations deeper than 1m and proposed groundwater abstractions. The survey needs to extend beyond the Site boundary where the distances require it.	No GWDTE are present on-Site or within a 100 m buffer of the Site as discussed in **Section 9.4.6** of this Chapter.

CONSULTEE AND DATE	SCOPING / OTHER CONSULTATION	CONSULTEE RESPONSE	RESPONSE / ACTION TAKEN
		b) If the minimum buffers cannot be achieved, a detailed Site specific qualitative and/or quantitative risk assessment will be required.	
		The submission must include a schedule of mitigation, which includes reference to best practice pollution prevention and construction techniques (for example, limiting the maximum area to be stripped of soils and peat at any one time) and regulatory requirements.	Mitigation is discussed in **Section 9.6** of this Chapter, and the regulatory guidance outlined in **Section 9.2.2.**

9.4 Baseline Conditions

9.4.1 Surface Water

9.4.1.1 The Site is gently sloping with elevations ranging from 190 m AOD to 85 m AOD, and surface water flow is predominantly from the south-west to the north-east. The Site is drained by a number of burns and field drains which make up the headwaters of the Bilsdean Burn (**Figure 9.2**). The Bilsdean Burn exits the Site in the north-east where it flows into a narrow-wooded ravine, ultimately discharging into the Firth of Forth approximately 2 km downstream of the Site. It is not classified within the Water Framework Directive (WFD).

9.4.1.2 The Bilsdean Burn was traversed during the Site survey. To the west of the minor road the watercourse flows west to east in a highly straightened channel. The height of the left bank ranges from approximately 0.5 m – 2 m. The land on the left bank slopes steeply towards the watercourse and as such surface water runoff will flow downhill and into the burn. The right bank varies in height from 0.5 m to 1 m but in areas there are breaks in the bank. The land immediately adjacent to the right bank is relatively flat, and rushes and saturated ground were observed at the time of the visit. A surface water flowpath was observed running south to north and into the burn from the area of saturated ground. There is also an excavated drainage channel running parallel to the deforested area, adjacent to the Application Site, from the crest of the hill into Bisldean Burn.

9.4.1.3 A tributary of the Bilsdean Burn flows south to north in a meandering channel west of the minor road. In areas the burn flows in a defined channel with eroding banks, but in other areas the channel is shallow, wider, and has less well-defined banks.

9.4.1.4 East of the minor road, the tributary and Bisldean Burn merge and flow in a well-defined meandering channel with banks ranging from less than 0.5 m to approximately 2 m. There is a crossing point where the burn emerges from the defined channel to spread out over the approximately 4 m wide crossing point before once again flowing in a defined channel downstream of the crossing point.

9.4.1.5 To the south of the Site is the Oldhamstocks Burn / Dunglass Burn. The Site is located within this burn's catchment area. It is a designated watercourse under the WFD (ID: 3901) with an overall 2020 status of Good[27]. To the north of the Site within the Study Area are two unnamed burns which flow from Branxton to the coast, and the Ogle Burn which discharges into the Thornton Burn. These watercourses are not classified under the WFD. The Proposed Development is downstream of the burns that feed into the Ogle Burn, and the Site is also not in hydrological connectivity with the two unnamed burns to the north. The Thornton Burn is located approximately 1.3 km north of the Site and is not in hydrological connectivity to the Proposed Development.

9.4.1.6 The Bilsdean Burn, Oldhamstocks / Dunglass Burn, and Ogle Burn discharge into the Barns Nest to Wheat Stack coastal waterbody (ID: 200038) which is also classified as being in overall good condition under the WFD.

[27] SEPA Water Classification Hub. Available online at: RBMP3 Accessed February 2025.

9.4.1.7 SEPA have created a recommended riparian corridor GIS layer for use in land use planning. The dataset indicates the minimum space needed along rivers to give them space to adapt to changes in flood frequency and magnitude, and which has other environmental benefits[28]. The dataset indicates all watercourses within the Site should have a 10 m riparian corridor in which no development takes place (**Figure 9.2**).

9.4.2 Hydrogeology

9.4.2.1 The northern half of the Site is underlain by the Inverclyde group, a moderately productive aquifer where flow is virtually all through fractures and other discontinuities. The southern half of the Site is underlain by the Stratheden Group which is also a moderately productive aquifer but with significant intergranular flow. It is described as: sandstone, partly pebbly with subordinate siltstone and mudstone produce moderate amounts of groundwater (**Figure 9.3**).

9.4.2.2 Under the WFD the Study Area is underlain by the Torness Coastal groundwater body (ID: 150730) and the Torness groundwater body (ID: 150568) which are both classified as being in Good condition.

9.4.3 Flood Risk

9.4.3.1 According to the SEPA Flood Maps[29] the Site is not at risk of fluvial (river) flooding (**Figure 9.4**). However, the SEPA flood maps only model watercourses with catchment areas over 3 km^2 and therefore there could still be the potential for fluvial flooding to occur on-Site. The Bilsdean Burn downstream of the Site, and Oldhamstocks / Dunglass Burn to the south of the Study Area, are both modelled to have a High likelihood of fluvial flooding (1 in 10 years, or 10% annual probability).

9.4.3.2 The scoping response from ELCC however noted that local experience is in contrast to the SEPA Flood Maps, with the community indicating fields within the Site flood annually in winter and affect the road infrastructure and one section of a lower field was underwater for months. In addition, the council indicated the BESS is to be situated south of the Bilsdean Burn that during the winter regularly has difficulty draining the area efficiently.

9.4.3.3 Based on the survey of the Bilsdean Burn west of the minor road which showed the right bank was lower, there were breaks in the bank, and there was saturated ground in the field, it is considered that this area would be at risk of flooding.

9.4.3.4 In addition, following submission of the Scoping Opinion SEPA released an updated Flood Map layer called Surface Water and Small Watercourses flooding[30]. This shows modelled flood extents for small watercourses with catchments less than 10 km^2. The modelled flood extents show flooding impacts across the Site associated with the Bilsdean Burn and a

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[28] SEPA. Recommended riparian corridor layer for use in land use planning. July 2024. Available online at: recommended-riparian-corridor-note.docx Accessed February 2025.
[29] SEPA Flood Maps. Available online at: SEPA Flood Maps Accessed February 2025.
[30] The SEPA Surface Water and Small Watercourses flood maps were published on 12 March 2025. SEPA News. Available online at: SEPA launches new surface water and small watercourses flood maps to strengthen Scotland's climate resilience | Beta | SEPA | Scottish Environment Protection Agency Accessed March 2025.

network of smaller watercourses across the Site. The flooding from Bilsdean Burn is the only flood extent shown to interact with the Proposed Development at the High (10% annual probability), Medium (0.5% annual probability), and Low (0.1% annual probability) probability events. This is discussed further in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**.

9.4.3.5 Flood risk planning policy and SEPA guidance defines the 1 in 200-year (0.5% annual probability) event plus climate change as the critical design event. Hydraulic modelling has been completed as part of the FRA to assess the potential risk of flooding and to build on the SEPA mapping. It was used to assesses the flood risk to both the Proposed Development and downstream flood risk as a result of the Proposed Development.

9.4.3.6 The outcome of the FRA indicated PV arrays are at risk of flooding in the baseline 1 in 200-year (+39% allowance for climate change) scenario. However, the flood depths are significantly lower than the minimum 0.8 m base height of the panels and therefore the extent and level of flooding will not impact the operation of the PV Arrays or flood risk elsewhere. The flood depths at the location of the BESS and HV infrastructure are shown to be limited to the existing access road which the access tracks will connect to and no electrical infrastructure is within the modelled flood extent.

9.4.3.7 The Site is located approximately 2 km inland, and upslope, of the coast and is therefore not at risk of coastal flooding.

9.4.4 Water Resources

Drinking Water Protected Areas

9.4.4.1 The Site is not located within a Scottish Government surface water DWPA[31]. Scottish Water also confirmed in their scoping response that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.

9.4.4.2 The Site is however located within a groundwater protected area[32]. The groundwater body is Torness (ID: 150568) which is classified as having an overall Good status under the WFD[33].

Private Water Supplies

9.4.4.3 A list of PWSs within the Study Area was requested from East Lothian Council (ELC). The council records are often incomplete in rural areas and often identify the property rather than the source and / or collection tank associated with the PWS. Therefore, ERM also

[31] Scottish Government. Drinking Water Protected Areas (Surface Water) in the Scotland River Basin District. Map 10 of 11. Available online at: DWPA+-+Scotland+RBD+-+surface+water+-+map+10+of+22.pdf Accessed February 2025.
[32] Scottish Government Drinking Water Protected Areas (Groundwater) in the Scotland River Basin District. Map 21 of 22. Available online at: DWPA+-+Scotland+RBD+-+groundwater+-+map+21+of+22.pdf Accessed February 2025.
[33] SEPA Water Environment Hub. Available online at: RBMP3 Accessed February 2025.

contacted properties within the Study Area to confirm the location and details of their supplies.

9.4.4.4 The response from ELC stated no known PWSs (for human consumption) are present within the Study Area. However, a number of PWS surveys were returned from local residents indicating there are PWSs within the Study Area.

9.4.4.5 Of the responses received, ten properties identified themselves as being reliant on a PWS. Six of the responses indicated their water was supplied via the Dunglass Estate and therefore they had no details on the water supply source (PWS 5-10 in **Table 9.6** and **Figure 9.5**). The easting and northing of these PWSs are the property itself as the water source location could not be identified from the survey response.

9.4.4.6 Dunglass Estate were contacted and advised the water supplies on their estate are private but supplied by Scottish Water mains and distributed via a private pipe network. No further information on the water supply source or pipe network was supplied.

9.4.4.7 The remaining four properties supplied grid references or mapped locations, as well as further details on their PWSs. **Table 9.6** summaries the PWS data at the time of writing and the PWS locations are shown on **Figure 9.5**.

9.4.4.8 PWS 1, PWS 2, PWS 3, and PWS 4 are located upstream and more than 250 m from the Proposed Development. They are not in downstream hydrological connectivity to the Proposed Development and are not anticipated to be impacted by the Proposed Development.

9.4.4.9 PWSs 5-10 are located more than 250 m from the Proposed Development but are downstream of it. These PWSs are those supplied by Dunglass Estate where further information on the source location, source type, and pipe network associated with them was unavailable at the time of writing. They are considered to be potentially at risk from the Proposed Development based on the current information available.

TABLE 9.6 KNOWN PRIVATE WATER SUPPLIES WITHIN THE STUDY AREA

FIGURE REFERENCE	PWS TYPE	SOURCE TYPE	EASTING	NORTHING	APPROXIMATE DISTANCE FROM INFRASTRUCTURE (M)
PWS 1	Domestic	Spring	374513	669466	1,400
PWS 2	Horticultural Business	Well / Spring	373791	672489	600
PWS 3	Domestic	Borehole	375349	669451	1,500
PWS 4	Unknown	Borehole	375291	669751	1,100
PWS 5	Domestic	Unknown	376287	672680	900
PWS 6	Domestic	Unknown	376294	672673	900

FIGURE REFERENCE	PWS TYPE	SOURCE TYPE	EASTING	NORTHING	APPROXIMATE DISTANCE FROM INFRASTRUCTURE (M)
PWS 7	Domestic	Unknown	376320	672558	910
PWS 8	Domestic	Unknown	376175	672136	770
PWS 9	Domestic	Unknown	376291	672639	910
PWS 10	Domestic	Unknown	376386	672478	930

Public Water Assets

9.4.4.10 Scottish Water data was supplied to ERM to inform this EIA.

9.4.4.11 A Scottish Water combined wastewater pipe runs from west to east through Oldhamstocks, 100 m south of the Application Site. The nearest proposed infrastructure to this is solar panels 500 m north of the wastewater pipe. Given the separation distance this infrastructure is unlikely to be impacted by the Proposed Development.

9.4.4.12 A Scottish Water mains water distribution pipe travels through the centre of the Site along a B-road that connects to a covered Scottish Water reservoir 500 m north of Oldhamstocks. The distribution pipe continues to travel south and beneath a field which will contain solar panels before feeding into the Oldhamstocks supply lines south of the Site.

Protected Bathing Waters

9.4.4.13 Thorntonloch approximately 1.6 km to the north-east of the Site (**Figure 9.6**) is a designated bathing water area[34] used by anglers, swimmers, and surfers. The bathing water is at risk of short-term pollution following heavy rainfall which has the potential to wash pollution into the coastal waters[35]. The catchment area of the bathing water is 16 km^2, and the main river within the catchment is Thornton Burn. SEPA's Environmental Monitoring dataset ranks the bathing water condition as Excellent.

9.4.4.14 SEPA have delineated two buffer zone areas around the bathing water, an Inner Zone of 100 m and an Outer Zone of 1,500 m. The Outer Buffer Zone extends along the coast to where the Bilsdean Burn discharges into the coastal waters. Therefore, water quality impacts to the Bilsdean Burn have the potential to impact water quality in the bathing water protected area.

[34] SEPA. Scotland's Bathing Waters. Available online at: Bathing Waters | Profiles | Scottish Environment Protection Agency (SEPA) Accessed February 2025.
[35] SEPA Bathing water profile – Thorntonloch. Available online at: thorntonloch-bathing-water-profile.docx Accessed February 2025.

9.4.5 Designated Sites

9.4.5.1 There are no designated sites (Sites of Special Scientific Interest (SSSI), Special Protected Areas (SPA), Special Area of Conservation (SAC), or Ramsar sites) within the Study Area. However, the coastline into which the Bilsdean Burn discharges is designated as an SPA (outer Firth of Forth and St Andrews Bay Complex). The Pease Bay Coast SSSI is located approximately 600 m east of where the Bilsdean Burn discharges.

9.4.6 Groundwater Dependent Terrestrial Ecosystems

9.4.6.1 The results of the UKHab Survey identified no habitats that are associated with National Vegetation Classification (NVC) communities that are indicative of potential GWDTEs; therefore, an NVC Survey was not considered necessary. A GWDTE assessment is not therefore required.

9.4.7 Watercourse Crossings

9.4.7.1 Three watercourse crossing locations have been identified for the Proposed Development. They are all existing culvert crossings. The crossing locations are shown on **Figure 9.7** and the crossing details in **Table 9.7**.

9.4.7.2 As discussed in **Section 9.5.1.1** below, any upgrades, changes, and detailed design of watercourse crossings will be the responsibility of the Applicant during the final design phase of the Proposed Development. The details of watercourse crossings will be provided as part of the Construction Method Statement secured through the final CEMP.

TABLE 9.7 EXISTING WATERCOURSE CROSSINGS

FIGURE 9.7 CROSSING NO.	WATERCOURSE NAME	CROSSING TYPE	CROSSING DIMENSIONS	BED SUBSTRATE	PHOTOS
1	Unnamed Burn	Concrete pipe culvert	0.5 m diameter	Silt	
2	Unnamed Burn	Concrete pipe culvert	0.4 m diameter	Silt	

FIGURE 9.7 CROSSING NO.	WATERCOURSE NAME	CROSSING TYPE	CROSSING DIMENSIONS	BED SUBSTRATE	PHOTOS
3	Bilsdean Burn	Arch culvert, open bottom	1.5 m by 1.5 m	Silt	
3	Bilsdean Burn tributary	Box culvert, open bottom (obscured entrance in photo)	1 m by 1 m	Cobble	

9.5 Summary of Sensitive Receptors

9.5.1 Scoped Out Receptors

9.5.1.1 Watercourse Crossing locations are shown in **Figure 9.7**. A detailed assessment of watercourse crossings is scoped out, as an assessment of flow rates and crossing size and type will be carried out by the Applicant at the detailed design stage. The crossings would be designed in compliance with SEPA[36,37] and CIRIA guidance. The crossings would be designed to covey the 0.5% AEP (1 in 200 year) probability flood event plus an appropriate allowance for climate change[38] and freeboard. Any new watercourse crossing would also be subject to registration and authorisation under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) and Water Environment (Miscellaneous) (Scotland) Regulations 2017.

9.5.1.2 As detailed in **Section 9.4.4** of this Chapter, there are no surface water DWPA or Scottish Water protected areas in the Study Area. Therefore, potential impacts on public surface water drinking water supplies are scoped out of further assessment.

9.5.1.3 There are no GWDTE within the Site or a 100 m buffer of the Site, as set out in **Section 9.4.6** of this Chapter. Therefore, no further assessment of these habitats is required.

9.5.2 Scoped In Receptors

9.5.2.1 **Table 9.8** provides a list of receptors scoped into the remainder of this impact assessment.

TABLE 9.8 SCOPED IN RECEPTORS

RECEPTOR	SENSITIVITY	JUSTIFICATION
Watercourses and surface water features	Medium	The Bilsdean Burn which flows through the Site is not classified within the WFD, but is of local importance and discharges into the buffer area of the Thorntonloch protected bathing water area.
Groundwater protected areas (hydrogeology)	Medium	The Site is within a groundwater protection zone which is classified as being in Good overall condition.
Flood Risk	High	SEPA Flood Maps show there is a risk of flooding on-Site and ELCC provided local anecdotal details of flooding at the Site and surrounding areas associated with the Bilsdean Burn. In addition, the FRA undertaken for this project indicates

[36] SEPA. Engineering in the water environment: good practice guide. River crossings. Second edition, November 2010. Available online at: River crossings - good practice guide Accessed February 2025.
[37] SEPA WAT-PS-06-02: Culverting of watercourses – Position statement and supporting guidance. Available at: WAT-PS-06-02 Accessed February 2025.
[38] SEPA. Climate change allowances for flood risk assessment in land use planning. Version 5. August 2024. Available online at: climate-change-allowances-guidance.docx Accessed February 2025.

RECEPTOR	SENSITIVITY	JUSTIFICATION
		components of the Proposed Development are at risk of flooding during the 1 in 200-year (+39%) climate change event.
PWS	Medium	Due to the limited number of PWS surveys returned, lack of PWS data from Dunglass Estate, and potential for unidentified PWSs to be within and hydrologically connected to the Study Area, this receptor could be at risk from the Proposed Development.
Public Water Supplies	High	A Scottish Water reservoir is adjacent to the Application Site in the centre of the Site and may be fed by, or water supply may come from, pipelines that run through the Site. Scottish Water pipelines also run right through the Site beneath where solar panels are proposed.
Protected Bathing Water Areas	Medium	The watercourses on-Site do not directly discharge into the Thorntonloch bathing water protected area. However, the Bilsdean Burn does discharge into the 1,500 m Outer Zone buffer area.
Designated Sites (coastal waters)	High	The Bilsdean Burn discharges into the Outer Firth of Forth and St Andrews Bay Complex SPA, and the Pease Bay Coast SSSI is located approximately 600 m east of where the Bilsdean Burn discharges. Although out with the 1 km Study Area there is direct hydrological connectivity with the Site.

9.6 Embedded Mitigation

9.6.1 Mitigation by Design

9.6.1.1 The following measures have already, or will be, embedded into the final detailed design to reduce the impacts to hydrological resources and are therefore considered mitigation by design:

- The final detailed design will take into account hydrological constraints identified in this EIA. This will include ensuring solar panels, fence lines, tracks (with the exception of watercourse crossing locations), and BESS infrastructure are positioned outside of the SEPA Riparian Corridor buffer zones. The current design breaches these corridors and is discussed in further detail in **Section 9.7.1** and **Table 9.10;**

- The solar panels themselves will be the most significant infrastructure on the Site. They will be constructed by piling the stanchions into the ground without the need for significant earthworks beneath the panels. This avoids soil compaction and removal of vegetation thus allowing the continued movement and infiltration of surface water across the Site;

- The solar PV modules will be designed to include regular gaps to enable rainwater to drip along the face of the panel rather than concentrating along a single drip line;

- The Site will be re-vegetated post-construction to ensure the maintenance of good infiltration and to help absorb sediment and / or pollutants in the unlikely event of an erosion or spillage event;

- The final detailed design of the BESS, substation, and construction compound will incorporate sustainable drainage systems (SuDS) to control runoff rates and provide pollution control measures. The drainage design will establish surface water interception and discharge measures for hardstanding areas in accordance with local and national best practice SuDS guidance and policy which will prevent an increase in surface water runoff and provide protection to the receiving water environment;

- The solar panels will not be affected by the extent and level of flooding. The only infrastructure below the flood level will be the panel supports which occupy a negligible space and therefore the panels would not affect floodplain storage or the conveyance of flows;

- All drainage features will be maintained so that they operate effectively. Maintenance activities may include: regular inspection of gravel bases and buffer strips; removal of sediment; and repairing damaged membranes; and

- The construction of new access routes will use existing watercourse crossings where possible. Where new watercourse crossings are required, these will be designed in-line with SEPA and CIRIA guidance (as set out in **Section 9.5.1.1** of this Chapter) and will be of sufficient size to convey the 0.5% annual probability (1 in 200 year) event plus freeboard and climate change allowance.

9.6.2 Mitigation Pre-Construction

9.6.2.1 A number of properties identified themselves as being on a PWS through the Dunglass Estate. However, no specific details on the pipe network were supplied by the estate at the time of writing. Therefore, the Applicant will be responsible for conducting a further PWS screening assessment prior to construction which will be secured through a planning condition to the deemed planning permission. The screening will involve:

- Identifying PWSs not previously located as part of this EIA assessment due to lack of survey responses;

- Further consultation with Dunglass Estate to obtain detailed information on the source, pipe network, and which properties are supplied by the estate;

- Confirming the type of supply source (e.g., borehole, spring, surface water);

- Identifying the infrastructure associated with the supply, this may include pipeline surveys;

- Outlining the baseline condition of the PWS source, infrastructure, and water quality;

- Defining the contributing catchment area of the PWS;

- Determining if the PWS is hydrologically connected to the Proposed Development; and

- The depth and extent of any proposed excavations within the vicinity of the supply.

9.6.2.2 Should the results of the screening assessment identify any risks to PWSs, such as potential impacts to water quantity and quality, Site specific mitigation will be developed and incorporated into a Site specific PWS Protection Plan (or similar), which will be produced by the Principal Contractor in consultation with the PWS owner and in accordance with SEPA guidelines prior to the commencement of construction. The SEPA guidance includes the requirement of twelve months of pre-construction monitoring of the PWS, thus the screening

assessment should be completed with enough time to undertake this monitoring. The PWS Protection Plan would also detail any mitigation required to protect the supply and contingency plans to provide alternative water supplies in the event of an unforeseen impact to an existing supply.

9.6.2.3 Should pre-construction water quality monitoring of the PWS be required to establish the baseline water quantity and quality, the frequency of sampling and parameters to be monitored will be agreed with SEPA prior to the commencement of sampling and will be documented within the PWS Protection Plan.

9.6.2.4 As there are public water assets adjacent to the Site and crossing the access track into the Site, the Principal Contractor will be responsible for engaging with Scottish Water prior to construction to determine the mitigation measures needed to protect Scottish Water assets from damage and to comply with Scottish Water's current process, guidance, standards and policies relating to such matters, as per the Scottish Water List of Precautions for Drinking Water and Assets guidance[39]. This will require submission of Risk Assessment Method Statements (RAMS) and Safe Systems of Work (SSoW) to be prepared and submitted in advance to Scottish Water for formal review. These documents will detail and outline in detail how existing Scottish Water assets are to be protected and / or managed for the duration of the construction works and operation of the Proposed Development. These documents will form part of the final CEMP.

9.6.2.5 For any areas where the SEPA Riparian Corridor is still breached, there may be a requirement for pre-construction monitoring to determine the baseline water quality conditions. The duration for which this would be required, the frequency of sampling, and parameters to be monitored would be agreed with SEPA in advance of construction.

9.6.2.6 The layout of the Proposed Development has been informed by hydraulic modelling, as detailed in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy.** The modelling results have been incorporated into a sequential design approach, with electrical infrastructure located outside of the critical design flood event.

9.6.3 Mitigation During Construction

9.6.3.1 A contractual requirement of the Principal Contractor will be the development and implementation of a comprehensive site-specific Construction Environment Management Plan (CEMP). This document will detail how the Principal Contractor will manage works in accordance with all commitments and mitigation detailed in this EIA Report, statutory consents and authorisations, and industry best practice and guidance, including pollution prevention.

9.6.3.2 The CEMP will include construction methods, environmental protection measures, and other supporting environmental management plans such as a Pollution Prevention Plan and Drainage Management Plan. The CEMP and all other relevant plans will apply the best practice guidance as set out in the applicable SEPA Guidance for Pollution Prevention (GPP)

[39] List of Precautions for Drinking Water and Assets – Hydro EdE. Annex 1: Precautions to protect drinking water and Scottish Water assets during hydro development construction and operational activities. Available at: 091120SWListOfPrecautionsForDrinkingWaterAndAssetsHydroEdE.pdf Accessed March 2025.

documents[14], SEPA supporting guidance[15], and CIRIA guidance[11]. Implementation of these measures during construction will ensure construction activities will not cause adverse effects to sensitive hydrological receptors.

9.6.3.3 The CEMP will also outline measures to ensure that the works minimise the risk to groundwater, surface water, PWSs, and public water assets. This will include ground investigations by the Principal Contractor to identify groundwater levels within areas of excavation e.g. the substation.

9.6.3.4 The construction activities proposed are anticipated to be permissible under the CAR Regulations[40]. Therefore, the Proposed Development will be subject to a Construction Site Licence (under the CAR Regulations). As such detailed design of proposed drainage works, and watercourse crossings, will be subject to licensing requirements set out under CAR and compliance with regulations would be agreed in consultation East Lothian Council and SEPA and set out in the Construction Site License application.

9.6.3.5 A breakdown of the embedded mitigation which will form part of the CEMP and relevant supporting environmental plans are outlined in **Table 9.9**.

[40] Scottish Government (2011). The Water Environment (Controlled Activities) (Scotland) Regulations 2011. Available online at: https://www.legislation.gov.uk/ssi/2011/209/contents/made Accessed February 2025

TABLE 9.9 MITIGATION

SENSITIVE RECEPTOR	POTENTIAL IMPACT	MITIGATION DESCRIPTION
Surface Water Features	Breach of Watercourse Buffers	Where the SEPA Riparian Corridor buffers cannot be achieved, the final preferred location of infrastructure will be determined on-Site in consultation with the project ECoW. At such locations the following mitigation measures will be in place and outlined in the CEMP: • Location specific drainage, pollution, and incident response plans; • A wet weather / flood risk protocol with works to cease during prolonged rainfall or where flood risk is high; • Reduction in the extent of the working area to minimize the area of ground disturbance; • Water quality control measures such as water diversion ditches, silt fences, or silt traps to control and treat runoff; • Daily inspection of works and watercourses and full-time supervision of construction and restoration works; • Where there is no construction in the Riparian Corridor, a vegetation strip will be maintained along all watercourses; and • There may be a requirement for water quality monitoring during construction. Any requirements for water quality monitoring will be agreed with SEPA and East Lothian Council in advance of construction commencing. The duration for which this would be required, the frequency of sampling, and parameters to be monitored would be agreed with SEPA and outlined in the CEMP.
Surface Water Features and Designated Sites	Erosion and Sedimentation	Sediment capture methods appropriate to the Site will be developed through the detailed design. They will be detailed in and implemented through the CEMP, Sediment and Erosion Control Plan (SECP), Pollution Prevention Plan (PPP), and DMP. The measures will ensure that sediment laden runoff from disturbed or excavated ground is directed to the appropriate treatment trains. A vegetation strip will be maintained along all watercourses within the SEPA Riparian Corridors. Construction activities will be overseen by an ECoW who will carry out inspections of watercourses and sediment control measures to ensure there are no impacts to surface waterbodies.

SENSITIVE RECEPTOR	POTENTIAL IMPACT	MITIGATION DESCRIPTION
	Chemical Pollution	The potential for impacts on the water environment through the release of pollutants during the construction phase would be managed through the CEMP and PPP to be developed by the Principal Contractor during the detailed design phase. This would follow measures outlined in GPP5: Works and maintenance in or near water and may include for example siting cement mixing areas on impermeable membranes, considering where to store chemicals in relation to on-Site surface water flowpaths, and how wastewater will be disposed of. The storage of potentially contaminated materials shall be at least 50 m from surface waterbodies. Fuels, oils, or chemicals stored on-Site shall be over an impervious base and in accordance with CAR Regulations. An ECoW will be on-Site to monitor the storage and potential leakage of chemicals on-Site. The CEMP will set out procedures that would be followed in the event of an accidental release of pollutants from the Site or on-Site machinery / vehicles in proximity to a surface waterbody. Immediately following a pollution incident, SEPA would be notified and consulted on the appropriate clean up or remediation were such measures required.
Surface Water Features	Abstractions	Any requirements for surface water abstraction will be completed in accordance with the CAR Regulations.
Surface Water Features	Site Drainage	Site drainage will be detailed in a Drainage Management Plan (DMP) which will be developed by the Principal Contractor. It will be based on SuDS design principles as set out in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**. Through the use of drainage management measures and implementation of a DMP adverse impacts to water quality, quantity, and flood risk will be mitigated. Implementation of onsite drainage will be supervised by an Ecological Clerk of Works (ECoW).
Flood Risk	Increase in flood risk	The Proposed Development has been subject to a sequential design approach informed by hydraulic modelling as detailed in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**. This approach has led to electrical infrastructure to be located outside of the flood extents of the critical design flood event. PV arrays located within the flood extents are shown to be raised above modelled flood levels, as further detailed in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**.
Hydrogeology	Groundwater Discharge	Following the pre-construction ground investigations, where groundwater is identified dewatering or groundwater diversion will be conducted with mitigation and control measures in accordance with best practice guidance (e.g., CIRIA Groundwater Control). Measures relating to the identification and protection of groundwater will be detailed and secured within the CEMP. The Principal Contractor will be required to meet regulatory requirements and

SENSITIVE RECEPTOR	POTENTIAL IMPACT	MITIGATION DESCRIPTION
		implement best practice measures. Measures will include ensuring potential groundwater pollutants are stored in appropriate areas of the Site, use of protective geomembranes, and sediment and pollution capture measures are in place.
	Abstractions	Any requirements for surface water abstraction will be completed in accordance with the CAR Regulations.
Public Water Assets	Water Quality or direct impact to infrastructure	The Principal Contractor will follow the RAMS and SSoW submitted to Scottish Water which will detail how Scottish Water assets will be protected during construction. Measures may include activities such as pegging out the course of the water distribution main and having appropriate buffer distances to the pipeline, monitoring water quality, and visual inspections of assets.
Private Water Supplies	Water Quality or direct impact to PWS infrastructure	The pre-construction PWS screening to be carried out by the Principal Contractor will identify any PWSs at risk from construction. Mitigation measures will be identified in the PWS Protection Plan and will be adhered to. This may include measures such as: • Fencing off the PWS source and intake (to avoid accidental damage) and identify relevant buffer distances; • Pegging out the route of distribution pipes and appropriate buffer zones in the vicinity of the construction works and avoiding activity in these areas; • Regular, recorded checks on any pipework (visible signs of cracking or other damage); • Checks on PWS infrastructure to assess for damage; • Avoid undertaking works within PWS catchments during wet weather or when wet weather is forecast as there will be increased surface water flows and therefore higher potential for impacts to PWSs; • Use low impact access methodologies including the use of track panels where access to works are within the PWS catchment; and • Ensure all Site operatives working in the area are made aware of the location of any PWSs, catchment areas, and mitigation measures. Signage should be considered to remind workers when work takes place in these areas; and • Provision of an alternative water supply should the PWS be impacted during construction. A water quality and quantity monitoring programme may be required during construction to ensure there are no impacts to PWSs. The frequency of sampling and parameters to be monitored will be agreed with SEPA prior to the

SENSITIVE RECEPTOR	POTENTIAL IMPACT	MITIGATION DESCRIPTION
		commencement of sampling and will be documented within the PWS Protection Plan. Regular reporting of the monitoring will also be kept.
Bathing Waters	Water quality	Implementation of the measures set out in the CEMP, SECP, and PPP will prevent water quality impacts that may extend to the protected bathing water area. Bathing waters are monitored by SEPA from 15 May to 15 September. This would indicate if pollution is a problem and SEPA would work with stakeholders to identify the source of pollution and resolve the issue. The Principal Contractor will work with SEPA if a pollution incident is highlighted. Any surface water quality monitoring needed during the construction of the Proposed Development would also indicate if there were likely to be potential impacts to the bathing water area. The Principal Contractor would notify SEPA in the event of a water quality issue.

9.6.4 Mitigation During Operation

9.6.4.1 An operational management plan and / or Site maintenance programme will be in place for the lifetime of the Proposed Development outlining the mitigation measures needed during operation.

9.6.4.2 As discussed in **Section 9.6.1** the final design will incorporate SuDS to manage surface water runoff rates and volumes to ensure that pre-development runoff rates are maintained and the rate of runoff to watercourses are not increased. The SuDS will also provide the appropriate treatment trains to mitigate against potential adverse impacts to water quality. A full SuDS solution will be developed during the detailed design phase of the project prior to construction. During operation a maintenance schedule for on-Site SuDS will be developed and implemented to ensure they function properly and benefit the water environment for the lifetime of the Proposed Development as stated in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**.

9.6.4.3 An operational management plan including an Emergency Response Plan (ERP) and PPP will be developed covering the steps to be taken in the event of thermal runaway.

9.6.4.4 For any areas where the SEPA Riparian Corridor is still breached after final design, there may be a requirement for post-construction monitoring to ensure the water quality and quantity is per the baseline conditions. The duration for which this would be required, the frequency of sampling, and parameters to be monitored would be agreed with SEPA.

9.6.4.5 Similarly, there may be a requirement for post-construction water quality monitoring of PWSs that were identified as being at risk from the Proposed Development to ensure the PWS water quality and quantity is per the baseline conditions. The duration for which this would be required, the frequency of sampling, and parameters to be monitored would be agreed with SEPA and the results detailed in regular progress reports.

9.6.4.6 The final BESS area drainage design will consider the management of fire water, and the likely contaminants potentially associated with a thermal runaway event / fire incident. Potential fire management will include firefighting that involves spraying around any on-fire BESS units in order to cool and wet the ground, rather than directly onto the units, to stop any spread and then let the on-fire units burn out. Therefore, any fire suppressant water would not contain any water that has directly interacted with the fire and anything within the unit. The drainage infrastructure will contain an isolation system where the fire suppressant water is isolated via a penstock system (infiltration through gravelled sections of the drainage system or gravel basins being underlain with an impermeable liner), then tested and tankered. This allows the stored water to be tested before release or, if necessary, removed by tanker and treated offsite. **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy** also discusses the approach to fire management.

9.7 Assessment of Potential Effects

9.7.1 SEPA Riparian Corridors

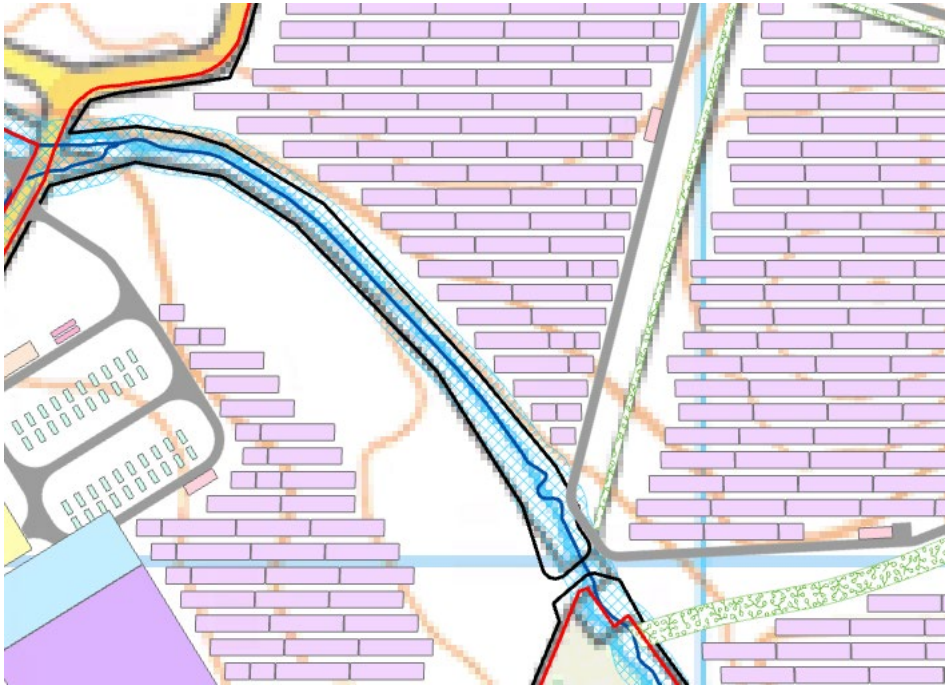
9.7.1.1 The SEPA Riparian Corridor dataset indicates watercourses within the Site should have a 10 m buffer where no development take place. The exception being watercourse crossings which are discussed in **Section 9.4.7** and are shown in **Figure 9.7.**

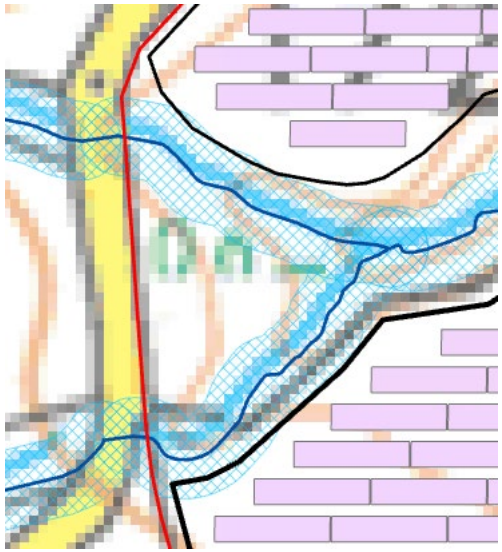
9.7.1.2 Almost all infrastructure has been located outwith the SEPA Riparian Corridors, and the areas breached are primarily by fence lines. Construction of the fences is unlikely to give rise to significant adverse impacts to watercourses particularly with implementation of the CEMP. During operation of the Proposed Development, due to the small footprint of fence stakes it is not anticipated they will significantly alter the functionality of the floodplain.

9.7.1.3 The access track on the left bank of the Bilsdean Burn opposite the substation will however impact the functionality of the floodplain and therefore during detailed design all infrastructure should be micro-sited to it from these areas to comply with SEPA guidance. **Table 9.10** shows the areas where the Proposed Development is currently located within the Riparian Corridor.

9.7.1.4 Should the detailed design still breach the Riparian Corridors, the Applicant will be responsible for ensuring mitigation measures to protect water quality (from sedimentation and chemical pollution) during the construction of the Proposed Development is followed as set out in **Section 9.6** of this Chapter.

TABLE 9.10 RIPARIAN CORRIDOR BREACHES

LOCATION	COMMENTS	DISTANCE OF INFRASTRUCTURE FROM WATERCOURSE CENTRELINE
	Fence line and internal access tracks breach the watercourse buffers of the Bilsdean Burn in the north of the Site.	Fences: 5.5 m at closest point Access Tracks: 2 m

LOCATION	COMMENTS	DISTANCE OF INFRASTRUCTURE FROM WATERCOURSE CENTRELINE
	Fence lines in the west of the Site breach the riparian corridor.	Fence line: 5.5 m at closest point

9.7.2 Potential Construction Effects

Changes to Hydrology, Flood Risk, and Surface Water Features

9.7.2.1 During construction the introduction of temporary access tracks and laydown areas, impermeable surfaces, soil compaction, and removal of vegetation can alter overland flow regimes increasing runoff rates and volumes from the Site through reduced infiltration. Trenching for cables can also increase runoff from the Site. This in turn can increase peak flows in hydrologically connected watercourses to the Site which has the potential to increase flood risk downstream of the Site as well as alter the aquatic ecology and fluvial geomorphology of watercourses.

9.7.2.2 Changes to overland flows as a result of soil compaction and removal of vegetation during construction may increase the rate and volume of runoff.

9.7.2.3 Surface waters are assessed to be of medium sensitivity and construction could result in high magnitude impacts. However, with embedded mitigation the impacts are reduced to low magnitude and therefore of minor effect and **Not Significant**.

9.7.2.4 As noted in **Section 9.4.3** of this Chapter, the Site is already at risk of fluvial and surface water flooding. Changes to overland flows as a result of soil compaction and removal of vegetation during construction may increase the rate and volume of runoff to these areas exacerbating this issue, as well as on-Site construction areas being vulnerable to flooding during construction. Flood risk is discussed in further detail in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**.

9.7.2.5 Flood risk is assessed to be of high sensitivity and the construction could result in high magnitude impacts. However, with embedded mitigation the impacts are reduced to low magnitude and therefore the potential effect to receiving waters is minor and **Not Significant**.

Hydrogeology

9.7.2.6 The installation of on-Site infrastructure does not include the construction of continuous foundations however the solar standings, electrical infrastructure, and tracks could lead to alterations in groundwater flows should the groundwater table be at superficial levels.

9.7.2.7 There is potential for construction activities to pollute (through sedimentation and chemical pollution) groundwater and thus reduce groundwater quality.

9.7.2.8 Groundwater is assessed to be of medium sensitivity. As there are no continuous foundations proposed as part of the Proposed Development and based on the evenly spaced nature of PV arrays and ancillary infrastructure, the impact on groundwater flows is assessed to be negligible. The impacts to water quality with implementation of embedded mitigation is negligible. Therefore, the effect on groundwater resources is none and **Not Significant**.

Sedimentation and Increased Erosion Rates

9.7.2.9 There is the potential to increase erosion and transportation of sediment to watercourses as a result of construction activities including excavations, land compaction, removal of vegetation and soil stripping, use of vehicles and machinery, and watercourse crossing construction. This impacts water quality as well as the geomorphology of watercourses. Impacts to surface water quality can in turn potentially impact the designated coastal waters downstream of the Site.

9.7.2.10 Construction could result in high magnitude impacts to surface waters assessed to be of medium sensitivity, and designated sites assessed to be of high sensitivity. However, with embedded mitigation there is a low magnitude of impact and therefore minor effect on receiving surface waters and designated sites which is **Not Significant**.

Chemical Pollution

9.7.2.11 Water quality of surface waters within and downstream of the Site could be impacted by the accidental release of contaminated water, foul water, stored chemicals, oils, and materials, or vehicle fluids. This would also impact aquatic ecology potentially impact the designated coastal waters downstream of the Site.

9.7.2.12 Construction could result in high magnitude impacts to surface waters assessed to be of medium sensitivity, and designated sites assessed to be of high sensitivity. With embedded mitigation the magnitude of impact would be low and therefore of minor effect and **Not Significant**.

Effects on Private Water Supplies and Public Water Assets

9.7.2.13 Changes to the quality e.g. through chemical pollution and / or sedimentation, or changes to the quantity of water on-Site as a result of construction activities has the potential to impact PWSs and public water assets through a reduction in water supply, reduction in water quality, and complete loss of water supply through damage to, for example, a supply pipeline. This may also impact the Scottish Water reservoir adjacent to the Site.

9.7.2.14 Based on the information held at the time of writing, no PWSs are hydrologically connected to the Proposed Development. However, there is considered the potential for other PWSs to be within the Study Area and at risk of impacts from the Proposed Development, specifically those properties within the Dunglass Estate who identified themselves as being on a PWS but the estate at the time of writing did not provide detailed information on the supply routes.

9.7.2.15 With the embedded mitigation that the Principal Contractor will identify all PWSs within the Study Area and undertake further consultation with Dunglass Estate to identify the pipe network and properties supplied, and have the relevant mitigation in place during construction, the potential for impacts to PWS is considered low magnitude and as such minor effect which is **Not Significant**.

9.7.2.16 Public water assets are assessed to be of high sensitivity and construction could result in high magnitude impacts due to a public water supply line running through the middle of the site. However, with the embedded mitigation in place which includes consultation with Scottish Water and the production of a RAMS and SSoW, the magnitude of impact is low and therefore the effect minor and **Not Significant**.

Effects on Bathing Waters

9.7.2.17 Impacts to water quality as a result of sedimentation and / or chemical pollution entering on-Site watercourses could extend downstream to the protected bathing water buffer zone, thus impacting the quality of coastal bathing waters.

9.7.2.18 Bathing waters are assessed to be of high sensitivity but with embedded mitigation is place construction will have a negligible magnitude impact and therefore no effect to receiving waters which is **Not Significant**.

Effects on Designated Sites

9.7.2.19 Impacts to water quality as a result of sedimentation and / or chemical pollution entering on-Site watercourses could extend downstream to designated sites.

9.7.2.20 With implementation of embedded mitigation, the potential impacts on designated sites assessed to be of high sensitivity as a result of changes to water quality (sedimentation and chemical pollution) are assessed to be of low magnitude and therefore of minor effect and **Not Significant**.

9.7.3 Potential Operational Effects

Changes to Hydrology, Flood Risk, and Surface Water Features

9.7.3.1 The panels sit on stilts such that the ground beneath remains uncompacted and vegetated. The panels therefore do not constitute a large impermeable area on-Site, or increase the rate of run-off, as surface water can still infiltrate into the soil beneath the panels. In addition, the panels are spaced in such a way that runoff will be spatially spread across the Site. Research completed by Cook and McCuen[41] has shown that the installation of PV arrays does not result in a significant increase in runoff volumes or peak flows, however where ground beneath panels is left bare, there is potential for an increase in peak discharge. Studies have quantified the increase ranging from 1.5% to 8.6% depending on specific parameters.

9.7.3.2 There is potential for rainwater to run along the face of PV arrays and concentrate beneath driplines, leading to channelisation and compaction of soils which can lead to flow routes for surface water during extreme rainfall. The solar PV modules will be designed to include regulator gaps to enable rainwater to drip along the face of the panel rather than concentrating along a single drip line. The ground beneath and in between panels will remain uncompacted and vegetated, allowing rainwater to disperse through the vegetation and preventing concentrated build of rainwater runoff beneath and between panels.

9.7.3.3 The Proposed Development will introduce areas of impermeable surface on-Site (at the BESS and substation) which may result in increased runoff rates and volumes which could increase flows in hydrologically connected watercourses, increasing flood risk and altering the aquatic ecology and fluvial geomorphology of watercourses. As noted in **Section 9.6** of

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[41] Lauren M. Cook and Richard H. McCuen (2013). Hydrologic Response of Solar Farms. Available online at: https://www.researchgate.net/publication/276982541_Hydrologic_Response_of_Solar_Farms Accessed March 2025.

this Chapter, embedded mitigation will include the use of SuDS in the final design to control runoff rates from these areas such that flows will not be impacted during the operational phase as set out in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**. In addition, as set out in **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy** and **Section 9.6**, the detailed design will raise solar panels above the critical flood depths and the BESS and substation compound will incorporate flood resilience and mitigation to its design to enable the Proposed Development to remain operational without increasing flood risk elsewhere during the critical design event.

9.7.3.4 The SEPA Riparian Corridors are in place to manage flood risk through maintenance of a floodplain, and these areas also act as buffer strips for sediment and / or other pollutants washed towards watercourses and are zones of biodiversity. As discussed in **Section 9.7.1**, fence lines and an access track are located within the 10 m designated buffer zone of the Bilsdean Burn. Due to the small footprint and minimal foundation depths of the fence posts these are unlikely to impact the floodplain capacity and function. The access track may impact floodplain functionality. However, it is assumed the internal access tracks will consist of permeable aggregate which would disperse flood waters as it currently does. The track is also proportionally a small area of the total floodplain.

9.7.3.5 As discussed in **Section 9.6.1** the final design will remove infrastructure from the SEPA Riparian Corridors where possible. The Site will also be revegetated after construction, restoring the functionality of the buffer strip to act as a natural sediment trap and area of biodiversity. In addition,

9.7.3.6 Surface waters are assessed to be of medium sensitivity. With mitigation the magnitude of impact during operation would be low and therefore of minor effect which is **Not Significant**.

9.7.3.7 Flood risk is assessed to be of high sensitivity and operation could result in a low magnitude impact which is **Not Significant**.

Hydrogeology

9.7.3.8 The solar standings do not present a significant barrier to near surface and / or groundwater flows across the Site during the operational phase. Therefore, operation of the Proposed Development would result in a low magnitude impact on hydrogeology which is assessed to be of medium sensitivity which is a minor effect and **Not Significant**.

Sedimentation and Increased Erosion Rates

9.7.3.9 The potential release of sediments during the operational phase of the Proposed Development is considerably lower than during the construction phase as there will be very minimal ground disturbance. As noted in **Section 9.6.1** the use of SuDS, re-vegetation of the Site, and regular maintenance of drainage systems will control potential sedimentation of watercourses.

9.7.3.10 The velocity of water falling from the panels would be significantly less than the velocity of unimpeded rainfall such that soils will be less susceptible to erosion. Furthermore, the approach of allowing underlying surfaces to remain vegetated will reduce sediment loadings when compared to worked agriculture land during rainfall events.

9.7.3.11 Surface waters are assessed to be of medium sensitivity and designated sites are assessed to be of high sensitivity. Operation could result in low magnitude impacts. This would be a minor effect and **Not Significant**.

Chemical Pollution

9.7.3.12 The potential release of chemicals during the operational phase of the Proposed Development is also considerably lower than during the construction phase as there will be fewer chemicals and vehicles on-Site. Thermal runaway of the solar panels are the highest risk of potential chemical leaks to waterbodies.

9.7.3.13 Surface waters are assessed to be of medium sensitivity and designated sites of high sensitivity. Operation could result in a high magnitude impact but with the embedded mitigation of an Emergency Response Plan, the magnitude of impact is reduced to low and therefore minor effect and **Not Significant**.

Effects on Private Water Supplies and Public Water Assets

9.7.3.14 Changes to water quantity may occur during the operational phase as a result of changes to overland surface water flow. However, operational effects on PWSs and public water assets as a result of changes to water quantity are not considered as high as during the construction phase.

9.7.3.15 Changes to water quality to PWSs and public water assets are also less likely than during the construction phase, but chemical pollution may occur in the event of regular Site maintenance or thermal runaway.

9.7.3.16 PWSs are assessed to be of medium sensitivity and public water assets to be of high sensitivity. Operation will result in negligible magnitude impacts which is of no effect and **Not Significant**.

Effects on Bathing Waters

9.7.3.17 The impacts to water quality as a result of sedimentation and / or chemical pollution are considered to be lower during the operational phase of the Proposed Development, but there is a risk of this impacting bathing waters at this stage. The effects to watercourses and, therefore, bathing waters are, however, not anticipated to extend as far downstream due to the mitigation by design measures outlined in **Section 9.6.1** of this Chapter, which includes the use of SuDS.

9.7.3.18 Bathing waters are assessed to be of medium sensitivity. Operation of the Proposed Development could result in a low magnitude impact which is a minor effect and **Not Significant**.

9.8 Mitigation

9.8.1.1 The assessment of potential effects (**Section 9.7** of this Chapter) has concluded there are no predicted likely significant effects with implementation of the embedded mitigation set out in **Section 9.6**. As such, no specific additional mitigation is required.

9.9 Residual Effects

9.9.1 Residual Construction Effects

9.9.1.1 As discussed in **Section 9.7.2**, with the embedded mitigation in place the potential for significant effects to all hydrological receptors and water resources is **Not Significant**.

9.9.2 Residual Operational Effects

9.9.2.1 As discussed in **Section 9.7.3**, with the embedded mitigation in place the potential for significant effects to all hydrological receptors and water resources during the operation of the Proposed Development is **Not Significant**.

9.10 Cumulative Effects

9.10.1.1 The cumulative developments are show in **Figure 4.1.**

9.10.1.2 The Proposed Development is located between the Dunglass Burn and Thornton Burn hydrological catchments as defined in the SEPA catchments dataset[24]. The south-east corner of the Site falls into the Dunglass Burn catchment, while the remainder of the Site is within the smaller Bilsdean Burn hydrological catchment which is not defined in the SEPA catchment dataset. There is the potential for cumulative and in-combination hydrological effects on the Bilsdean Burn and Dunglass Burn and their tributaries if construction of other developments were to take place at the same time as the Proposed Development within these catchments.

9.10.1.3 Branxton Substation (23/00616/PM) is approximately 800 m north of the Site and Branxton BESS (ECU00004659) is approximately 1.1 km north of the Site. Both developments are outwith the Bilsdean Burn catchment therefore no cumulative impacts to the Bilsdean Burn are anticipated.

9.10.1.4 However, both the Branxton Substation and Branxton BESS developments fall within the hydrological catchment area of a small unnamed burn which discharges directly into the Thorntonloch protected bathing water area. The construction schedule for Branxton Substation is from March 2024 to February 2027[42], and construction is estimated to commence in 2026/2027[43] for the Branxton BESS. Construction for the Proposed Development is anticipated to commence in 2028/2029 therefore there would be no overlap in the construction schedules. In addition, it is anticipated each cumulative development will be subject to their own CEMP during construction to control impacts to water quality and quantity and it will be in line with SEPA and CIRIA guidance[43]. Therefore, no cumulative construction impacts are anticipated.

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[42] Scottish Power Energy Networks. Branxton Substation. Available online at: Roller_Banner_Branxton_Substation_Jan23.pdf Accessed March 2025.
[43] Greencat Renewables (2023). Drainage Strategy Report. Branxton Battery Storage Facility. Version 1.1 – Final Draft. Available online at: Microsoft Word - Branxton BESS - Drainage Strategy Report.docx Accessed March 2025.

9.11 Summary

9.11.1.1 **Table 9.11** provides a summary of the potential effects of the Proposed Development, proposed mitigation and commitments, and the likely residual effect (Significant or Not Significant).

TABLE 9.11 SUMMARY OF RESIDUAL EFFECTS

POTENTIALEFFECT	RECEPTOR	RECEPTOR SENSITIVITY	EMBEDDED MITIGATION	ADDITIONAL MITIGATION	MAGNITUDE OF IMPACT (POST-MITIGATION) AND RESULTING RESIDUAL EFFECT
Construction					
Changes in water quantity including increased runoff and peak flows in rivers as a result of an increase in impermeable surfaces, removal of vegetation, changes to overland flowpaths, soil compaction, and damage to pipelines.	Watercourses	Medium	CEMP including a DMP. The final detailed design will incorporate the results of **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy**. Detailed design to ensure the SEPA Riparian Corridors are not breached. If the SEPA Riparian Corridors are still breached, a water monitoring programme may be required to assess potential impacts to water quantity. Pre-construction PWS screening assessment to be carried out by the Applicant. Where PWSs are identified to be at risk from the Proposed Development, a PWS Protection Plan will be developed. A water monitoring programme may be required to gather baseline water quantity data. Engagement with Scottish Water and development of RAMS and	N/A	Low magnitude of impact to receptors. Residual effect: minor, Not Significant.
	Flood risk	High			
	PWS	Medium			
	Public water assets	High			

POTENTIALEFFECT	RECEPTOR	RECEPTOR SENSITIVITY	EMBEDDED MITIGATION	ADDITIONAL MITIGATION	MAGNITUDE OF IMPACT (POST-MITIGATION) AND RESULTING RESIDUAL EFFECT
			SSoW to protect public water assets.		
Changes to water quality as a result of sedimentation and chemical pollution.	Watercourses	Medium	CEMP including a DMP, SECP, and PPP. Final detailed design will remove infrastructure from the SEPA Riparian Corridors. If the SEPA Riparian Corridors are still breached a water monitoring programme may be required to assess potential impacts to water quality. Mitigation measures to prevent sedimentation and chemical pollution of watercourses will be in place, the specific measures will be developed through the detailed design and preparation of the final CEMP. PWS Protection Plan. Water monitoring programme may be required to check water quality. Engagement with Scottish Water and development of RAMS and SSoW. Works to be overseen by an ECoW.	N/A	Low magnitude of impact to watercourses, designated sites, PWS, and public water assets. Residual effect: minor, not significant Negligible magnitude of impact to bathing waters. Residual effect: negligible, Not Significant.
	Designated sites (SSSI and SPA)	High			
	PWS	High			
	Public water assets	High			
	Protected Bathing Waters Area	Medium			

POTENTIALEFFECT	RECEPTOR	RECEPTOR SENSITIVITY	EMBEDDED MITIGATION	ADDITIONAL MITIGATION	MAGNITUDE OF IMPACT (POST-MITIGATION) AND RESULTING RESIDUAL EFFECT
Pollution of groundwater as a result of chemical pollution.	Groundwater protected area (hydrogeology)	Medium	CEMP including a PPP. Works to be overseen by an ECoW.	N/A	Negligible magnitude of impact. Residual effect: Negligible, Not Significant.
Changes to the quantity of sub-surface water as a result of excavations.	Groundwater protected area (hydrogeology)	Medium	The solar panels will be mounted on stands and not have deep, extensive concrete bases. Groundwater flows are unlikely to be impacted due to the superficial depths of excavations. The Applicant will conduct a Site investigation to determine groundwater levels prior to construction. No dewatering activities are anticipated.	N/A	Negligible magnitude of impact. Residual effect: Negligible, Not Significant.
Operational					
Changes in water quantity including increased runoff and peak flows in rivers as a result of an increase in impermeable surfaces, removal of vegetation,	Watercourses	Medium	The Site will be re-vegetated post construction to maintain pre-construction infiltration rates and conveyance. The final design will also incorporate SuDS to control runoff rates.	N/A	Low magnitude of impact. Residual effect: Minor, Not Significant

POTENTIALEFFECT	RECEPTOR	RECEPTOR SENSITIVITY	EMBEDDED MITIGATION	ADDITIONAL MITIGATION	MAGNITUDE OF IMPACT (POST-MITIGATION) AND RESULTING RESIDUAL EFFECT
changes to overland flowpaths.	Flood risk	High	Final detailed design will remove infrastructure from the SEPA Riparian Corridors. The final detailed design will incorporate the results of **Technical Appendix 9.1: Flood Risk Assessment and Outline Drainage Strategy** to manage flood risk and surface water drainage. Regular inspection of the Site to ensure vegetation growth beneath the solar panels in maintained, and that the SuDS are functioning as intended. Where the SEPA riparian corridors are still breached a water monitoring programme to determine post-construction water quantity may be required.		
	PWS	High			
Changes to water quality as a result of chemical pollution through thermal runaway of solar panels.	Watercourses	Medium	Final detailed design will remove infrastructure from the SEPA Riparian Corridors. An Operational Management Plan including an ERP and operational PPP will be in place for the lifetime of the proposed development. It will outline the measures to be taken in	N/A	Low magnitude of impact. Residual effect: Minor, Not Significant
	Designated sites (SSSI and SPA)	High			
	PWS	High			
	Public water assets	High			

POTENTIALEFFECT	RECEPTOR	RECEPTOR SENSITIVITY	EMBEDDED MITIGATION	ADDITIONAL MITIGATION	MAGNITUDE OF IMPACT (POST-MITIGATION) AND RESULTING RESIDUAL EFFECT
	Protected Bathing Waters Area	Medium	the event of thermal runaway to protect hydrological resources.		
Reduction in groundwater flows.	Groundwater protected area (hydrogeology)	Medium	The solar panels will be mounted on stands and not have deep, extensive concrete bases. Groundwater flows are unlikely to be impacted due to the superficial depths of permanent infrastructure.	N/A	Negligible magnitude of impact. Residual effect: Negligible, Not Significant.
Potential chemical pollution of groundwater in the event of thermal runaway.	Groundwater protected area (hydrogeology)	Medium	An Operational Management Plan including an ERP and operational PPP will be in place for the lifetime of the proposed development. It will outline the measures to be taken in the event of thermal runaway to protect hydrological resources.	N/A	Low magnitude of impact. Residual effect: Not Significant