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Environmental Statement – Volume 1 – Chapter 20 Surface Water Resources and Flood Risk

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)

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20. SURFACE WATER RESOURCES AND FLOOD RISK

20.1. SCOPE OF THE ASSESSMENT

20.1.1. INTRODUCTION

20.1.1.1. This chapter reports the assessment and likely significant effects arising from the Proposed Development upon surface water resources and flood risk.

20.1.1.2. The assessment of likely significant effects arising from the Proposed Development upon groundwater resources is assessed separately in Chapter 19 (Groundwater) of the Environmental Statement ('ES') Volume 1 (document reference 6.1.19).

20.1.1.3. This chapter assesses the impacts arising from the Proposed Development within the Onshore Components of the Order Limits only (above Mean Low Water Springs ('MLWS')). Refences to the Order Limits in this chapter, any appendices and/ or figures enclosed to it, is only in relation to the Order Limits as applicable to the Onshore Components as illustrated in Figure 3.9 of the ES Volume 2 (document reference 6.2.3.9) Figure 3.9.

20.1.1.4. This chapter:

- Identifies sensitive environmental and human receptors associated with the surface water resources and flood risk environments arising from the Proposed Development within the onshore elements of the Order Limits - above Mean High Water Springs ('MHWS') only;
- Presents the potential impacts arising from the Proposed Development, based on the embedded mitigation prior to the implementation of additional mitigation measures;
- Presents the proposed environmental control measures and additional mitigation measures to prevent, reduce and/ or offset the anticipated potential impacts; and
- Identifies assumptions and limitations encountered.

20.1.1.5. This chapter considers the potential impacts during construction, operation and decommissioning on:

- Surface water receptors with regards to surface water drainage patterns; including main rivers, ordinary watercourses and overland surface water drainage routes;
- Water supply and wastewater infrastructure; including drinking water supply network, public and private sewage (surface water and foul) drainage networks;

- Surface water receptors with regards to water quality; and
- Human receptors and associated infrastructure with regards to the flood risk profile.

20.1.1.6. This chapter is complimented with the following Appendices:

- Appendix 20.1 (Surface Water Resources and Flood Risk Consultation) of the ES Volume 3 (document reference 6.3.20.1);
- Appendix 20.2 (Onshore Water Framework Directive Assessment) ('Onshore WFDa') of the ES Volume 3 (document reference 6.3.20.2);
- Appendix 20.3 (Watercourses Summary) of the ES Volume 3 (document reference 6.3.20.3);
- Appendix 20.4 (Flood Risk Assessment) ('FRA') of the ES Volume 3 (document reference 6.3.20.4); and
- Appendix 20.5 (Surface Water Resources and Flood Risk Cumulative Effect Assessment ('CEA') Matrix (Stage 1 & 2)) of the ES Volume 3 (document reference 6.3.20.5).

20.1.1.7. This chapter is complimented with the following Figures:

- Figure 20.1 (Constraints Overview) of the ES Volume 2 (document reference 6.2.20.1);
- Figure 20.2 (LiDAR) of the ES Volume 2 (document reference 6.2.20.2);
- Figure 20.3 (Watercourses) of the ES Volume 2 (document reference 6.2.20.3);
- Figure 20.4 (Flood Zone Map) of the ES Volume 2 (document reference 6.2.20.4);
- Figure 20.5 (surface Water Flood Risk) of the ES Volume 2 (document reference 6.2.20.5);
- Figure 20.6 (Reservoir Flood Risk) of the ES Volume 2 (document reference 6.2.20.6);
- Figure 20.7 (History of Flooding) of the ES Volume 2 (document reference 6.2.20.7); and
- Figure 20.8 (WFD Surface Water Catchments) of the ES Volume 2 (document reference 6.2.20.8).

20.1.1.8. In relation to the wider water environment, this chapter should be read in conjunction with the following chapters and appendices:

- Chapters 6 to 14 (Marine) of the ES Volume 1 (document reference 6-1.6 - 6.1.14) discuss impacts on sensitive and/or important marine physical processes, marine

water and sediment quality, intertidal and benthic ecology (e.g. water resources and ecology including and below MHWS);

- Chapter 16 (Onshore Ecology) of the ES Volume 1 (document reference 6.1.16) – impacts on sensitive and/or important onshore aquatic species and habitats within the non-saline environment;
- Chapter 18 (Ground Conditions) of the ES Volume 1 (document reference 6.1.18) – impacts on the release of contaminants contained in the ground, and
- Chapter 19 (Groundwater);
- Appendix 3.6 (Surface Water Drainage and Aquifer Contamination Mitigation Strategy) of the ES Volume 3 (document reference 6.3.3.6) – outline details of the proposed surface water and foul water management at the Converter Station Area;
- The Onshore Outline Construction Environmental Management Plan ('CEMP')) (document reference 6.9);
- Appendix 20.1 (Consultation Responses);
- Appendix 20.2 (Onshore WFDa);
- Appendix 20.3 (Watercourses Summary);
- Appendix 20.4 (FRA); and
- Appendix 20.5 (Surface Water Resources and Flood Risk Cumulative Effect Assessment ('CEA') Matrix (Stage 1 & 2)).

20.1.2. STUDY AREA

20.1.2.1. The extent of the study area for the assessment of the surface water and flood risk environment encompasses sensitive surface water and flood risk receptors within the Order Limits; including, where present, the various Onshore Cable Corridor options.

20.1.2.2. The study area also includes a 500 m radius buffer around the Order Limits to consider any potential impacts associated with overland migration of pollutants directly to surface features (including watercourses), pollutants conveyed in drainage systems, and potential impacts on the upstream and downstream flood risk environment.

20.1.2.3. Outside of this buffer it is unlikely that any direct impacts upon the surface water and flood risk environment would be attributed to the Proposed Development. However, in addition to the 500 m radius, features typically up to 1 km radius from the Order Limits, and further afield if deemed appropriate, are considered within this assessment if these features are deemed to be highly sensitive or directly connected or interconnected to receptors within the Order Limits.

20.1.2.4. These features are likely to include any potential surface water abstractions, downstream watercourses and other receptors highly sensitive to the water environment. Features outside of the 500 m buffer will be considered based on the professional judgement of the assessor and current knowledge of the surface water features in the area that are in hydraulic connectivity.

20.1.2.5. For the purpose of this assessment, the Onshore Cable Corridor (Sections 1 to 10) has been assessed collectively with the Convertor Station Area (Section 1) and the Landfall (Section 10) also assessed separately where appropriate.

20.1.2.6. Within the CEA, the Zone of Influence ('ZOI') of other developments has been identified up to 0.5 km from the Order Limits however in addition to the 500 m radius features typically up to 1 km radius from the Order Limits, and further afield, if deemed appropriate based on professional judgement, are considered within this assessment if these features are deemed to be highly sensitive or directly connected or interconnected to receptors within the Order Limits.

20.1.3. ELEMENTS SCOPED OUT OF ASSESSMENT

20.1.3.1. No elements were scoped out at the Scoping stage. However, since the Scoping Opinion has been received, embedded mitigation measures have been incorporated into the Proposed Development. As a result, the elements summarised in Table 20.1 are no longer considered to give rise to likely significant effects and have been scoped out of this assessment.

Table 20.1 – Topics and elements scoped out of the assessment Post Scoping

Element Scoped Out	Justification
Impacts on foul water and combined sewer capacity (during operation)	No proposed connections to foul and/or combined water sewer network during operation as part of Proposed Development.
Impacts on foul water and combined sewer quality (during operation)	No proposed connections to foul and/or combined water sewer network during operation as part of Proposed Development.

20.1.4. IMPACTS SCOPED INTO THE ASSESSMENT

Construction Stage

20.1.4.1. The following impacts are considered to have the potential to give rise to likely significant effects during construction of the Proposed Development and have therefore been considered within the ES:

- Potential changes to surface water drainage during construction with effects to surface water drainage patterns; including main rivers, ordinary watercourses and overland surface water drainage routes;
- Potential increased demand and/or pressure due to construction activities with impacts on:
  - Public foul and surface water sewer network; and
  - Public potable water network.
- Potential physical contamination due to construction activities; including, ground disturbance, accidental leaks and spillages with impacts on surface water resources water quality; including:
  - Surface water features (e.g. water bodies, main rivers, ordinary watercourses);
  - Public surface water sewers; and
  - Overland surface water drainage patterns.
- Potential increase in flood risk due to construction activities with impacts on human receptors and associated infrastructure; including:
  - Construction workers; and
  - Residents, users and associated infrastructure of the surrounding areas (public).

Operational Stage

20.1.4.2. The following impacts are considered to have the potential to give rise to likely significant effects during the operation of the Proposed Development and have therefore been considered within the ES:

- Potential permanent changes to surface water drainage with impacts to surface water drainage patterns; including main rivers, ordinary watercourses and overland surface water drainage routes
- Potential increased demand and/ or pressure due to potential permanent increase in usage with impacts on:
  - Public surface water sewer network; and
  - Public potable water network.
- Potential physical contamination from the Proposed Development due to insufficient management of potential pollutants with impacts on surface water resources water quality; including:
  - Surface water features (e.g. main rivers and ordinary watercourses);

- Public surface water sewers; and
- Overland surface water drainage patterns

- Potential increase in flood risk due to an increase in impermeable surfaces, obstruction of watercourse and surface water flow routes with impacts on human receptors and associated infrastructure; including:
  - Staff; and
  - Residents, users and associated infrastructure of the surrounding areas (public).

Decommissioning Stage

20.1.4.3. The activities anticipated to be undertaken during decommissioning are anticipated to be the same as during construction. Therefore, in the absence of mitigation measures, there is the potential for the same short-term impacts on the surface water and flood risk environment receptors.

20.2. LEGISLATION, POLICY AND GUIDANCE

20.2.1.1. This assessment has considered current legislation, policy and guidance relevant to the surface water resources and flood risk environment; a chronological overview is provided hereafter.

20.2.2. LEGISLATION

Environmental Protection Act 1990

20.2.2.1. The Environmental Protection Act defines the structure and authority for waste management and the control of emissions to the environment. Part 1 sets out the regulations whereby the Secretary of State for Food and Rural Affairs can set limits on emissions into the environment. Part 2 deals with regulations surrounding the controlled disposal of waste. It also addresses the regulations surrounding transportation, treatment and storing of waste.

- The legislation endorses the principle of a 'suitable for use' approach to contaminated land, where remedial action is only required if there are significant risks to human health or controlled waters.

The EU Nitrates Directive (1991)

20.2.2.2. The EU Nitrates Directive aims to protect water quality by preventing nitrates from agricultural sources polluting groundwater and surface water and, by promoting the use of good farming practices. The Nitrates Directive has close links to the Water Framework Directive ('WFD') and Groundwater Directives (2006). The Groundwater Directive confirms that nitrate concentrations must not exceed the trigger value of 50mg/L in order to reach 'Good' status under the WFD.

Land Drainage Act (1991) (as amended)

20.2.2.3. The Land Drainage Act includes environmental duties in relation to drainage and requires that a watercourse is maintained by its owner in such a condition that the free flow of water is not impeded. If a riparian owner fails to carry out their responsibilities under the Land Drainage Act, or if anyone else causes a watercourse to become blocked or obstructed, Local Authorities and Internal Drainage Boards ('IDBs') have powers of enforcement by serving a notice under the Act.

20.2.2.4. The Land Drainage Act amended the 1991 Act in relation to the functions of IDBs and Local Authorities to further conserve and enhance areas of natural beauty, and to conserve flora, fauna and geological or physiographical features of special interest, as well as taking account of any impacts on the beauty or amenity of any rural or urban area, or on any such flora, fauna or other features.

Water Resources Act (1991) (as amended)

20.2.2.5. The Water Resources Act (as amended by the Water Resources Act (1991) (Amendment) (England and Wales) Regulations) regulates water resources, pollution, water quality and flood defence. The Act aims to prevent and minimise pollution of water. Currently, the EA is responsible for the policing of this Act.

20.2.2.6. Under the Act, it is an offence to cause or knowingly permit any poisonous, noxious or polluting material, or any solid waste to enter any controlled water.

The Environment Act (1995)

20.2.2.7. The Environment Act sets out the responsibilities of the Environment Agency ('EA') in relation to water pollution, resource management, flood defence and fisheries.

Drinking Water Directives (1998)

20.2.2.8. The Drinking Water Directives (98/83/EC) aims to ensure the quality of water intended for human consumption is safe. Its objective is to protect human health from adverse impacts of any contamination within water intended for human consumption.

Anti-Pollution Works Regulations (1999)

20.2.2.9. The Anti-Pollution Works Regulations allows the EA to serve notice under Section 161A of the Water Resources Act to a business or person that has caused pollution or has a risk of causing pollution to any watercourse. The notice requires the recipient to conduct preventative works and operations in order to minimise the risk and future risk. Failing to abide by the notice may lead to prosecution.

Water Framework Directive (2000)

20.2.2.10. The WFD is an over-arching framework which is designed to:

- Enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands, which depend on the aquatic ecosystems;
- Promote the sustainable use of water;
- Reduce pollution of water, especially the 'priority' and 'priority hazardous' substances; and
- Ensure progressive reduction of groundwater pollution.

20.2.2.11. The WFD is a European Union ('EU') Directive which commits EU member states to achieving good qualitative and quantitative status of all water bodies (including coastal waters up to one nautical mile from shore, inland surface water, transitional waters, and groundwater) at six-year intervals. The next objective is to achieve a "good" status by 2021.

20.2.2.12. The WFD is transposed into United Kingdom ('UK') law through the WFD (England and Wales) Regulations 2017 and in order to address the requirements of the Directive, the EA has produced river basin management plans, which develop new ways of protecting and improving the water environment.

20.2.2.13. These regulations provide technical advice to the UK Administrators, co-ordinate the UK Agencies' input to the development of the European Guidance and develop guidance and methods to support the consistent implementation of the Directive by the UK Agencies.

The Water Act (2003)

20.2.2.14. The Water Act aims to encourage the sustainable use of water resources; strengthening the voice of the consumer; a measured increase in competition and finally the promotion of water conservation. The Act made it a statutory obligation on water companies to produce a Water Resources Plan.

Groundwater Daughter Directive (2006/118/EC) (2006)

20.2.2.15. Groundwater Daughter Directive (2006/118/EC) establishes specific measures to prevent and control groundwater pollution. In particular; (a) criteria for the assessment of good groundwater chemical status; and (b) criteria for the identification and reversal of significant and sustained upward trends and for the definition of starting points for trend reversals. The Directive also aims to prevent the deterioration of the status of all bodies of groundwater.

Climate Change Act (2008)

20.2.2.16. The Climate Change Act places the government under a legal duty to reduce greenhouse gas emissions by 80% below 1990 levels by 2050 and to assess the risk to the UK from the impacts of climate change.

Flood Risk Regulations (2009) and Floods Directive (2007/60/EC)

20.2.2.17. The Flood Risk Regulations transpose the EU Floods Directive (2007/60/EC) into law in England and Wales. The EU Floods Directive aims to provide a consistent approach to flood risk management across all of Europe. Under the Flood Risk Regulations , the EA and Lead Local Flood Authorities ('LLFA's) are required to prepare Preliminary Flood Risk Assessments ('PFRA's).

20.2.2.18. LLFAs duty within an agreed Flood Risk Area to publish flood hazard and flood risk maps for all sources of flooding by December 2013 and flood risk management plans have been published in December 2015 to manage flood risk for the next six years to the year 2021. These flood risk management plans should set objectives for flood risk management and outline measures for achieving these objectives.

The Groundwater (England and Wales) Regulations (2009)

20.2.2.19. The Groundwater (England and Wales) Regulations are an environmental protection measure which provide enhanced protection for groundwater by preventing the input of 'hazardous' substances into groundwater and limiting the input of 'non-hazardous' pollutants into groundwater.

Flood and Water Management Act (2010)

20.2.2.20. The Flood and Water Management Act is the Government's newest legislation to help improve flood risk management and ensure the security of water supplies in England and Wales. The Act updates legislation to ensure better protection from flooding and coastal erosion, manage water more sustainably, improve public services and secure water resources during periods of drought. The aims of the Flood and Water Management Act are to:

- Clarify who is responsible for managing all sources of flood risk, including new responsibilities to unitary authorities and county councils;
- Encourage more sustainable forms of drainage in new developments;
- Make it easier to resolve misconnections to sewers;
- Make a national strategy for floods; and
- Establish regional flood and coastal committees.

The Water Act (2014)

20.2.2.21. The Water Act covers four main areas: making water supplies more resilient to natural hazards such as droughts and floods; creation of a national water supply network to make it easier for water companies to buy and sell water from each other; ensuring access to affordable flood insurance from 2015 via a new industry backed levy; and increasing competition in the water industry by allowing all businesses,

charities and public sector customers in England to switch their water and sewage supplier.

Environmental Damage (Prevention and Remediation) (England) Regulations (2015)

20.2.2.22. The Environmental Damage (Prevention and Remediation) (England) Regulations provides guidance for imminent threats of 'environmental damage' or actual 'environmental damage', related to surface water and groundwater. Guidance is provided to ensure appropriate mitigation measures such as easements when working near waters. In addition, it recommends remediation measures should there be significant effects to cause a change in surface water and groundwater. This regulation only applies to England up to one nautical mile seaward in England.

Environmental Permitting (England and Wales) Regulations (2016) (as amended)

20.2.2.23. The Environmental Permitting (England and Wales) Regulations set out an environmental permitting and compliance regime that applies to various activities and industries, including the discharge of water to surface water and groundwater.

The Water Environment (Water Framework Directive) (England and Wales) Regulations (2017)

20.2.2.24. The Water Environment (Water Framework Directive) (England and Wales) Regulations outline the duties of regulators in relation to environmental permitting, abstraction and impoundment of water. Specifically, Regulation 3 enforces the duty on the Secretary of State, and the EA to act in compliance with various water directives when considering permits and licenses affecting water quality, and to coordinate their actions relating to these Directives.

20.2.3. PLANNING POLICY

National Policy

National Policy Statement for Energy (2011)

20.2.3.1. The overarching National Policy Statement for Energy (NPS EN-1) sets out the Government's policy for delivery of major energy infrastructure.

20.2.3.2. Parts 4 and 5 of EN-1 detail the general principles that will be used in the assessment of applications and sets out how generic physical impacts (i.e. those impacts most likely to arise from the development of any type of energy infrastructure) and means of mitigation will be considered. The physical impacts detailed that are most relevant to this chapter include Parts 5.7 (Flood Risk) and 5.15 (Water Quality and Resources).

National Planning Policy Framework (2019)

20.2.3.3. The National Planning Policy Framework ('NPPF') was first published on 27 March 2012 and updated on 24 July 2018 and 19 February 2019. The NPPF aims to protect the environment and promote sustainable growth, with an overarching presumption in favour of sustainable development that should be the basis of every plan and every decision.

20.2.3.4. The following paragraphs/policies within the NPPF are considered relevant to this assessment:

- Paragraph 155: Requires that "Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere";
- Paragraph 158: Explains that "the aim of the Sequential Test is to steer development to areas with the lowest probability of flooding";
- Paragraph 163: Explains that "When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere […]"; and
- Paragraph 165: Recommends that "major development should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:
  - Take account of advice from the lead local flood authority;
  - Have appropriate proposed minimum operational standards;
  - Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
  - Where possible, provide multifunctional benefits".

Local Policy

Portsmouth City Council

20.2.3.5. Portsmouth Plan (Portsmouth Core Strategy) adopted January ;

- PCS12 Flood Risk – outlines the measures that will be taken to reduce flood risk when considering planning applications. Details requirement for sequential and exception tests and the requirement for site-specific flood risk assessment.

Havant Borough Council

20.2.3.6. Local Plan (Core Strategy) adopted March 2011 ;

- CS15 Flood and erosion risk - details requirement for sequential and exception tests and requirement for site-specific flood risk assessment. Incorporation of

flood protection, resilience and resistance and flood warning measures. Outlines requirements for Sustainable Drainage Systems ('SuDS'). Development that does cause unacceptable deterioration to water quality or have an unacceptable impact on water quantity will not be supported;

- DM10 Pollution – outlines the criteria that polluting development is required to meet in order to be considered acceptable.

Winchester City Council

20.2.3.7. The Local Plan Part 1: WCC and SDNPA Joint Core Strategy adopted March 2013 ;

- CP17 Flooding, flood risk and the water environment – details requirement for sequential and exception tests. Safeguards land, structures and features required for flood management. Outlines requirements for SuDS. Development that does not cause unacceptable deterioration to water quality or have an unacceptable impact on water quantity will be supported.

20.2.3.8. Local Plan Part 2: Development Management and Allocations adopted April 2017 ;

- DM19 Development and pollution – states that development which generates pollution (or is sensitive to it) will only be permitted where it achieves an acceptable standard of environmental quality. Outlines when detailed assessments and mitigation measures will be required.

East Hampshire District Council

20.2.3.9. Local Plan Part 1: EHDC and SDNPA Joint Core Strategy adopted June 2014

- CP25 Flood risk – sets out the requirement for sequential and exception tests, and site-specific flood risk assessments for development in areas at risk of flooding. CP25 requires all new development to ensure there is no net increase in surface water runoff. It also sets out requirement for SuDS;
- CP26 Water resources/water quality – requires new development to protect the quality and quantity of water and make efficient use of water;
- CP27 Pollution – states that development must not result in pollution that prejudices the health and safety of communities and their environment.

20.2.3.10. Hampshire Portsmouth, Southampton, New Forest National Park & South Downs National Park Minerals and Waste Plan ;

- The Policy 11: Flood risk and prevention Minerals and waste development in areas at risk of flooding should:
  - a. not result in an increased flood risk elsewhere and, where possible, will reduce flood risk overall;

- b. incorporate flood protection, flood resilience and resistance measures where appropriate to the character and biodiversity of the area and the specific requirements of the site;
- c. have site drainage systems designed to take account of events which exceed the normal design standard;
- d. not increase net surface water run-off; and e. if appropriate, incorporate Sustainable Drainage Systems to manage surface water drainage, with whole-life management and maintenance arrangements.

Other

Water Resources Management Plans (Draft 2018, 2019)

20.2.3.11. Portsmouth Waters' ('PW') Water Resources Management Plans ('WRMPs') & are essential to ensure the long-term balance between supply and demand. Every five years statutory WRMPs set out a company's intended approach for at least the next 25 years.

20.2.3.12. Within Portsmouth, the draft 2019 WRMP is available with an annual summary available on the current position.

Local Planning Policy Supplementary Documents

20.2.3.13. A number of supplementary planning documents ('SPDs') in relation to surface water resources and flood risk environment are available to help inform an understanding of the local environment and how to appraise the risk of flooding in that area. The key SPDs relevant to this assessment are summarised below.

Strategic Flood Risk Assessment

20.2.3.14. The NPPF requires local planning authorities to appraise the risk of flooding in their areas by undertaking a Strategic Flood Risk Assessment which looks at flood risk at a strategic level on a local planning authority scale.

20.2.3.15. A Strategic Flood Risk Assessment takes into account the impacts of climate change and assesses the impact that land use changes and development in the area will have on flood risk and should help various parties consider flood risk when making planning decisions about the design and location of any: development, and/ or flood risk management features and structure.

20.2.3.16. Within the study area the following Strategic Flood Risk Assessment's are applicable:

- East Hampshire District Council ('EHDC') Strategic Flood Risk Assessment ;
- Winchester City Council ('WCC') Strategic Flood Risk Assessment ;
- Partnership for Urban South Hampshire ('PUSH') Strategic Flood Risk Assessment relevant to:

- Havant Borough Council ('HBC'); and
- Portsmouth City Council ('PCC').

20.2.3.17. Other strategic documents include:

- Surface Water Management Plan;
- Local Flood Risk Management Strategy; and
- Supplementary Sustainable Drainage Guidance.

20.2.4. ENVIRONMENTAL PERMITS, REGULATORY POSITION STATEMENTS AND GUIDANCE

20.2.4.1. The Gov.uk website includes detail of a number of guidance documents, summary of requirements under environmental permits and detail of regulatory position statements, which have been published and are managed by the EA under the Department for Environment, Food & Rural Affairs ('DEFRA').

20.2.4.2. A summary of information relevant to the surface water and flood risk environment is provided hereafter.

Flood risk assessments: climate change allowances

20.2.4.3. Provides detail of how to use climate change allowances in flood risk assessments and strategic flood risk assessments.

UK Climate Change Projection 2018 Factsheets and Supplementary Information

20.2.4.4. Provides an overview of the results, comparisons with observations and links to relevant information in the UKCP18 suite of science reports.,

Discharges to surface water and groundwater: environmental permits (2016)

20.2.4.5. Outlines when an environmental permit is required to discharge liquid effluent or waste water to surface water or into the ground, and how to apply.

Flood risk activities: environmental permits (2016)

20.2.4.6. Outlines when an environmental permit is required for a flood risk activity, and how to apply.

Temporary Dewatering from Excavations to Surface Water (2018)

20.2.4.7. Outlines when a permit is required for temporary discharges of uncontaminated water from excavations to surface water.

Pollution prevention for businesses (2016)

20.2.4.8. Outlines how businesses and organisations can avoid causing pollution from oil and chemical storage, car washing, construction and other activities.

Oil storage regulations for businesses (2015)

20.2.4.9. How to store oil, design standards for tanks and containers, where to locate and how to protect them, and capacity of bunds and drip trays.

Manage water on land: guidance for land managers (2015)

20.2.4.10. Provides guidance on how to manage water use, levels, drainage and irrigation, and avoid pollution from waste water. This includes details of relevant water abstraction requirements/ licencing.

Septic tanks and treatment plants: permits and general binding rules

20.2.4.11. Outlines requirements for foul drainage where not connected to the mains sewers.

20.2.5. FURTHER GUIDANCE

LA 113 Road drainage and the water environment

20.2.5.1. This document sets out the requirements associated with the assessment and management of potential environmental impacts on the water environment from highway construction, operation, improvement and maintenance, and aligns with the requirements of the WFD.

Transport Analysis Guidance Unit A3 Environmental Impact Appraisal – Impacts on the Water Environment (2019)

20.2.5.2. Transport Analysis Guidance ('TAG') Unit A3 Environmental Impact Appraisal – Impacts on the Water Environment provides guidance for appropriately qualified environmental practitioners/topic specialists on appraising the impact of transport proposals on the built and natural environment, and on people. When using the guidance in this TAG unit, environmental practitioners/topic specialists should refer to current European and UK legislation, regulations and policy and best practice.

Construction Industry Research and Information Association Guidance Documents

20.2.5.3. A number of Construction Industry Research and Information Association (CIRIA) guidance documents provide guidance on the control of water pollution, these guidance documents are noted below:

- CIRIA Report C532, Control of water pollution from construction sites: Guidance for consultants and contractors ;

- CIRIA Report C648, Control of water pollution from linear construction projects: Technical guidance ;
- CIRIA Report C649, Control of water pollution from linear construction sites: Site guide; and
- CIRIA Report C753, The SuDS Manual .

Additional Guidance for Pollution Prevention

20.2.5.4. In addition to the Pollution prevention for businesses presented above a number of Pollution Prevention Guidelines/ Guidance for Pollution Prevention provide environmental good practice guidance for the whole UK and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only.

20.2.5.5. In England these have been withdrawn from use and the latest guidance is summarised under the 'Environmental permits, regulatory position statements and guidance' section.

20.2.5.6. Notwithstanding, they still provide relevant best environmental practice. The various relevant documents and number (No.) references are listed below.:

- Pollution Prevention Guidelines :
  - No.1 Understanding your environmental responsibilities – good environmental practices (July 2013);
  - No.3 Use and design of oil separators in surface water drainage systems (April 2006);
  - No.6 Working at construction and demolition sites (2012);
  - No.7 Safe storage – the safe operation of refuelling facilities (July 2011);
  - No.18 Managing fire water and major spillages (June 2000);
  - No.22 Incident response - dealing with spills; (April 2011); and
  - No.26 Safe storage – drums and intermediate bulk containers (March 2011).
- Guidance for Pollution Prevention
  - No.2 Above ground oil storage tanks (January 2018);
  - No.4 Treatment and disposal of wastewater where there is no connection to the public foul sewer (November 2017);
  - No.5 Works and maintenance in or near water (January 2017);
  - No.8 Safe storage and disposal of used oils (July 2017);
  - No.13 Vehicle washing and cleaning (April 2017); and
  - No.21 Pollution incident response planning (July 2017).

20.3. SCOPING OPINION AND CONSULTATION

20.3.1. SCOPING OPINION

20.3.1.1. As detailed within Chapter 1 (Introduction) of the ES Volume 1 (document reference 6.1.1), a Scoping Opinion was received by the Applicant from the Planning Inspectorate ('PINS'), on behalf of the Sectary of State ('SoS') on 7 December 2018. A summary of the items raised in relation to the surface water and flood risk environment and how they are being addressed within this chapter are presented below:

- Identified the need to consider sensitive receptors within the ZoI for the Proposed Development – this is addressed in section 20.1.2;
- Identified the need to consider groundwater quality and include appropriate cross-references – this is assessed in Chapter 19 (Groundwater);
- Identified the need to discuss flood defences in detail in the baseline – section 20.5.5 provides a summary of the flood defences present within the Order Limits which are considered within this assessment and Appendix 20.4 (FRA). The flood defences are further considered as part of the Proposed Development in relation to the interaction of the Proposed Development with the existing and current future proposed coastal flood defence schemes.
- Discussions with East Solent Coastal Partnership ('ESCP'), as detailed in Appendix 20.1 (Consultation Responses), have been on-going to discuss the practicability of the: construction programme, scheme alignment, and interactions between the Proposed Development and flood defences schemes.
- These discussions have informed the Proposed Development, and where the Proposed Development is in close proximity to the coastal flood defences; detailed design will demonstrate the proposed works would not compromise the existing and currently proposed coastal flood defences subject to relevant environmental permitting/ consenting;
- *Identified the need to take into account climate change using the latest UK Climate Projections (UKCP18)* – through ES consultation it has been agreed with the EA that climate change impacts do not need to be assessed for construction activities and that a new assessment will be required at the Decommissioning Stage. Consideration of climate change has been undertaken based on the latest guidance available from the EA as agreed through consultation;
- Identified the need for further clarification of watercourse crossings including locations, mitigation and/or design measure relied upon – watercourses are discussed in section 20.5.4, and have been informed by a detailed site visit and

consultation with relevant consultees which is further detailed within Appendix 20.3 (Watercourses Summary);

- *Identified the need for an assessment of likely impacts associated with temporary works* – considered within assessment for construction scenario;
- Identified the need to include clear and appropriate figures including those for the FRA and WFD assessments – Figures are appended to this chapter; and
- Identified reference to outdated legislation – this has been amended.

20.3.1.2. Appendix 20.1 (Consultation Responses) includes the responses to the PINS EIA Scoping Opinion.

20.3.2. PEIR CONSULTATION

20.3.2.1. Consultation undertaken prior to the Preliminary Environmental Report ('PEIR') included:

- EA – primarily email correspondence from May 2018 and ongoing at the time of the PEIR's publication including a face-to-face meeting to discuss the scheme at a high level;
- ESCP – email correspondence from May 2018 and ongoing at the time of the PEIR's publication including a face-to-face meeting to discuss the scheme at a high level;
- Hampshire County Council ('HCC') – email correspondence from May 2018 and ongoing at the time of the PEIR publication;
- PCC – email correspondence from May 2018 and ongoing at the time of the PEIR publication;
- EHDC – email correspondence from May 2018 and ongoing at the time of the PEIR publication;
- HBC – email correspondence from May 2018 and ongoing at the time of the PEIR publication;
- WCC – email correspondence from May 2018 and ongoing at the time of the PEIR publication; and
- PW – email correspondence from May 2018 and ongoing at the time of the PEIR publication including a face-to-face meeting to discuss the scheme at a high level.

20.3.2.2. Following publication of the PEIR, feedback was obtained from a number of statutory consultees including:

- The EA regarding main river crossings, environmental permitting, climate change, surface water management, surface water contamination, foul drainage, flood risk

management and flood defences and the extent/ level of detail to assessment methodology presented within the ES;

- HCC stated that "the Lead Local Flood Authority is satisfied that a Water Resources and Flood Risk Assessment will be submitted as part of the EIA. This should include a surface water drainage strategy, as per the County Council's guidance" with no other comments on the current surface water resources assessment or proposed ES approach;
- PCC commented on the works around flood defences on Portsea Island with no specific comments on the surface water resources assessment or proposed ES approach;
- Other statutory consultees raised concerns about a lack of justification on the assessment of alternative options which are addressed in Chapter 2 (Consideration of Alternatives) of the ES Volume 1 (document reference 6.1.2); and
- LPA's commented on the opportunity for mitigation opportunities to be considered that would benefit biodiversity and the environment. The indicative landscape mitigation plan has taken into account biodiversity considerations. The WFD Assessment makes further recommendations in terms of mitigation measures with respect to watercourses.

20.3.2.3. Appendix 20.1 (Consultation Responses) includes the responses to the PEIR consultation in relation to this topic and how these have been addressed.

20.3.3. OTHER CONSULTATION

20.3.3.1. Following the production of the PEIR and subsequent consultation feedback, consultation in the form of email correspondence and workshop meetings has been undertaken to directly inform the production of this chapter with the following organisations:

- EA;
- ESCP;
- HCC LLFA;
- PCC LLFA; and
- PW.

20.3.3.2. Key engagement that has informed an understanding of the baseline environment includes the Flood Risk Workshop held by the Applicant on 23 July 2019 with HCC LLFA, PCC LLFA, PW and the EA.

20.3.3.3. Appendix 20.1 (Consultation Responses) includes a summary of consultation undertaken and the outcome of discussions.

20.4. ASSESSMENT METHODOLOGY

20.4.1.1. This chapter provides a predominantly qualitative assessment of the potential impacts of the Proposed Development on the surface water resources and flood risk environment; including impacts to water quality, drainage regime, water resource availability and flood risk.

20.4.1.2. The assessment is based on the sensitivity of the identified surface water and flood risk receptors and magnitude of impact upon the receptors to determine the potential significance of effects during construction, operation and decommissioning – a) prior to mitigation considering the embedded design considerations; and b) following the implementation of the proposed environmental control measures and mitigation measures.

20.4.2. METHOD OF BASELINE DATA COLLECTION

20.4.2.1. Baseline conditions within the study area have been established through a desk-based review, complimented by a site walkover and consultation with relevant consultees.

Desk Study

20.4.2.2. The desk study assessment to inform the baseline data included a review of the following, where applicable:

- Ordnance Survey ('OS') mapping;
- British Geological Survey ('BGS') data;
- Defra.gov.uk online MAGIC Map database;
- Gov.uk/EA's online 'Flood map for planning' database;
- Gov.uk/EA's online 'Long term flood risk information' database;
- EA's Catchment Data Explorer database;
- EA's water abstractions database; and
- Local Planning Authority and Lead Local Flood Authority flood strategic flood risk studies including:

- Strategic FRA;
- Surface Water Management Plan;
- Local Flood Risk Management Strategy; and
- Groundwater Management Plan.

Consultee Engagement and Meetings

20.4.2.3. In addition to the above summarised data sets, the desk study has been informed by data sets obtained through consultation as summarised in Section 20.3.

Site Visits

20.4.2.4. To verify and further compliment the information gathered through the desk top study and engagement with consultees a number of site visits were undertaken to verify assumptions and baseline data already collected.

20.4.2.5. A high-level walkover of the Converter Station Area was undertaken in February 2018, to confirm the understanding of flood risk profile and surface water features at the Converter Station Area.

20.4.2.6. A detailed site wide walkover was subsequently undertaken in July 2019 of all identified surface water and flood risk features within or directly adjacent to the Order Limits; including:

- All Main Rivers and Ordinary Watercourses identified within the Order Limits, based on the desk top review (OS data, EA/LLFA data);
- All areas identified to be at high risk of extreme event surface water flooding based on gov.uk mapping;
- All coastal flood defences;
- Overview of the Order Limits topography;
- Converter Station Area; and
- Landfall.

20.4.2.7. A summary of the detailed site visit can be found in Appendix 20.3 (Watercourses Summary).

20.4.3. SIGNIFICANCE CRITERIA

20.4.3.1. The significance level attributed to each effect has been assessed based on the magnitude of change/effect as a consequence of the Proposed Development and the sensitivity of the affected receptors at each of the stages.

20.4.3.2. No standard methodology exists for assessing surface water effects and evaluation methods can vary within the water environment. The assessment methodology used in this chapter is predominantly qualitative and builds on and adapts the classification

contained in LA 113 Road Drainage and the Water Environment and the TAG Unit A3 Environmental Impact Appraisal – Impacts on the Water Environment.

20.4.3.3. The above guidance was developed for assessing potential impacts that road projects may have on the water environment; however, provides a suitable framework and basis to develop a consistent classification of both magnitude of impact and sensitivity of potential water receptors and generally considered as industry best practice.

Magnitude

20.4.3.4. The TAG Unit A3 guidance provides classifications of magnitude of impact in' Large', 'Moderate', and 'Slight' quantities and the LA 113 Road Drainage and the Water Environment guidance provides classification of magnitude of impact in 'Major', 'Moderate', 'Minor' and 'Negligible'. For the purpose of this assessment, we have referred to magnitude of change/effect as 'High', Medium', 'Low' and 'Negligible'. Table 20.2 specifies the general criteria used to qualitatively determine the magnitude of change/effect within the surface water and flood risk environment using professional judgement based on the information presented within this ES.

Table 20.2 - Magnitude of change/effect criteria

Magnitude	Descriptor	Examples
High	Results in a major impact of integrity (beneficial or adverse) of feature or loss or gain of part of a feature	Impact capable of causing a change in WFD classification; Impact capable of causing a loss of regionally important public water supply; Impact capable of causing a loss of important fishery; A major change in the likelihood, depth or extent of flooding as a consequence of the development (existing receptors); High probability/risk of flooding potentially affecting construction workers and future residents/users of the area (new receptors); Impact capable of causing extensive changes to local hydrography and flow paths.
Medium	Results in a moderate impact of integrity (beneficial or adverse) of feature or loss or gain of part of a feature.	Impact capable of causing some contribution or reduction of pollution entering feature, but insufficient to change WFD classification; Impact capable of causing a loss in productivity of a fishery; Impact capable of causing some degradation of regionally important public water supply or loss of significant commercial/industrial/agricultural supplies; Significant change in the likelihood, depth or extent of flooding as a consequence of the development (existing receptors); Medium probability/risk of flooding potentially affecting future residents/users of the area (new receptors); Impact capable of causing limited and, localised change in local hydrography and flow paths.
Low	Results in a minor impact of integrity (beneficial or adverse) of feature or loss or gain	Impact capable of causing measurable changes in feature but of limited size or proportion; Measurable but limited in size or magnitude change in the probability, depth or extension of flooding (existing receptors);

Magnitude	Descriptor	Examples
	of part of a feature.	Low risk of flooding potentially affecting future residents/users of the area (new receptors); Impact capable of causing a localised and minor change in local hydrography and flow paths.
Negligible	Results in little or no change and insufficient to affect attribute.	The Proposed Development is unlikely to affect the integrity of the water environment and the impact on flooding is not significant. For example, the quantity is immeasurable or not significant, when compared to the baseline condition; No increase of amount of flow entering controlled systems i.e. no effect when compared to baseline condition; or Negligible risk of pollution; No measurable change in the risk of flooding (existing receptors); Negligible risk of flooding (new receptors); Physical effect to a water resource, but no significant reduction/increase in quality, productivity or biodiversity. No significant effect on the economic value of the feature.

Value/Sensitivity

20.4.3.5. LA 113 Road Drainage and the Water Environment and the TAG Unit A3 Environmental Impact Appraisal – Impacts on the Water Environment refer to the importance/ value of an environmental attributes/ features. Sensitivity and importance/value are strictly linked and for the purposes of this chapter, sensitivity has been used to reflect the rarity, vulnerability and importance/quality of the potential receptor.

20.4.3.6. Sensitivity of the affected receptor is assessed on a scale of 'High', 'Medium' and 'Low'. Receptors that do not have any value within the water environment are considered to have a 'Negligible' sensitivity and are not considered within this assessment as any effects would be not significant.

20.4.3.7. Table 20.3 specifies the general criteria used in qualitatively assessing the sensitivity of surface water and flood risk receptors using professional judgement based on the information presented within this ES.

Table 20.3 – Sensitivity of receptors criteria

Sensitivity	Descriptor	Example Receptors
High	Attribute has a high quality and rarity on regional or national scale.	Watercourse having a WFD classification under the River Basin Management Plan or watercourse considered to significantly contribute to surface water body with 'good' status or 'good potential' status by 2027; Waterbody with a range of hydromorphological features with very little modification; Designated site or species protected under EU or UK habitat legislation, such as Sites of Special Scientific Interest ('SSSI'), Special Areas of Conservation ('SAC'), and Special Protection Areas ('SPA'), hydrologically linked to the Site; Water resource supplying large/regional population, public drinking water supply; Principal aquifer/Source Protection Zone 1 ('SPZ1')/Source Protection Zone 2 ('SPZ2'); Essential infrastructure, highly vulnerable and more vulnerable users (as defined in Table 2 of the Flood Risk technical guidance section of the NPPF), including: • Local residents Existing water supply or wastewater network with no availability/ capacity.
Medium	Attribute has a medium quality and rarity on local scale.	Watercourse not having a WFD classification under the River Basin Management Plan and watercourse with limited contribution to WFD classified surface water body catchment; Waterbody containing limited hydromorphological diversity and/or identified as 'heavily modified waterbodies' or 'artificial waterbodies'; Locally designated site (Local Nature Reserve) considered to be directly supporting or maintaining water conditions hydrologically linked to the Site; Water resource supplying private water abstraction to a small population or industry;

Sensitivity	Descriptor	Example Receptors
		Secondary or perched aquifer/Source Protection Zone 3 ('SPZ3'); Less vulnerable users (as defined in Table 2 of the Flood Risk technical guidance section of the NPPF), including: • Construction workers • Operational Staff Existing water supply or wastewater network with limited availability/ capacity.
Low	Attribute has a low quality and rarity on local scale.	Watercourse not having a WFD classification under the River Basin Management Plan and watercourse with negligible contribution to WFD classified surface water body catchment; Surface water sewer, minor pond, ditch or overland flow route; Waterbodies not considered to contribute or maintain water conditions in any wetland sites; No existing water resource supply; Unproductive strata; Water compatible infrastructure; Existing water supply or wastewater network with availability/ capacity.

20.4.3.8. The TAG Unit A3 and LA 113 Road Drainage and the Water Environment guidance includes a 'Very High' classification for the value/importance of receptors. For the purposes of this assessment, receptors assessed with 'Very High' value/importance in accordance with TAG Unit A3 and LA 113 Road Drainage and the Water Environment guidance will be assessed as having a 'High' sensitivity.

20.4.3.9. Sensitivity of people to flooding has been assessed taking into account their intrinsic vulnerability based on several factors such as expected awareness, in-place practices, operation times. For example, residents are generally considered more vulnerable than commercial users, as the former sleep within their premises, although in some cases their vulnerability might be reduced by specific factors (e.g. people sleeping at or above the first floor and are therefore less vulnerable to flooding). Construction workers normally have a lower vulnerability than residents due to their

increased awareness of health and safety through specific training for working near water.

Significance

20.4.3.10. The overall significance will be assessed using the matrix shown in Table 20.4. Effects deemed to be significant for the purpose of assessment are those which are described as 'Major' and 'Moderate/Major'. In addition, 'Moderate' impacts can also be deemed as significant. Whether they do so shall be determined by a qualitative analysis of the specific impact to the environment and will be based on professional judgement. If/where this is the case, the basis for any judgement will be outlined.

Table 20.4 - Matrix for classifying the significance of effects

		Sensitivity of receptor/receiving environment to change		
		High	**Medium**	**Low**
Magnitude of Change	**High**	Major	Major to Moderate	Moderate
	Medium	Major to Moderate	Moderate	Minor to Moderate
	Low	Moderate	Minor to Moderate	Minor
	Negligible	Negligible	Negligible	Negligible

20.4.3.11. The following terms have been used to define the significance of the effects identified:

- **Major effect:** where the Proposed Development could be expected to have a considerable effect (either beneficial or adverse significant effect) on flood risk, drainage and water resources quality or water resources quantity in the area;
- **Moderate effect:** where the Proposed Development could be expected to have a noticeable effect (either beneficial or adverse potentially significant effect) on flood risk, drainage and water resources quality or quantity in the area;
- **Minor effect:** where the Proposed Development could be expected to result in a small, barely noticeable effect (either beneficial or adverse, however the effect is not significant) on flood risk, drainage and water resources quality or quantity in the area; or
- **Negligible:** where no discernible effect is expected as a result of the Proposed Development on drainage or water resources in the area. (i.e. the effect is not significant).

20.4.4. ASSUMPTIONS AND LIMITATIONS

20.4.4.1. This chapter has assessed the Proposed Development with embedded mitigation considered prior to the implementation of the proposed environmental control measures and mitigation measures.

20.4.4.2. With specific consideration of the surface waters and flood risk environment it is assumed that the measures detailed within the Surface Water Drainage and Aquifer Contamination Mitigation Strategy (Appendix 3.6), in relation to the management of surface water, principles have been developed in accordance with relevant guidance and are supported by the regulating authorities and that these measures will be further developed during detailed design by the Appointed Contractor.

20.4.4.3. It is assumed that the mitigation measures listed as part of the Onshore Outline CEMP, considered as additional mitigation, are correctly implemented and best practice is adopted at all times.

20.4.4.4. Identification of surface water features such as Main Rivers, Ordinary Watercourses and other surface water features is based on Ordnance Survey mapping, EA mapping, consultation with statutory and non-statutory authorities and organisations and a site walkover.

20.4.4.5. Any buried or sub-surface surface water features that have not been identified cannot be assessed, however it is expected that if any such water body is identified during construction appropriate appraisal of the environmental impacts will be made in-line with the principles already detailed and proposed as part of the Onshore Outline CEMP.

20.4.4.6. Other minor ditches and dry watercourses, also defined as Ordinary Watercourses, have not been individually identified at this stage; however, it is anticipated that a number of additional Ordinary Watercourse crossings may be required within the Onshore Cable Corridor. Identification of any other Ordinary Watercourse crossings will be further investigated post-application as part of the detailed design undertaken by the appointed contractor once the specific cable route is confirmed within the Onshore Cable Corridor.

20.4.4.7. It is assumed that all the principal existing land uses adjoining the Proposed Development will remain, other than those detailed within Chapter 29 (Cumulative Effects).

20.4.4.8. In relation to water supply and wastewater drainage networks only public water supplies, highway surface water drainage, public surface water drainage and public combined/ foul water drainage networks have been considered as any private networks are not expected to be impacted upon.

20.4.4.9. Onshore surface water resources and flood risk are closely linked with a number of other environmental assessments being undertaken as part of this ES. It should be noted that potential impacts on these topic areas are not included within this chapter and can be found in other chapters as outlined in 20.1.1.6.

20.5. BASELINE ENVIRONMENT

20.5.1. DESIGNATED SITES

20.5.1.1. Designated sites that have a hydrological linkage to the Proposed Development and which therefore have a High sensitivity are summarised in Table 20.5.

Table 20.5 – Summary of Designated Sites

Designation	Name	Location and Linkage to Site (where relevant)
Converter Station Area (Section 1 of Order Limits)		
No relevant designated sites in Section 1		
Onshore Cable Corridor (Section 2 to 9 of Order Limits)		
SSSI, SPA Ramsar site	Langstone Harbour	Section 7 and adjacent to Section 8 - Hydrological linkage from Section 7 where it crosses Broom Channel which forms part of Langstone Harbour
SAC	Solent Maritime	Section 7 and adjacent to Section 8 - Hydrological linkage from Section 7 where it crosses Broom Channel which forms part of Solent Maritime
SPA, Ramsar site	Chichester Harbour	Section 7 and adjacent to Section 8 - Hydrological linkage from Section 7 where it crosses Broom Channel which forms part of Chichester Harbour
Landfall (Eastney) (Section 10 of Order Limits)		
SSSI, SPA, Ramsar site	Langstone Harbour	Approximately 200 m north east of Section 10 - Hydrological linkage from Section 7 where it crosses Broom Channel which forms part of Langstone Harbour
SAC	Solent Maritime	Approximately 200 m north east of Section 10 - Hydrological linkage from Section 7 where it crosses Broom Channel which forms part of Solent Maritime
SPA, Ramsar site	Chichester Harbour	Approximately 200 m north east of Section 10 - Hydrological linkage from Section 7 where it crosses Broom Channel which forms part of Chichester Harbour

20.5.2. SITE TOPOGRAPHY

20.5.2.1. A summary of the topography within each section of the Oder Limits is provided within Table 20.6 which is based on OpenSource Gov.uk LiDAR data which has been reproduced on Figure 20.2.

20.5.2.2. A high-level review of the competency of the LiDAR was undertaken as part of the detailed site visit.

20.5.2.3. Key terrain features discussed include:

- Hills: areas of high ground, from hilltop ground slopes down in all directions;
- Ridges: a line of high ground with height variations along its crest;
- Valleys: reasonably level ground bordered on the sides by higher ground (contours often U shaped);
- Draws: similar to a valley, except that it normally is less developed (contours often V shaped); and
- Spurs: a usually short, continuously sloping line of higher ground, normally jutting out from the side of a ridge.

Table 20.6 – Summary of Site Topography

Section of Order Limits	Overview	Typical Elevations
1	Section 1 is the most northern section of the Order Limits and located 400 m south of a ridge/ spur of the South Downs. Two minor draws fall towards the south and converge at the southern end of section.	North approximately 100 m above Ordnance Datum Newlyn (AODN) dropping to 60 m AODN at the south, 40 m elevation drop over 1 km (1 in 25 = 4%).
2	The draw develops into valley and continues dropping south throughout section.	North approximately 60 m AODN dropping to approximately 40 m AODN at the south, 20 m elevation drop over 1.2 km (1 in 60 = 1.6%).
3	Below the South Downs a more defined valley forms from north to south with a number of draws heading towards the valley.	North approximately 41 m AODN dropping to 37 m AODN at the south, 4 m elevation drop over 0.75 km (1 in 187.5 = 0.5%).
4	From north to south the Order Limits passes across a small ridge (1) at 42 m AODN, followed by two	1) Ridge (1 in 40 = 2.5%) 2) Hill (1 in 60 = 1.6%)

Section of Order Limits	Overview	Typical Elevations
	shallow valleys at 37 m and 36 m AODN respectively, the route then passes over a hill (2) at 61 m AODN followed by a valley at 38m AODN. The study area then follows a spur up a hill/ ridge (3) of Port Downs at a high of approximately 90m AODN.	3) Hill/ ridge (1 in 200 = 5%)
5	The Order Limits then follows the hill down towards the coast.	North approximately 90 m AODN dropping to 4 m AODN at the south, 86 m drop over 2 km (1 in 23.3 = 4.3%)
6	Section 6 of the Order Limits is typically low lying with minor level variations.	Levels range between 1 m and 9 m AODN
7	Section 7 of the Order Limits is typically low lying with minor level variations.	Levels range between 0 m and 10 m AODN
8	Section 8 of the Order Limits is typically low lying with minor level variations.	Levels range between 0 m and 6 m AODN
9	Section 9 of the Order Limits is typically low lying with minor level variations.	Levels range between 2 m and 6 m AODN
10	Section 10 of the Order Limits is typically low lying with minor level variations.	Levels range between 3 m and 5 m AODN

20.5.3. GEOLOGY

20.5.3.1. A detailed description of the geology is available in Chapter 18 (Ground Conditions) with a summary hereafter based on a review of BGS mapping.

Section 1 – Lovedean (Converter Station Area)

20.5.3.2. Superficial geology:

- Head Deposits around the Converter Station and Access Road comprising mostly clay, silt, sand and gravel.

20.5.3.3. Bedrock geology:

- Tarrant Chalk Member comprising soft white chalk with relatively widely spaced but large flint seams.

Section 2 to Section 9 – Onshore Cable Corridor

20.5.3.4. Superficial geology:

- Head Deposits composed mostly of clay, silt, sand and gravel;
- River Terrace Deposits (undifferentiated) consisting of sand, silt and clay; and
- Raised Marine Deposits comprising sand and gravel.

20.5.3.5. Bedrock geology:

- Tarrant Chalk Member which is composed of soft white chalk with relatively widely spaced but large flint seams (Section 2 of the Order Limits);
- Lambeth Group comprising clay, silt and sand (Section 3 of the Order Limits);
- London Clay and Wittering Formations both comprising clay, silt and sand (Section 4 of the Order Limits);
- Portsdown Chalk Formation and Whitecliff Sand Member comprising white chalk with marl seams and flint bands (Section 4 of the Order Limits);
- Spetisbury Chalk Member which is composed of firm white chalk with regular large flint seams (Section 4 and Section 5 of the Order Limits);
- Tarrant Chalk Member (Section 4 and Section 5 of the Order Limits);
- Newhaven Chalk Formation comprising soft to medium hard chalk with marl and flint bands (Section 5 of the Order Limits);
- White Chalk Subgroup comprising chalk with flints (Section 5 to Section 7 of the Order Limits), which is composed of the following units:
  - Portsdown Chalk Member;
  - Spetisbury Chalk Member;
  - Tarrant Chalk Member;
  - Newhaven Chalk Formation;
  - Seaford Chalk Formation; and
  - Lewes Nodular Chalk Formation.
- Lambeth Group, London Clay Formation and Bognor Sand Member, the latter is composed of partially cemented fine to medium grained sands (Section 8 of the Order Limits); and

- London Clay Formation (Portsmouth Sand Member) and Wittering Formation (Section 9 of the Order Limits).

Section 10 – Eastney (Landfall)

20.5.3.6. Superficial geology:

- River Terrace Deposits and Tidal Flat Deposits comprising clay, silt, sand and gravel; and
- Storm Beach Deposits comprising gravel and rarely sand.

20.5.3.7. Bedrock geology:

- The Wittering Formation is composed of clay, silt and sand and underlies the superficial deposits in Section 10 of the Order Limits.

20.5.4. SURFACE WATER FEATURES (CATCHMENTS, WATERCOURSES AND WATER QUALITY)

20.5.4.1. The EA's Catchment Data Explorer, which builds upon the data in the river basin management plans provides detail about the water environment, catchment and specific waterbody classifications.

20.5.4.2. Based on the Catchment Data Explorer the study area is located within:

- **River Basin District**: South East;
- **Management Catchments:** East Hampshire and South East Transitional and Coastal; and
- **Operational Catchments:** East Hampshire Rivers, Hampshire East Transitional and Coastal and Solent.

20.5.4.3. Surface water features consider:

- Strategic river basin catchments,
- Water bodies,
- Watercourses and their associated water quality.

Watercourses and Water bodies

20.5.4.4. Within the South East river basin catchment the study area is located in a number of different surface watercourse water body catchments with a number of designated Main Rivers identified.

20.5.4.5. Various Ordinary Watercourses are not specifically designated with a specific water body classification; however, they are direct tributaries to other designated Main Rivers and form part of the associated water body catchment.

20.5.4.6. A summary of the onshore, transitional and coastal WFD water bodies and catchments are illustrated on Figure 20.8 with Table 20.7 providing a summary of any Main Rivers, Ordinary Watercourses and other surface water features (e.g. ponds and lakes) located within the study area and which water body each surface water feature is located within.

20.5.4.7. Main Rivers and Ordinary Watercourses are based on the detailed site visit, Ordnance Survey, EA mapping and consultation with HCC LLFA, PCC LLFA and the EA. Consultation did not identify any additional watercourses to be considered as part of this assessment. Detail of the Main Rivers and Ordinary Watercourses, including site specific recordings and photos from the site visit, can be found in Appendix 20.3 (Watercourses Summary).

20.5.4.8. Other minor ditches and dry watercourses, also defined as Ordinary Watercourses, have not been individually identified at this stage. It is anticipated that a number of additional Ordinary Watercourse crossings may be required within the Onshore Cable Corridor; however, identification of any further Ordinary Watercourse crossings will be investigated post-application as part of the detailed design undertaken by the appointed contractor once the specific cable route is confirmed within the Onshore Cable Corridor.

20.5.4.9. As illustrated in Figure 20.8 and summarised in Table 20.7 below, Section 4 of the Order Limit passes through the corner of the Hermitage Stream water body catchment however does not cross any watercourses. The Onshore Cable Corridor crosses the bottom corner of the Hermitage Stream water body catchment for a distance of approximately 150 m and is typically located within the carriageway. Linkages or pathways into the Hermitage Stream water body catchment and impacts upon the Hermitage Stream from the Order Limits are not expected due to the urbanised nature of the Order Limits within the catchment and therefore impacts on the Hermitage Stream water body catchment are not considered further.

Table 20.7 – Summary of Watercourses and Waterbodies within and adjacent to the Study Area

Section	Catchment Watercourses that pass-through Onshore Cable Corridor (designation)	WFD Water body
1 & 2	No watercourses	Potwell Trib
3	Kings Pond (Pond) [WC.01]	Potwell Trib
	Soake Farm – North (Main River) [WC.01]	Potwell Trib
	Soake Farm – East (Main River) [WC.02]	Potwell Trib
4	Unnamed watercourse (Ordinary Watercourse) [WC.03]	Potwell Trib
	Old Park Farm (Main River) [WC.04]	Potwell Trib
	Unnamed watercourse (Ordinary Watercourse) [WC.05]	Potwell Trib
	Unnamed watercourse (Ordinary Watercourse) [WC.06]	Potwell Trib
	No watercourse	Hermitage Stream (see 20.5.4.9)
	Unnamed watercourse (Ordinary Watercourse) [WC.07]	Potwell Trib
	Unnamed watercourse (Ordinary Watercourse) [WC.08]	Potwell Trib
	North Purbrook Heath – North (Main River) [WC.09]	Potwell Trib
	North Purbrook Heath – South (Main River) [WC.10]	Potwell Trib
5 & 6	No watercourses	Not with water body, discharges to Langstone Harbour
7	Farlington Marshes Gutter (Ordinary Watercourse) [WC.11]	Not with water body, discharges to Langstone Harbour
	Farlington Marshes Gutter (Main River [WC.12]	Not with water body, discharges

Section	Catchment Watercourses that pass-through Onshore Cable Corridor (designation)	WFD Water body
		to Langstone Harbour
	Ports Creek/Broom Channel (Coastal Estuary) [WC.13]	Langstone Harbour
8	Great Salterns Drain (Main River) [WC.14]	Not with water body, discharges to Langstone Harbour
	Milton Common Ponds (three ponds)	Not with water body, considered as offline ponds
9 & 10	Langstone Harbour	Langstone Harbour

20.5.4.10. Where watercourses are not located within a WFD Catchment based on the EA 'Catchment Data Explorer – Water Body Classification' professional judgement has been used to assess what water body and catchment it would contribute to. In the case of Farlington Marshes Gutter, Great Salterns Drain, and surrounding surface water features, it is understood that these discharge downstream into the Langstone Harbour based on the natural topography.

20.5.4.11. The hydromorphological designation, which considers if a water body is artificial or heavily modified by human activity, considers both the Potwell Trib and Langstone Harbour to be heavily modified.

20.5.4.12. The downstream surface water catchments include:

- Potwell Trib (River) > Wallington below Southwick (River) > Portsmouth Harbour (Transitional Water) > Solent (Coastal Water)
- Langstone Harbour (Transitional Water) > Solent (Coastal Water)

Surface Water Quality

20.5.4.13. The EA 'Catchment Data Explorer – Water Body Classification' classifies water bodies for each catchment based on their ecological and chemical status expressed in terms of five classes (high, good, moderate, poor or bad).

20.5.4.14. An ecological status is based on biological parameters and physicochemical parameters supporting the biology of the water body where 'High' represents largely

undisturbed conditions. Other classes show increasing deviation from undisturbed conditions towards a 'Bad' status.

20.5.4.15. The chemical status is intended to check compliance with certain European Directives regarding defined chemical content within a watercourse. The status grading follows the same approach as ecological status, from 'High' to 'Bad', where 'Bad' represents the worst possible conditions.

20.5.4.16. The Potwell Trib WFD Catchment has been assigned a Chemical Status (2016) of 'Good', an Ecological Status (2016) of 'Moderate' and an Overall Status (2016) of 'Moderate'.

20.5.4.17. The Langstone Harbour WFD Catchment has been assigned a Chemical Status (2016) of 'Good', an Ecological Status (2016) of 'Moderate' and an Overall Status (2016) of 'Moderate'.

Water Framework Directive

20.5.4.18. In relation to the surface waters Appendix 20.2 (Onshore WFDa) identified that the Proposed Development has the potential to impact upon the following water bodies:

- Potwell Trib (GB107042016400);
- Langstone Harbour (GB580705130000);

20.5.4.19. The surface water bodies (Potwell Trib and Langstone Harbour water bodies) are designated as highly modified water bodies. All other surface water bodies have been scoped out due to due to distance from works and assessed lack of impact, as agreed with the EA through consultation.

20.5.4.20. Impacts from construction on biological quality elements include modifications to sediment regimes from construction works. Overall these impacts are considered to pose minimal threat to the integrity of the biological quality elements at a water body scale with only localised impacts anticipated. The general low quality of the watercourses could aid in buffering the effects of localised impacts from works during construction so that there would be no deterioration in status/potential on the WFD designated water bodies. The majority of these impacts would be likely to be mitigated for by following best practices.

20.5.4.21. Physico-chemical quality elements could potentially be affected during the Construction Stage. Pumping of trenches and Horizontal Directional Drilling ('HDD') pits could result in increased flow to surrounding watercourses if not managed correctly. This could then affect the hydrological discharges and dilution, whilst the works could also release contaminants or sediment into the watercourse. It is anticipated that these impacts would be mitigated for through the discharge consent process and by following best practices during the detailed design and construction.

20.5.4.22. No hydromorphological quality impacts have been identified during the Construction Stage.

20.5.4.23. There are no proposed structures, discharges, diversions, realignments or on-going maintenance that would impact on surrounding WFD surface water bodies of the South East River Basin District during the Operational Stage.

20.5.5. FLOOD DEFENCES

20.5.5.1. A high-level summary of all known flood defences associated to the watercourses within the Order Limits are presented in Table 20.8 and illustrated in Figure 20.4, which is based on the following information/ data sets:

- EA Product 4 data and gov.uk spatial data 'spatial flood defences (including standardised attributes)' – which provides a summary of known fluvial and tidal main river flood defences; and
- Correspondence with ESCP, HCC LLFA, PCC LLFA and the EA.

Table 20.8 – Summary of known Flood Defences within/adjacent to the Site

Watercourse	Defence Type
Soake Farm (North)	High ground/embankment
Soake Farm (East)	High ground/embankment
Old Park Farm	High ground/embankment
River Wallington (South)	High ground/embankment
North Purbrook Heath (North)	Culvert
North Purbrook Heath (South)	High ground
Farlington Marshes Gutter	High ground
Great Salterns Drain	High ground
Langstone Harbour (Coastal Defences)	Embankment/Revetment/Wall/Sheet Piled Wall

20.5.5.2. High ground is a term used to define a natural earth bank adjacent to the watercourse.

20.5.5.3. Based on correspondence with ESCP it is understood that a programme of improvement works to the coastal/tidal flood defences within Portsea Island is currently being undertaken.

20.5.5.4. A number of these flood defence schemes have been completed, however there are a number of proposed flood defence schemes still to be implemented which are considered within the Proposed Development.

20.5.6. LICENCED SURFACE WATER ABSTRACTIONS AND DISCHARGES

20.5.6.1. Based on EA consultation it is understood that there are two licenced surface water abstractions in the near vicinity of the Order Limits, including:

- **Licence No.:** 28/032 (approximately 400m west of the Onshore Cable Corridor - Section 3)
  - **Purpose:** Industrial, Commercial and Public Services/Golf Courses/Spray Irrigation – Direct,
  - **Source/Point Name:** Southern Region Surface Waters/ River Wallington At Furzely Farm Lake, Denmead (SU66001067).
- **Licence No.:** So/042/0028/002 (approximately 600m east of Onshore Cable Corridor - Section 9)
  - **Purpose:** Agriculture/Aquaculture Fish/Fish Farm/Cress Pond Throughflow,
  - **Source/Point Name:** Southern Region Tidal Waters/Hayling Island Ferry Pontoon (SU6847200125).

20.5.6.2. EA data has also identified a number of licenced surface water discharges located in the near vicinity of Section 1 which have a range of discharge types including:

- Agriculture;
- Domestic property;
- Making of machinery/Engine/Pump;
- Miscellaneous;
- Pumping station/sewerage network;
- Sewage – non-water company;
- Sewage – water company;
- Sport, amusement and recreation;
- Storm tank/ combined sewer overflow on sewerage Network;
- Treated foul effluent; and
- Unidentified.

20.5.7. WATER SUPPLY AND WASTEWATER DRAINAGE NETWORKS

20.5.7.1. Throughout the Order Limits there are a number of water supply and wastewater drainage networks anticipated to cross through the Onshore Cable Corridor. For the purpose of the assessment relevant to this chapter, no site-specific water supply and wastewater drainage network details are discussed within this Chapter.

20.5.7.2. However, a high-level overview for both water supply and wastewater drainage networks is provided hereafter.

Water Supply Networks

20.5.7.3. Within the Order Limits, PW supply the public water supply managed under PW's WRMP, which is formed of a single Water Resources Zone.

20.5.7.4. The last WRMP was prepared in 2014 with a draft WRMP available from 2018 with which following consultation a further draft has been released in 2019. A review of water resources is undertaken annually. The WRMP summary states that:

"*by 2045 [we] Portsmouth Water expect to supply a similar amount of water but to more people – 833,000 people in 374,000 homes and businesses. Portsmouth Water will be able to do this because Portsmouth Water will have reduced the amount of water lost to leaks and users will be more efficient with water in homes and businesses".*

20.5.7.5. Within the Converter Station Area a water supply network is located in Broadway Lane and currently supplies the Lovedean Substation located close to the Onshore Cable Corridor - Section 1.

20.5.7.6. PW water supply assets are present throughout the rest of the Onshore Cable Corridor, however specific detail is not discussed as specific connection locations are not currently identified and any temporary connection locations are subject to identification, if required post-application by the appointed contractor.

Wastewater Networks

20.5.7.7. Within the study area Southern Water supply the public wastewater/ sewage (surface water and foul water), with HCC and PCC managing the highway drainage in their role as highways authorities in each respective authority area.

20.5.7.8. Adjacent to the Converter Station Area the closest public sewers are located within Lovedean Lane approximately 1 km east of Onshore Cable Corridor Section 1 of the Site.

20.5.7.9. There are a number of wastewater/sewage networks (surface water and foul water) that pass through the Order Limits, however as there are no connections proposed to the wastewater/sewage (foul water) network as part of the Proposed Development no details of the site-specific wastewater/sewage network (foul water) is provided.

20.5.7.10. Furthermore, no further details of site specific wastewater sewage (surface water) networks have not been detailed hereafter as any impacts to the surface water and flood risk environment only been qualitatively assessed.

20.5.8. EXISTING SOURCES OF FLOOD RISK

20.5.8.1. Appendix 20.4 (FRA) should be referred to for full details of the existing and future expected flood risk profile relevant to the Proposed Development.

20.5.8.2. The FRA considers impacts on flood risk in relation to:

- Tidal Flooding;
- Fluvial Flooding;
- Surface Water Flooding;
- Reservoir Flooding;
- Groundwater Flooding; and
- Sewer Flooding.

20.5.8.3. Table 20.9 provides a summary of the probability and risk of flood risk for the assessed sources of flood risk in general terms based on Appendix 20.4 (FRA). The typical risk expected during construction and operation is presented for the key components of the Proposed Development (Converter Station Area, Cables, Joint Bay & Link Pillar/Box, Landfall including Optical Regeneration Station(s) ('ORS'(s))).

20.5.8.4. Isolated locations within the Order Limits that recognise a locally higher probability and risk of flooding, are considered as a 'Hot-spot' flood risk areas for this assessment. Where 'Hot-spot' flood risk areas exist, these are presented in brackets within Table 20.9 and illustrated within Figure 20.1, for example '(High^{x})', further detail of the specific location with a 'high' risk of flooding is presented within Table 20.9 footnotes and illustrated within Figure 20.1.

Table 20.9 – Summary of Flood Risk and 'Hot-spot' Flood Risk Areas

Source of Flooding	Probability and Risk of Flooding			
	Converter Station Area	Cables	Joint Bay & Link Pillar/Box	ORS(s)
Tidal	C – N/A O – N/A (N/A)	C –Low O – N/A (Medium[1])	C –Low O –Low (Medium[1])	C – Low O – Medium[2] (N/A)
Fluvial	C –Low O –Low (N/A)	C –Low O – N/A (High[3])	C –Low O –Low (High[3])	C – N/A O – N/A (N/A)

Source of Flooding	Probability and Risk of Flooding			
	Converter Station Area	**Cables**	**Joint Bay & Link Pillar/Box**	**ORS(s)**
Surface Water	C – Very Low O – Very Low (Low[4])	C – Very Low O – N/A (High[5])	C – Very Low O – Very Low (High[5])	C – Very Low O – Very Low (N/A)
Groundwater	C –Low O –Low (N/A)	C –Low O – N/A (High[6])	C –Low O –Low (High[6])	C –Low O –Low (N/A)
Sewer	Refer to surface water.			
Other/ Reservoir	C – N/A O – N/A (N/A)	C –Low O – N/A (Low[7])	C –Low O – N/A (Low[7])	C – N/A O – N/A (N/A)

Footnotes:

C = Construction Stage, **O** = Operational Stage,

(text[no.]) = Isolated increased risk of flooding with isolated hot spot flood risk locations detailed in the footnotes and Figure 20.1

1. Tidal flood risk within Section 7 to 10 of Order Limits – tidal flood risk during construction associated to the risk of extreme event tidal/ wave overtopping or tidal exceedance of historic flood defences where new flood defence schemes have not been completed (medium)

2. Tidal flood risk Section 10 of Order Limits – tidal flood risk during operation risk to the ORS (medium)

3. Fluvial flood risk during construction of cable route and potential during operation if Link Pillars are located in these specific areas:

    a. Section 2 of Order Limits – Soake Farm North & Soake Farm East (Medium to High)

    b. Section 4 of Order Limits - Old Park Farm (Medium)

    c. Section 4 of Order Limits - River Wallington (Low)

    d. Section 4 of Order Limits - North Purbrook Heath (Low)

Source of Flooding	Probability and Risk of Flooding			
	Converter Station Area	Cables	Joint Bay & Link Pillar/Box	ORS(s)

4. Surface Water flood risk within Section 1 of Order Limits – during construction and operation – Surface Water flood risk from extreme event winterbourne/ dry watercourse (low)

5. Surface Water flood risk during construction of cable route and potential during operation if Link Pillars are located in these specific areas

   a. Section 2 of Order Limits – Anmore Road (medium to high);

   b. Section 3 of Order Limits – Soake Farm Watercourses (low/ medium);

   c. Section 3 of Order Limits – Hambledon Road/ Soake Road Junction (medium/high);

   d. Section 4 of Order Limits – Hambledon Road, north of Waterlooville (medium/high);

   e. Section 4 of Order Limits – Hambledon Road, north of Wellington Retail Park (medium/high);

   f. Section 4 of Order Limits – London Road/Ladybridge Road Junction (medium/high);

   g. Section 4 of Order Limits – London Road/ Portsdown Hill Road Junction (low);

   h. Section 6 of Order Limits – Eastern Road (medium);

   i. Section 7 of Order Limits – Eastern Road/Anchorage Road Junction (medium);

   j. Section 7 of Order Limits – Milton Common/Tamworth Park (medium); and

   k. Section 9/10 of Order Limits – Bransbury Road/Henderson Road/ Fort Cumberland Road (low to high).

6. Groundwater flood risk during construction which is exacerbated in winter as groundwater levels are expected to be at shallower depths:

   a. Section 2 to Section 10 is susceptible to groundwater flood risk during construction below ground level – (low)

   b. Section 2 – Kings Pond (medium to high)

   c. Section 6 – shallow groundwater recorded (medium to high)

   d. Section 7 to 10 – coastal Environment due to groundwater linkage to sea levels (medium to high)

7. Reservoir flood risk during construction for cable route and potential during operation if Link Pillars are located in these specific areas:

Source of Flooding	Probability and Risk of Flooding			
	Converter Station Area	Cables	Joint Bay & Link Pillar/Box	ORS(s)
a. Section 4 – maximum flood extent from Purbrook Regulating Reservoir b. Section 5 and 6 – maximum flood extent from Farlington No 9				

20.5.8.5. Based on Appendix 20.4 (FRA) and Table 20.9 the key 'hot spot' areas at risk of flooding include:

- Tidal flooding adjacent to Langstone Harbour;
- Fluvial flooding adjacent to inland rivers;
- Tide locking of urban drainage catchments adjacent to Langstone Harbour (Great Salterns Drain);
- Extreme event surface water overland flow routes and areas of ponding; and
- Groundwater flooding in areas of elevated groundwater.

20.5.9. FUTURE BASELINE

WFD Water Bodies

20.5.9.1. It is considered that the future baseline conditions in relation to WFD water bodies would remain relatively unchanged over the short/medium term provided that any existing surface water features and associated assets are maintained.

20.5.9.2. Any significant improvements or deteriorations or changes in the long term would need to be re-assessed at that time in the future.

Water Supply and Wastewater Drainage Networks

20.5.9.3. It is considered that the future baseline conditions in relation to water supply and wastewater would remain relatively unchanged over the short/medium term provided that there the existing networks are maintained and any required network upgrade works are undertaken by PW and or Southern Water as appropriate.

Flood Risk

20.5.9.4. It is considered that the future baseline conditions in relation to surface water and flood risk environment would remain relatively unchanged over the short/medium term provided that any existing surface water features and associated assets are maintained.

20.5.9.5. However, in the long-term the future baseline would be affected as a consequence of climate change as the intensity of precipitation is expected to increase and sea level rise is expected to continue at an increasing rate based on the latest EA guidance on climate change.

20.5.9.6. The impacts of climate change could have an impact on flood risk environment and associated receptors.

20.6. SUMMARY OF IDENTIFIED SENSITIVE RECEPTORS

20.6.1.1. Based on the review of baseline conditions and Proposed Development, the sensitive Receptors within Table 20.10 have been identified.

20.6.1.2. Where sensitive Receptors and their sensitivity are common throughout the Proposed Development or common to multiple locations they have been grouped within this assessment.

20.6.1.3. Where Receptors have a variance in their sensitivity, professional judgement has been used to consider a worst-case scenario or sub-divided the Receptors where grouping of the Receptor would result in a dis-proportional assessment being undertaken.

Table 20.10 – Summary of Receptors

Receptors	Sensitivity	Description
Surface water receptors with regards to surface water drainage patterns; Main Rivers, Ordinary Watercourses and overland surface water drainage routes		
Surface Water Drainage Patterns	**Medium**	Surface water drainage patterns, including; Main Rivers, Ordinary Watercourses and overland surface water drainage routes, are considered in relation to their value in terms of surface water contribution and physical form within the rural and urban environment. Within the study area surface water drainage patterns contain limited hydromorphological benefit, with Potwell Trib and Langstone Harbour considered as heavily modified WFD water bodies. Within the study area there are no known watercourses that directly contribute or maintain water conditions in any local wetlands or environmental feature driven by surface water, thus providing limited value within the surface water environment.
Water supply and drainage infrastructure receptors		
Public and Highway Sewer Networks (Water quality)	Surface Water Sewers (**Medium**) Foul and Combined Sewers (**Low**)	Surface water sewers are sensitive to potential pollutants due to potential discharge to open surface water features whilst foul and combined sewers are considered to be less sensitive due to their subsequent treatment prior to discharge to onwards surface water features.

Receptors	Sensitivity	Description
Public and Highway Sewer Networks (Water quantity)	**High**	Sensitivity of the public sewer network (Surface Water, Foul & Combined Sewers) is unknown but expected to vary along the length of the Onshore Cable Corridor, however is expected to be highly sensitive in some places.
Public Clean Water Supply Network (Water quantity)	**Medium**	Sensitivity of public water supply network is considered medium as PWs WRMP sets out how they are currently and propose to maintain clean water supply throughout their Water Resources Zone. The sensitivity may locally vary throughout the Order Limits, for example it is expected to be low at the Converter Station Area, based on in principle agreement from PW for a clean water supply connection.
Surface water receptors water quality		
Watercourses (Main Rivers and Ordinary Watercourses)	**High**	The surface water bodies along sections 1 to 6 of the Proposed Development are part of the Potwell Trib WFD water body which is classified as 'moderate' and a 'good potential' by 2027. In sections 7 to 10 Great Salterns Drain and Farlington Marshes Gutter drain into the Langstone Harbour WFD water body which is classified as 'moderate' and a 'good potential' by 2027. The following designated watercourses are present within the Order Limits: 1) Old Park Farm (Potwell Trib), and 2) North Purbrook Heath South (Potwell Trib).

Receptors	Sensitivity	Description
		All other identified Main Rivers and Ordinary Watercourses are not specifically designated, however are considered to directly contribute to the overall Potwell Trib and Langstone Harbour which are heavily modified with a 'good potential' by 2027.
Overland Surface Water Drainage Routes	**Medium**	The surface water bodies along sections 1 to 6 of the Proposed Development are part of the Potwell Tributary WFD water body which is classified as 'moderate' and a 'good potential' by 2027. In sections 7 to 10 Great Salterns Drain and Farlington Marshes Gutter drain into the Langstone Harbour WFD waterbody which is classified as 'moderate' and a 'good potential' by 2027. Overland surface water drainage routes are expected to have a limited contribution to the identified WFD classified surface water body catchments, however remains within hydraulic connection to the water body.
Human receptors affected by changes in, or impact of change in the flood risk profile		
Construction workers	**Medium**	Flooding may impact upon construction workers. Their sensitivity is generally lowered as a result of a level of competence attained through appropriate health and safety training commonly exercised by competent contractors and their presence on site only during working hours.
Local residents and users of	**High**	Residents/users of the surrounding areas might have limited or no awareness of flood risk; sensitivity of residents is generally higher than that of workers due to their presence overnight (sleeping accommodation).

Receptors	Sensitivity	Description
surrounding area		
Operational Staff	**Medium**	Flooding may impact upon future staff, when they attend either the Converter Station, Joint Bay(s), Link Box(es)/ Pillar(s) or the ORS(s) at Landfall. Their sensitivity is lowered as a result of a level of competence attained through appropriate health and safety training commonly exercised by competent contractors and their presence on site only during working hours and infrequency of being on-site.

20.7. PREDICTED IMPACTS

20.7.1.1. The following sections discuss the predicted impacts on receptors, with inclusion of embedded mitigation prior to the implementation of any additional proposed environmental control measures and additional mitigation measures.

20.7.1.2. Where sensitive Receptors and their associated impacts are common throughout the Proposed Development or common to multiple locations they have been grouped within this assessment.

20.7.1.3. The receptors identified above in Table 20.10 are assessment hereafter in the following sections as:

- Impacts on surface water drainage patterns;
- Impacts on water supply and drainage infrastructure receptors (quantity and quality);
- Impacts on surface water features water quality; and
- Impacts on human receptors as a consequence of flood risk.

20.7.2. SURFACE WATER DRAINAGE PATTERNS

Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)

20.7.2.1. Predicted impacts on surface water drainage patterns have collectively considered the Order Limits as one (including: Converter Station Area, the Onshore Cable Corridor and ORS) during: Construction, Operation and Decommissioning Stages individually.

20.7.2.2. Predicted impacts have been considered for the Onshore Components collectively as any potential or predicted changes to any surface water drainage patterns within the Order Limits remain similar throughout as all features are located within either the Potwell Trib or Langstone Harbour WFD catchment based on the River Basin Management Plan. Furthermore, both water bodies have been considered to have a **Medium** sensitivity and neither are known to directly contribute or maintain water conditions in any local wetlands or environmental feature driven by surface water, thus providing limited value within the surface water environment.

Construction Stage

Embedded Mitigation

20.7.2.1. A number of Main River and Ordinary Watercourse crossings are expected, as detailed within section 20.5.4 and Appendix 20.3 (Watercourses Summary). To limit the impact to the surface water environment alongside other environmental and design constraints it is proposed to pass under a number of these open channel

watercourses using HDD or trenchless techniques to pass under the watercourses open channel. HDD/trenchless solutions are proposed at:

- Soake Farm East (Main River) [WC.02] – Kings Pond (HDD) HDD-5;
- Farlington Marshes Gutter (Ordinary Watercourse) [WC.11] – Farlington Railway Crossing (Trenchless) HDD-4; and
- Broom Channel (Transitional/ Tidal Watercourse) [WC.13] – Langstone Harbour (HDD) HDD-3.

20.7.2.2. Thereafter the other Main Rivers and Ordinary Watercourses identified at this stage, as detailed within section 20.5.4 and Appendix 20.3 (Watercourses Summary), are proposed to be crossed within the public highway where the watercourses are confined to a culvert, and works within the Onshore Cable Corridor will not impact on the watercourses drainage patterns. Watercourses which are likely to be crossed within the carriageway include:

- Unnamed (Ordinary Watercourse) [WC.03] – Carriageway Culvert/ Sewer;
- Old Park Farm (Main River) [WC.04] – Carriageway Culvert;
- Unnamed (Ordinary Watercourse) [WC.05] – Carriageway Culvert/ Sewer;
- Unnamed (Ordinary Watercourse) [WC.06] – Carriageway Culvert/ Sewer;
- Unnamed (Ordinary Watercourse) [WC.08] – Carriageway Culvert/ Sewer;
- North Purbrook Heath (North) (Main River) [WC.09] –Carriageway Culvert; and
- Great Salterns Drain (Main River) [WC.14] –Carriageway Culvert.

20.7.2.3. No other embedded mitigation is proposed during the construction stage in relation to the overland surface water drainage patterns.

Impacts

20.7.2.4. Within the Order Limits there are a number of likely Main River and Ordinary Watercourse crossings, as detailed within section 20.5.4 and Appendix 20.3 (Watercourses Summary). The proposed embedded mitigation within these identified watercourses prevents works from interfering with the existing drainage patterns which is expected to result in a negligible impact on these surface water drainage patterns and water environment.

20.7.2.5. As discussed in the baseline assessment, other minor ditches and dry watercourses, also defined as Ordinary Watercourses, have not been individually identified at this stage and are subject to confirmation of the exact cable route during detailed design. These features are typically dry or with limited flow and will generally convey surface water during extreme rainfall events. Without appropriate construction environmental control measures these drainage features/ systems may be impacted with a loss or

diversion in flow. This potential loss of inflow into any given overland surface water drainage feature/ system is expected to provide limited impact upon the local surface water drainage patterns and water environment.

20.7.2.6. Construction activities could have an impact upon overland surface water drainage patterns, by partially blocking or diverting the existing flow paths (e.g. through overpumping). This could result in a change to the natural overland surface water drainage patterns and result in less or more quantity of water being observed in specific locations. This change could subsequently cause accretion or erosion of material and or change in the associated surface water environment within any localised area.

20.7.2.7. For example, earthworks could result in the increased compaction of ground material and restrict the rate of infiltration of rainfall into the soil and underlying superficial deposits, resulting in a localised increase in surface runoff which may result in erosion of the surrounding environment, whilst changing the route of surface water entering the surface water catchment.

20.7.2.8. Within any urban environment of the Order Limits there is typically limited existing natural surface water drainage routes, with the existing landscaping typically heavily modified with surface water drainage patterns managed through engineered overland surface water drainage routes, which have limited value within the water environment.

20.7.2.9. Where natural surface water drainage routes are present, any disturbance would be localised and surface water entering the drainage pattern is likely to enter the same catchment, with the same contribution of surface water either upstream or downstream of its existing entry point. Based on this, any potential change is expected to have a limited impact upon the local surface water drainage patterns and surface water environment.

20.7.2.10. If the quantity of surface water and the flow rate changes, this could cause erosion and accretion of the moveable substrate material, however as these areas do not provide or support any notable water environments these changes are expected to have a limited impact upon the local surface water drainage patterns and water environment.

20.7.2.11. Where overland surface water drainage routes exist in the urban environment across an existing hard standing environment no erosion or accretion is expected and new overland surface water drainage routes may be introduced. In this scenario it is expected that the surface water will still discharge into the same overall surface water drainage catchment (either watercourse or surface water sewer network) and will have a negligible impact on the local surface water drainage patterns and water environment.

20.7.2.12. Without appropriate construction environmental control measures to divert flow routes during open trenching, works may intercept an existing overland surface water drainage route that would typically be captured in a formal drainage open channel or sewer system and subsequently divert its route where it might infiltrate into the ground or discharge into another surface water drainage feature/ system. This potential loss of inflow into an overland surface water drainage feature/ system such as an open channel or sewer system is expected to be localised and minor with limited impact upon the local surface water drainage patterns and water environment.

20.7.2.13. Based on the above and due to the entire Order Limits being located within either the Potwell Tributary water body or Langstone Harbour water body, it is expected that any localised diversion or loss/ increase of surface water, erosion/ accretion of material would have a temporary **Negligible to Low adverse** magnitude of change without any additional mitigation due to the embedded mitigation and limited changes and value surface water drainage patterns and water environment provide within the study areas.

20.7.2.14. The sensitivity of surface water drainage patterns is **Medium**. The magnitude of change is expected to be **Negligible to Low** adverse as there could be some local changes to flow paths however these are not expected to significantly change the surface water drainage patterns and water environment. This results in a **Minor** to **Moderate** adverse temporary effect on surface water drainage patterns and water environment during construction prior to the implementation of additional mitigation measures.

Operational Stage

Embedded Mitigation

20.7.2.15. Appendix 3.6 (Surface Water Drainage and Aquifer Contamination Mitigation Strategy) includes details of the proposed principles for managing surface water during operation at the Converter Station. As part of the strategy it is proposed to incorporate SuDS; potentially including swales, filter drains, detention/infiltration ponds and soakaways to subsequently infiltrate surface water to the ground. These design principles have been agreed through consultation with PW and the EA and are subject to detailed design and subsequent approval.

20.7.2.16. Outline principles proposed to manage surface water at the ORS are detailed within Appendix 20.4 (FRA), which discusses the design principles to be further developed as part of the detailed design to ensure that any overland surface water run-off generated from the ORS is appropriately managed within a surface water drainage system (either infiltration to ground or, if this is not feasible, connection to public sewer at an agreed discharge rate).

20.7.2.17. Thereafter, the majority of all the Proposed Development within the Onshore Cable Corridor and associated permanent infrastructure; namely, cables, joint bays and link

boxes, are proposed to be built underground with reinstatement of any native soils/ surfacing.

20.7.2.18. The only exception to permanent infrastructure being built underground within the Onshore Cable Corridor is the Link Pillar(s) which are proposed on arable land and or highway verges (instead of Link Boxes) and are normally located adjacent to hedgerows subject to detailed design.

Impacts

20.7.2.19. No permanent works are proposed within Main Rivers or Ordinary Watercourses, and therefore there is a negligible impact expected to the local surface water drainage patterns and water environment.

20.7.2.20. Within the proposed Converter Station Area there are no permanent surface water features, e.g. Main River or Ordinary Watercourse that permanently convey surface water and it is reasonable to assume that surface water currently infiltrates into the ground and into the underlying strata and subsequently the underlying aquifer.

20.7.2.21. The increase in impermeable surfaces would impact upon the existing overland surface water drainage pattern within the catchment, however as all surface water generated within the Converter Station Area is captured and managed through an on-site surface water drainage system that subsequently discharges through soakaways to the same groundwater catchment, there is a negligible impact on the local surface water drainage patterns and water environment.

20.7.2.22. At the location of the ORS(s) surface water runoff currently naturally flows across the permeable car park surfacing and infiltrates into the ground. It is currently anticipated that the compound for the ORS(s) would have a maximum size of 18 m x 34 m with the maximum building dimensions of approximately 11 m long x 4 m wide. Depending on the management of surface water (infiltration or, if not feasible, discharge into the surface water sewer, subject to detailed design) a small change in to the overland surface water drainage pattern could be expected however this would have a negligible impact on the catchment and local surface water drainage patterns and water environment.

20.7.2.23. Thereafter within the Onshore Cable Corridor the only evidence of the cable and permanent infrastructure above ground will be Link Box man hole cover(s) set at ground level and/or Link Pillar(s) at certain points along the route, if required. Therefore, during operation, a negligible impact upon the on the surface water drainage routes are expected as the land will continue to drain as existing. The presence of the Link Pillars, which are approximately 1.0 m x 1.0 m x 0.6 m, would result in a negligible impact on the local surface water drainage patterns and water environment.

20.7.2.24. The sensitivity of surface water drainage patterns is **Medium**. The magnitude of change in relation to overland surface water drainage patterns is expected to be

Negligible when taking into consideration the embedded mitigation. Therefore, the significance of the effect to the surface water drainage patterns and water environment during operation is expected to be **Negligible**.

Decommissioning Stage

20.7.2.25. Impacts during decommissioning are anticipated to be similar to those predicted during construction as similar types of activities would be undertaken.

20.7.3. WATER SUPPLY AND DRAINAGE INFRASTRUCTURE – QUANTITY

Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)

20.7.3.1. Predicted impacts to the water supply and drainage infrastructure are collectively considered throughout the Order Limits; including: Converter Station Area, Onshore Cable Corridor, Joint Bays, Link Boxes and/or Link Pillars, Landfall including ORS each during the Construction, Operation and Decommissioning Stages as any predicted impacts remain within the same surface water resources catchment and strategic wastewater catchment.

Construction Stage

Embedded Mitigation

20.7.3.2. During construction as part of the embedded mitigation it is proposed that any temporary requirements for water supply and foul wastewater throughout the Order Limits are likely to be provided through temporary site compounds and construction set up that would not utilise the existing local networks.

20.7.3.3. Notwithstanding the above, an in-principle connection agreement with PW has been obtained for the proposed permanent connection for the Converter Station Area with agreement for temporary use during construction, if required, subject to detailed design and to be determined by the appointed contractor. This in-principal agreement is for a connection point at Broadway Lane, and has been obtained from PW for an assumed demand requirement of 105 'loading units' based on PW's application for water supply calculations, as summarised in Appendix 20.1 (Consultation Responses).

20.7.3.4. Any changes to the assumed demand and construction demand shall be agreed with PW prior to connection, with the contractor responsible to account for any head loss when sizing the supply.

20.7.3.5. If the contractor determined, during detailed design, that it would be appropriate to utilise a local water infrastructure network throughout the Onshore Cable Corridor, the anticipated quantities are likely to be variable throughout the Onshore Cable Corridor depending on its specific use. Furthermore, and proposed temporary connection for either clean water supply, surface water and foul water discharge

would be subject to approval from PW (clean water supply) and Southern Water (wastewater).

Impacts - Public (and Highway) Foul, Surface Water and Combined Sewer Networks

20.7.3.6. The sensitivity of the foul water, surface water and combined sewer networks quantity is considered to be **high** for both public and highway drainage systems, where relevant, as a worst-case scenario.

20.7.3.7. No connections to the public foul sewer network is anticipated for welfare, as this typically would form part of a temporary site compound which is not expected to connect to the public network and would typically be collected in a septic tank which is appropriately disposed of off-site. However, if a connection was required the volumes required for welfare would be expected to be limited and would have a **negligible** to **low** adverse magnitude of change on the foul sewer network capacity.

20.7.3.8. Construction activities throughout the Order Limits may require surface water overland flows to be diverted and over pumped. Furthermore, groundwater emergence during excavation works may require groundwater dewatering away from the construction activities.

20.7.3.9. Both of these activities could introduce or result in an increase in surface water/ groundwater discharged into a drainage network without any additional mitigation in place. The quantity of surface water/ groundwater that could be discharged into the drainage networks is likely to vary throughout the Order Limits depending on the site-specific conditions (overland flow paths, groundwater levels); however, in a worst-case scenario could be expected to cause a **high** adverse magnitude of change on the surface water and combined sewer networks.

20.7.3.10. This would result in a **Major adverse** temporary effect on surface water and combined sewer network infrastructure during construction prior to the implementation of additional measures. It should however be noted that consent is required for temporary dewatering and construction works to that would impact overland flow paths (Ordinary Watercourses) which is considered as part of the additional mitigation measures.

Impacts - Public Clean Water Supply Network

20.7.3.11. The sensitivity of the clean water supply network is collectively assessed to be **Medium**, however the sensitivity is expected to be **low** at the Converter Station Area based on the in-principle agreement from PW obtained for connection. Any clean water supply demand required during construction (construction activities and welfare) is expected to be supplied from off-site; however, if any supply was required it is reasonable that the water demand requirements would be localised and limited in time which is expected to give a **Low** adverse magnitude of change. Furthermore,

if a connection was required for construction activities it could only be obtained if approved by PW, and PW are likely to only allow connection if the sensitivity in the area of connection was **low** or the magnitude of change was **negligible** to ensure the surrounding network is not negatively impacted upon.

20.7.3.12. This would result in either:

1. **medium** sensitivity coupled with a **negligible** magnitude of change; or
2. **low** sensitivity coupled with a **low** magnitude of change.

20.7.3.13. In either scenario this would result in a temporary **Negligible to Minor Adverse** temporary effect on public clean water supply infrastructure during construction.

Operational Stage

Embedded Mitigation

20.7.3.14. During operation the Proposed Development has no permanent foul water sewer or combined sewer connections proposed.

20.7.3.15. The only requirement for the management of foul water is within the Converter Station Area which is proposed to be managed through an on-site package treatment plant, for further details refer to Appendix 3.6 (Surface Water Drainage and Aquifer Contamination Mitigation Strategy), which will be routinely emptied and removed off-site in accordance with appropriate operation and management requirements, and thus scoped out. Furthermore, no permanent connections are proposed to any public combined sewers or highway surface water sewers which are also scoped out of this assessment.

20.7.3.16. The only element of the Proposed Development that requires permanent clean water supply is the Converter Station Area. An in principal agreement for a connection point at Broadway Lane has been obtained from PW for an assumed demand requirement of 105 'loading units' based on PW's application for water supply calculations, as summarised in Appendix 20.1 (Consultation Responses). Any changes to the assumed demand shall be agreed with PW prior to connection, with the contractor responsible to account for any head loss when sizing the supply.

20.7.3.17. At the Converter Station Area during operation, as part of the Proposed Development, it is proposed to manage surface water through a soakaway/infiltration with no connection to a sewer network, for further details refer to Appendix 3.6 (Surface Water Drainage and Aquifer Contamination Mitigation Strategy).

20.7.3.18. The only potential permanent connection to the surface water sewer network is associated to the ORS to manage surface water generated across the buildings footprint.

20.7.3.19. As detailed within Appendix 20.4 (FRA) it is proposed to manage surface water at the ORS through a soakaway, however if this was not practicable due to insufficient infiltration rates, due to be investigated as part of the detailed design, surface water

would be attenuated on-site and discharged into an adjacent Public Southern Water sewer at a restricted discharge rate, (targeting greenfield runoff rates where practicable) subject to detailed design and approval from Southern Water and PCC's LLFA.

Impacts – Public Surface Water Sewer Network

20.7.3.20. The sensitivity of the surface water and combined sewer network is **High**.

20.7.3.21. If connection is required to the surface water sewer for the ORS, surface water attenuation as part of the Proposed Development will ensure that the surface water discharge rate is restricted to a rate agreeable with PCC's LLFA and Southern Water.

20.7.3.22. Based on the limited catchment area likely to contribute to the sewer network which will be discharged at a restricted discharge rate, there is a limited increase in peak and volumetric runoff expected. Due to the minor scale of the proposed surface water drainage catchment of 88m² in total a **Negligible** magnitude of change to the surface water sewer network is expected as the overall catchment is expected to be notably larger. This would result in a **Negligible** effect on public surface water sewer network infrastructure during operation prior to the implementation of mitigation measures.

Public Water Supply Network

20.7.3.23. The Proposed Development will require a permanent water supply connection only for the Converter Station Area.

20.7.3.24. The sensitivity at the Converter Station Area is considered to be **Low** due to the in-principle agreement for connection obtained with PW which did not raise any concern of demand issues. The demand requirement, as agreed through the PW application is very limited and is expected to be a **Negligible** magnitude of change to the water supply network.

20.7.3.25. This would result in a **Negligible** effect on public water supply network during operation prior to the implementation of mitigation measures.

Decommissioning Stage

20.7.3.26. Impacts during decommissioning are anticipated to be similar to those predicted impacts during construction as similar types of construction practices and activities are likely to be undertaken.

20.7.4. SURFACE WATER FEATURES WATER QUALITY

Converter Station Area (Section 1)

Construction Stage

Embedded Mitigation

20.7.4.1. No embedded mitigation is proposed at the Converter Station Area during the construction stage, however it should be noted there are no existing surface water

drainage watercourses or surface water sewer infrastructure within the Converter Station Area.

Impacts - Surface watercourses

20.7.4.2. Within the Converter Station Area there are no existing surface watercourses, therefore there cannot be any direct impact upon any waterbodies at the Converter Station Area through watercourses.

20.7.4.3. No further assessment is considered to be required.

Impacts – Discharge into surface waterbodies via surface water drainage patterns

20.7.4.4. The Potwell Trib. is considered to have a **High** sensitivity as it has a WFD classification and is classified as having a 'good potential' by 2027.

20.7.4.5. Construction activities through have the potential to introduce pollutants into water bodies. Pollutants could be expected from poorly maintained or improper use of plant equipment, in the form of oil, glycol, fuel. Other potential pollutants to surface water could occur from a spill incident or improper storage and direct rainfall onto construction materials including stored chemicals, oils, fuel, cement, concrete and general waste generated from construction activities.

20.7.4.6. Other more common pollutants are also typically generated from construction activities including creation of suspended solids within surface water.

20.7.4.7. Any polluting material that could be subject to direct rainfall or generated within an existing surface water drainage pattern has the potential to enter the wider surface water body.

20.7.4.8. Increased suspended sediments can result in increased turbidity levels which affect the aquatic ecology, particularly fish stocks, by reducing light and oxygen levels in the water. Sediment deposition can further affect water bodies by potentially smothering plant life, invertebrates and spawning grounds.

20.7.4.9. Due to the limited surface water drainage patterns currently present within the Converter Station Area the potential measurable changes in water quality is expected to be of limited size or proportion due to the limited pathways to the wider water body and a **Low** adverse magnitude of change is expected to the Potwell Trib surface water body via surface water drainage patterns within the Converter Station Area prior to additional mitigation measures.

20.7.4.10. This would result in a **Moderate** adverse temporary effect on the surface waterbody receptors when taking into consideration the embedded mitigation measures and prior to consideration of post mitigation.

Impacts - Public Surface Water and Combined Wastewater Networks

20.7.4.11. Within the Converter Station Area there are no existing wastewater networks, therefore there can be no direct impact upon the wastewater network.

20.7.4.12. No further assessment is considered to be required.

Operational Stage

Embedded Mitigation

20.7.4.13. Appendix 3.6 (Surface Water Drainage and Aquifer Contamination Mitigation Strategy) includes details of the proposed principles for managing surface water during operation at the Converter Station. As part of the strategy it is proposed to incorporate SuDS including, swales, infiltration drains, detention ponds and soakaways prior to discharging surface water to ground.

20.7.4.14. The strategy includes specific details of the proposed water quality treatment measures prior to the discharge into the settlement pond and subsequent proposed infiltration to ground. These measures have been agreed in principle with PW and the EA, subject to further detailed design and approval, and include:

- Oily water treatment train; and
- Access Road – filter strip.

Impacts - Surface Watercourses

20.7.4.15. Within the Converter Station Area there are no existing surface waterbodies, therefore there can be no direct impact upon a waterbody at the Converter Station Area.

Impacts – Discharge into surface water bodies via surface water drainage patterns

20.7.4.16. Surface water at the Converter Station Area is proposed to manage through an on-site surface water drainage strategy, which forms part of Appendix 3.6 (Surface Water Drainage and Aquifer Contamination Mitigation Strategy). Based on this strategy all surface water generated on-site within impermeable areas will pass through on-site surface water treatment measures, and subsequently discharge via a soakaway to ground. Therefore, there will be a **Negligible** magnitude of change to the surface water body catchment.

20.7.4.17. The extreme event overland flow route, also known as a winterborne/ dry watercourse is expected to pass across the access road. Generally, the access road will locally manage pollutants through a filter strip prior to discharge through a soakaway to ground. During operation the access road is unlikely to have frequent traffic and the risk of pollutants arising on the access road is low to negligible. Any overland flow from the winterborne/ dry watercourse is expected to have a limited opportunity to pick up pollutants from the access road is therefore expected to result in a **Negligible** magnitude of change on the surface water quality to the expected surface water drainage patterns.

20.7.4.18. Thereafter any existing surface water drainage patterns will continue as existing with a **Negligible** magnitude of change.

20.7.4.19. This would result in a **Negligible** effect on Potwell Trib surface water body during operation prior to the implementation of mitigation measures. It should also be noted that the proposed principals for the management of surface water and permanent changes to the Ordinary Watercourse will be subject to relevant Environmental Permitting/ Ordinary Watercourse Consent.

Impacts - Public (and Highway) Foul, Surface Water and Combined Sewer Networks

20.7.4.20. Within the Converter Station Area there are no existing wastewater networks, therefore there can be no impact upon the wastewater networks at the Converter Station Area.

20.7.4.21. No further assessment is considered to be required.

Decommissioning Stage

20.7.4.22. Impacts during decommissioning are anticipated to be similar to predicted impacts during construction as similar activities would be undertaken.

Onshore Cable Corridor and Landfall (Sections 2 – 10)

Construction Stage

Embedded Mitigation

20.7.4.23. The Proposed Development and associated works are proposed to avoid disruption to the Main Rivers and Ordinary Watercourses, as detailed within section 20.5.4 and Appendix 20.3 (Watercourses Summary), located within the Order Limits by ensuring that all installed ducts and trenching across watercourses are undertaken within the highway carriageway. By remaining within the carriageway any existing watercourses are expected to pass under the carriageway within a watercourse structure (e.g. culvert or sewer).

20.7.4.24. Where open channel watercourses are present within the Order Limits, it is proposed to use HDD or trenchless solutions to pass under the watercourses open channel. HDD/ trenchless solutions are proposed at:

- Soake Farm East (Main River) - Kings Pond (HDD) HDD-5;
- Farlington Marshes Gutter (Ordinary Watercourse) - Farlington Railway Crossing (Trenchless) HDD-4; and
- Broom Channel (Transitional/Tidal Watercourse) - Langstone Harbour (HDD) HDD-3.

Impacts – Discharge into surface waterbodies via surface watercourses

20.7.4.25. The sensitivity of all surface watercourses including Main Rivers and Ordinary Watercourses within the Order Limits which are located within the Potwell Trib or

Langstone Harbour water body and are considered to have a **High** sensitivity based on their WFD classification.

20.7.4.26. Based on the embedded mitigation, where the Proposed Development and associated construction works proposed avoid disruption to the Main Rivers and Ordinary Watercourses through the use of HDD/ trenchless techniques and open trenching around watercourses where they are confined to watercourse structures (culverts and sewers), as detailed in Appendix 20.3 (Watercourses Summary) the magnitude of change to the water quality directly to any surface watercourses, including Main Rivers and Ordinary Watercourses is expected to be **Negligible** as no watercourses will be directly passed through, eliminating the risk of any pollutants entering the water bodies via any watercourses.

20.7.4.27. As discussed in the baseline assessment, other minor ditches and dry watercourses, also defined as Ordinary Watercourses, have not been individually identified at this stage and are subject to confirmation of the exact cable route during detailed design. These features are typically dry or with limited flow and will generally convey surface water during extreme rainfall events. Without appropriate construction environmental control measures these drainage features/systems have the potential to convey pollutants into the water body. This is expected to cause some contribution of pollution entering the surface water body feature, but insufficient to change WFD classification and is expected to have a **medium** magnitude of change.

20.7.4.28. Where works avoid disruption to the Main Rivers and Ordinary Watercourses through the embedded mitigation (HDD, trenchless solutions, works confined above culvert/ sewer a **Negligible** effect on the surface waterbody receptors is expected.

20.7.4.29. However, where works could pass through open channel Ordinary Watercourse, subject to detailed design and refinement of the Onshore Cable Corridor, a **Major** to **Moderate** adverse temporary effect on the surface waterbody receptors is expected prior to the implementation of mitigation measures.

Impacts – Discharge into surface waterbodies via surface water drainage patterns and flood risk areas

20.7.4.30. Similar opportunities for contamination and pollution to the water bodies are present as discussed above for the Converter Station Area associated to rainfall and surface water runoff. Furthermore, opportunities for contamination and pollution are present due to the risk of flooding from rivers and the sea. Any construction activities located within Flood Zone 2 and Flood Zone 3, as identified on Figure 20.1 and 20.4 are at an increased risk of flooding from rivers and the sea compared to areas located in Flood Zone 1 and areas at low or very low risk of surface water flooding. If flood within the Order Limits coincides with construction activities being undertaken within that location there is a significantly increased risk of pollutants entering the surface water water bodies (Potwell Trib and Langstone Harbour).

20.7.4.31. Even when considering the embedded mitigation, construction activities will still pass through areas of Flood Zone 2 and 3 associated with the identified waterbodies or across a surface water flood route and prior to mitigation the magnitude of change to the water quality is capable of causing some contribution of pollution entering the surface water body, but insufficient to change WFD classification and expected to cause a **medium** magnitude of effect prior to the implementation of additional mitigation measures.

20.7.4.32. This would result in a **Moderate to Major** adverse temporary effect on the surface water bodies when taking into consideration the embedded mitigation measures and prior to consideration of additional mitigation.

Impacts – Surface water bodies via public (and highway) foul, surface water and combined water (overflow) sewer networks

20.7.4.33. Within the Order Limits there are a number of foul water, surface water and combined wastewater networks are present. Foul and combined sewers are considered to have a **Low** sensitivity with regards to water quality and surface water sewers and combined sewer overflows are considered to have a **medium** sensitivity.

20.7.4.34. Construction activities throughout the Order Limits may require surface water overland flows to be diverted and over pumped. Furthermore, groundwater emergence during excavation works may require groundwater dewatering away from the construction activities.

20.7.4.35. Both of these activities could introduce or result in a polluted or contaminated surface water/groundwater to be discharged into a drainage network without any additional mitigation in place or discharge consents are in place.

20.7.4.36. Within foul sewer networks the polluted or contaminated surface water or groundwater would discharge to a treatment works where any polluted or contaminated water would be treated prior to discharge to the wider surface water catchment.

20.7.4.37. Discharges to surface water or combined sewer (overflows) networks which discharge directly into the wider surface water body at a downstream location might cause pollution. Typically, surface water sewers or combined sewer (overflows), these networks have less control/treatment measures prior to discharge to these surface water bodies in comparison to the foul sewer networks. Combined sewers have more formal treatment prior to discharge to the receiving water body at a treatment works however where combined sewer overflows are in place these treatments can become by-passed.

20.7.4.38. Prior to mitigation, construction activities in relation to contamination and pollution are expected to result in a **Medium** magnitude of change to the surface water body via foul, surface water or combined water sewers, including combined overflows,

networks prior to the implementation of mitigation measures or consideration of required discharge consenting.

20.7.4.39. This would result in a **Moderate adverse** temporary effect on the surface water body as a result of discharges of polluted or contaminated water through the wastewater networks prior to the implementation of mitigation measures or consideration of required discharge consenting.

Operational Stage

Embedded Mitigation

20.7.4.40. As part of the embedded design, the Proposed Development and any associated construction activities for open trenching for duct laying are proposed to be reinstated with native soil and or surfacing, typically with no infrastructure left above ground.

20.7.4.41. The proposed infrastructure outside the Converter Station Area above ground includes Link Boxes/ Link Pillars associated with the Joint Bays and Transition Joint Bays and the ORS at the Landfall that will be positioned at some location within the Onshore Cable Corridor which is to be determined as part of the detailed design, post Development Consent Order ('DCO').

20.7.4.42. No discharges to foul or combined sewers are proposed as part of the Proposed Development during operation.

20.7.4.43. As detailed within Appendix 20.4 (FRA) it is proposed to manage surface water at the ORS through a soakaway, however if this was not practicable due to insufficient infiltration rates, due to be investigated as part of the detailed design, surface water would be attenuated on-site and discharged into an adjacent Public Southern Water sewer at a restricted discharge rate, (targeting greenfield runoff rates where practicable with suitable water quality treatment in accordance with best practice) subject to detailed design and approval from Southern Water and PCC's LLFA.

Impacts - Discharge into surface waterbodies via watercourses

20.7.4.44. As the majority of the Onshore Cable Corridor is proposed to be reinstated with native soils and or surfacing the magnitude of change from the existing conditions are expected to be negligible.

20.7.4.45. This would result in a **Negligible** effect on the surface waterbodies water quality prior to the implementation of mitigation measures.

Impacts - Discharge into surface waterbodies via surface water drainage patterns

20.7.4.46. As the majority of the Onshore Cable Corridor is proposed to be reinstated with native soils and or surfacing the magnitude of change from the existing conditions are expected to be negligible.

20.7.4.47. This would result in a **Negligible** effect on the surfaces waterbodies water quality prior to the implementation of mitigation measures.

Impacts - Discharge into surface waterbodies via Surface Water Sewer Networks

20.7.4.48. The only potential contribution to the sewer network is associated to the potential connection to a public surface water sewer from the ORS. As part of the embedded mitigation suitable water quality treatment in accordance with best practice is proposed.

20.7.4.49. This would result in a **Negligible** effect on the surfaces waterbodies water quality prior to the implementation of additional mitigation measures.

Decommissioning Stage

20.7.4.50. Impacts during decommissioning are anticipated to be similar to predicted impacts during construction as similar activities would be undertaken.

20.7.5. HUMAN RECEPTORS AND INFRASTRUCTURE AS A CONSEQUENCE OF FLOOD RISK

20.7.5.1. The existing 'hot spot' flood risk areas present throughout the Proposed Development relate to different sources of flood risk.

20.7.5.2. The assessment of impacts on the human receptors considers the magnitude of change as a consequence of the Proposed Development and the magnitude of effect from flood risk on the human receptors intruded as a consequence of the Proposed Development (i.e. construction workers and operators).

20.7.5.3. The Converter Station Area Onshore Cable Corridor and Landfall have been grouped due to the similarities and repetition of likely changes and or impacts associated to human receptors as a consequence of flood risk.

Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)

Construction Stage

Embedded Mitigation

20.7.5.4. The Converter Station Area is located on high ground and away from any watercourse and is located within Flood Zone 1.

20.7.5.5. Proposed watercourse crossings are proposed to be via HDD/trenchless solutions or within the carriageway around a watercourse structure (culvert or sewer).

20.7.5.6. Works adjacent within the Onshore Cable Corridor adjacent to the coastal flood defences have been developed alongside consultation with ESCP where it has been agreed in principle that the design will avoid works to existing or proposed coastal flood defence alignments. Furthermore, the proposed HDD under Broom Channel (Langstone Harbour HDD-3) is proposed to pass below or avoid any sheet piling associated to the coastal flood defence.

20.7.5.7. It should be noted that the implementation of above principles will be the responsibility of the appointed contractor to develop during detailed design and be subject to relevant environmental consents prior to construction.

20.7.5.8. There is no other embedded mitigation proposed throughout the Converter Station Area or along the Onshore Cable Corridor and Landfall to minimise flood risk during construction.

Impacts – Construction Workers

20.7.5.9. As previously discussed, the sensitivity of construction workers to flooding is **Medium** and based on the flood risk profile within the Proposed Development there are various sources of flood risk that could directly affect construction workers or activities associated to the Proposed Development that could impact upon the risk of flooding and as a consequence affect construction workers.

20.7.5.10. Appendix 20.4 (FRA) and Figure 20.1 (Constraints Overview) highlight the 'hot spot' flood risk areas.

20.7.5.11. It is important to note that this section considers the magnitude of impacts directly on construction workers rather than a magnitude of change, as prior to the Proposed Development construction workers were not present. The potential impact on construction workers being introduced to areas at risk of flooding are:

- Impacts from tidal flood risk;
  - a number of locations within the Proposed Development are located within Flood Zone 2 and Flood Zone 3, see Figure 20.1 and 20.4.
  - The potential magnitude of effects/change from the risk of tidal flooding is **medium** due to the potential danger to life if tidal flooding was to occur as this flood water could suddenly appear, be fast moving and deep. However, such risk is typically reduced by the standard of protection offered by the existing flood defences which limits the likelihood of a potential flood event to happen and the infrequent occurrence of such extreme events to occur. For example, within Flood Zone 2, without consideration of flood defences the annual exceedance probably of flooding is between 0.5% and 0.1% from the sea in any given year.
  - In areas within Flood Zone 1 the magnitude of impact is **Negligible**.
- Impacts from fluvial flood risk;
  - A number of locations within the Proposed Development are located within Flood Zone 2 and Flood Zone 3, see Figure 20.1 and 20.4.
  - The potential magnitude of effects/change from the risk of fluvial flooding is **medium** due to the potential danger to life if fluvial flooding was to occur as

this flood water could suddenly appear, be fast moving and deep. However, such risk is typically reduced by the standard of protection offered by the existing flood defences which limits the likelihood of a potential flood event to happen and the infrequent occurrence of such extreme events to occur. For example, within Flood Zone 2, without consideration of flood defences the annual exceedance probably of flooding is between 1% and 0.1% from rivers in any given year.

  - In areas within Flood Zone 1 the magnitude of impact is **Negligible**.

- Impacts from groundwater flood risk;
  - Within the Order Limits there are a number of locations where elevated groundwater is anticipated. Based on the information available, groundwater emergence above ground level has only been recorded at a few discrete locations. Thereafter, the probability of groundwater emergence above ground level is considered to be Low to Negligible.
  - The potential magnitude of effects/change above ground level, where a risk exist, are typically **low** as groundwater flooding is unlikely to be fast flowing or suddenly appear and unlikely to cause injury or endanger life.
- Impacts from surface water and sewer flood risk;
  - Within the Order Limits there are a number of isolated areas considered to be at low, medium and high risk of flooding from surface water as detailed within Table 20.9 and Figure 20.1 and Figure 20.5.
  - The potential magnitude of effects/change from the risk of surface water and sewer flooding is **Medium** in areas at risk of surface water flooding as surface water flows during extreme events can be fast flowing and could cause injury however is unlikely to endanger life. However, this risk is typically further reduced by the likely infrequent occurrence of such extreme events to occur. For example, areas of a medium risk of surface water flooding are expected to have an annual exceedance probably of flooding between 1% and 3.3% from surface water in any given year.
  - Outside areas at risk the magnitude of impact is considered to be **Low** to **Negligible**.
- Impacts from reservoir flood risk;
  - Within the Proposed Development there are two locations that fall within the extent of reservoir flooding from two different reservoirs, see Figure 20.1 and Figure 20.6.

- The potential magnitude of effects/change from the risk of reservoir flooding is low due to the potential danger to life if reservoir flooding was to occur mitigated by the extreme rarity of such a potential event; it is **Negligible** in areas outside the area at risk of reservoir flooding.

- Water supply and wastewater infrastructure;
  - In the event of a failure or burst pipe, the typical magnitude of effects /change is considered to be **Low** as flooding is likely to be predicable and slow moving and unlikely to endanger life, further mitigated by the rarity of such a potential event.

20.7.5.12. In addition to the magnitude of effects/change based on a direct risk of flooding alone, the magnitude of effects on construction workers based on the anticipated construction activities associated to the Proposed Development are:

- Excavation/trenching works – generally increases the magnitude of effects to construction works as without any control measures flood water could inundate excavations:
  - Tidal – magnitude of effects is **High** as tidal flood water inundating an excavation with works could result in drowning;
  - Fluvial – magnitude of effects is **High** as fluvial flood water inundating an excavation with works could result in drowning;
  - Surface Water and Sewer – magnitude of effects remains **Medium** as the volumes of surface water are typically unlikely to result in drowning, however considered to be high in areas where significant overland flow routes could be intersected by trenching and quantises of water could endanger life;
  - Groundwater – magnitude of effects increases to **High** as excavating into the ground in areas of shallow groundwater is likely to cause groundwater emergence within the excavation up to the natural water table level which could result in drowning;
  - Reservoir - magnitude of effects remains unchanged; and
  - Water supply and wastewater infrastructure - magnitude of impact remains unchanged.
- General works within proximity to water supply and wastewater infrastructure, watercourses and flood defences:
  - Tidal/ Main Rivers and Coastal Environment – magnitude of impact is **High**; there is an increased risk when working in close proximity to flood defences as works could cause damage to the flood defences which could result in a breach of the flood defence causing fast moving, sudden inundation.

- Fluvial/ Main Rivers – magnitude of impact is **High**; there is an increased risk when working in close proximity to watercourse structures (culverts, sewers and flood defences). In the event that works cause damage to these features a breach or surcharging of the watercourse could result in a fast-moving sudden inundation of flood water.
- Surface Water (including minor watercourses) and Sewer – magnitude of impact remains **Medium** however there is an increased risk of surface water flooding or sewer flooding occurring based on potential construction activities being undertaken that could result in changes to natural extreme event surface water flow routes; which may result in a higher concentration of runoff. Furthermore, creation of additional impermeable or additional flows from surface water and/ or groundwater dewatering would result in an increase in peak and volumetric runoff.
- Groundwater – magnitude of impact remains unchanged.
- Reservoir - magnitude of impact remains unchanged.
- Water supply and wastewater infrastructure – magnitude of impact remains unchanged; however, construction works increase the risk of damage or burst to the infrastructure.

20.7.5.13. A summary of the magnitude of effects/change on construction workers as a consequence of flooding from different sources from construction workers being present on site and the subsequent magnitude of effects following undertaking the activities anticipated during the construction stage are summarised in Table 20.11.

Table 20.11 Summary of Potential Magnitude of effects/change

Source of Flooding	Outside 'Hot spot' flood risk areas		Within 'Hot spot' flood risk areas	
	Potential direct impact	Potential impact due to construction	Potential direct impact	Potential impact due to construction
Tidal	Negligible	Negligible	Medium	High
Fluvial	Negligible	Negligible	Medium	High
Surface Water	Low to Negligible	Low to Negligible	Medium	Medium
Groundwater	Low to Negligible	Low to Negligible	Low	High

Source of Flooding	Outside 'Hot spot' flood risk areas		Within 'Hot spot' flood risk areas	
	Potential direct impact	Potential impact due to construction	Potential direct impact	Potential impact due to construction
Reservoir	Negligible	Negligible	Low	n/a
Water Infrastructure	Low	Low	Low	Low

20.7.5.14. It should be noted that the above summary provides the worst case in the 'hot spot' flood risk areas. As a consequence of the sensitivity construction workers (**Medium**) and a worst-case magnitude of impact (**High**), a **Major to Moderate** adverse temporary effect on construction workers is predicted prior to the implementation of mitigation measures in 'hot spot' flood risk areas assuming an extreme flood risk event occurred.

20.7.5.15. It should be noted that the occurrence of an extreme flooding event coinciding with a construction activity within the associated 'hot spot' flood risk area is unlikely and the above assessment has conservatively considered the worst case of such scenarios coinciding.

Impacts – Residents, users and associated infrastructure of the surrounding area

20.7.5.16. The potential impacts on residents, users and associated infrastructure of the surrounding area already located in areas at risk of flooding as a consequence of the Proposed Development during construction, are:

- **Tidal** – magnitude of impact, as a precautionary approach, could in theory be High without appropriate control measures due to the risk of works in close proximity to the coastline causing damage to flood defences which could result in a breach of the flood defence that protect Portsmouth from tidal flooding. The magnitude of change is typically reduced to **Medium** by the likely infrequent occurrence of such extreme events occurring. Furthermore, the joint probability of an extreme flood event coinciding with a construction activity causing unexpected damage is subsequently less likely and the nature of the proposed works are unlikely to cause damage resulting in a catastrophic failure.
- **Fluvial** – magnitude of impact, as a precautionary approach, could in theory be High without appropriate control measures due to the risk of works in close proximity to the watercourse causing damage to their associated structures (culvert/ sewer) that could block the watercourse and cause flooding upstream. The magnitude of change is typically reduced to **Medium** by the likely infrequent

occurrence of such extreme events occurring. Furthermore, the joint probability of an extreme flood event coinciding with a construction activity causing unexpected damage is subsequently less likely and the nature of the proposed works are unlikely to cause damage resulting in a catastrophic failure.

- **Surface Water** (including minor watercourses) and Sewer – magnitude of impact is **Medium** as there is an increased risk of occurring based on the potential for construction activities to impact on surface water drainage patterns by diverting or introducing additional flows from surface water and/ or groundwater dewatering activities which would result in an increase in peak and volumetric runoff.
- **Groundwater** – magnitude of impact is **Negligible** as there are no proposed structures anticipated to divert or restrict groundwater conveyance.
- **Reservoir** – magnitude of impact is **Negligible** as construction activities are not located in close proximity to the reservoirs and therefore will not change the risk of flooding associated with them.
- **Water supply and wastewater infrastructure** – In the event of a failure or burst pipe, the typical magnitude of effects /change is considered to be **Low** as flooding is likely to be predicable and slow moving and unlikely to endanger life, further mitigated by the rarity of such a potential event.

20.7.5.17. It should be noted that the above summary provides the worst case in the 'hot spot' flood risk areas. As a consequence of the sensitivity of residents, users and associated infrastructure is **High**. Magnitude of impact would be **Medium** which assumes that an extreme flood risk event occurred at the same time as a construction activity causing unexpected damage or failure to a watercourse structure with the resultant flooding affecting residents, users and associated infrastructure.

20.7.5.18. This would result in a **Major** to **Moderate** adverse temporary effect on residents, users and associated infrastructure is predicted prior to the implementation of mitigation measures in hot spot flood risk areas.

Operational Stage

Embedded Mitigation

20.7.5.19. The Converter Station Area is located on high ground and away from any watercourse and is located within Flood Zone 1 with Appendix 3.6 (Surface Water Drainage and Aquifer Contamination Mitigation Strategy), that defines the outline principles for the management of surface water which is proposed to cater for surface water events up to the 1 in 100 year rainfall event plus an allowance for climate change and consideration to maintain any existing surface water overland flow routes.

20.7.5.20. Specific design measures (e.g. raised thresholds) have been embedded into the design of the ORS at Landfall to provide resistance and resilience to the risk of tidal flooding affecting the building, users and associated equipment.

20.7.5.21. The presence of the ORS(s) is proposed within the tidal flood zone 2; however, has a negligible impact on the tidal flooding as flood plain loss is not significant in the tidal environment.

20.7.5.22. As part of the embedded mitigation in relation to the flood risk environment, the cable ducts are proposed to be buried in the ground and backfilled, with reinstatement of native soils and surfacing.

Impacts – Site Workers

20.7.5.23. During operation the Proposed Development will be introducing site workers to within the Order Limits to undertake routine inspections to isolated areas of the Proposed Development. The routine visits and works requiring site workers is expected to be very infrequent.

20.7.5.24. Attending certain locations within the Proposed Development exposes site workers to the impacts from flood risk in the isolated 'hot spot' flood risk areas identified. As site workers will only be at site for short durations and during an isolated number of days within any given year, the likelihood of a flooding event coinciding with a site worker being on site is significantly reduced, however a risk still remains. The anticipated magnitude of impact to site workers throughout the Order Limits as a consequence of flood risk is summarised below:

- Tidal – The likelihood of a site worker attending site coinciding with a tidal flood event occurring is extremely unlikely due to the joint probability of the two events occurring at the same time and the risk is therefore considered to be low. Based on this low probability of occurrence the magnitude of effect is also considered to be **Low**.
- The risk is also considered to be reduced for a site worker attending site within the defended tidal flood zone 2 or 3 due to the standard of protection against flooding in these areas. Furthermore, the ORS is located in Flood Zone 2, however the proposed flood resilience measures reduces this risk of flooding affecting site workers at the ORS.
- It should be noted that a risk remains for attending site within both the defended and undefended flood zones, however tidal flooding is typically easily predicted and local public flood risk management/closures are likely to be in place to prevent site workers becoming in danger from flood water. In areas within Flood Zone 1 the magnitude of impact is **Negligible**.

- Fluvial – The likelihood of a site worker attending site coinciding with a fluvial flood event occurring is extremely unlikely due to the joint probability of the two events occurring at the same time and the risk is therefore considered to be low. Based on this low probability of occurrence the magnitude of effects is also considered to be **Low**. Furthermore, limited infrastructure is likely to be located within areas at risk of fluvial flooding reducing the risk further. In areas where a risk of flooding remains, local flood warning and management/ closures are likely to be in place to prevent site workers becoming in danger from flood water. In areas within Flood Zone 1 the magnitude of impact is **Negligible**.
- Surface Water and Sewer – The potential magnitude of effects from the risk of surface water (including ordinary watercourses) and sewer flooding is **low** in areas at risk of surface water flooding as surface water flows during extreme events can be fast flowing and could cause injury however is unlikely to endanger life and it also unlikely that works would be undertaken during a flood event. Outside areas at risk the magnitude of impact is considered to be **Low** to **Negligible**.
- Groundwater – The potential magnitude of effects above ground level are typically low in isolated areas at risk of groundwater flooding above ground as groundwater flooding is unlikely to be fast flowing or suddenly appear and unlikely to cause injury or endanger life, where groundwater flooding is not expected the magnitude of effect is considered to be **Negligible**.
- Reservoir – The potential magnitude of effects from the risk of reservoir flooding is **Low** due to the potential danger to life if reservoir flooding was to occur and is **Negligible** in areas outside the area at risk of reservoir flooding.
- Water supply and wastewater infrastructure - Typical magnitude of impact is considered to be **Low** as flooding is likely to be predicable, slow moving and unlikely to endanger life.

20.7.5.25. Impacts associated specifically with the Converter Station and ORS Infrastructure at Landfall are discussed in the proceeding sections.

20.7.5.26. As a consequence of the inherent sensitivity of staff (medium) with a likely low predicted magnitude of impacts when considering the frequency of site workers visiting site and the joint probability of a site visit occurring with an extreme flood event a **Minor to Moderate** effect on site workers is predicted prior to the implementation of mitigation.

Impacts – Residents, users and associated infrastructure of the surrounding area

20.7.5.27. Due to the embedded design within the Proposed Development having a negligible impact on the flood risk profile, the predicted magnitude of impacts are negligible.

20.7.5.28. As a consequence of the inherent sensitivity of residents, users and associated infrastructure (**High**) with a **Negligible** predicted magnitude of impacts, a **Negligible** effect on residents, users and associated infrastructure of the surrounding area is predicted.

20.8. CUMULATIVE EFFECTS

Summary

20.8.1.1. A summary of the likely projects/effects considered in association with the Proposed Development are presented in Chapter 29 (Cumulative Effects).

20.8.1.2. The predicted cumulative effects in relation to surface water resources and flood risk are considered for both construction and operational stages of the Proposed Development.

20.8.1.3. The cumulative effects are considered with embedded and additional mitigation taken into consideration. The list of other developments considered within the stage 1 and 2 cumulative assessment are outlined in Appendix 20.5 (Surface Water Resources and Flood Risk Cumulative Assessment Matrix (Stage 1 & 2)).

20.8.1.4. Following undertaking the stage 1 and 2 cumulative assessment no developments were progressed to a stage 3 and 4 cumulative assessment. A summary of the cumulative assessment is presented below.

Inter-project Effects

Surface Water Drainage Patterns

20.8.1.5. All developments located within the same surface water catchment may result in localised temporary impacts to surface water drainage patterns, however the overall catchment influences are not anticipated to be impacted.

Water Supply and Wastewater Drainage Infrastructure

20.8.1.6. The Proposed Development and all developments, where required will be supplied by PW's potable water network and Southern Water's wastewater drainage network.

20.8.1.7. Water demand is expected to increase as a result of each respective development. PW strategically assess the availability of water supply to cater for continued development and increase in demand as part of their long-term water resources management strategies as set out in PW's Draft WRMP 2019. Any upgrade and off-site reinforcement works required to support the Proposed Development or developments will be proposed at a local scale in consultation with PW who can assess the impacts holistically between all registered developments and development growth projections.

20.8.1.8. With regards to the wastewater drainage network, any developments that require upgrade and off-site reinforcement works required to support the developments will be proposed on a local scale in consultation with Southern Water who can assess

the impacts holistically between all registered developments and development growth projections.

Surface Waterbodies Water Quality

20.8.1.9. Where SuDS and other drainage features are proposed across the cumulative developments, it is likely that the cumulative developments would recognise a benefit in terms of water quality, urban cooling, public amenity/ perception and biodiversity.

20.8.1.10. During construction risks associated to surface water feature contamination and pollution will typically be managed through CEMPs.

Human Receptors as a Consequence of Flood Risk

20.8.1.11. Demonstrating the management of surface water and other forms of flood risk to ensure flood risk is not increased on or off-site is typically required as part of a site-specific Flood Risk Assessment where a specific source of flood risk is present or for any major development.

20.8.1.12. This is to ensure surface water and other forms of flood risk are appropriately managed, therefore any cumulative effects would have a negligible impact if other developments have appropriately incorporated flood risk management into their design.

Intra-project Effects

20.8.1.13. It is not currently considered that there are any significant transboundary effects as a result of the Proposed Development.

Transboundary-project Effects

20.8.1.14. It is not currently considered that there are any significant transboundary effects as a result of the Proposed Development.

20.9. PROPOSED MITIGATION AND ENHANCEMENT

20.9.1.1. In addition to the embedded mitigation discussed above, additional mitigation is proposed to manage the predicted impacts associated with the Proposed Development in relation to the surface water resources and flood risk environment.

20.9.1.2. Based on the predicted impacts assessment, no significant effects are expected and the following potentially significant effects are expected to occur prior to implementation of additional mitigation include:

- During the construction stage:
  - Impacts on Wastewater infrastructure– **Major** Effect
  - Impacts on Surface Water Features Water Quality – **Major** to **Moderate** Effect
  - Impacts on Human Receptors and Infrastructure as a Consequence of Flood Risk – **Major** to **Moderate** Effect

- Impacts on Surface Water Drainage Patterns – **Minor** to **Moderate** Effect

- During operational stage:
  - Impacts on Human Receptors and Infrastructure as a Consequence of Flood Risk – **Minor** to **Moderate** Effect

20.9.1.3. Other effects not expected to be significant prior to mitigation include (only **Minor** effects shown, **Negligible** effects not summarised):

- During the construction stage
  - Impacts on Water Supply
- During operational stage:
  - No minor effects.

20.9.1.4. As a result, the additional mitigation measures discussed in this section apply specifically in relation to construction activities which reduces any expected effects to negligible or minor, which are considered not significant. Detail can also be found within the Onshore Outline CEMP.

20.9.1.5. The only exception to this is in relation to the effects on staff during operation. The additional mitigation measures proposed to deal with these effects are discussed in the independent Health and Safety File on completion of the Project sub-section below.

20.9.2. SURFACE WATER RESOURCES AND FLOOD RISK PROPOSED MITIGATION

Principles of Proposed Onshore Outline CEMP Mitigation

20.9.2.1. As part of the DCO application it is not proposed to disapply environmental permits/consents in relation to the surface water resources and flood risk environment.

20.9.2.2. The permitting process will be completed by the Appointed Contractor, after detailed design, once construction methodologies have been agreed upon. The Appointed Contractor will be responsible for acquiring the relevant consents and permits and for adhering to the conditions of said consents and permits.

20.9.2.3. Nevertheless, the general principles have been discussed and agreed with HCC LLFA, PCC LLFA, the EA, and ESCP through consultation. Details of this consultation is presented in Appendix 20.1 (Consultation Responses).

20.9.2.4. The general principles in relation to the surface water resources and flood risk environment have been embedded into the Onshore Outline CEMP which will outline principles that the appointed contractor will be required to follow to ensure that the predicted impacts are managed to reduce any residual effects.

20.9.2.5. Consents or exemptions are expected to be required for the following consents/ permits, which should be further reviewed and confirmed during detailed design process by the appointed contractor:

- Temporary dewatering consent;
- Ordinary watercourse consent;
- Flood risk activities permit – environmental permits; and
- Discharges to surface water and groundwater: environmental permits.

20.9.2.6. Activities expected to require the above noted additional permits and consents are summarised below:

- Works within 16 m and 8 m of tidal and fluvial flood defences;
- Works within the flood plain;
- Works through, under or above a watercourse;
- Works requiring diversions or alterations to Ordinary Watercourses or extreme event surface water overland flow routes; and
- Works requiring temporary dewatering of surface water or groundwater.

20.9.2.7. The overarching principles required to obtain these approvals are summarised below, however specific methodologies are not defined as part of Onshore Outline CEMP to allow flexibility for the Appointed Contractor (and any sub-contractors) to conduct works in accordance with their preferred practices.

20.9.2.8. As part of Onshore Outline CEMP it is proposed that:

- The Appointed Contractor (and any sub-contractors) must take precautions during the Construction Stage to protect all surface water bodies including watercourses and drainage patterns from erosion, siltation or pollution in accordance with industry best practice. Based on Appendix 20.2 (Onshore WFDa) and in accordance with best practice, to prevent fine sediment entering the watercourses, construction activities should occur away from the watercourses and extreme event overland flow routes where practicable. Should vegetation clearance be required, the extent should be limited to the areas necessary to reduce the amount of sediment released during clearance and the potential release of sediment from bare ground following clearance. Further recommended pollution prevention mitigation measures for adoption by the contractor based on the recommendations within Appendix 20.2 (Onshore WFDa) include:
    - All operatives should be made aware of the need to protect the watercourse from contamination, including EA guidance and legal obligations.

- When construction activities, including stock piling (not permitted within fluvial flood zone 2 or 3 unless otherwise agreed with EA) and plant and vehicle washing, occur in close proximity to a watercourse they should be separated from the watercourse with barriers (e.g. sediment fences) to prevent surface runoff from these sites entering the watercourse.
- Geotextile-material silt fences should be installed to filter suspended solids from runoff.
- The works should be carried out in accordance with established best practice and environmental permitting requirements.
- Pollution spill kits should be kept on site. In the event of an incident these would be used.
- Any soils contaminated would be removed immediately to a suitable landfill site.
- Waste facilities should be provided on site for debris away from areas at risk of flooding.
- Cleaning of tools and shuttering will be carried out in water not draining directly to the watercourse.
- In any event of expected heavy rain pouring concrete and other activities which increase the risk of contaminating runoff should not be undertaken.
- Activities near watercourses should be avoided during fish migratory and spawning seasons (typically October to May).
- The control on invasive non-native species should be managed through best practice guidance and by implementing the Wildlife Law: Control of Invasive Non-native Species HC1039 (Law Com No. 342).

- The Appointed Contractor (and any sub-contractors) must obtain appropriate approval through appropriate consents and permits to undertake any construction activity or appropriate exception prior to commencement of that activity and is responsible for agreeing the construction methodologies in association to these consents and permits.
- The Appointed Contractor (and any sub-contractors) must ensure that existing Main River, Ordinary Watercourses, extreme event surface water overland flow routes are maintained within no increase to flood risk through appropriate temporary works and subject to approval or exemption of relevant environmental permits (flood risk activities permit/ ordinary watercourse consent).
- Appointed Contractor (and any sub-contractors) will need to ensure any works over, under or directly adjacent to watercourses/watercourse structures (culvert/

sewer) and flood defences are subject to approval or exemption of environmental permits (flood risk activities permit/ordinary watercourse consent), where the contractor will need to develop appropriate design and construction methodologies to ensure that flood risk is not increased, the integrity of these features are not negatively impacted, flow conveyance is not impacted and there is suitable pollution prevention measures in place during the Construction and Operational Stages.

- The Appointed Contractor (and any sub-contractors) will manage any potential surface water ingress or groundwater emergence that is deemed of a quantity unsafe to work in or that may create a pollution pathway which should be managed through temporary dewatering with and discharge at a controlled discharge rate to an agreed discharge location through an appropriate pollution treatment mechanism. Dewatering quantities for trench construction will be determined at detailed design. The designer must ensure the discharge quantities are accurate or conservative to ensure no flood risk is not increased due to surplus groundwater encountered during the Construction Stage.
- Best practice methodology, in accordance with EA, LLFA guidance and other recommendations, should be implemented during construction to minimise the potential impacts of the Proposed Development on flood risk and potential contamination of surface waters.
- All construction activities will be undertaken in accordance with legislation and the gov.uk/EA Environmental Permits, Regulatory Position Statements and Guidance and other relevant documentation.
- The Appointed Contractor (and any sub-contractors) must ensure that works within flood zone 2 or 3 do not introduce significant structures or spoil storage in the flood plain;
- The Appointed Contractor (and any sub-contractors) for works within flood zone 2 or 3, or directly adjacent to, should ensure a flood warning/ evacuation plan with appropriate training to staff as deemed appropriate will be in place to ensure staff are aware of the potential risk and able to adopt suitable procedures in relation to flood risk (e.g. halt works if there is an immediate risk of flooding and evacuate to safe place);
- The Appointed Contractor (and any sub-contractors) should aim to identify locations for Joint Bays/ Link Pillars and Link Boxes outside of flood zones 2 and 3 or areas at risk of surface water flooding where practicable, however if this is not practicable due to other constraints, during construction any works in the flood zone 2 or 3 would be subject to approval or exemption of a flood risk activities

permit or exemption and works within areas at risk of surface water flooding would be subject to approval or exemption of an ordinary watercourse consent.

- If the Appointed Contractor (and any sub-contractors) decides to use temporary bunds to protect the trench or construction works, these would be in small localised areas and any impacts on existing drainage regime will need to be managed to ensure the impact of flooding is not increased subject to approval or exemption of relevant environmental permits (flood risk activities permit/ordinary watercourse consent).
- The detailed design of the HDDs is proposed to be developed post application and any specific provisions to protect the HDD construction works from the tidal flood risk will be developed by the contractor prior to works, if required. Any pathways under a flood defence created through the HDD during construction and operation will require appropriate bunding to ensure a pathway is not created around the flood defence subject to approval from approval or exemption of a flood risk activities permit.
- Any works over, under or directly adjacent to watercourses/watercourse structures (culvert/sewer) and flood defences will be subject to approval or exemption of environmental permits (flood risk activities permit/ ordinary watercourse consent), where the contractor will need to develop appropriate design to ensure that the integrity of these features are not negatively impacted, flow conveyance is not impacted and there is suitable pollution prevention measures in place during construction and operation.

Specific input to Health and Safety File on completion of the Project in Relation to Human Receptors as a Consequence of Flood Risk

20.9.2.9. Similar to the mitigation against flood risk, staff should be trained to understand the risk of flooding, what do if faced by a flood event, and made aware of areas at risk of flooding through input into the Health and Safety File on completion of the Project which would be developed prior to operation.

20.9.2.10. Specific measures that should be included to manage the risk to staff including:

- Detail of all areas at risk of flooding, their form and detail of the associated danger;
- If maintenance activities need to be undertaken in areas at risk of flooding staff should be signed up to flood warnings (rainfall, tidal, fluvial, reservoir) and check the weather forecast to be able to plan ahead and avoid attending site if there is a risk of flooding; or
- If flooding is identified when out on site an appropriate level training to staff should be in place to ensure staff are aware to stay away from flood water, abandon any work that needs to be undertaken in flooded areas and report the incident or

request appropriately trained operatives to work if a maintenance activity needs to be undertaken.

20.10. RESIDUAL EFFECTS

20.10.1.1. Following the implementation of the additional mitigation measures all predicted impacts are reduced and considered to have either minor or a negligible effect and are not not-significant. The following table provides a summary of the findings of the assessment.

20.10.1.2. Effects during decommissioning are not presented within the summary table as all effects prior to mitigation and following mitigation are considered to be the same as during construction.

Table 20.12 – Summary of Effects Table for Surface Water Resources and Flood Risk

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
Surface Water Drainage Patterns				
Construction Stage - Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)				
Change in surface water drainage patterns and water environment	Surface Water Drainage Patterns	**Minor to Moderate (potentially significant)** - / T / D / ST	Embedded mitigation: works avoid crossing through watercourses by using HDD/ trenchless solutions or watercourse crossing in carriageway Additional mitigation: Environmental Consents	**Minor (not significant)** - / T / D / ST
Operational Stage - Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)				
Change in surface water drainage patterns and water environment	Surface Water Drainage Patterns	**Negligible (not significant)** - / P / D / ST	Embedded mitigation: Aquifer Contamination Mitigation Strategy (including Surface Water Drainage Strategy) at Converter Station Area and Surface Water Drainage Strategy ORS	**Negligible (not significant)** - / P / D / ST

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
Water supply and wastewater infrastructure – Quantity				
Construction Stage - Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)				
Change in demand on sewer network	Public (and Highway) Foul, surface Water and Combined Sewer Networks	**Major (significant)** - / T / D / ST	Additional mitigation: Environmental Permits and discharge consent.	**Minor (not significant)** - / T / D / ST
Change in demand on water supply network/ catchment	Public Water Supply Network	**Negligible to Minor (not significant)** - / T / D / ST	Embedded mitigation/ Additional mitigation: Obtain licence from PW for any temporary connections required.	**Negligible to Minor (not significant)** - / T / D / ST
Operational Stage - Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)				
Change in demand on sewer network	Public Surface	**Negligible (not significant)** N/A	Embedded mitigation: ORS Surface Water Drainage Strategy	**Negligible (not significant)** N/A

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
	Sewer Networks			
Change in demand on network/ catchment	Public Water Supply Network	**Negligible (not significant)** N/A	Embedded mitigation: Obtain licence from PW for any permanent connections required.	**Negligible (not significant)** N/A
Surface Water Features Water Quality				
Construction Stage - Converter Station Area (Section 1)				
Change in surface water quality	Surface water bodies via Surface Watercourses	N/A	N/A	N/A
Change in surface water body quality	Surface water bodies via surface water drainage patterns	**Moderate (potentially significant)** - / T / D / ST	Additional mitigation: Onshore Outline CEMP Contamination and pollution prevention measures all subject to relevant environmental consents.	**Negligible (not significant)** N/A

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
Change in surface water quality	Public Surface Water & Combined Wastewater Networks	N/A	N/A	N/A
Operational Stage - Converter Station Area (Section 1)				
Change in surface water quality	Surface water bodies via surface watercourses	N/A	N/A	N/A
Change in surface water quality	Surface water bodies via surface water drainage patterns	**Negligible (not significant)** N/A	Embedded mitigation: Aquifer Contamination Mitigation Strategy (including Surface Water Drainage Strategy) Additional mitigation: Environmental Permitting/ Ordinary Watercourse Consent	**Negligible (not significant)** N/A

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
Change in surface water quality	Public Surface Water & Combined Wastewater Networks	N/A	N/A	N/A
Construction Stage - Onshore Cable Corridor and Landfall (Sections 2 – 10)				
Change in surface water body quality	Surface water bodies via surface watercourses	**Negligible** (Where works through watercourses avoided) **(not significant)** **Major to Moderate** (where works through watercourse may be required – subject to Onshore Cable Corridor refinement) **(potentially significant)** - / T / D / ST	Embedded mitigation: design avoids any works within any watercourses by using HDD/trenchless solutions or watercourse crossing in carriageway Additional mitigation: Onshore Outline CEMP - Contamination and pollution prevention measures all subject to relevant environmental consents	**Negligible (not significant)** N/A

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
		N/A		
Change in surface water body quality	Surface water bodies via flood plains and surface water drainage patterns	**Major to Moderate (potentially significant)** - / T / I / ST	Additional mitigation: Onshore Outline CEMP – Flood warning and works planning, contamination and pollution prevention measures all subject to relevant environmental consents.	**Negligible (not significant)** N/A
Change in surface water body quality	Surface water bodies via surface water drainage patterns and flood risk areas	**Moderate (potentially significant)** - / T / D / ST	Additional mitigation: Onshore Outline CEMP - Contamination and pollution prevention measures all subject to relevant environmental consents.	**Negligible (not significant)** N/A
Change in surface water body quality	Surface water bodies via public (and highway) foul, surface water and	**Moderate** (foul, surface, combined, or combined overflow) **(potentially significant)** - / T / D / ST	Additional mitigation: Onshore Outline CEMP - Contamination and pollution prevention measures all subject to relevant environmental consents.	**Negligible (not significant)** N/A

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
	combined water (overflow) sewer Networks		Additional mitigation: Environmental Consents (temporary dewatering and discharge consents)	
Operational Stage - Onshore Cable Corridor and Landfall (Sections 2 – 10)				
Change in surface water body quality	Surface water bodies via surface watercourses	**Negligible (not significant)** N/A	None	**Negligible (not significant)** N/A
Change in surface water body quality	Surface water bodies via surface water drainage patterns and flood risk areas	**Negligible (not significant)** N/A	None	**Negligible (not significant)** N/A
Change in surface water body quality	Surface water bodies via public surface	**Negligible (not significant)**	Embedded mitigation: ORS Surface Water Drainage Strategy	**Negligible (not significant)**

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
	water sewer networks	N/A		N/A
Human Receptors and Infrastructure as a Consequence of Flood Risk				
Construction Stage – Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)				
Impacted by flooding	Construction Workers	**Major to Moderate (potentially significant)** - / T / D / ST	Embedded mitigation: Converter Station in Flood Zone 1. Embedded mitigation: design avoids any works within any watercourses by using HDD/trenchless solutions or watercourse crossing in carriageway. Embedded mitigation: design avoids any works to existing or proposed flood defence alignments. Embedded mitigation: design avoids any flood defences associated to HDD/trenchless solutions or watercourse crossing in carriageway. Additional mitigation: Onshore Outline CEMP – Flood warning and works	**Minor (not significant)** N/A

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
			planning, localised control of waters, temporary dewatering, temporary diversions all subject to relevant environmental consents.	
Impacted by flooding	Residents, users and associated infrastructure of the surrounding area	**Major to Moderate (potentially significant)** - / T / D / ST	Embedded mitigation: design avoids any works within any watercourses by using HDD/trenchless solutions or watercourse crossing in carriageway. Embedded mitigation: design avoids any works to existing or proposed flood defence alignments. Embedded mitigation: design avoids any flood defences associated to HDD/trenchless solutions or watercourse crossing in carriageway. Additional mitigation: Onshore outline CEMP – Flood warning and works planning, localised control of waters, temporary dewatering, temporary diversions all subject to relevant environmental consents.	**Negligible (not significant)** N/A

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance Residual Effects following Mitigation /Enhancement
Operational Stage –Converter Station Area, Onshore Cable Corridor and Landfall (Sections 1 – 10)				
Impacted by flooding	Site Workers	**Minor to Moderate (potentially significant)** - / T / D / ST	Embedded mitigation: ORS design (with tidal flood resilience) and SuDS strategy Additional mitigation: Health and Safety File/ Practices including Flood warning and works planning,	**Negligible (not significant)** N/A
Impacted by flooding	Residents, users and associated infrastructure of the surrounding area	**Negligible (not significant)** N/A	Embedded mitigation: Converter Station Surface Water Drainage Embedded mitigation: ORS SuDS strategy.	**Negligible (not significant)** N/A

Key to table:

+ / - = Beneficial or Adverse P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term, N/A = Not Applicable

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