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Rampion 2 WIND FARM

Volume 2, Chapter 27

Water Environment

GoBe wood.

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27. Water environment

27.1 Introduction

27.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary results of the assessment of the likely significant effects of Rampion 2 with respect to the onshore elements of the water environment (i.e. landwards of Mean High Water Springs (MHWS)), which comprises aquatic environment, water resources and flood risk receptors. It should be read in conjunction with the project description provided in **Chapter 4: The Proposed Development** and the relevant parts of the following chapters:

- **Chapter 6: Coastal processes** (in relation to offshore coastal processes receptors including coastal morphology);
- **Chapter 14: Nature conservation** (in relation to offshore conservation sites and marine water quality considerations);
- **Chapter 18: Socio-economics** (in relation to the socio economic considerations pertaining to the recreational use of the rivers Arun and Adur and bathing waters)
- **Chapter 23: Terrestrial ecology and nature conservation** (in relation to water dependent ecological features); and
- **Chapter 25: Ground conditions** (in relation to the mobilisation of potential contaminants present on site).

27.1.2 This chapter describes the following:

- the legislation, planning policy and other documentation that has informed the assessment (**Section 27.2: Relevant legislation, planning policy, and other information and guidance**);
- the outcome of consultation engagement that has been undertaken to date, including how matters relating to the water environment within the Scoping Opinion received in August 2020 have been addressed (**Section 27.3: Consultation and engagement**);
- the scope of the assessment for the water environment (**Section 27.4: Scope of the assessment**);
- the methods used for the baseline data gathering (**Section 27.5: Methodology for baseline data gathering**);
- the overall baseline (**Section 27.6: Baseline conditions**);
- embedded environmental measures relevant to the water environment and the relevant maximum design scenario (**Section 27.7: Basis for PEIR assessment**);
- the assessment methods used for the PEIR (**Section 27.1: Methodology for PEIR assessment**);

- the assessment of water environment effects (**Section 27.9 – 27.11: Preliminary assessment**
- the assessment of potential cumulative effects (**Section 27.12: Preliminary assessment: Cumulative effects**);
- consideration of transboundary effects (**Section 27.13: Transboundary effects**);
- consideration of inter-related effects (**Section 27.14: Inter-related effects**);
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 27.15: Further work to be undertaken for the ES**);
- a glossary of terms and abbreviations is provided in **Section 27.16: Glossary of terms and abbreviations**; and
- a references list is provided in **Section 27.17: References**.

27.1.3 This chapter is supported by the following technical appendices, which will be referred to by their technical appendix numbers hereafter:

- **Appendix 27.1: Detailed water environment information report, Volume 4**;
- **Appendix 27.2: Flood Risk Screening Assessment, Volume 4**; and
- **Appendix 27.3: Preliminary Water Framework Directive Assessment, Volume 4**.

27.2 Relevant legislation, policy and other information and guidance

Introduction

27.2.1 This section identifies the legislation, policy and other documentation that has informed the assessment of effects with respect to the water environment. Further information on policies relevant to the EIA and their status is provided in **Chapter 2: Policy and legislative context** of this PEIR.

Legislation and national planning policy

27.2.2 **Table 27-1** lists the key legislation relevant to the assessment of the effects on water environment receptors.

Table 27-1 Legislation relevant to the water environment

Legislation description	Relevance to assessment
The EU Water Framework Directive (2000 / 60 / EC) (WFD), as enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017	
The aim of the WFD is for all water bodies to achieve Good Status (comprised of scores for Ecological Status and Chemical Status for surface water and Good Quantitative and Quality Status for groundwater) by 2021 or 2027 as appropriate, and to ensure no deterioration from current status.	The Proposed Development has the potential to have an effect on surface water bodies (coastal waters, transitional waters and rivers) and groundwater bodies during its construction, operation and decommissioning. A draft assessment is incorporated in this chapter within **Sections 27.9** to **27.11**. A preliminary WFD Assessment has been provided in **Appendix 27.3, Volume 4** to demonstrate the effect on WFD water bodies and describe the appropriate embedded environmental measures. At the ES stage, the assessment will be updated and developed with any changes in the ongoing design evolution.
The EU Groundwater Directive (2006 / 118 / EC)	
The aim of the directive is to protect groundwater against pollution caused by dangerous substances.	The Proposed Development has the potential to have an effect on groundwater bodies through the introduction of dangerous substances, during the construction phase. Appropriate embedded environmental measures have been put forward in **Section 27.7** of this chapter and in **Chapter 25: Ground conditions** to help ensure the protection of groundwater.
Flood and Water Management Act 2010	
The Flood and Water Management Act sets out the Government's proposals to improve flood risk management, water quality and ensure water supplies are more secure.	Appropriate flood and water management will be incorporated through construction and operation to protect local populations, maintain / improve water quality and mitigate the risk of flooding. Existing water supplies are considered within **Appendix 27.1, Volume 4** and flooding and drainage issues are considered in **Appendix 27.2, Volume 4**, with embedded environmental measures are identified in **Section 27.7** in this chapter.

Legislation description	Relevance to assessment
Water Resources Act 1991, Water Act 2003 and The Environmental Permitting (England and Wales) Regulations 2016	
The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The Act was revised by the Water Act 2003, which sets out regulatory controls for water abstraction, water impoundment and protection of water resources. Provisions for the regulation of water discharges to controlled waters are set out in the Environmental Permitting (England and Wales) Regulations 2016, and have replaced provisions in the earlier Acts.	These Acts and Regulations set out the permitting and compliance framework which will regulate all site emissions, water abstractions and discharges with the potential to interact with the water environment. Important for the Proposed Development is the requirement to obtain a licence for dewatering of engineering works and to ensure that any impact on the environment can be mitigated as set out in **Section 27.7** of this chapter.

27.2.3 **Table 27-2** lists the key national planning policy relevant to the assessment of the effects on water environment receptors.

Table 27-2 National planning policy relevant to the water environment

Policy description	Relevance to assessment
National Policy Statement (NPS) for Energy EN-1 (Department of Energy and Climate Change (DECC), 2011a)	
NPS EN-1 identifies requirements to assess the potential impacts of energy projects on flood risk (Section 5.7), and water quality and water resources (Section 5.15), including consideration of climate change effects over the proposed development lifetime (Section 4.8). Paragraph 5.15.2 requires that "*Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent.*"	Assessments of the effects of the Proposed Development on the aquatic environment (which includes water quality), water resources and flood risk receptors are included on a project-wide basis in this chapter (**Sections 27.6** to **27.11**). The future baseline accounting for climate change is presented in **Section 27.6**. WFD classifications and objectives are taken into account as WFD water bodies themselves are receptors in the assessment and in **Appendix 27.3, Volume 4**.

Policy description	Relevance to assessment
NPS EN-1 paragraph 5.7.5 identifies a variety of the minimum requirements for FRAs.	A Flood Risk Screening Assessment has been undertaken and is provided in **Appendix 27.2, Volume 4**. The assessment sets out what the various requirements are and provides a breakdown of how each requirement has been addressed. The screening assessment will form the basis of the Flood Risk Assessment (FRA) which will be provided alongside the ES.
Paragraph 5.7.7 states that "*Applicants for projects which may be affected by, or may add to, flood risk should arrange pre-application discussions with the EA, and, where relevant, other bodies such as Internal Drainage Boards, sewerage undertakers, navigation authorities, highways authorities and reservoir owners and operators. Such discussions should identify the likelihood and possible extent and nature of the flood risk, help scope the Flood Risk Assessment, and identify the information that will be required by the IPC [now the Planning Inspectorate] to reach a decision on the application when it is submitted.*"	Discussions have been held with the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs) at the Scoping, and PEIR stages of the assessment. A Flood Risk Screening Assessment has been undertaken and is provided in **Appendix 27.2, Volume 4**. This will form the basis of the FRA which will be provided alongside the ES.
Paragraph 5.15.6 outlines that "*The IPC [now the Planning Inspectorate] should satisfy itself that a proposal has regard to the River Basin Management Plans and meets the requirements of the Water Framework Directive (including Article 4.7) and its daughter directives, including those on priority substances and groundwater.*"	WFD classifications and objectives are taken into account, as the WFD water bodies themselves are receptors in the preliminary assessment presented in this chapter, and within a preliminary WFD Assessment in **Appendix 27.3, Volume 4**. At the ES stage, the assessment will be updated and developed with any changes in the ongoing design evolution.
Paragraph 5.15.3 requests that *"The ES should in particular describe:* *• The existing quality of waters affected by the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges;* *• Existing water resources affected by the proposed project on water resources, noting any relevant existing abstraction*	The baseline characteristics of the water environment (which includes water quality, water resources and flood risk) has been provided in **Section 27.6** and associated assessments are provided in **Sections 27.6** to **27.11**. There is also a preliminary WFD Assessment and Flood Risk Screening Assessment presented respectively within **Appendix 27.2** and **Appendix 27.3, Volume 4**.

Policy description	Relevance to assessment
rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and in reference to Catchment Abstraction Management Strategies; *• Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics; and* *• Any impacts of the proposed project on water bodies or protected areas under the WFD [Water Framework Directive] and Source Protection Zones (SPZs) around potable groundwater abstractions".*	
NPS for Electricity Networks Infrastructure EN-5 (DECC, 2011b)	
NPS EN-5 restates the requirements of NPS EN-1 that due consideration and assessment is given to the effects of future climate change on flood risk to electricity transmission infrastructure (Section 2.4). Paragraph 2.4.1 requires that "*Applicants should in particular set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it would be resilient to: flooding, particularly for substations that are vital for the electricity transmission and distribution network; effects of wind and storms on overhead lines; higher average temperatures leading to increased transmission losses; and earth movement or subsidence caused by flooding or drought (for underground cables).*"	The Flood Risk Screening Assessment presented in **Appendix 27.2, Volume 4** has identified the need to take into account the issue of resilience to flooding and other aspects of climate change. At the ES stage, the FRA will further address issues of flood vulnerability resilience.
National Planning Policy Framework (NPPF) (Communities and Local Government 2019a)	
The NPPF sets out planning policy for England and places a general presumption in favour of sustainable development. The policies relating to planning and flood risk are set out in NPPF paragraphs 155 to 165.	The NPPF requirements (Department for Communities and Local Government, 2012a) are captured within the Flood Risk Screening Assessment (**Appendix 27.2, Volume 4**), which presents information on the sequential and exception tests as well as demonstrating that the development will

Policy description	Relevance to assessment
Paragraph 5 of the NPPF states that the framework "*does not contain specific policies for Nationally Significant Infrastructure Projects (NSIPs)*". However, it states that "*these are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework).*"	not result in an increase in flood risk from any source of flooding. This assessment includes consideration of climate change in line with NPPF requirements, as agreed with the EA. It is also carried out in accordance with its supporting technical guidance (Department for Communities and Local Government, 2012b), taking into account associated vulnerability classifications.

Local planning policy

27.2.4 The study area also crosses the boundaries of several district councils including Arun District Council (ADC), Horsham District Council (HDC), and Mid Sussex District Council (MSDC). **Table 27-3** lists the local planning policy relevant to the assessment of the effects on water environment receptors.

Table 27-3 Local planning policy relevant to the water environment

Policy description	Relevance to assessment
Adoption Arun Local Plan 2011-2031 (July 2018)	
Policy W SP1 Water sets out water efficiency measures in order to protect the water resources and enhance the quality of the water environment which supports a range of habitats and ecosystems.	The policy states that any development will be encouraged to make active use of surface water as a design feature and permitted where it identifies measures to improve and enhance water bodies, coastal habitats or provides additional flood relief. In addition, it states that the Council will support developments which are appropriately located, taking account of flood risk and promotes the incorporation of appropriate mitigation measures into new development, particularly sustainable drainage systems (SuDS) that reduce the creation and flow of surface water and improves water quality. This policy has been addressed within environmental measures in **Section 27.7** of this chapter, and as part of **Appendix 27.2, Volume 4**.
Policy W DM1 Water supply and quality sets out measures required for the provision of a water supply and measures to ensure good water quality.	The policy states that the provision of water supply for developments should not be detrimental to existing abstractions, river flows, water quality, fisheries, amenity or nature conservation. In addition, any development must illustrate, where necessary, how they have contributed to the protection and enhancement of water bodies identified by the South East River Basin Management Plan (RBMP) objectives. These requirements have been addressed within **Sections 27.9** to **27.11** of this chapter.
Policy W DM2: Flood Risk sets out the requirements for any developments in areas at risk from flooding, identified on the latest EA flood risk maps and within the Council's Strategic Flood Risk Assessment (SFRA).	The policy states that developments will only be permitted where a site-specific FRA demonstrates that the development will not increase flood risk elsewhere and will reduce flood risk overall. It also specifies that new site drainage systems are designed to take account of events which exceed the normal design standard i.e. consideration of flood flow routing and utilising temporary storage areas, and new schemes need to identify adaptation and

Policy description	Relevance to assessment
	mitigation measures. Flood risk is considered within **Appendix 27.2, Volume 4**, and this considers the Arun SFRA. The route of the onshore temporary cable construction corridor crosses the lower tidal River Arun area and the Proposed Development takes account of relevant Surface Water Management Plans, Catchment Flood Management Plans and related Flood Defence Plans and strategies such as the Lower Tidal River Arun Strategy.
Policy W DM3: SuDS sets out the requirement to identify opportunities in the early stage of the design process of a development to incorporate a range of SuDS to increase the levels of water capture and storage and improve water quality.	Drainage design to manage and, if necessary, treat surface water run-off will be included in all elements of temporary and permanent infrastructure of the Proposed Development. As set out in **Section 27.7** of this chapter and **Appendix 27.2, Volume 4**, drainage design will follow the SuDS hierarchy with preference being given to local infiltration of surface water run-off from new areas of hardstanding, where possible, and appropriate mitigation will be embedded into the design to ensure the maintenance of overland flow pathways or areas of known surface water flooding appropriate measures.
Horsham District Planning Framework (2015 - 2031)[1]	
Policy 24: Environmental Protection sets out the issues related to maintaining, and where necessary improving, the quality of the environment.	The route of the onshore temporary cable construction corridor crosses areas identified as at risk of flooding and this policy states that the Council will ensure that surface water flooding is managed to prevent the contamination of watercourses. This policy has been addressed as part of measures set out in **Section 27.7** of this

[1] It is acknowledged that the Horsham District Local Plan is being consulted on, with an update anticipated soon. Based on information from the Horsham District website https://www.horsham.gov.uk/planning/local-plan [Accessed: 24/06/2021], it is understood that a Regulation 19 document is due to published in the Summer 2021. Any relevant polices will be incorporated at the ES stage and given appropriate consideration.

Policy description	Relevance to assessment
	chapter and within **Appendix 27.2, Volume 4**.
Policy 35: Climate Change sets out measures which should be used to mitigate the effects of climate change and to meet the district's carbon reduction targets as set out in the Council's Acting Together on Climate Change Strategy, 2009.	The policy states that any development must be designed so that it can adapt to the impacts of climate change, particularly in terms of flood risk, water supply and changes to the district's landscape in terms of providing appropriate flood storage capacity and the use of SuDS to help reduce surface water runoff and provide flood storage capacity. This policy has been addressed as part of measures set out in **Section 27.7** of this chapter and within **Appendix 27.2, Volume 4**.
Policy 37: Sustainable Construction sets out measures to improve the sustainability of developments.	The policy states that sustainable design measures should be put in place to minimise vulnerability to flooding. This policy has been addressed as part of measures set out in **Section 27.7** of this chapter and within **Appendix 27.2, Volume 4**.
Policy 38: Flooding Development sets out measures that proposals will follow with respect to flood risk management.	The policy states that priority will be given to development sites with the lowest risk of flooding and making required development safe without increasing flood risk elsewhere. The route of the onshore temporary cable construction corridor crosses areas identified as at risk of flooding and any development proposals should take a sequential approach to ensure most vulnerable uses are placed in the lowest risk areas. In addition, floodplains (Flood zone 3b) should be avoided and only be acceptable in Flood Zone 2 and 3 following completion of tests, such as those within the recommendations set out in the Horsham District SFRA. The policy also states that proposals will require a site-specific FRA for all developments over 1 hectare in Flood Zone 1 and all proposals in Flood Zone 2 and 3. This policy has been addressed as part of measures set out in **Section 27.7** of this chapter and within **Appendix 27.2, Volume 4**.

Policy description	Relevance to assessment
	Further, this policy states that where there is the potential to increase flood risk, proposals must incorporate the use of SuDS where technically feasible or incorporate water management measures which reduce the risk of flooding and ensure flood risk is not increased elsewhere. Consideration should be given to the vulnerability and importance of local ecological resources such as water quality and biodiversity when determining the suitability of SuDS, and drainage techniques that mimic natural drainage patterns and manage surface water as close to its source as possible will be required where technically feasible. This policy has been addressed as part of measures set out in **Section 27.7** of this chapter and within **Appendix 27.2, Volume 4**.
Mid Sussex District Plan (2014-2031) (Adopted March 2018)	
Policy DP41: Flood Risk and Drainage sets out how development proposals will be considered within areas at risk of flooding. The objective is to promote development that makes the best use of resources and increases the sustainability of communities and their ability to adapt to climate change.	The policy states that a SFRA has been prepared to identify areas that are at risk from flooding and associated mapping is kept up-to-date with data from recent flood events and EA information. Development proposals in areas at risk of flooding should be supported by site-specific flood risk assessments. The SFRA provides information on the use SuDS to avoid increased flood risk or adverse impacts on water quality. SuDS should be sensitively designed and located to promote improved biodiversity. This policy has been addressed as part of measures set out in **Section 27.7** of this chapter and within **Appendix 27.2, Volume 4**. The policy also states that proposals for development will need to follow a sequential risk-based approach, ensure development is safe across its lifetime and not increase the risk of flooding elsewhere. The SFRA should be used to identify areas at present and future flood risk from a

Policy description	Relevance to assessment
	range of sources including fluvial (rivers and streams), surface water (pluvial), groundwater, infrastructure and reservoirs. Particular attention will be paid to those areas that have experienced flooding in the past and proposals for development should seek to reduce the risk of flooding by achieving a reduction from existing run-off rates. The policy also states that the preferred hierarchy of managing surface water drainage from any development is: 1. Infiltration measures; 2. Attenuation and discharge to watercourses; and, if these cannot be met, 3. Discharge to surface water-only sewers. Land that is considered to be required for current and future flood management will be safeguarded from development and proposals will have regard to relevant flood risk plans and strategies. This policy has been addressed in **Section 27.7** of this chapter and within **Appendix 27.2, Volume 4**.
Policy DP42: Water Infrastructure and the Water Environment sets out its objectives of promoting development that makes the best use of resources and increases the sustainability of communities and its ability to adapt to climate change.	This policy requires any new development proposals to be in accordance with this European WFD to prevent deterioration of water quality and to achieve Good Ecological Status in coastal waters, estuaries and rivers, together with Good Status of groundwater by at least 2027. This policy has been addressed within **Sections 27.9 to 27.11** of this chapter and **Appendix 27.3, Volume 4**.
South Downs Local Plan 2014-2033 (Adopted July 2019)	
Policy SD17: Protection of the Water Environment sets out the requirement of development proposals to conserve and enhance aspects of groundwater, surface water features and watercourse corridors.	This policy states that water quality and quantity should be conserved and enhanced to achieve requirements of the WFD or its replacement. In addition, the ability of groundwater, surface water features and watercourse corridors to function by natural processes throughout seasonal variations, within the immediate vicinity, and both upstream and downstream, of the site of the proposal should be considered. It states that

Policy description	Relevance to assessment
	development proposals must conserve watercourse corridor biodiversity and that maintenance is carried out for flood risk management purposes. The policy states that development within groundwater Source Protection Zones (SPZs) will only be permitted provided that there is no adverse impact on the quality of the groundwater source, and provided there is no risk to its ability to maintain a water supply, and any development must incorporate measures to eliminate risk of pollution to groundwater, surface water and watercourse corridor features that would harm their ecological and / or chemical status. This policy has been addressed within **Section 27.9 to 27.11** of this chapter.
Policy SD49: Flood Risk Management sets out how development proposals should seek to reduce the impact and extent of flooding.	This policy requires that development is away from areas of flood risk as identified by the EA and the SFRA, and preferably within Flood Zone 1, wherever possible, and should be accompanied by a site-specific FRA. It also states that proposed developments should not increase the risk of flooding elsewhere and, wherever possible, reduce overall flood risk and ensure that the integrity of coastal and river flood defences are not undermined. In addition, flood protection, mitigation and adaptation measures should be necessary and appropriate to the specific requirements of the proposal, the development site and other areas potentially impacted. This policy has been addressed within **Appendix 27.2, Volume 4**.
Policy SD50: Sustainable Drainage Systems sets out how flood risk management opportunities should be sought to reduce the overall level of flood risk.	This policy states that development proposals will be permitted where they ensure that there is no net increase in surface water run-off, taking account of climate change. Major developments will only be permitted where they provide suitable SuDS unless it is demonstrated to be inappropriate and adopt suitable sustainable drainage systems where

Policy description	Relevance to assessment
	required by the LLFA. In addition, the policy states that where SuDS are provided, arrangements must be put in place for their whole life management and maintenance. This policy has been addressed in **Section 27.7** of this chapter and within **Appendix 27.2, Volume 4**.
West Sussex County Council Culvert Policy (2021)	
"*West Sussex Local Authorities are in general opposed to the culverting of watercourses because of the potential for adverse effect on flood risk and ecology. The Competent Authority will therefore adopt a precautionary principle and only approve an application to culvert an ordinary watercourse if there is no reasonably practicable alternative or if the potential negative impact of culverting would be so minor that they would not justify a more costly alternative.*" *The Culvert Policy states that "a culvert will not be considered until alternatives have been considered, for example:* - *Clear span bridges;* - *Revision of the site layout to incorporate an open watercourse that can be easily maintained; or* - *Diverting the watercourse without loss of its hydraulic flow characteristics."* "*In all cases and where it is appropriate to do so, compensation in full is to be provided for any loss in storage capacity or habitat.*"	Some culverts are proposed by the Proposed Development (as opposed to clear span bridges) associated with the haul road / running track on the basis of their temporary nature. There will be full removal and restoration undertaken to restore the watercourse to its previous state upon completion of construction works. This is provided to meet these culvert design requirements set out in the West Sussex County Council Culvert Policy. Importantly this West Sussex County Council Culvert Policy is principally aimed at proposals for permanent culverts, none of which are being put forward as part of the Proposed Development.

Other relevant information and guidance

27.2.5 A number of bodies with responsibility for management and regulation of the water environment have produced guidance that is relevant to this assessment.

27.2.6 The EA is the lead statutory body with responsibility for protection of the water environment in England. The EA is responsible for flood defence and drainage for

Main Rivers[2]and estuarine and coastal areas. The EA has produced regional management plans and strategies for the water environment relevant to this assessment, as follows:

- South East RBMP (EA, 2016);
- Rivers Arun to Adur Flood and Erosion Management Strategy 2010 – 2020 (EA, 2011);
- River Arun to Pagham Flood and Coastal Erosion Risk Management Strategy (EA, 2015);
- Arun and Western Streams Catchment Flood Management Plan (EA, 2009a); and
- River Adur Catchment Flood Management Plan (EA, 2009b) identified West Sussex County as the LLFA (as defined by the Flood and Water Management Act, 2010) that covers the study area. The LLFAs coordinate flood management for all Ordinary Watercourses[3] plus flooding from other sources, including surface water, groundwater and the sewer network. Their Preliminary Flood Risk Assessment (West Sussex County Council (WSCC), 2011) and Local Flood Risk Management Strategy (LFRMS) (WSCC, 2014) are of relevance to this assessment.

27.2.7 Each of the local planning authorities (ADC, HDC, MSDC) have produced a SFRA to support the development of their local plans outlined in the section above (in **Table 27-3**). The SFRAs are reviewed as part of the baseline assessment in the Flood Risk Screening Assessment presented in **Appendix 27.2, Volume 4**.

27.2.8 The following good practice guidance has also been taken into account during the assessment includes, but is not limited to, the following:

- The EA's approach to groundwater protection (EA, 2017), updating its previous Groundwater protection: principles and practice GP3 (2013);
- Discharges to surface water and groundwater: environmental permits (EA, 2021a);
- Groundwater activity exclusions from environmental permits (EA, 2018a);
- Groundwater risk assessment for your environmental permit (EA, 2018b);

[2] Main rivers are usually larger rivers and streams. The EA carries out maintenance, improvement or construction work on main rivers to manage flood risk. They are shown on the main rivers map: [online] (Accessed: 24 June 2021) https://www.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386 (Accessed: 24 June 2021)

[3] An Ordinary Watercourse is a smaller stream or ditch which drains away water. WSCC regulates all works on Ordinary Watercourses that require an Ordinary Watercourse Consent (OWC).

- CIRIA C648 Control of Water Pollution from Linear Construction projects: Technical Guidance (Construction Industry Research and Information Association (CIRIA), 2006);
- CIRIA C741 Environmental Good Practice on Site (CIRIA, 2015);
- CIRIA Report C624: Development and Flood Risk – Guidance for the Construction Industry (CIRIA, 2004);
- Defra: Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Department for Environment and Rural Affairs (Defra), 2009);
- Netregs Guidance for Pollution Prevention (GPPs) (Netregs, 2017); and
- EA Pollution Prevention Guidance (PPG) Notes (2014, now discontinued).

27.3 Consultation and engagement

Overview

27.3.1 This section describes the outcome of, and response to, the Scoping Opinion in relation to the water environment assessment and also provides details of the ongoing informal consultation that has been undertaken with stakeholders and individuals. An overview of engagement undertaken can be found in **Section 1.5** of **Chapter 1: Introduction**.

27.3.2 Given the restrictions which have been in place due to the COVID-19 pandemic during this period, all consultation has taken the form of conference calls using Microsoft Teams.

Early engagement

27.3.3 Early engagement was undertaken with a number of prescribed and non-prescribed consultation bodies and local authorities in relation to the water environment. This engagement was undertaken to introduce the Proposed Development and the proposed approach to scoping the EIA.

Scoping opinion

27.3.4 Rampion Extension Development Limited (RED) submitted a Scoping Report (RED, 2020) and request for a Scoping Opinion to the Secretary of State (administered by the Planning Inspectorate (PINS)) on 2 July 2020. A Scoping Opinion was received on 11 August 2020. The Scoping Report sets out the proposed water environment assessment methodologies, outlines the baseline data collected to date and proposed, and summarises the scope of the assessment. **Table 27-4** sets out the comments received in Section 5 of the PINS Scoping Opinion 'Aspect based scoping tables – Onshore' and how these have been addressed in this PEIR. A full list of the PINS Scoping Opinion comments and responses is provided in **Volume 4, Appendix 5.1: Response to the Scoping Opinion**. Regard has also been given to other stakeholder comments that were received in relation to the Scoping Report.

27.3.5 The information provided in the PEIR is preliminary and therefore not all the Scoping Opinion comments have been able to be addressed at this stage, but all comments will be addressed within the ES.

Table 27-4 PINS responses for the water environment

PINS ID number	Scoping Opinion comment	How this is addressed in this PEIR
PINS		
5.9.1	On construction, operation and maintenance and decommissioning activities resulting in a potential impact on groundwater level (excluding the proposed substation) being scoped out: *"The Inspectorate agrees that as a result of the limited land disturbance during the earthworks associated with the landfall-cable it is unlikely for such activities to culminate in significant effects on groundwater levels. This is also the case in respect of disturbance during the operational and decommissioning stages. The Inspectorate agrees that this matter can be scoped out of the assessment, with the exception of the proposed substation. The ES will assess the potential for significant effects on groundwater levels from the proposed substation as set out in Table 6.10.11. However, the Inspectorate expects the ES will include an assessment of potential effects on groundwater quality during all phases and covering all aspects of the Proposed Development where significant effects are likely to occur."*	Onshore substation potential effects and also all effects on groundwater quality are retained in the preliminary assessment of effects. In addition to this potential effect from the onshore temporary construction corridor on groundwater levels have been scoped back in, in response to the stakeholder request. This assessment is presented in **Sections 27.9** to **27.11** of this chapter.

PINS ID number	Scoping Opinion comment	How this is addressed in this PEIR
5.9.2	The Scoping Report does not clearly identify the locations where the cable may cross below or run near a river. This should be detailed in the ES. Site-specific assessments for each location should also be undertaken to inform the cable crossing techniques at each main river and where significant effects may occur. Any mitigation and/or design measures relied upon for the purposes of the assessment should be explained in the ES and appropriately secured. Effort should be sought to agree proposed mitigation and reinstatement measures with the relevant consultation bodies.	A preliminary assessment of effects from watercourse crossings is carried out for these watercourses within this chapter in **Sections 27.9** to **27.11**, together with the provision of appropriate embedded environmental measures in **Section 27.7**. These measures will be further developed as the Proposed Development progresses and the design becomes further refined.
5.9.3	The assessment in the ES should take into account the potential impacts of climate change as per the latest UK Climate Projections (UKCP18). Effort should be made to agree the climate change model and future flood risk allowance baseline with relevant consultation bodies including the EA and lead local flood risk authority.	The future baseline accounting for climate change is presented in **Section 27.6** of this chapter, and the Flood Risk Screening Assessment presented in **Appendix 27.2, Volume 4** has identified the need to take into account the issue of resilience to flooding and other aspects of climate change. At the ES stage, the FRA will further address issues of flood vulnerability resilience.
5.9.4	The ES should clearly include in the baseline a description of existing (and where relevant, proposed) flood defences or flood alleviation measures that could be impacted or required by the Proposed Development.	The existing flood defences and future options are described in the Flood Risk Screening Assessment provided in **Appendix 27.2, Volume 4** and summarised within **Section 27.6** of this chapter. An FRA will be carried out at the ES Stage and will include an assessment of all flood effects and required embedded environmental measures.
5.9.5	Where site specific mitigation measures are to be implemented, the ES should describe the mitigation clearly. The ES should also outline how the mitigation measures will be secured through the DCO or other legal mechanism.	The provision of appropriate embedded environmental measures is outlined in **Section 27.7** of this chapter.

PINS ID number	Scoping Opinion comment	How this is addressed in this PEIR
5.9.6	The Inspectorate notes that little consideration has been given to any potential effects of the Proposed Development on marine water quality specifically (only by proxy in terms of it's bearing on benthic and fish ecology, coastal processes and other relevant aspects). Paragraph 6.10.3 sets out that the study area will encompass surface water bodies (river and transitional) and groundwater bodies but not coastal bodies. The ES should include any potential impacts of the works on marine water and sediment quality, particularly with regard to the two designated in proximity of the proposed cable corridor and landfall site (including cross reference to any standalone WFD assessment and other relevant aspect chapters of the ES). The Inspectorate has also made comments to this effect in section 4.10 of this Opinion in respect of the proposed nature conservation aspect chapter.	The assessment on marine water quality falls within the remit of **Chapter 6: Coastal processes** and **Chapter 14: Nature conservation**, as the receptors are offshore and not land-based. Within this chapter in the preliminary assessment (**Sections 27.9** to **27.11**), potential effects from land-based activities at the proposed landfall are considered on the Coastal Sussex WFD water body. A preliminary WFD assessment has been provided in **Appendix 27.3, Volume 4** for all WFD bodies under consideration. At the ES stage, this assessment will be developed and refined subject to any further changes in the ongoing design evolution.

27.3.6 In **Table 27-5** below regard has been given to other stakeholder comments that were received in relation to the Scoping Report.

Table 27-5 Other stakeholder responses for the water environment

Stakeholder Comment	How this is addressed in the PEIR
EA Comments	
The EA notes that only very little consideration has been given to any potential effects of the Proposed Development on marine water quality.	The assessment on marine water quality falls within the remit of **Chapter 6** and **Chapter 14**, as the receptors are offshore and not land-based. Within this chapter in the preliminary assessment (**Sections 27.9** to **27.11**), potential effects from land-based activities at the proposed landfall are considered on the Coastal Sussex WFD water body. A targeted preliminary WFD assessment has been undertaken in **Appendix 27.3, Volume 4** and this incorporates findings from each relevant aspect. At the ES stage, this assessment will be developed and refined subject to any further changes in the ongoing design evolution.
The impacts on water quality from increases in suspended sediment concentrations will need to be considered, in particular those related to re-suspension of contaminated sediments near the designated Bathing Waters. Potential effects should be assessed during construction and maintenance	The water environment chapter considers impacts to water quality pertaining to the onshore environment. As above, **Chapter 6** and **Chapter 14** carries out the assessment covering impacts on water quality for the offshore environment. **Chapter 18: Socio-economics** considers potential socio-economic impacts related to use of bathing waters. This chapter (**Sections 27.9** to **27.11**) considers (inter-related) potential impacts on onshore receptors such as the tidal section of the River Arun and Coastal Sussex WFD water body from landfall works and onshore temporary construction corridor works. A preliminary WFD assessment has been provided in **Appendix 27.3, Volume 4** and this considers the potential for contaminated sediments near bathing waters.
A WFD assessment will be required for this development. The EA recommends including this as a standalone chapter in the report.	A preliminary WFD assessment has been provided in **Appendix 27.3, Volume 4**.

Stakeholder Comment	How this is addressed in the PEIR
The WFD assessment should include any potential impacts of the works on marine water and sediment quality, particularly with regard to the two designated Bathing Waters (Middleton-on-Sea, Littlehampton) in proximity of the proposed cable corridor and landfall site. Elements of the proposed works will result in the mobilisation of sediments and associated contaminants, potentially including faecal bacteria. This presents an increased risk to bathing water quality during the bathing water season (May - September). While the EA acknowledges that impacts on water quality from increases in suspended sediment concentrations will be temporary, even a small and temporary increase in background faecal bacterial load has the potential to impact on bathing water compliance at a designated bathing water.	As covered above, consideration of this is covered within **Chapter 6, Chapter 14**, **Chapter 18**, and **Appendix 27.3, Volume 4**. A full assessment on the potential for mobilisation sediments (and sediment bound bacteria) on the compliance of Middleton-on-Sea and Littlehampton Bathing Waters is provided in **Appendix 27.3, Volume 4**. A consideration for the potential for the release of contaminants is provided in **Appendix 27.3, Volume 4**. The results of the sediment contaminant survey that has been undertaken across Rampion 2 were not available for inclusion within this PEIR assessment but will be fully reported within the final ES. The conclusion of whether the activity may disturb contaminants above Cefas Action Level 1 will be provided in the DCO Application and assessed accordingly.
The EA advises that the applicant should assess even short-term effects as part of the WFD assessment. This will be particularly relevant in the context of any activities that may give rise to increased suspended sediment concentrations in proximity to sensitive areas. Suitable evidence of no likely impact will be required for any marine works.	The preliminary assessment of onshore-based effects on WFD water bodies is presented in **Sections 27.9** to **27.11** of this chapter, and **Appendix 27.3, Volume 4** and this includes short term effects relating to the disturbance and mobilisation of sediments. As noted above, **Chapter 6** and **Chapter 14** also consider short term impacts on the offshore marine environment. A full assessment on the potential for reduction in water clarity and potential deterioration on the status of coastal and transitional water bodies is provided in **Appendix 27.3, Volume 4**. This assessment provides quantified evidence to provide assurance that there will be no likely impact on coastal and transitional water bodies.
The WFD assessment should follow the ‘Clearing the Waters for All’	This guidance has been taken into account in the preliminary WFD

Stakeholder Comment	How this is addressed in the PEIR
guidance, which has been published on https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters	assessment in **Appendix 27.3, Volume 4**.
A WFD assessment should comprise either: an explanation of why the activity has been screened out; or an explanation of why all elements have been scoped out, ideally using the scoping template; or an impact assessment.	In **Appendix 27.3, Volume 4**, initial screening has been carried out based on whether there is a potential connection between the WFD water bodies and activities as part of the spreadsheet in Annex B.
The EA states that the size and scale of the WFD assessment should be proportional to the risk posed by the potential works, but the applicant must demonstrate that they have assessed the risks and provided mitigation where necessary.	The preliminary assessment for WFD water bodies conducted at the PEIR stage in **Appendix 27.3, Volume 4** is commensurate with the risks posed by the potential works, and mitigation has been drafted in that document and **Section 27.7** of this chapter.
For water quality specifically applicants should assess impacts for activities that potentially increase suspended sediment concentrations in proximity to Bathing Waters and Shellfish Waters, including short-term effects. In order to assess the risks, an estimate of the volume of sediment disturbed during the activity is required. Sediment sampling might be required if the volume of disturbed sediment is significant, or where heavy contamination is expected. Where risks to water quality are identified, measures have to be taken to avoid or mitigate potential impacts.	The preliminary assessment for WFD water bodies for onshore-based effects is presented in **Sections 27.9** to **27.11** of this chapter, and this includes short term effects relating to the disturbance and mobilisation of sediments, for instance at the landfall. As noted above, **Chapter 6: Coastal processes** and **Chapter 14: Nature conservation** have considered short term impacts on the offshore marine environment, in proximity to Bathing Waters and Shellfish Waters. A full assessment on the potential for mobilisation sediments (and sediment bound bacteria) on the compliance of Middleton-on-Sea and Littlehampton Bathing Waters is provided in **Appendix 27.3, Volume 4**. No designed Shellfish Waters have been identified within 2km of the PEIR Assessment boundary. Sediment sampling has been undertaken by the Applicant to determine the levels of

Stakeholder Comment	How this is addressed in the PEIR
	potential contamination within the offshore cable corridor. Details of the embedded measures of relevance to this WFD assessment are provided in **Appendix 27.3, Volume 4**.
The EA states that examples of mitigation should consider the timing of works: 1) Work around low water to avoid stirring up any sediment into the water column; 2) Plan activities to occur outside the bathing water season. Methodology also needs to be considered: 1) Land-based or marine plant; 2) Choice of dredger e.g. backhoe dredging is less likely to increase suspended sediment concentrations than water injection dredging; 3) Use of temporary bunds or silt curtains.	The assessment on marine water quality falls within the remit of **Chapter 6** and **Chapter 14**, as the receptors are offshore and not land-based. These chapters are where the main assessment including embedded environmental measures for bathing waters and marine waters is providing and this includes consideration of dredging and construction methods.
The chemical water quality risk posed by disturbing a volume of sediment will always depend on the pre-existing water quality, the levels of contaminant present in the sediment being disturbed and the potential for dilution within the receiving water body. As water bodies vary considerably in size, a significant volume for a small water body might be insignificant in a larger one. In estuaries, tidal state and freshwater flow in the context of available dilution may vary considerably, and the choice of timing of the works will be important.	**Appendix 27.3, Volume 4** considers all potential effects WFD water bodies in relation to both onshore and offshore proposals. This chapter considers the transitional tidal extent of the Arun watercourse which is within the same catchment as the proposed landfall and the southern section of the onshore temporary construction corridor (**Section 27.6** and **Appendix 27.1, Volume 4**). Environmental measures have been embedded into the Proposed Development, including timing of onshore works with respect to river flow levels in the estuary (**Section 27.7**). **Chapter 25** has taken into account the levels of contaminant in sediment, whilst **Chapter 14** considers marine water quality and the timing of offshore works.

Stakeholder Comment	How this is addressed in the PEIR
The EA states that onshore construction is likely to cross several watercourses that have WFD status, including the main River Arun. Therefore, it will be necessary to demonstrate how this development could contribute to the delivery of WFD actions on these impacted water bodies.	A preliminary assessment of effects from watercourse crossings is carried out for these watercourses within this chapter in **Sections 27.9** to **27.11**, together with the provision of appropriate embedded environmental measures in **Section 27.7**. A preliminary WFD Assessment is presented in **Appendix 27.3, Volume 4** which demonstrates compliance with WFD objectives for waterbodies, including the Arun.
The EA would expect to see the impacts of any intrusive works or horizontal directional drilling (HDD) through any sensitive locations such as SPZs and Principal Aquifers adequately assessed in the ES. The proposed onshore route from the landfall site at Climping through to Bolney may go through the SPZ for the public drinking supply at Hardham, and this would need to be addressed for impacts.	The preliminary assessment in **Sections 27.9** to **27.11** of this chapter includes consideration of potential effects on groundwater and quantity quality of licensed abstractions including public water drinking supplies and SPZs (identified in **Appendix 27.1, Volume 4** and **Section 27.6**). In **Section 27.7**, specific embedded environmental measures have been embedded into the Proposed Development for SPZs and water supplies which have been carefully considered during constraints mapping and onshore optioneering at the outline design process. The measures will also ensure that each supply is protected during the construction, operation and decommissioning phases.
Groundwater SPZs indicate the risk to groundwater supplies from potentially polluting activities and accidental releases of pollutants. Designated to protect individual groundwater sources, these zones show the risk of contamination from any activities that might cause pollution in the area. In this context they are used to inform pollution prevention measures in area which are at a higher risk, and to monitor the activities of potential polluting activities nearby.	The SPZs have been carefully considered as part of a constraints and embedded environmental measures set out in **Section 27.7** to help minimise impacts on all the relevant public water supplies (identified in **Appendix 27.1, Volume 4**).
The EA expects to see the impacts and possibility of creating pathways	The specific consideration of ground contaminants mobilisation and pathways

Stakeholder Comment	How this is addressed in the PEIR
for contaminants assessed adequately within the ES including how these will be managed and monitored through the pollution prevention precautions.	is covered in **Chapter 25**, which also contains a section on mitigation and assessment. The appropriate measures that relate to water environment receptors have also been captured within the list of embedded environmental measures in **Section 27.7** of this chapter.
If the cable route passes through areas of contamination, it may create a preferential pathway for contamination to migrate. Any risk assessment for the areas of known / suspected contamination, specifically historic landfills, must also consider the potential for leachate from the waste mass and the disturbance of any site engineering or containment systems, if applicable. The EA would welcome site specific discussions in this respect.	**Chapter 25** identifies the potential sources and pathways for any contaminants from historic landfills, including leachate from waste mass and disturbance of site containment systems. This chapter utilises this information including embedded environmental measures in **Section 27.7** to provide a preliminary assessment of potential effects on water environment receptors in **Sections 27.9** to **27.11**.
During construction any de-watering activities (from land or from excavations) must comply with the EA's Position Statement on Dewatering Temporary Excavations: https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water If this can't be achieved, then the applicant will need to apply for a discharge permit and potentially an abstraction licence as well. This should be recognised in the ES.	The terms of this guidance are referenced in this chapter and the need for compliance is included as an embedded environmental measure within the commitments register to be secured as part of the DCO.
The boundary for the proposal is currently shown to be within areas of Flood Zones 3 and 2, both tidal and fluvial. The EA has particular interest in the proposed works within fluvial areas, particularly where subsoil and topsoil storage is required, both temporary and permanent. It requires a flood risk assessment at the detailed application stage.	A Flood Risk Screening Assessment has been carried out and is provided in **Appendix 27.2, Volume 4** and summarised within **Section 27.6** of this chapter. An FRA will be carried out at the ES Stage and will include an assessment of all flood sources including fluvial flood risk.

Stakeholder Comment	How this is addressed in the PEIR
Based on the application area, the applicant should be aware that the coastal frontage at Climping was severely damaged and overtopped in January and February 2020, and widespread flooding occurred inland as far as the A259 carriageway and beyond. The EA has since constructed a large shingle embankment, which at the time of writing has held up well when subjected to further high tides.	This has been taken into account within the Flood Risk Screening Assessment in **Appendix 27.2, Volume 4**. Engagement has also been carried out with the EA to obtain details about the shingle embankment, and details of these defences are summarised in **Appendix 27.2, Volume 4** and have been taken into account as part of the outline design.
The EA is reviewing future options for the beach management of the Climping coastal frontage.	**Appendix 27.2, Volume 4** presents a brief summary of any future options for flood defences. The future strategies for these defences including natural realignment will inform the detailed design of landfall proposals at the ES stage as part of the FRA.
As part of the EA's internal projects, it should be borne in mind that proposals are being considered for removal of riverbanks so as to form inter-tidal habitats, particularly in the area of the Adur valley. These areas may be within the route of the proposed cabling.	During the ongoing onshore cable corridor design process this information will be sought and taken account of as part of the FRA at the ES stage.
A major flood defence scheme has just been completed in the town of Arundel. These areas may be within the route of the proposed cabling.	**Appendix 27.2, Volume 4** has identified these defences and their attributes. These will be taken further into account as part of the FRA at the ES stage.
Historic flood issues have affected the communities of Storrington, Steyning and Bramber. These areas may be within the route of the proposed cabling.	Storrington is in the area of a headwater of the Arun (not connected to the Proposed Development). Steyning and Bramber are approximately 0.5km - 1.5km downstream of the Proposed Development and so are unlikely to be impacted following implementation of embedded environmental measures set out in **Section 27.7** of this chapter. This will be confirmed as part of the FRA at the ES stage.

Stakeholder Comment	How this is addressed in the PEIR
For the previous Rampion 1 (Brooklands to Bolney) works which impact 'Main River', 'IDB ditches' and 'Ordinary Watercourses', Flood Defence Consents would have been dealt with entirely by the EA.	Local authorities have initially been consulted as well as the EA as part of ongoing engagement. The Proposed Development is within the WSCC area. In addition, the EA has been consulted with in relation to proposed works on Ordinary Watercourses relating to the River Arun. Discussions regarding flood defence consents and Ordinary Watercourse consents will be discussed with these consultees as the design evolves and at the detailed design stage. **Section 27.7** of this chapter has captured the need for these environmental measures to be embedded as part of the Proposed Development.
Whilst the EA will still deal with works to Main Rivers and the River Arun IDB ditches (the River Adur IDB has since been dissolved), Flood Defence Consents have now been superseded by Flood Risk Activity Permits (FRAPs) and are now subject to a completely different charging mechanism. This also includes the coastal frontage at Climping which would be subject to a FRAP application.	This chapter acknowledges the need for FRAPs in **Section 27.7**. In relation to the River Arun, ongoing engagement with the EA has been undertaken for both Main Rivers and what were previously IDB ditches (prior to the River Adur IDB being dissolved). Ongoing engagement will continue into the ES stage and post-detailed design stages as part of preparation of FRAP applications.
The EA would welcome a meeting with the applicant once the cabling route has been firmly established, so that all issues can be identified at the earliest stage.	A meeting will be held with the EA once the onshore temporary cable corridor has been established to discuss any potential issues with them.
As part of the EA FRAP process opportunities for WFD improvements would be sought.	FRAPs have been set out as part of the mitigation requirements in **Section 27.7** of this chapter with the aim of no deterioration in status as a result of the Proposed Development. A preliminary CEA has also been carried out to consider other relevant developments in **Section 27.12**. At the ES stage, this process will again be considered alongside other development work in the area to clarify that there are also no

Stakeholder Comment	How this is addressed in the PEIR
	cumulative impacts which would result in deterioration to WFD water body status.
All other watercourses within the area that are known as 'Ordinary Watercourses' will require consent approval from the LLFA, namely WSCC.	This has been acknowledged in **Appendix 27.2, Volume 4** and relevant part of the embedded environmental measures in **Section 27.7** of this chapter, which will be updated at the ES stage.
Works which are on the coastal frontages, and tidal watercourses e.g. River Arun and River Adur will not only require a FRAP, but most probably also a Marine Management Licence.	The need for Marine Management Organisation (MMO) mitigation is identified within **Chapter 6** and **Chapter 14**.
The EA will have a presumption against open cut crossing of watercourses, and would always favour cabling being directionally drilled below bed level. Particular permitting concerns at this initial stage in addition to cable crossings would involve temporary works which include dewatering, and as stated earlier any spoil heaps in the flood plain both temporary and permanent which could result in the need for flood storage compensation.	The presumption against open cut trenching methods has been taken into account as part of the ongoing onshore cable corridor design. Sensitive watercourses including Main Rivers and WFD watercourses will be crossed by trenchless methods and bridges, whilst minor watercourses and ditches with less sensitivity will be crossed by open cut methods. Environmental measures have been set out in **Section 27.7** of this chapter to ensure that potential impacts from trenched and trenchless methods of watercourses are minimised. Further environmental measures are being considered to be embedded into the design of Rampion 2 to avoid soil storage in flood plains. These will be further developed as the design of the Proposed Development becomes further refined as necessary at the ES stage.
Works timings and ecological safeguarding would also be considerations as part of any FRAP application.	The importance of standoff distances (riparian buffers) and the timing of work (drier periods with less surface runoff) have been incorporated into the embedded environmental measures set out in **Section 27.7** of this chapter.

Stakeholder Comment	How this is addressed in the PEIR
Horsham District Council Comments	
HDC is in broad agreement with the assessment methodology detailed in the Scoping Report, including that related to Hydrogeology, Hydrology and Flood Risk.	Agreement noted.
The Scoping Report has identified the current areas of flood risk and potential pathways. It should be noted however that there are a number of smaller Ordinary Watercourses, such as ditches, within the study area that may not have been mapped for flood risk due to their catchment size.	The layout of smaller watercourses has been taken into account as part of initial constraints mapping exercises. They have also been initially considered within **Appendix 27.2, Volume 4** and will continue to be at the ES Stage as part of the FRA.
Based on the flood map, parts of the study area are shown to be located with Flood Zone 2 and 3. However the majority of the construction corridor is within Flood Zone 1. As the site contains Flood Zones 2 and 3, the sequential test applies to this development.	**Appendix 27.2, Volume 4** has set out where the current PEIR Assessment Boundary crosses watercourses and identifies a series of constraints, and the need for sequential tests. At the ES stage, this will be evidenced as part of the FRA which will show how the sequential test has been carried out and that the onshore temporary construction corridor has been steered away from areas of flood risk.
The study area includes a stretch of the River Adur, its tributaries and impoundments. HDC would encourage the opening up of culverts and other appropriate river restoration or land management techniques to be incorporated with existing flow routes to deliver flood risk and water quality improvements along the cable route, particularly where known upstream flood risk to adjacent areas can be reduced by improving conveyance and storage areas.	The preliminary assessment in Sections **27.9** to **27.11** and appropriate embedded environmental measures in **Section 27.7** of this chapter and **Appendix 27.2, Volume 4** and **Appendix 27.3, Volume 4, Volume 4** are focussed on ensuring there is no increase in flood risk and deterioration in water quality associated with the construction and operation of the development in accordance with NPPF and the WFD. At the ES stage, a Flood Risk Assessment will be carried out to support the DCO and this will include further consideration of flood risk management measures.

Stakeholder Comment	How this is addressed in the PEIR
West Sussex County Council Comments	
WSCC wishes for RED to ensure that Table 6.10.3 is more in keeping with the rest of the EIA (significance evaluation) e.g. for moderate impacts to also be classified as 'significant' in EIA terms, rather than 'potentially significant'?	In the Scoping Report in Table 6.10.3, a 'significant' effect corresponded to a Major rating whereas a Moderate rating corresponded to a 'potentially significant' effect at that stage of the EIA process. As noted in **Section 27.1** of this chapter, "the approach will be subject to further investigation at the ES stage following refinement of design information. This approach will be based on professional judgement and carried out on a precautionary basis". Flexibility is given on the basis that there are still uncertainties around the onshore elements of the Proposed Development, (for example local onshore cable corridor options and onshore substation search areas). The flexibility around 'potential significance' (i.e. whether an impact is significant / not significant) in the methodology and matrix table therefore remains included at PEIR. With sufficient design information at DCO Application submission, the assessment of effects section in the water environment ES chapter will distinguish which moderate level effects are significant from those that are not.
WSCC as LLFA is the risk management authority responsible for local flood risk defined as flooding from surface water, groundwater, and Ordinary Watercourses.	Noted. WSCC is part of the EPP stakeholder group and was consulted during the first EPP meeting in October 2020. WSCC will continue to be consulted during the ES and post-DCO Application stages.
With regards to requirements for the attenuation of water from the proposed infrastructure, WSCC refers RED to the West Sussex LLFA Policy for the Management of Surface Water (November 2018), that can be found on the WSCC web site, and all of the relevant guidance within it. Also of relevance is the	This guidance has been acknowledged and taken into account within the Flood Risk Screening Assessment (**Appendix 27.2, Volume 4**) and will be considered as part of the ES within the FRA.

Stakeholder Comment	How this is addressed in the PEIR
West Sussex Local Flood Risk Management Strategy (2013 – 2018) that focusses on the risks of flooding from surface water, groundwater and Ordinary Watercourses. It also considers flooding from rivers and the seas and provides clarification on the roles and responsibilities of WSCC as the LLFA for flood risk management.	
WSCC welcomes the commitment C-75, which states that construction and permanent development in identified floodplains within the Scoping Boundary will be avoided where possible. WSCC expects any work where this cannot be avoided to be robustly justified through the site selection process, and any mitigation proposed to be compliant with all relevant policies, including the NPPF.	These constraints have been identified as part of the ongoing onshore cable corridor design refinement, and further environmental measures have been embedded into the Proposed Development within **Section 27.7** of this chapter to avoid proposals in the floodplain where practicable. These measures will be refined and further mitigation will be developed at the ES stage as part of the FRA in order to ensure that proposals are fully NPPF compliant.
WSCC has reviewed the 'Rampion 2 Scoping report' and comments in regard to flooding and drainage below. The Key Constraints section considered flooding from rivers and sea as a key constraint but not flooding from surface water or groundwater. Surface water and groundwater is suitably covered in Section 6.10, but should perhaps be considered as a key constraints too. The potential obstacles section considered Main Rivers as a potential obstacle but not Ordinary Watercourses. Again, Ordinary Watercourses should be considered here too.	As noted, Section 6.10 of the water environment scoping chapter (RED, 2020) covered surface water, groundwater and Ordinary Watercourses as important considerations. This is also provided in the baseline **Section 27.6** of this chapter. They have been considered and addressed as constraints as part of the Flood Risk Screening Assessment process (**Appendix 27.2, Volume 4**), and at the ES stage they be given further consideration as potential obstacles / constraints as part of the FRA.

Stakeholder Comment	How this is addressed in the PEIR
Section 6.10 covers the Water Environment well and WSCC is happy with its content.	

Evidence Plan Process (EPP)

27.3.7 The EPP has been set up to provide a formal, non-legally binding, independently chaired forum to agree the scope of the EIA and HRA, and the evidence required to support the DCO Application.

27.3.8 For water environment, further engagement has been undertaken via the EPP Expert Topic Group (ETG) 'Onshore Ecology, Hydrology and Nature Conservation' meeting held by conference calls on 28 October 2020.The conference call was attended by the following stakeholders:

- West Sussex County Council;
- Environment Agency;
- Sussex Ornithological Society;
- South Downs National Park Authority;
- Sussex Wildlife Trust;
- Royal Society for the Protection of Birds;
- Natural England; and
- Ouse and Adur Rivers Trust.

27.3.9 The water environment section of the first ETG meeting on 28 October 2020 covered the proposed scope and methodology of the assessment, key datasets, preliminary findings and onshore temporary construction corridor optioneering constraints including SPZs, watercourse crossings and interactions with flood zones.

27.3.10 The EA asked whether a watercourse crossing schedule would be provided as part of a DCO Application (see the draft version presented in **Appendix 4.2: Crossing schedule, Volume 4**). The EA and WSCC also noted that Environmental Permits and Ordinary Watercourse Crossings would be considered as part of the DCO Application. Environmental measures have accordingly been embedded into the design of the Proposed Development within **Section 27.7** of this chapter.

27.3.11 The EA also requested that consideration is given to any potential effects from the Proposed Development on SPZs (for example Patching SPZ) on groundwater levels and associated public water supplies within the Chalk aquifer. Consideration and assessment is presented in **Appendix 27.1, Volume 4** and **Section 27.6** and **Sections 27.9** to **27.11** of this chapter, including the scoping back in of potential

effects on groundwater levels from the onshore temporary construction corridor to address this point.

27.3.12 A second ETG meeting was held for Onshore Ecology, Hydrology and Nature Conservation on 23 March 2021 with the same key stakeholders as the meeting in October 2020.

27.3.13 The water environment section of the second ETG meeting on 23 March 2021 provided further information on the latest design evolution, key data sources, the structure of the PEIR assessment and its appendices, potential water environment receptors and the role of embedded environmental measures.

27.3.14 In particular, details were presented for measures which related to works in the floodplain, watercourse crossing methodologies, appropriate standoff distances and stockpile management, dewatering and treatment, protection of water supplies, pollution prevention and remediation.

27.3.15 On watercourse crossing methodologies it was explained permanent onshore cable crossings will be under watercourses and not in channel. It was also noted that all EA main rivers and their flood defences will be crossed via trenchless methods (possibly HDD), to avoid any interactions with floodplains where possible. Other smaller watercourses and ditches will be crossed by open cut methods, and that the associated temporary haul road will cross using culverts or clear span bridges depending on their sensitivity.

27.3.16 In relation to design evolution, the water environment aspect also referred to the work that has been carried out to ensure no activities in Source Protection Zone 1, and that there will be no drilling or storage of hazardous materials in any SPZ.

27.3.17 For WFD water bodies, the criteria for the spatial scope of the preliminary assessment were presented, and it was noted that environmental measures have been incorporated to minimise disturbance and avoid significant effects on these receptors.

27.3.18 On flood risk screening various potential flood risk sources (tidal, fluvial, surface water) were identified. The key embedded environmental measures were also presented in relation to avoiding loss of floodplain storage in the fluvial floodplain, including the use of temporary trackway where practicable in Flood Zone 3, and where not possible building access routes and working areas in the floodplain as close to the ground as possible. It was also noted that for temporary haul road crossings, culverts will be sized based on those of culverts located up or downstream by proxy.

27.3.19 The EA acknowledged and agreed with this approach in principle, and asked that lessons learned from Rampion 1 of ordinary watercourse crossings be taken into account with particular interest in crossings in the River Adur catchment. The water environment team welcomed any advice and asked for any particular points from the EA be passed on. **Appendix 27.2, Volume 4** acknowledges relevant policies in relation to sizing culverts and the water environment team will work with engineers from Rampion 1 to ensure that relevant information from that project is utilised and implemented.

Informal consultation and further engagement

Overview

27.3.20 Informal consultation has been ongoing with a number of prescribed and non-prescribed consultation bodies and local authorities in relation to the water environment. A summary of consultation undertaken between the completion of the Scoping Report and up to and including March 2021 is outlined in this section.

Environment Agency (EA)

27.3.21 Engagement with the EA has been ongoing since June 2020 in the form of emails, conference calls and Evidence Plan Progress (EPP) Expert Topic Group (ETG) meetings discussed below. This has included discussion of a broad range of topics including data requests for baseline data sources, discussions in relation to the future of an existing sea defence along the Climping sea frontage, and the EA's role as the IDB for the River Arun internal ditches. The EA noted that it in principle agreed with the selection of Climping as a landfall location on the basis that there are no other reasonably available locations along the stretch of the coast to make landfall that are not already development. The EA also noted that the long term strategy for the shingle embankment sea defence at the proposed landfall is to allow natural processes to reform a non-natural section into a natural embankment, which would result in a shift of the coastline landwards as part of a natural realignment process.

Local Authorities including Arun District Council, Horsham District Council, Mid Sussex District Council and Adur and Worthing District Council

27.3.22 Engagement with each of these councils has been ongoing since June 2020 mainly in the form of emails. This has principally covered data requests for information on existing private water supply (PWS) information.

West Sussex County Council

27.3.23 Engagement with WSCC has also taken the form of emails requesting information on relevant flood risk policy, and historical flood risk information to inform the baseline assessment.

Informal consultation – January / February 2021

27.3.24 RED carried out an Informal Consultation exercise for a period of four weeks from 14 January 2021 to 11 February 2021. This Informal Consultation exercise aimed to engage with a range of stakeholders including the prescribed and non-prescribed consultation bodies, local authorities, Parish Councils and general public with a view to introducing the Proposed Development and seeking early feedback on the emerging designs.

27.3.25 The key themes emerging from Informal Consultation in January 2021 relating to water environment are:

- flood risk and erosion in the coastal area at Climping; and
- details around construction programming and phasing.

27.3.26 Further detail about the results of the Informal Consultation exercise can be found in **Informal Consultation Analysis**.

27.4 Scope of the assessment

Overview

27.4.1 This section sets out the scope of the PEIR assessment for the water environment. This scope has been developed as Rampion 2 design has evolved and responds to feedback received to date as set out in **Section 27.3**. As outlined in PINS Advice Note Seven, information presented in the PEIR is preliminary, therefore this scope will be reviewed and may be refined as Rampion 2 evolves and as a result of ongoing consultation.

Spatial scope and study area

27.4.2 The study area for the water environment assessment is shown on **Figure 27.1, Volume 3** and is defined as:

- the WFD surface water bodies (river and transitional) which are intersected by, and are downstream of, the PEIR Assessment Boundary; and
- the WFD groundwater bodies which the PEIR Assessment Boundary intersects.

27.4.3 Note that the study area for the water environment is different to the onshore element of the PEIR Assessment Boundary, which is defined as the area within which the Proposed Development will be located, including the temporary work areas. The PEIR Assessment Boundary comprises a corridor which allows flexibility in the positioning of a 50m onshore temporary construction corridor within it. At PEIR stage, the study area typically includes a variable buffer (typically 100m wide) either side of an indicative centreline. Both the study area and onshore part of the PEIR Assessment Boundary are used where appropriate for providing spatial context throughout this chapter.

27.4.4 Given that the onshore part of the PEIR Assessment Boundary is extensive in size, in the water environment baseline assessment in **Section 27.6** it has been regularly described in the following way:

- Southern section: Onshore landfall, and onshore temporary construction corridor towards Warningcamp;
- Central section: Onshore temporary construction corridor from Warningcamp to Washington, West Sussex; and
- North eastern section: The remainder of the onshore temporary construction corridor from Washington, West Sussex towards Bolney, and the two onshore substation search areas at Bolney Road / Kent Street and Wineham Lane North.

Temporal scope

27.4.5 The temporal scope of the assessment of the water environment is consistent with the period over which Rampion 2 would be carried out and therefore covers the construction, operation and maintenance and decommissioning phases as set out in **Chapter 4**. In summary:

- the maximum total onshore construction duration is anticipated to take approximately four years;
- the operational lifetime of the Proposed Development is expected to be around 30 years; and
- the timing of the decommissioning is itself more uncertain but it is assumed that decommissioning works will take between 1 – 3 years.

Potential receptors

27.4.6 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of Rampion 2. The receptors identified that may experience likely significant effects for the water environment are outlined in **Table 27-6**.

Table 27-6 Receptors requiring assessment for the water environment

Receptor group	Receptors included within group
WFD Water Bodies	WFD Groundwater Bodies
	Littlehampton Anticline East GB40701G503400
	Littlehampton Anticline West GB40701G504900
	Sussex Lambeth Group GB40701G505100
	Worthing Chalk GB40701G505300
	Lower Greensand Adur and Ouse GB40701G502400
	Adur and Ouse Hastings Beds GB40702G502000
	WFD Surface Water Bodies
	Ryebank Rife GB107041006620
	Black Ditch (West Sussex) GB107041012890
	Honeybridge Stream GB107041012120
	Adur Lockbridge GB107041012200
	Adur East (Sakeham) GB107041012900
	Adur East, GB107041012180
	Cowfold Stream GB107041012260

Receptor group	Receptors included within group
	Arun Lower GB540704105000
	Adur GB540704116000
	Sussex GB640704540003
Conservation Sites, Ponds and Springs	Designated Conservation Sites
	Arundel Park Site of Special Scientific Interest (SSSI)
	Amberly Mount to Sullington Hill SSSI
	Undesignated Conservation Sites
	Arun Valley, Watersfield to Arundel Local Wildlife Site (LWS)
	Bines Green LWS
	Local Geological Sites (LGSs), Ponds and Springs
	Rock Common Sand Quarry LGS
	Undesignated ponds near Patching (Black Ditch catchment); Washington Road A283 (River Stor catchment); Buncton Manor Farm (Honeybridge Stream catchment); between Blakes Farm and Sweethill Farm, near Eatons Farm (Ordinary Watercourse tributary of the tidal Arun); and south west of the Wineham Lane North onshore substation search area (Adur East (Sakeham) catchment)
	Undesignated springs near Hammerpot (Black Ditch catchment); between Kithurst Farm and Garston Farm (River Stor catchment); Water Lane, Buncton, Castle Farm Estate, and Hawking Soppers (Honeybridge Stream catchment)
Water Resources	Public Water Supply Abstractions
	A15 24/063 Warningcamp Pumping Station (PS) Borehole
	A16 10/41/310210 Burpham PS Borehole 1
	A17 10/41/310210 Burpham PS Borehole 2
	A18 10/41/310210 Burpham PS Boreholes 3 & 4
	A20 10/41/310210 Angmering PS Point 2
	A21 10/41/310210 Angmering PS Point 1
	A28 10/41/310210 Patching PS
	A33 10/41/310210 Findon PS
	A35 10/41/310210 Sompting PS

Receptor group	Receptors included within group
	A36 10/41/310210 Broadwater PS Borehole 1
	A37 10/41/310210 Broadwater PS Borehole 2
	A38 10/41/310210 Broadwater PS Borehole 3
	A39 10/41/310210 Broadwater PS Well
	Large Licensed Abstractions
	A1 10/41/542009 Point A At New Barn, Climping
	A5 23/059 Point A St Alders Fish Farm
	A6 10/41/411021 River Arun – Estuary Tidal
	A9 24/060 Knucker Hole Fish Farm
	A19 10/41/414101 Lee Farm, Patching
	A45 23/059 Point A at Alders Fish Farm
	A46 10/41/312103 Wappingthorn Farm, Steyning Borehole A
	A47 10/41/312010 Huddlestone Farm, Steyning
	A48 10/41/312010 Huddlestone Farm, Steyning
	Small Licensed Abstractions
	A11 10/41/411010 Church Farm, Lyminster
	A12 10/41/411102 Broomhurst Farm
	A42 25/084 Point A, Sandgate Pit, Storrington
	A43 25/084 Point B, Sandgate Pit, Storrington A44 23/073 Washington Garden Centre
	Private Water Supplies
	P1 The Old Rectory
	P2 Brookbarn House
	P3 Pauls House
	P6 Lample House;P7 Upper Barpham
	P8 Turners Dairies
	P9 Long Furlong Barn
	P10 The Chantry Mere
	P11 Wappingthorn Farm

Receptor group	Receptors included within group
	P12 Huddlestone Farm P18 Unknown
	Unregistered Mapped Wells Near Godmarks Farm (unnamed Ordinary Watercourse tributary of River Adur catchment); two between Frylands and Waterperry House along Frylands Lane (Adur East (Sakeham) catchment); the Hangers, Ewhurst Cottages, the Rectory, Park Farm, and the Fodges, Kent Street (Cowfold Stream catchment)
	Consented Discharges D1 St. Mary at Clymping School (P03693); D2 St. Mary at Clymping School (P07396); D3 H M Prison, Ford, Arundel (P06977); D4 Clay Lane, Warningcamp (P01142); Turkey breeding unit, Rock Cross Road (S01785); Gratwicke Farm, Partridge Green (D01392); Bolney sub-station, Bob Lane (P11968); Bolney substation, Wineham Lane (S01525).
Flood Risk Receptors	Essential Infrastructure Arundel Station
	Highly Vulnerable Land Use Brookside caravan park
	More Vulnerable Land Use Residential properties within Atherington; The Mill, Climping Residential and mixed-use properties on Church Lane, Lyminster Mixed-use properties on Sandhill Lane, Washington, and Springlands, Wineham.
	Less Vulnerable Land Use Climping Park, Priory Farm, Old Waterworks Farm, Rock Business Park, Washington, and Yokenclose Barn, Bines Green

27.4.7 The list of receptors will be kept under review during the EIA as more detailed information is obtained during baseline surveys and other forms of data collection by other aspects and will be reflected in the final ES.

Potential effects

27.4.8 Potential effects on water environment receptors that have been scoped in for assessment are summarised in **Table 27-7**.

Table 27-7 Potential effects on water environment receptors scoped in for further assessment

Receptor	Activity or impact	Potential effect
Construction		
Groundwater and Surface WFD Water Bodies (River, Transitional and Coastal) Landfall –cable and associated earthworks resulting in potential impacts on water quality or flood risk (Construction)	Spillage or leakage of fuels, lubricants or other chemicals during construction at the landfall, cable laydown and onshore substation. This includes the potential for leakage of bentonite during HDD.	Potential for accidental contamination entering watercourses or groundwater.
Groundwater WFD Water Bodies	Dewatering of the trenched excavations for cabling and the onshore substation, for piling if it is required for the installation of sub-surface substation foundations, or the development of less permeable access track / temporary construction compound establishment reducing infiltration.	A decline in groundwater levels.
Surface WFD Water Bodies (River, Transitional and Coastal)	Ground disturbance and mobilisation of sediments / contaminants during construction at the landfall, cable laydown and onshore substation.	Silt laden or otherwise contaminated runoff entering watercourses and / or intertidal areas.
	Works in or near watercourses (e.g. installation of landfall cable,	Changes to watercourse morphology.

Receptor	Activity or impact	Potential effect
	watercourse crossings and associated earthworks).	
Conservation Sites, Ponds and Springs	Dewatering of the trenched excavations for cabling, ground disturbance for the development of temporary access track establishment, or the leakage / spillage of fuels and chemicals onsite.	Reduction of water availability to support existing groundwater or surface water designated or undesignated sites, ecosystems and features.
Water Resources (Licensed Abstractions, PWSs and Unregistered Mapped Wells)	Dewatering of the landfall, cable laydown and onshore substation excavations for cabling and substation foundations, ground disturbance for the development of temporary access track / temporary construction compound establishment, or the leakage / spillage of fuels and chemicals onsite.	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quantity and / or quality effects.
Water Resources (Consented Discharges)	Landfall, cable and onshore substation trenching and temporary access track / temporary construction compound establishment.	Physical disruption to existing discharge infrastructure (e.g. septic tank soakaways or discharge outfalls).
Flood Risk Receptors (Residential Properties)	Construction during landfall, cable laydown and onshore substation construction of temporary stockpiles and raised access tracks within floodplain areas.	Volumetric displacement of flood water.
	Ground disturbance and the development of temporary access tracks and temporary construction compound areas during landfall, cable laydown and	Changes in runoff rates and new flow pathways.

Receptor	Activity or impact	Potential effect
	onshore substation construction.	
	Dewatering of landfall, cable laydown and onshore substation excavations.	Increases in flow in watercourses.
	Temporary watercourse crossings.	Changes in watercourse conveyance.
Operation and maintenance		
Groundwater and Surface Water WFD Water Bodies (River, Transitional and Coastal)	Isolated cable repairs or the leakage / spillage of fuels and chemicals from vehicles onsite or during occasional maintenance visits to the onshore substation.	Potential for accidental contamination entering groundwater or watercourses.
Groundwater WFD Water Body	The presence of a below ground grid, onshore substation support structures and impermeable surfaces.	A reduction in groundwater levels.
Surface Water WFD Water Bodies (River and Transitional)	The permanent presence of erosion protection around cable crossings.	Exacerbation of downstream or upstream bank and bed erosion and sediment deposition leading to changes to watercourse morphology.
Conservation Sites, Ponds and Springs	Isolated repairs, and the leakage / spillage of fuels and chemicals from vehicles onsite or from diversion of sub-surface land drainage flow pathways due to the permanent presence of limited below ground concrete-lined joint bays	Reduction of water availability to support existing groundwater or surface water designated or undesignated sites, ecosystems and features as a consequence of quantity / quality effects.

Receptor	Activity or impact	Potential effect
	and backfilled material around cable circuits.	
Water Resources (Licensed Abstractions, PWSs and Unregistered Mapped Wells)	Isolated repairs, and the leakage / spillage of fuels and chemicals from vehicles onsite or during occasional maintenance visits to the onshore substation, or from diversion of sub-surface land drainage flow pathways due to the permanent presence of limited below ground concrete lined joint bays, backfilled material around cable circuits and below ground grid, onshore substation support structures and impermeable surfaces.	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of quantity / quality effects.
Flood Risk Receptors	Maintenance works in floodplains during isolated repairs of the landfall TJB or cable circuits.	Volumetric displacement of flood water.
	Ground disturbance during isolated repairs of landfall TJB or cable circuits, or associated with the impermeable onshore substation footprint.	Changes in runoff rates and new flow pathways.
Decommissioning		
Groundwater and Surface Water WFD Water Bodies (River, Transitional and Coastal)	Isolated decommissioning works and the leakage / spillage of fuels and chemicals from vehicles onsite.	Potential for accidental contamination entering groundwater or watercourses.

Receptor	Activity or impact	Potential effect
Surface Water WFD Water Bodies (River and Transitional)	The permanent presence of erosion protection around cable crossings.	Exacerbation of downstream or upstream bank and bed erosion and sediment deposition leading to changes to watercourse morphology.
Conservation Sites, Ponds and Springs	Isolated decommissioning works, and the leakage / spillage of fuels and chemicals from vehicles onsite or from diversion of sub-surface land drainage flow pathways due to the permanent presence of limited below ground concrete-lined joint bays and backfilled material around cable circuits.	Reduction of water availability to support existing groundwater or surface water designated or undesignated sites, ecosystems and features as a consequence of quantity / quality effects.
Water Resources (Licensed Abstractions, PWSs and Unregistered Mapped Wells)	Isolated decommissioning works, and the leakage / spillage of fuels and chemicals from vehicles onsite; or from diversion of sub-surface land drainage flow pathways due to the permanent presence of limited below ground concrete-lined joint bays and backfilled material around cable circuits.	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quality and / or quantity effects.
Water Resources (Consented Discharges)	Temporary access track / temporary construction compound establishment.	Physical disruption to existing discharge infrastructure (e.g. septic tank soakaways or discharge outfalls).
Flood Risk Receptors	Maintenance works in floodplains during decommissioning of the landfall TJB or cable circuits.	Volumetric displacement of flood water.

Receptor	Activity or impact	Potential effect
	Ground disturbance during decommissioning of the landfall TJB and the cable circuits.	Changes in runoff rates and new flow pathways

Activities or impacts scoped out of assessment

27.4.9 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out activity or impact is considered in turn in **Table 27-8** and an indication given of whether the scope has evolved since Scoping.

Table 27-8 Activities or impacts scoped out of assessment

Activity or impact	Rationale for scoping out
Landfall – cable and associated earthworks resulting in potential impacts on groundwater levels	Subsurface works will be limited to the coastal area and the local water table will be connected to the sea levels, therefore no impact on freshwater groundwater levels is anticipated. PINS has agreed with this approach (**Table 27-4**). No stakeholders have commented on the issue.
Operation and maintenance activities resulting in a potential impact on groundwater levels	Operation and maintenance activities will not involve dewatering works and therefore no impact on groundwater levels is anticipated. PINS has agreed with this approach (**Table 27-4**). No stakeholders have commented on the issue.
Decommissioning activities resulting in a potential impact on groundwater levels	Sub-surface infrastructure will be left in place in the decommissioning phase and there will be no dewatering works and therefore no impacts on groundwater levels are anticipated.

Activity or impact	Rationale for scoping out
	PINS has agreed with this approach (**Table 27-4**). No stakeholders have commented on the issue.

27.5 Methodology for baseline data gathering

Overview

27.5.1 Baseline data collection has been undertaken to obtain information over the study area described in **Section 27.4**. The current baseline conditions presented in **Section 27.6** are based on data available at the time of writing for the study area. This data has been sourced by means of a desk study, with no field monitoring or ground investigation undertaken or proposed other than a future site walkover survey which will be carried out at the ES stage.

Desk study

27.5.2 The data sources that have been collected and used to inform this water environment assessment are summarised in **Table 27-9**.

Table 27-9 Data sources used to inform the water environment PEIR assessment

Topic	Source of information and summary of data	Coverage of the study area	Dates accessed
Topography	On-line maps and aerial photography, at: https://gridreferencefinder.com/ https://www.bing.com/maps Ordnance Survey (OS) OS topographic maps, 1:25,000 and 1:50,000 scale, also locator found at: https://gridreferencefinder.com/ 1:10,000 OS raster data. 5 m Digital Terrain Model (DTM) data.	Full coverage of the study area	16/11/2020 – 27/11/2020
Climate	EA, average daily rainfall totals recorded at Arundel and Storrington EA Climate Stations between 01/01/2009 and 31/12/2019. Meteorological Office (Met. Office), annual rainfall averages for the Bognor	Full coverage of the study area	16/11/2020

Topic	Source of information and summary of data	Coverage of the study area	Dates accessed
	Regis and Shoreham Airport Climate Stations for the period 1981-2010, at: https://www.metoffice.gov.uk/		
Surface Water Hydrology	EA, gauged maximum daily tidal level data for tidal River Arun at Littlehampton, and maximum daily river flow data for River Adur at Sakeham (East branch). Flow record obtained for 1991 – 2020, and graphs for the 2019 annual period have been presented. National River Flow Archive (NRFA), summary river flow statistics for EA flow gauges online at: http://www.ceh.ac.uk/data/nrfa/data/search.html These are presented for flow gauges at Hardham Rother Arun, Pallingham Arun, Sakeham Adur (East Branch) Hatterell Bridge Adur (West Branch) and Chess Bridge.	Covers the two Main Rivers within the study area	16/11/2020
Geology and Hydrogeology, and Soils	British Geological Society (BGS), geological mapping and observation borehole data from the BGS Geology of Britain Viewer, the BGS Onshore GeoIndex, BGS Memoirs and the 1:625,000 scale Hydrogeological Map of England and Wales. BGS Geology of Britain Viewer, at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html BGS Onshore GeoIndex, at: http://mapapps2.bgs.ac.uk/geoindex/home.html BGS Major and Minor Aquifer Properties Manuals (Allen et al 1997, and Jones et al 2000 respectively). Information from publications obtained for hydrogeological properties including storage coefficients	Full coverage of the study area	16/11/2020

Topic	Source of information and summary of data	Coverage of the study area	Dates accessed
	and transmissivity values for relevant Principal and Secondary aquifers. Hydrogeological mapping, at: http://www.largeimages.bgs.ac.uk/iip/hydromaps.html?id=south-downs.jp2 http://www.largeimages.bgs.ac.uk/iip/hydromaps.html?id=england-wales.jp2 Location of water wells and borehole and geological logs. Cranfield University Land Information System (Cranfield University, 2020) soil types, at: http://www.landis.org.uk/soilscapes/		
Designated Conservation Sites	Defra, interactive maps from the MAGIC natural environment map viewer, at: http://www.magic.gov.uk/ Includes aquifer designations and statutory and non-statutory designated nature conservation sites. Natural England, Conservation sites and SSSI citations and information online, at: http://www.sssi.naturalengland.org.uk/	Full coverage of the study area	16/11/2020
WFD Water Bodies	EA WFD water body status, Nitrate Vulnerable Zones (NVZs) within the RBMP (2016 cycle 2) information, via the EA Catchment Data Explorer (EA, 2021b), at: http://environment.data.gov.uk/catchment-planning/		
Water Resources	EA, water resource data including licensed abstractions and consented discharges. ADC, HDC, Adur and Worthing District Council (AWDC), and MSDC, registered PWS records comprising coordinates and summary of their uses.	Full coverage of the study area	01/10/2020 – 31/11/2020

Topic	Source of information and summary of data	Coverage of the study area	Dates accessed
	EA, summary of water availability the Arun and Western Streams Abstraction Licensing Strategy (March 2019) and The Adur and Ouse Catchment Abstraction Management Strategy (March 2005). SPZ data from the MAGIC natural environment map viewer, at: http://www.magic.gov.uk/		
Flood Risk	EA Flood Map for Planning map (EA, 2021c), at: https://flood-map-for-planning.service.gov.uk/ EA, River Arun to Pagham Flood and Coastal Erosion Risk Management Strategy Appraisal Report. Open Government, Fluvial Flood Zones and Risk of Surface Water Flooding Extents mapped on Open Government Data On-line at: https://data.gov.uk/ ADC (2016), HDC (2010) and MSDC (2015) SFRAs presenting baseline information on all flood risk sources including groundwater and sewer flooding. Each document references findings from the EA's Areas Susceptible to Groundwater Flooding (AStGWF) dataset.	Full coverage of the study area	01/10/2020 – 31/11/2020

Data limitations

27.5.3 From the data sources in **Table 27-9** the data have overall been appropriate for the purposes providing a suitable baseline assessment in **Section 27.6**, with the following limitations taken into account.

27.5.4 A data request was submitted to Southern Water for historic sewer flooding information in August 2020. This information was requested to inform the baseline conditions section of the Flood Risk Screening Assessment in **Appendix 27.2, Volume 4**. Southern Water has responded stating that it is unable to provide this information on the grounds of General Data Protection Regulations (GDPR). Further correspondence was undertaken to check whether it could be provided by redacting personal information. However, in October 2020, Southern Water said that this would still constitute personal data and that it would not be providing this

information. In lieu of this information the Flood Risk Screening Assessment has utilised other summary information of the records where it is available in the form of SFRAs for local planning authorities.

27.5.5 ADC, HDC, MSDC and AWDC all noted that they were unable to provide information relating to the purpose of PWSs (domestic, industrial, agriculture), and that information was based on users' responses. It has been assumed that all the PWSs provide unlicensed potable domestic drinking water supplies, in order to assign an appropriate level of value (in **Section 27.1**).

27.6 Baseline conditions

Current baseline

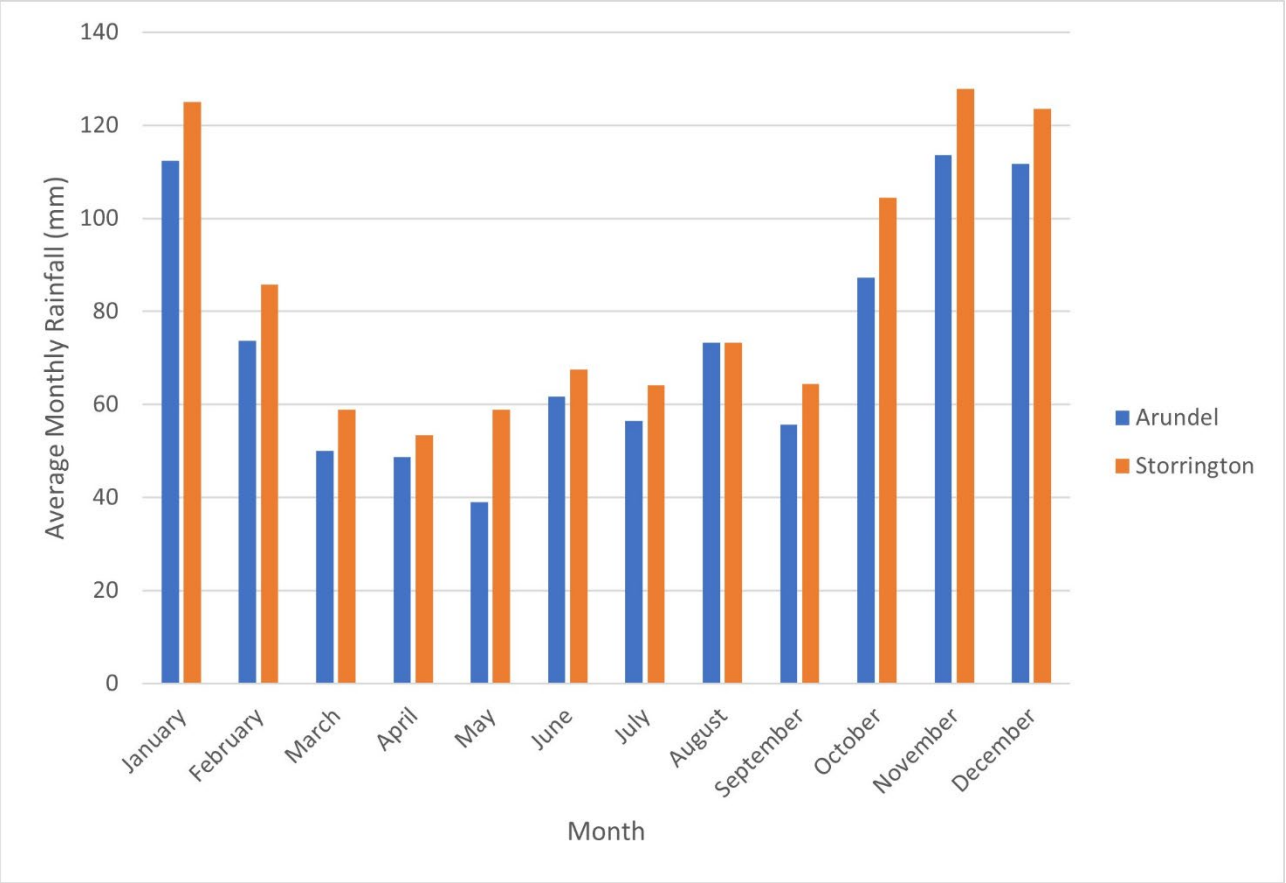
Climate

27.6.1 The Met. Office website holds the latest set of 30-year rainfall averages, covering the period 1981-2010 (Met Office, 2020). Average annual rainfall of 722.7mm/a and 725.1mm/a are recorded for climate stations at Shoreham Airport (National Grid Reference (NGR) 520472, 105168, 10km south east of the PEIR Assessment Boundary) and Bognor Regis (NGR 493719, 098888, 5km west of the PEIR Assessment Boundary) respectively. The Shoreham Airport climate station is located within the River Arun catchment, whilst the Bognor Regis climate station is located within the Arun and Western Streams catchment.

27.6.2 Rainfall data from were also obtained from the EA from its rain gauges at its Arundel (NGR 500360, 107398) and Storrington (510780, 115100) Climate Stations which are respectively situated approximately 2.5km to the north west and 1.3km to the north of the closest points of the PEIR Assessment Boundary where it crosses Warningcamp and Washington, West Sussex respectively. Based on these data the average annual rainfall recorded between January 2009 and December 2019 inclusive was 883.3mm at Arundel and 1066.77mm at Storrington.

27.6.3 **Graphic 27-1** illustrates the average monthly rainfall that has been recorded at each of the EA stations during the 2009 – 2019 period. This information indicates that the periods of highest rainfall in a typical year are expected between October and January, i.e. during the autumn and early winter.

Graphic 27-1 Average monthly rainfall totals recorded at Arundel and Storrington EA Climate Stations, January 2009 and December 2019 inclusive



Topography and land use

27.6.4 The PEIR Assessment Boundary covers a varied terrain, ranging from a flat and low-lying coastal area at the landfall where the ground level is 0mAOD (Above Ordnance Datum) at Mean Low Water Spring (MLWS) adjacent to Climping (NGR 501071, 100815) to higher elevations across the South Downs hills such as Perry Hill (122mAOD) at Norfolk Clump (NGR 505509, 109354) and Sullington Hill (205mAOD) near Washington, West Sussex (NGR 509292, 112023). From Washington, West Sussex, the onshore temporary construction corridor drops down into the River Adur valley, where elevations are typically only between 10 to 30m AOD within the vicinity of the onshore temporary construction corridor and the two potential onshore substation search areas being considered at Bolney Road / Kent Street and Wineham Lane North.

27.6.5 Land use within the PEIR Assessment Boundary is predominantly arable and improved grassland (from the UKCEH Land Cover Map 2015 dataset).

Hydrology

27.6.6 The onshore part of the PEIR Assessment Boundary extends approximately 36km from the landfall at Climping in the River Arun catchment to the potential onshore substation search areas in the proximity of Wineham and Bolney within the River Adur catchment. The following paragraphs describe the hydrological

characteristics of the main surface water catchments and watercourses, as shown in **Figure 27.1, Volume 3** and in more detail in **Figure 27.2, Volume 3**.

River Arun catchment

27.6.7 The River Arun is tidal as it flows through the onshore part of the PEIR Assessment Boundary. Its freshwaters are derived from the series of small streams that form its source in the area of St Leonard's Forest in the Weald (NGR 521325,131599), approximately 10.5km to the north east of the PEIR Assessment Boundary. The River Arun becomes tidally influenced approximately 3km upstream of the confluence with the River Rother at Pulborough (NGR 503432,118021). It then flows south through a gap in the South Downs to Arundel (NGR 501838,106971) and on into the English Channel at Littlehampton. The south western part of the PEIR Assessment Boundary covers the meandering flood plain stretch of the River Arun from the coast to Arundel. Along this section of the River Arun there is a proposed onshore cable corridor crossing (NGR 501343, 103166), located approximately 250m to the west of the Littlehampton Industrial Estate (NGR 501335, 103144).

27.6.8 The EA has provided maximum daily flow level data at Littlehampton gauging station (NGR 502694, 101821) for the tidal portion of the River Arun which is approximately 1.3km to the east of the PEIR Assessment Boundary landfall. The flow record shows that the levels in the River Arun regularly fluctuate due to the influence of tidal activity in the vicinity of the PEIR Assessment Boundary. The observed magnitude of peak river levels are also shown to increase slightly between September and March, i.e. between autumn and spring (**Graphic 27-2**).

27.6.9 There are also two river flow gauges (on the Rivers Arun and Rother) upstream of the tidal limit (**Figure 27.1, Volume 3**), that are respectively located 9km (NGR 503400, 117900) and 15km upstream (NGR 504600, 122900) from the PEIR Assessment Boundary. The NRFA summary statistics for these flow gauges are presented in **Table 27-10**.

27.6.10 Rivers draining impervious clay catchments typically have baseflow indices (BFIs) in the range 0.15 to 0.35, whereas most Chalk streams have a BFI greater than 0.9 as a consequence of the high groundwater component in the river discharge. The relatively low BFIs in **Table 27-10** are a reflection of the mix of Chalk and clays in the upper Arun catchment. The tidal section that flows through the PEIR Assessment Boundary is likely to have a higher groundwater inflow component due to the presence of the Chalk in the lower catchment.

Graphic 27-2 Daily maximum level / stage recorded at Littlehampton Tidal Gauge (NGR 502694 101821) during 2019

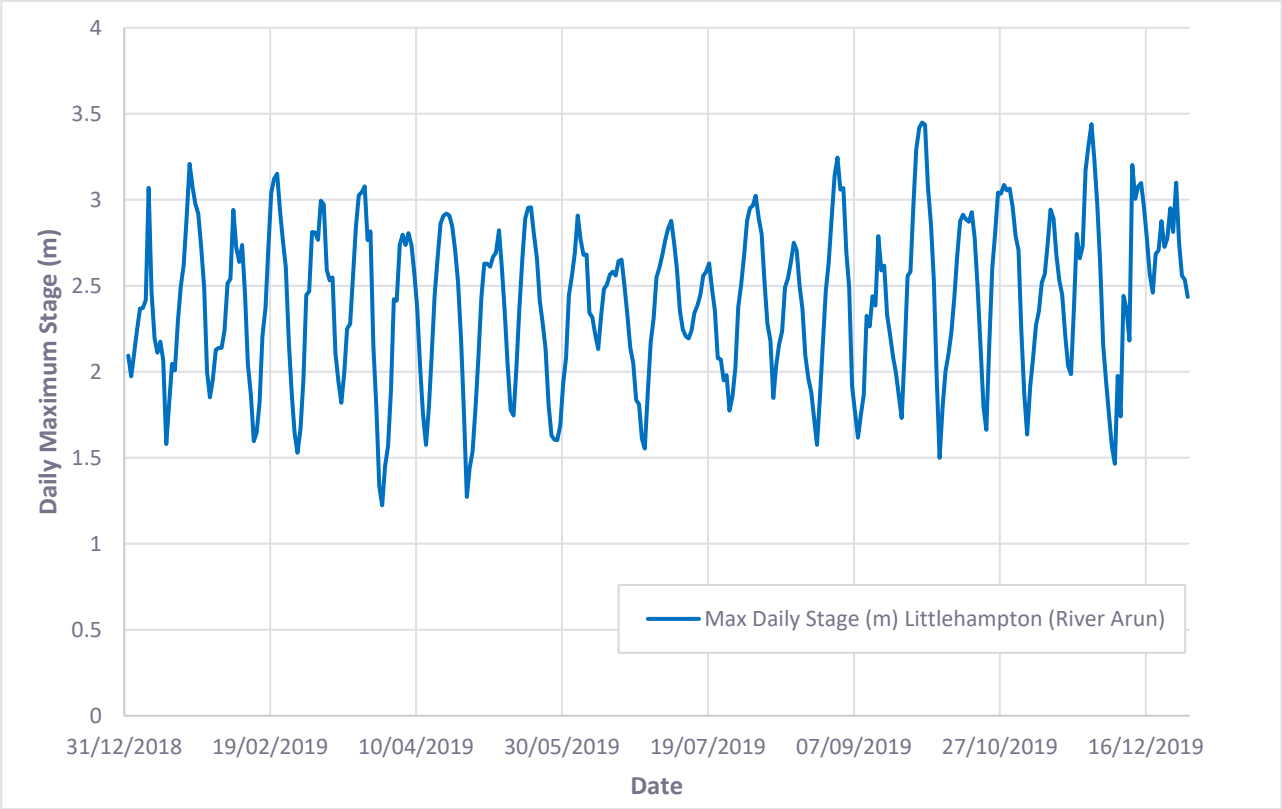


Table 27-10 Flow characteristics at selected river gauges in the Arun Catchment

Gauge reference	Gauge name	Water-course	NGR	Catchment area (km^2)	Mean flow (m^3/s)	Q10[1] (m^3/s)	Q95[2] (m^3/s)	BFI[3]	Period of record
41009	Hardham	Rother (Arun Catchment)	503400, 117900	346	4.451	10.3	1.083	0.64	1959 – 2018
41014	Pallingham	Arun	504600, 122900	379	4.107	10.24	0.275	0.29	1970-2018

Table notes:

Source: NRFA (Ref. https://nrfa.ceh.ac.uk/data/search).

[1]Q10: the flow that is equalled or exceeded 10% of the time – an index of high flow.

[2]Q95: the flow that is equalled or exceeded 95% of the time – an index of low flow.

[3]BFI: baseflow index, the proportion of the total river flow that is derived from gradual release from groundwater storage, as opposed to rapid surface or near-surface runoff.

27.6.11 The onshore temporary construction corridor crosses several EA Main River tributaries of the River Arun, including the Ryebank Rife and the Black Ditch, and these and other watercourses are described briefly below and shown on **Graphic 27-2.**

Ryebank Rife

27.6.12 The Ryebank Rife (outlined in **Figure 27.2, Volume 3**) is approximately 6.8km in length and flows in an easterly direction from its source in the vicinity of Yapton (NGR 497229,103488) to its confluence with the tidal River Arun at Littlehampton docks (NGR 501589,101377). The watercourse is joined by several unnamed Ordinary Watercourses and ditch tributaries along its length which are managed by the EA as part of its role as the IDB for the River Arun.

27.6.13 The proposed landfall is sited approximately 300m to the south of Ryebank Rife, from which the onshore temporary construction corridor crosses the Main River channel (NGR 50136, 101943). The proposed onshore temporary construction corridor also crosses several of the ditch tributaries (including NGR 500852, 102339, and 501004, 101950) where there are a range of potential temporary and permanent access routes associated with the landfall and the onshore temporary construction corridor.

Black Ditch (West Sussex)

27.6.14 The Black Ditch (West Sussex) (outlined in **Figure 27.2, Volume 3**) is approximately 7km in length and flows in a south westerly direction from its mapped sources including Patching Pond (NGR 508940,105906) and springs near Hammerpot (NGR 506665,105828, towards its confluence with the River Arun at Arundel Junction (NGR 501128,104074). The upper reaches of the Black Ditch catchment extend further to the north east to Kithurst Hill (NGR 508153,112882) within the South Downs, where there is a dry valley with no mapped surface watercourses due to the high permeability and transmissivity of the underlying Chalk (see the geology and hydrogeology sections for further information).

27.6.15 Within its southern section (landfall to Warningcamp), the onshore temporary construction corridor crosses the Black Ditch channel near its confluence to the north of Brook Barn Farm (NGR 501489, 104216). Between the southern and central section (Warningcamp to Sullington), the onshore temporary construction corridor also traverses the upper reaches of the Black Ditch catchment between Wepham Down and Sullington Hill.

Other tributaries of the River Arun

27.6.16 Within the southern section between Lyminster and Warningcamp Hill, the onshore temporary construction corridor options Warningcamp B and C both cross an unnamed Ordinary Watercourse (NGR 501943, 104977) which is under the management of the EA as the IDB. The onshore temporary construction corridor also straddles the upper reaches of the Burpham tributary catchment between Warningcamp Hill and Wepham Down but does not intersect any watercourses, and therefore this water body was screened out from further assessment in **Appendix 27.1, Volume 4**.

27.6.17 Within the central section (Warningcamp to Sullington Hill), approximately 1.1km of the proposed onshore temporary construction corridor also crosses the upper catchment boundary of the River Stor catchment. Within this catchment there are no tributary watercourses intersected by the onshore temporary construction corridor. There is a series of ponds (NGR 512148, 113646) approximately 180m to the north of the PEIR Assessment Boundary of an existing access road on the opposite side of the Washington Road A283. There is also a spring between Kithurst Farm and Garston Farm (NGR 508204,113635), approximately 1.2km to the north west of the PEIR Assessment Boundary.

River Adur catchment

27.6.18 The River Adur and its tributaries drain the Low Weald area through the South Downs, and the Main River flows south, entering the English Channel at the urban centre of Shoreham-by-Sea, approximately 12.3km south of the PEIR Assessment Boundary. The catchment of the River Adur is extensive, covering in excess of 600km^2, and within its upper reaches is underlain by the Wealden Group and is largely rural with low-lying rolling hills of arable land and few built-up areas of population.

27.6.19 A number of rivers and tributaries of the River Adur converge to the north west of Henfield (NGR 521075,116080), and approximately 300m to the east of the onshore temporary construction corridor at its closest point, and the Adur is tidally influenced downstream of this confluence. There are numerous tributary watercourses that drain the north eastern sections of the onshore temporary construction corridor (Sullington Hill to Bolney), including the two potential onshore substation search areas being considered, before joining the non–tidal and tidal sections of the River Arun.

27.6.20 **Graphic 27-3** provides the daily maximum flow record for 2019 taken from the EA Sakeham (East branch) flow gauge (NGR 521800, 118900) just upstream of the tidal section, and approximately 980m to the south of the nearest section of the onshore temporary construction corridor near Wineham. The chart illustrates a high variability in flow, and shows that a higher frequency and magnitude of peak flows are recorded during mid-October to late-December, i.e. later autumn to winter months.

27.6.21 Longer term summary statistics are presented in **Table 27-11** for this gauge, along with records for the western branch of the Adur (lockbridge) (NGR 517800, 119700) and the Chess Stream (NGR 521600, 117200), which are also upstream of the tidal limit and respectively situated 1.7km to the east and north west of the onshore temporary construction corridor near Partridge Green. The summary statistics show that there is a relatively low BFI recorded at each monitoring location, which can be attributed to the catchment being underlain by relatively low permeability Wealden geological strata.

27.6.22 The PEIR Assessment Boundary is intersected by a number of catchments for tributary streams and rivers which discharge into the River Adur. These include an unnamed Main River and several Ordinary Watercourses which drain into the tidal section, as well as the Honeybridge Stream, Adur (lockbridge), Adur East and Adur East (Sakeham), Cowfold Stream and Bolney Sewer which discharge into the non-tidal section. Each of these watercourses is described briefly below and shown on **Figure 27.2, Volume 3**.

Unnamed Main River and Ordinary Watercourse

27.6.23 Two catchments drain the central to northern section of the onshore temporary construction corridor, between Upper Buncton and Bines Green, with watercourses flowing in an easterly direction into the tidal section of the River Arun.

27.6.24 The first is a Main River which is approximately 4km in length, flowing from its ephemeral tributary headwaters near Sevier's Barn (NGR 515397 113966), crossing the onshore temporary construction corridor then flowing for 3.8km before discharge into the tidal Arun near Wykham Wood (NGR 519597, 114087).

27.6.25 There is another catchment which has several Ordinary Watercourse tributaries which range in length from 600m to 2.7km and cross the onshore temporary construction corridor in several places prior to discharge into the tidal Arun. Within this catchment there are two ponds alongside the tributaries, including one overlapping with the upstream and outer extent of the PEIR Assessment Boundary between Blakes Farm and Sweethill Farm (NGR 517709,115696), and one approximately 100m downstream of the PEIR Assessment Boundary near Eatons Farm (NGR 518701,116364). There is also a well mapped at Godmarks Farm (NGR 518212,116860) near Ashurst approximately 420m to the west of the PEIR Assessment Boundary.

Honeybridge Stream

27.6.26 The Honeybridge Stream is approximately 5.9km in length and flows in a north easterly direction from its sources in the South Downs (NGR 513537,112798 and 514004,112716) between Washington and Buncton, West Sussex towards its confluence with Adur (lockbridge) near Bines Green (NGR 517991,117865). Within its central section the onshore temporary construction corridor is crossed by several minor tributary stream headwaters and ditches (e.g. NGR 514439, 113794) which are all classed as Ordinary Watercourses. There are several springs mapped at Water Lane, Buncton (NGR 514418,113948), Castle Farm Estate (NGR 512653,114236), and Hawking Soppers (NGR 515712,115296), which are respectively situated 115m, 100m and 640m to the north of the PEIR Assessment Boundary. There is also a pond (514609, 113613) which lies 10m to the west of an access point associated with the PEIR Assessment Boundary at Buncton Manor Farm.

Graphic 27-3 EA daily maximum flow recorded at Sakeham River Gauge (521884 118985) during 2019

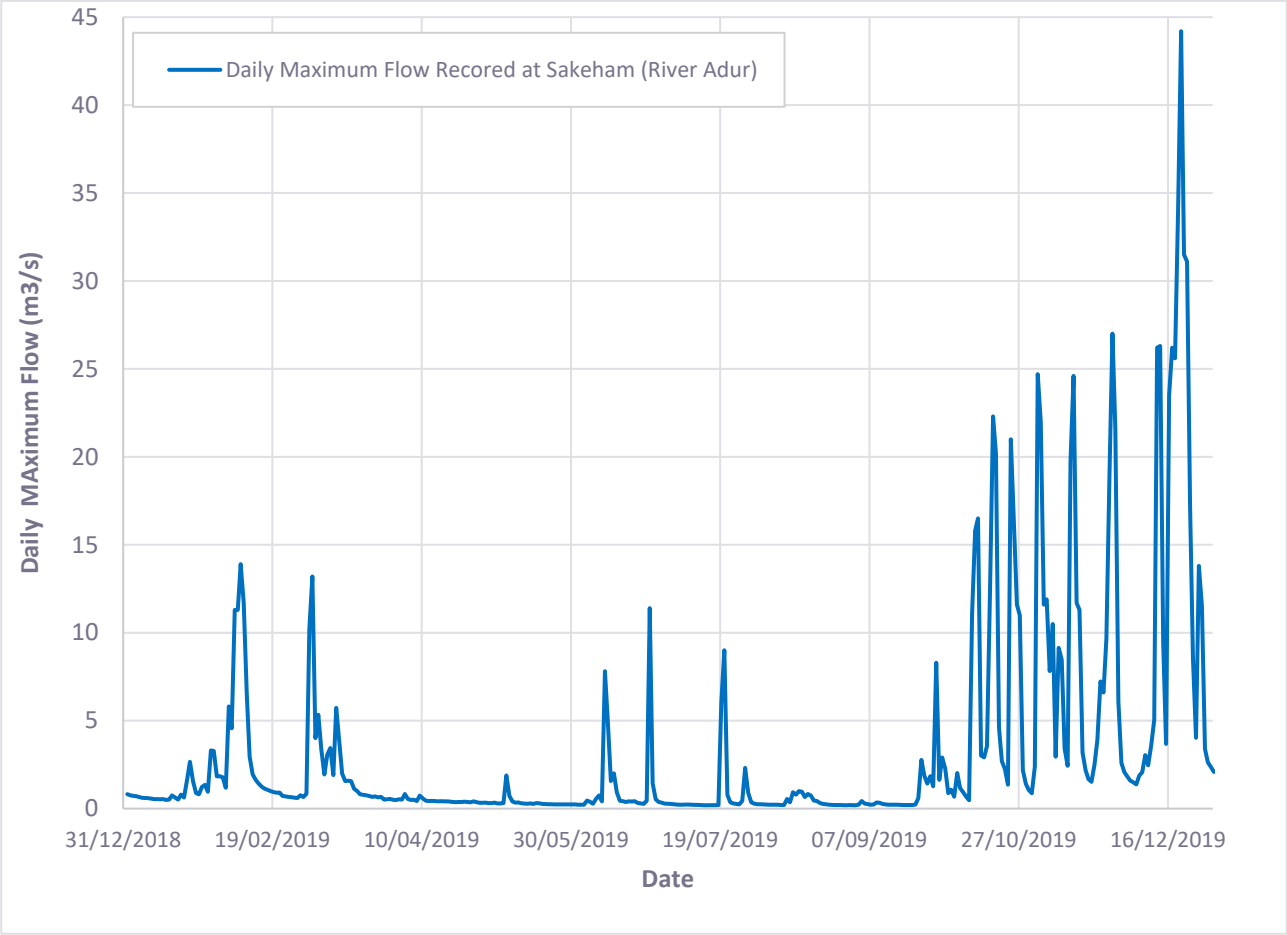


Table 27-11 Flow characteristics at selected river flow gauges in the River Adur catchment

Gauge reference	Gauge name	Water-course	NGR	Catchment area (km^2)	Mean flow (m^3/s)	Q10[1] (m^3/s)	Q95[2] (m^3/s)	BFI[3]	Period of record
41012	Sakeham	Adur East Branch	521800, 118900	93	1.325	2.97	0.159	0.34	1967 – 2018
41010	Hatterell Bridge	Adur West Branch	517800, 119700	109.1	1.16	3.468	0.025	0.3	1961-2005
41028	Chess Bridge	Chess Stream	521600, 117200	24	0.273	0.633	0.021	0.39	1964 – 2018

Table notes:

Source: NRFA (Ref. https://nrfa.ceh.ac.uk/data/search).

[1]Q10: the flow that is equalled or exceeded 10% of the time – an index of high flow.

[2]Q95: the flow that is equalled or exceeded 95% of the time – an index of low flow.

[3]BFI: baseflow index, the proportion of the total river flow that is derived from gradual release from groundwater storage, as opposed to rapid surface or near-surface runoff

Adur (lockbridge)

27.6.27 The Adur (lockbridge) is an EA Main River which forms the western branch of the non-tidal River Adur and is approximately 5.5km in length, flowing in a south easterly direction from its origins at the confluence of Adur Knepp and Blakes Gill near West Grinstead (NGR 516846, 120655) towards its discharge into the non-tidal Arun to the west of Henfield (NGR 519443, 116680). The onshore temporary construction corridor crosses a tributary and the EA main river channel (NGR 519181, 116963) of Adur (lockbridge), which has EA flood defences along its banks at the point of crossing.

Adur (East) and Adur East (Sakeham)

27.6.28 The section of the Adur eastern branch comprising the Adur (East) and Adur East (Sakeham) channel flows for approximately 6.6km in a south westerly direction from the Goddards Green branch near Twineham Green towards its discharge point into the tidal Arun. The north eastern section of the onshore temporary construction corridor runs parallel to the main channel and crosses several of its Ordinary Watercourses (e.g. NGR 523874, 120804 and 524442, 121275) between Bines Green and the Wineham Lane North onshore substation search area. There are also minor tributary headwaters mapped along the perimeter of the onshore substation search area to the south and east, towards the Adur (East) branch. There is also a small pond mapped approximately 250m to the south of the PEIR Assessment Boundary and onshore temporary construction corridor (NGR 523846, 120526). There are two mapped wells within this catchment between Frylands and Waterperry House along Frylands Lane (NGR 522826, 119675 and 522625, 119559) that are respectively situated 100m and 330m to the south west of the PEIR Assessment Boundary.

Cowfold Stream

27.6.29 The Cowfold Stream is a Main River which is approximately 6.9km in length, flowing in a southerly direction from its source near Hillsfoot (NGR 519348, 123194), past the hamlet of Cowfold, prior to its discharge into Adur East (Sakeham) near Shermanbury (NGR 521265, 118636). The main river channel is crossed by the onshore temporary construction corridor in two locations, namely the Wineham Lane North 1A/1B section (NGR 521902, 119932) and the Bolney Road / Kent Street 1A/1B/1C/1D section (NGR 522202, 121194), where the channel is protected by EA flood defences. The proposed onshore substation search area at Bolney Road / Kent Street and its associated temporary construction compound locations are also situated approximately 320m and 15m to the west of an unnamed Ordinary Watercourse tributary (NGR 522537, 122394). There are also a series of wells mapped within this catchment at the Hangers (NGR 520856,119934), Ewhurst Cottages (NGR 521321,119551), the Rectory (NGR 522208,119594), Park Farm (NGR 522375,120635) and the Fodges, Kent Street (NGR 522962,121096) which are respectively situated approximately 2m, 385m, 170m, 520m and 310m from the PEIR Assessment Boundary.

Other tributaries of the River Adur

27.6.30 There are several other tributary watercourses of the River Adur which are in close proximity to the PEIR Assessment Boundary but are not shown to intersect. These include tributaries such as Bolney Sewer, Adur East (Goddards Green), Herrings Stream, Chess Stream, Woodsmill Stream and Black Sewer. It is also considered that there is limited potential for impacts on the lower course of the tidal Arun to the south and downstream of the discharge point from the unnamed Main River tributary at Wyckham Wood, as this is approximately 350m south east of the onshore cable corridor, and also given the size of the watercourse, its tidal nature, and the dilution from the many tributary inflows described above.

Geology

27.6.31 The following sections provide a summary of the bedrock and superficial deposits which the PEIR Assessment Boundary overlies and are supported by **Figures 27.3** (bedrock geology) and **27.4** (superficial geology), **Volume 3**.

27.6.32 **Table 27-12** provides a summary of the bedrock encountered from the landfall at Climping towards the proposed onshore substation search areas near Bolney.

Table 27-12 Succession of geological units along the PEIR Assessment Boundary

Group / Subgroup	Lithological description	Section of the PEIR Assessment Boundary
Chalk (White Chalk)	Chalk	Southern section
Lambeth Group	Clay, silt, sand and gravel	
Thames Group	Clay, silt, sand and gravel	
Lambeth Group	Clay, silt, sand and gravel	
Chalk (White Chalk)	Chalk	Central section
Chalk (Grey Chalk)	Chalk	
Gault Formation and Upper Greensand Formation (undifferentiated)	Mudstone, sandstone and limestone	

Group / Subgroup	Lithological description	Section of the PEIR Assessment Boundary
Lower Greensand Group	Sandstone and mudstone	
Wealden Group	Mudstone, siltstone and sandstone	North eastern section
Lower Greensand Group	Sandstone and mudstone	
Wealden Group	Mudstone, siltstone and sandstone	

Southern section

27.6.33 The bedrock geology beneath the first several kilometres of the PEIR Assessment Boundary inland from the landfall towards Lyminster and Crossbush comprises predominantly the White Chalk subgroup. The Chalk is part of an east to west trending synclinal fold, with its axis located just to the south of Arundel.

27.6.34 Between Lyminster and Warningcamp, each cable corridor option Warningcamp B – C crosses a narrow band of Thames Group (London Clay Formation) and Lambeth Group strata that form the core of the synclinal fold. The Thames Group is composed of clay, silt, sand and gravel, and along with the Chalk forms the low-lying land along the coast. The Lambeth Group comprises varying gravels, sands, silts and clays.

27.6.35 BGS data indicates that there are two fault lines that intersect this section of the PEIR Assessment Boundary trending in an east to west direction, namely near Littlehampton Junction within the Chalk and at Crossbush within the London Clay.

27.6.36 The superficial deposits are widespread within the coastal region and along the River Arun. The coastal deposits comprise beach and tidal flat deposits in the landfall area within the PEIR Assessment Boundary. The proposed landfall overlaps an area of brickearth silt deposits and Raised Alluvium Marine deposits comprising of clay, silt, and sand. The indicative onshore temporary construction corridor then crosses an area in which the River Arun and the Black Ditch have laterally migrated, and which is therefore widely covered with Raised Marine deposits of clay, silt and sand. Superficial deposits are recorded to be up to 20 to 30m depth along the River Arun valley (BGS, 2020).

Central section

27.6.37 Chalk forms the higher elevated topography of the South Downs and the central section of the PEIR Assessment Boundary between Warningcamp and Washington, West Sussex. This section is underlain by the east to west trending White Chalk subgroup which dips to the north and north east at about 20 – 30º (Allen et al., 1999) and has a steep scarp slope on the southern side towards the band of Lambeth Group strata and the south coast.

27.6.38 Within the central section of the PEIR Assessment Boundary, in the vicinity of Buncton, the onshore temporary construction corridor also crosses a series of bedrock geological formations in the Weald Anticline including the Gault Formation (sandstone), Upper Greensand Formation (siltstone and sandstone) and Lower Greensand Group (sandstone and mudstone). The Greensand ridge forms part of the same scarp (a steeper slope) and dip (a gentle slope) landform as the Chalk hills, dipping to the north and north east along the South Downs.

27.6.39 Superficial deposits along this central section are indicated to be absent in comparison with the ubiquitous coverage to the south. The BGS Geoindex indicates there are narrow bands of Head clay, silt, sand and gravel deposits occurring along the base of the valleys. Some larger patches of superficial Clay-with-Flints Formation and Head clay, silt, sand and gravel deposits are present 4km to the east of Arundel, on the slopes and at the base of the South Downs (BGS, 2020).

North eastern section

27.6.40 To the north and east of Buncton, the north eastern section of the PEIR Assessment Boundary predominately overlies the Wealden Clay Formation (mudstone, siltstone and sandstone), apart from a band of Lower Greensand located near Ashurst. The two onshore substation search areas at Wineham Lane North, and Bolney Road / Kent Street both overlie the Wealden Clay Formation.

27.6.41 The BGS data also indicates that there are approximately eight fault lines within the north eastern section of the PEIR Assessment Boundary. Four are positioned at the transition between Wealden Clay and Lower Greensand along the cable corridor near Ashurst, and the others are positioned across the Wealden Clay between Partridge Green and Cowfold along the Bolney Road / Kent Street onshore temporary construction corridor options and the proposed onshore substation search area.

27.6.42 In this area superficial deposits include patches of Alluvium (clay, silt, and sand) deposits, River Terrace deposits (undifferentiated sand and gravel) and Head deposits (clay silt, sand and gravel). The Alluvium and River Terrace deposits follow the route of the River Adur and its associated tributaries.

Hydrogeology

Aquifer status

Southern section

27.6.43 The Defra MAGIC website identifies the White Chalk in the southern section of the PEIR Assessment Boundary as being a Principal aquifer[4] with high vulnerability[5]. The Lambeth Group (clay, silt, sand and gravel) aquifer within the southern section is classified as a Secondary A Aquifer[6] with medium to high groundwater vulnerability. The Thames Group underlying Warningcamp Routes B – C is classified as being unproductive strata, with low groundwater vulnerability.

27.6.44 With respect to superficial deposits aquifer status, the MAGIC website identifies the brickearth beach deposits and tidal Arun Alluvium as a Secondary A Aquifer and the London Clay Formation near Crossbush is identified as unproductive strata.

Central section

27.6.45 The White Chalk underlying the central section of the PEIR Assessment Boundary between Warningcamp and Sullington Hill is classified as being a Principal Aquifer with high vulnerability. The Upper and Lower Greensand Group within the central section of the PEIR Assessment Boundary in the vicinity of Washington and Buncton, West Sussex respectively is identified as a "highly productive and extensive" Principal Aquifer. Flow is dominantly intergranular and can yield up to 50l/s, and the aquifer is classed as highly vulnerable. The Gault Formation north of Washington, West Sussex is indicated as comprising unproductive strata and is of low groundwater vulnerability.

27.6.46 In relation to the superficial deposits, there are very limited narrow bands of Secondary (undifferentiated) Aquifer associated with the sparse Head deposits and Clay-with-flint deposits within the central section of the PEIR Assessment Boundary between Warningcamp and Sullington.

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[4] These are layers of rock or drift deposits that have high intergranular and / or fracture permeability, meaning they usually provide a high level of water storage. They may support water supply and / or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

[5] The term vulnerability in this context means the overall likelihood of a pollutant reaching the groundwater. The EA vulnerability maps have five risk categories (High, Medium – High, Medium, Medium – Low, and Low) based on the type of aquifers present and the potential impact (i.e. on the aquifer designation).

[6] These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

North eastern section

27.6.47 Within the River Adur catchment and in the north east of the PEIR Assessment Boundary, the Wealden Clay Formation is shown as being unproductive strata with low groundwater vulnerability.

27.6.48 Alluvium / River Terrace and Head superficial deposits within the north east of the PEIR Assessment Boundary are designated as a Secondary (undifferentiated) Aquifer and Secondary A Aquifer respectively. The Secondary (undifferentiated) Aquifer is associated with the tidal portion of the River Adur. The Secondary A Aquifer is associated with the main freshwater tributaries of the River Adur such as the Cowfold Stream and the River Adur East, upstream of the confluence near Henfield.

Groundwater levels and flows

27.6.49 The 1:625,000 scale Hydrogeological map of England and Wales indicates that groundwater level fluctuation is common within the top 80m of the Chalk. The map shows groundwater levels as being typically around 0mAOD within the Chalk along the coastal area trending to between 30 and 60mAOD on the South Downs (over 100 metres below ground level (mbgl) at higher elevations).

27.6.50 The Chalk forms a well-drained terrain with lime-dominated topsoils that are often very shallow and can sustain limited vegetation cover. Rain can easily infiltrate through the thin soils to the underlying Chalk aquifer, with groundwater emerging along a scarp-slope spring line further downgradient towards the lower reaches of the River Arun and River Adur catchments.

27.6.51 Groundwater flow lines on the 1:100,000 scale Hydrogeological map of the South Downs are indicated along the valleys, where higher Chalk transmissivity (permeability-dependent) is reported. Close to the River Arun and River Adur valleys the groundwater contours indicate flow towards the watercourses, but away from this influence groundwater flow is predominantly to the south towards the coast. Groundwater from the Chalk is likely to discharge into the river as baseflow at a relatively constant rate throughout much of the year. However, when groundwater levels rise groundwater flooding can occur, particularly in the broad Chalk valleys.

27.6.52 The 1:100,000 scale Hydrogeological map shows that in the southern section of the PEIR Assessment Boundary the groundwater levels within the Chalk Formation within the vicinity of Burpham and Warningcamp typically range between 3mAOD and 20mAOD (approximately 30 – 35mbgl respectively) with groundwater flow to the south and south west towards the River Arun. Across the South Downs and the central section of the PEIR Assessment Boundary between Wepham Down and Sullington Hill Chalk, groundwater levels range between 50mAOD and 70mAOD (50mbgl and 135mgl respectively), with groundwater flowing in a southern and south western direction towards Clapham, Patching and Angmering (see subsequent section on water resources in relation to their SPZs).

27.6.53 The map indicates that there is a clear divide in groundwater flow at the point where the onshore temporary construction corridor crosses Sullington Hill. To the north and east of Sullington Hill groundwater levels within the Lower Greensand Formation fall from greater than 60mAOD near Green Farm to below 0mAOD near

Buncton and Wiston (approximately between 100 to 20mbgl respectively), approximately 4km to the east.

27.6.54 The online BGS GeoIndex Viewer describes the Weald Clay Formation (Wealden Group) in the north east of the PEIR Assessment Boundary as being low permeability and generally having no groundwater except at shallow depths. The predominantly thick clayey sequence with subordinate sandstones may occasionally support domestic water supplies.

27.6.55 The Weald Clay retards infiltration and is further characterised by standing surface water features and higher rates of surface flow at times of heavy rainfall. Consequently, flow in the River Adur can respond rapidly to rainfall.

Hydraulic properties

27.6.56 **Table 27-13** provides an overview of the range of hydraulic properties for the Principal and Secondary aquifers underlying the PEIR Assessment Boundary, based on typical values obtained from Allen et al., (1997) and Jones et al. (2000). This summary indicates that transmissivity and storage exhibits the largest range within the Chalk, due to the importance of fissure flow as a flow mechanism within this aquifer. In contrast, the Upper and Lower Greensand Formations show less variation in their hydraulic characteristics given that intergranular flow is the dominant flow mechanism in these aquifers.

Table 27-13 Aquifer hydraulic properties

Hydraulic properties	Chalk	Lower Greensand	Upper Greensand
Storage Coefficient (S) (dimensionless)	2 X 10^{-4} - 0.032	10^{-5} to 0.08	0.0002 – 0.013
Transmissivity (m^2/d)	16 to 9,500	33 to 3400	1.24 - 1565
Geometric Mean Transmissivity (m^2/d)	500	270	64

27.6.57 The available hydrogeological data for the Chalk indicates that there is an inverse relationship between transmissivity and water level depth, i.e. where water levels are shallow, for instance in valleys, transmissivity tends to be high and in areas with deeper water levels transmissivity is generally low. As such, water table depth is an important indicator of groundwater flow activity in the South Downs within the central section of the PEIR Assessment Boundary.

27.6.58 Within the Chalk significant permeability tends to be developed towards the top of the aquifer. The frequency and size of fissures and fractures decrease at depth due to increasing overburden and is accompanied with an overall reduction in circulating groundwater and associated dissolution. The most important flow

horizons are concentrated in the near-surface, with little flow deeper than 50m below groundwater levels.

27.6.59 Nevertheless, sea level changes in the Pleistocene period have created fissure systems at various different depths. On this basis, groundwater flow can occasionally occur at depths below the surface (Southern Water, 1979), and fracture systems can exist above the normal water table and become groundwater-active at seasonally high water levels.

27.6.60 An important factor that determines the development of fracturing at depth is the lithology. Where the Chalk is softer and more marly fracturing is less well developed and groundwater flow less active. Harder nodular chalks, referred to as hardgrounds, and as a result the permeability within hardgrounds is often higher than in the surrounding rocks. The Upper and Middle Chalk lithological hardground groups of Lewes Nodular Chalk, New Pit Chalk and Holywell Nodular Chalk overlying the central section of the PEIR Assessment Boundary usually exhibit higher permeabilities than the surrounding Chalk.

Aquatic environment

WFD classifications

27.6.61 **Appendix 27.1, Volume 4** indicates that within the study area there are 23 WFD water bodies, of which 16 have a potential for a connection with the Proposed Development due to having features intersected or directly adjacent to the PEIR Assessment Boundary (**Figures 27.2** and **27.5, Volume 3**). The 16 WFD water bodies are screened in for further assessment in **Sections 27.9** to **27.11**, and comprise one coastal water body, two transitional water bodies, seven river water bodies and six groundwater bodies.

27.6.62 **Appendix 27.1** and **Appendix 27.3 Annex A, Volume 4** presents further information on the WFD condition, supporting elements at less than Good overall status and issues for each of these 16 WFD water bodies. The overall condition of each WFD water body is summarised later in **Section 27.1** to help inform determination of their value.

Conservation sites

27.6.63 **Appendix 27.1, Volume 4** provides details of eight water dependent conservation sites within the study area (**Figure 27.2, Volume 3**), as indicated on the Defra MAGIC and Natural England websites. Based on their location, and their potential for a surface water hydrological and hydrogeological connections, the following sites have been screened in for further assessment within **Sections 27.9** to **27.11**:

- Arundel Park SSSI comprises Chalk grassland including an artificial lake (Swanbourn Lake) and marsh within the western floodplain of the River Arun. It is situated 1.1km to the north west and downgradient of the PEIR Assessment Boundary and there is potential connection via the White Chalk aquifer and the Burpham Tributary watercourse;
- Arun Valley, Watersfield to Arundel LWS has features including a system of flood meadows dissected by ditches which are botanically rich, supporting species including water beetles / dragonflies. At their closest point they are

situated approximately 40m and downgradient to the west of the access point associated with the Warningcamp B and C section of the PEIR Assessment Boundary within the same unnamed IDB surface water tributary ditch catchment of the River Arun;

- Amberly Mount to Sullington Hill SSSI comprises groundwater-dependent Chalk grassland on the scarp northern slopes of Sullington Hill. It lies on the edge of the PEIR Assessment Boundary along the western edge of an access track, and is approximately 160m to the north west and downgradient of the onshore temporary construction corridor;
- Bines Green LWS has features including neutral grassland and a surface water pond with high botanical interest. The associated surface water pond is situated 200m to the north east of and at the same elevation as the Bines Green access point; and
- Rock Common Sand Quarry LGS has its south western corner overlapping with the PEIR Assessment Boundary near Washington, West Sussex.

27.6.64 In addition to these sites, within the hydrology section of this chapter various ponds and springs (shown on 1:25,000 OS mapping) have been identified as potential receptors which are also considered in the assessment within **Sections 27.9** to **27.11.**

Water resources

Private water supplies

27.6.65 ADC, HDC, MSDC and AWDC were all contacted regarding the presence of PWSs within their relevant part of the study area. Each has provided a list of registered users though all were not able to confirm the type or exact location of the PWSs. As outlined in **paragraph 27.5.5**, it has been assumed that where the nature of the supply is not known, that it pertains to an unlicensed potable supply (in **Section 27.8)**. From the 18 PWSs identified in **Appendix 27.1, Volume 4** and shown on **Figure 27.6, Volume 3**, 11 are assessed as having a potential hydrological or hydrogeological connection to the PEIR Assessment Boundary, and are included in the assessment in **Sections 27.9** to **27.11**.

27.6.66 In addition to this, within the hydrology section of this chapter (**paragraphs 27.6.12** to **27.6.29**) various wells (visible on 1:25,000 OS mapping) have been identified. None of these features are registered with the district councils as PWSs and therefore may not be in use. However, as part of the precautionary assessment approach they too have also been considered as potential receptors in the assessment in **Sections 27.9** to **27.11.**

Licensed abstractions

27.6.67 The study area intersects numerous SPZs which are classified as Safeguard Zones and Drinking Water Protected Areas (DWPAs) on the Defra MAGIC website.

27.6.68 The PEIR Assessment Boundary overlaps with the edge of inner SPZ2s associated with the Southern Water public water sources at Warningcamp

(GWSGZ0141, NGR 504590, 107250) and Burpham (GWSGZ014, NGRs 505050, 109450; 504970, 109370; & 504850, 109280), within the Worthing Chalk groundwater catchment. There are also a number of other more distant SPZs within the wider study area.

27.6.69 The EA was contacted to obtain details on licensed abstractions within the study area. **Appendix 27.1, Volume 4** provides details of the 72 licensed abstractions that have been identified (**Figure 27.6, Volume 3**), and presents the results of a screening exercise based on their topographical, hydrological and hydrogeological characteristics to determine whether they are potentially connected to the PEIR Assessment Boundary. 27 licensed abstractions are considered to have a potential hydrological and hydrogeological connection and have been screened in for further assessment within **Sections 27.9** to **27.11**. The majority of these supplies are groundwater-fed supplies situated within the Principal Chalk aquifer to the south and west of the central section of the PEIR Assessment Boundary between Warningcamp and Sullington Hill.

Consented discharges

27.6.70 **Appendix 27.1, Volume 4** also identifies details of eight EA consented discharges that are located within the PEIR Assessment Boundary (**Figure 27.6, Volume 3**) and have been screened in for assessment within **Sections 27.9** to **27.11**.

Flood risk

27.6.71 This section provides an overview of the baseline sources of flood risk within the PEIR Assessment Boundary. A Flood risk Screening Assessment has been provided within **Appendix 27.2, Volume 4** that considers each of these sources of flood risk in more detail.

Fluvial and tidal flood risk

27.6.72 The EA's Flood Zone mapping provides an indication of the likelihood of flooding from fluvial and or tidal sources, with Flood Zones 1, 2, and 3 indicating a low, medium and high annual probability of flooding, respectively. Flood Zone extents are shown in **Figure 27.7, Volume 3** (any area not highlighted on these maps is Flood Zone 1).

27.6.73 The most significant areas of Flood Zones 2 and 3 are located in the lower tidal reaches of the River Arun at Littlehampton at the south west limit of the onshore temporary construction corridor, and on the River Adur and the Cowfold Stream on the north east end of the onshore temporary construction corridor. The central section of the onshore temporary construction corridor between Warningcamp and Ashurst sits within Flood Zone 1.

27.6.74 At the southern end of the PEIR Assessment Boundary at the landfall adjacent to Littlehampton, the primary source of flood risk is combined fluvial and tidal flooding associated with the River Arun and / or direct from the sea itself. The landfall and majority of the onshore temporary construction corridor is situated within Flood Zone 3 south west of Crossbush. The EA flood defence dataset shows defences along the length of the lower River Arun adjacent to Littlehampton, and along the Black Ditch and Ryebank Rife tributaries. Within **Appendix 27.2, Volume 4** third

party receptors have been identified that could potentially be at increased risk of tidal fluvial flooding and / or combined tidal and fluvial flooding, and therefore these have been screened in for further assessment within **Sections 27.9** to **27.11**.

27.6.75 Sections of the north east portion of the PEIR Assessment Boundary are at risk of fluvial and/or combined tidal and fluvial flooding associated with the River Adur and the Cowfold Stream (the River Adur is tidal for much of the section intersected by the site). The onshore temporary construction corridor intersects Flood Zone 3 in several locations adjacent to Bines Green (NGR 518867 117300), Homeland's Farm (NGR 519469 118349), Pook's Farm (NGR 522028 119955), and Moatfield Farm (NGR 522262 121140). EA flood defences are shown along the River Adur western branch downstream of Pinlands Farm, along the length of the River Adur eastern branch and Cowfold Stream.

Surface water flood risk

27.6.76 The EA's Risk of Flooding from Surface Water (RoFSW) mapping has been used to give an indication of the broad areas likely to be at risk of surface water flooding and is summarised in **Figure 27.8, Volume 3.**

27.6.77 This mapping indicates that overall interactions with surface water pathways along the PEIR Assessment Boundary are minimal with limited, confined spatial extents. The majority of surface water flood risk intersecting the PEIR Assessment Boundary is associated with the fluvial flood extents associated with the Main Rivers discussed above (**paragraphs 27.6.72.- 27.6.75**) and / or crossings of minor watercourses and tributaries of the River Adur and Cowfold Stream. In addition, regions of high surface water flood risk are shown to intersect the two proposed onshore substation search areas, and temporary construction compound locations at Washington, West Sussex in the central section (Honeybridge Stream tributary) and Oakendene (Cowfold Stream tributary) within the north eastern section of the PEIR Assessment Boundary.

27.6.78 Within **Appendix 27.2, Volume 4** third party flood risk receptors have been identified that could potentially be at increased risk of surface water flooding, and these have been screened in for further assessment within **Section 27.9** to **27.11**.

Groundwater flood risk

27.6.79 Shallow groundwater is likely to be encountered along sections of the onshore temporary construction corridor. The south west portion of the onshore temporary construction corridor is underlain by Chalk bedrock, and the ADC, HDC and MSDC SFRAs all indicate the potential for groundwater flooding in this section of the onshore temporary cable construction corridor.

27.6.80 The EA AStGWF indicates High (>= 75%) susceptibility to groundwater flooding across the majority of the southern and central sections of the PEIR Assessment Boundary underlain by Chalk between landfall and near Sullington Hill. The dataset indicates a lower susceptibility of groundwater emergence in the north eastern part of the PEIR Assessment Boundary, which is overall underlain by other geology types (for example Gault Formation and Wealden Group) from Sullington Hill towards Bolney, with susceptibility ranging between 25% - 75%.

27.6.81 **Appendix 27.2, Volume 4** has identified that groundwater emergence of interception of shallow groundwater is most likely to occur at the following locations:

- within the Arun valley adjacent to Littlehampton and Lyminster;
- where the onshore temporary construction corridor passes through low ground at the foot of Sullington and Barnsfarm Hill, adjacent to Washington, West Sussex; and
- within the Adur Valley adjacent to Bines Green, Partridge Green, Pooks Farm and Moatfield Farm.

Sewer flood risk

27.6.82 The risk of flooding from sewers is likely to be limited to where the PEIR Assessment Boundary intersects urban areas.

27.6.83 Sewer flood risk information from the ADC, HDC and MSDC SFRAs has been presented within **Appendix 27.2, Volume 4**. The highest number of historical incidents of sewer flooding across the PEIR Assessment Boundary was recorded within the ADC along the urbanised coastal front near the proposed landfall at Climping. Further along the onshore temporary construction corridor, historical incidents are generally low since the region is predominantly rural, and the closest other concentrations were recorded at Ashington approximately 2km to the north of the PEIR Assessment Section that passes through Washington, West Sussex.

Artificial sources of flood risk

27.6.84 **Appendix 27.2, Volume 4** identifies several impoundments upstream of the eastern and western branches of the River Adur that in the event of failure could result in flooding towards the Proposed Development. However, the likelihood of such a dam failure event occurring is considered to be extremely low owing to the risk management measures in place for large storage reservoirs.

Future baseline

27.6.85 Some of the baseline conditions outlined in the current baseline section above may change even if the Proposed Development were not to go ahead, for the following reasons:

- Climate change: the concept of climate change is well documented, the main implication for the United Kingdom appearing to be more rainfall seasonality, with wetter winters and drier summers. This will, of course, have implications for river flows, tidal and groundwater levels, although these effects are difficult to quantify at present Information regarding climate change was obtained from the UK Climate Projections (UKCP18, 2020) website. The UKCP18 is a climate analysis tool which features comprehensive projections for different regions of the UK. Based on a high emissions scenario, the central estimate climate information for the south coast of England indicates that mean summer temperatures could increase by approximately 7 °C between 2080 and 2100. The central estimate also predicts that summer precipitation could reduce by up to 50 % before 2100. Summer rainfall reductions are projected to be highest

in the south of England relative to the rest of the United Kingdom. The projections also show a pattern of increases in winter precipitation over southern coastal regions towards 2100. Therefore, in winter months there could be an increase in rainfall. If climate change leads to drier summers there is potential for increased pressures on increased demand from water users and habitats supporting sensitive species. Current projections also indicate that summer storms are likely to be more intense and frequent and this may lead to more extreme flow values immediately following such events, with consequential flooding issues;

- Sea level rise: the proposed landfall is situated along the Arun to Pagham section of the coast which is protected by an existing sea defence, formed by a shingle beach which is actively managed to provide a 1 in 200 year standard of protection at present. This coastal section is considered to be very vulnerable, not just to overtopping but to erosion and natural coastal realignment. The short term strategy of the EA is to maintain the defence for as long as possible, and in the longer term there could be a shift of coastline landwards as part of a wider strategy of natural realignment in response to projected changes in sea level rise (EA, 2015);
- Changes in abstraction: changes in the location and rate of surface and groundwater abstractions could occur over time, and variations in the groundwater flow regime may result in changes to the aquifer status and SPZ designations;
- Changes in WFD water body status: WFD water bodies have an overall target of Good condition by 2027 unless a lower condition is justified by way of technical infeasibility or disproportionate cost. For the purposes of the preliminary assessment, all water bodies outlined in **Appendix 27.1, Volume 4** that are currently Moderate condition or less have been assumed to have reached Good condition during the operation and maintenance phase of the Proposed Development, between 2027 and the 2050s; and
- Changes in land use: changing land use in the form of changing agricultural land management practices, urban development or development of industrial sites could cause changes to the hydrological, hydrogeological and geological conditions over time. The land use changes could result in changes patterns and rates of infiltration, changes in flow pathways and sources of sediment inputs, direct physical changes to WFD water bodies, and / or the introduction or removal of sources of pollution. Although there is expected to be some urban development along the PEIR Assessment Boundary (for instance on the western outskirts of settlements such as Littlehampton), the existing land uses are expected to remain largely unchanged during the lifecycle of the Proposed Development.

27.7 Basis for PEIR assessment

Maximum design scenario

27.7.1 Assessing using a parameter-based design envelope approach means that the assessment considers a maximum design scenario whilst allowing the flexibility to

make changes to the design in the future in ways that cannot be anticipated at the time of submission of the DCO Application. The assessment of the maximum adverse scenario for each receptor establishes the maximum potential adverse impact and as a result impacts of greater adverse significance would not arise should any other development scenario (as described in **Chapter 4: The Proposed Development**) to that assessed within this Chapter be taken forward in the final scheme design.

27.7.2 The maximum assessment assumptions that have been identified to be relevant to the water environment are outlined in **Table 27-14** below and are in line with the project design envelope (**Chapter 4**).

Table 27-14 Maximum assessment assumptions for impacts on the water environment

Project phase and activity	Maximum assessment assumptions	Justification
Construction	Landfall • the temporary construction compound will be used for HDD activities, cable pulling and construction of the TJBs; and • the location of these works will be located behind Climping Beach within the PEIR Assessment Boundary. Onshore cable corridor • the width of the onshore temporary cable construction corridor for surface trenching is up to 50m (widened in locations where there is a technical necessity, such as at HDD sites) within the PEIR Assessment Boundary, which has an approximate length of 36km;	The PEIR Assessment Boundary represents the areas where landfall construction works may result in effects to the water environment and provides the worst – case assessment to allow for micro siting of the landfall infrastructure. The PEIR Assessment Boundary represents the areas where onshore temporary construction corridor works may result in effects on the water environment and provides for worst case scenario.

Project phase and activity	Maximum assessment assumptions	Justification
	• the target excavation depth of the cable will be on average 1.2 m (to the top of the ducting; and • up to four temporary construction compound locations, with a duration of up to 3 years and 6 months at each. Watercourse crossings • the duration of temporary watercourse crossings is up to 3 years 6 months; • the draft crossing schedule is provided in **Chapter 4, Appendix 4.2, Volume 4** and shown on **Figure 27.2, Volume 3**; and • the maximum potential for disturbance of minor drainage features is associated with culverts. Onshore substation • 5.9hectares (ha) onshore substation with associated structures and infrastructure; • 2.5ha additional temporary works area;	These assessment assumptions represent the maximum potential for disturbance on water environment receptors from watercourse crossings (main rivers, ordinary watercourses and minor drainage ditches). Temporary culverting is considered to represent the worst-case crossing methodology (as opposed to HDD, and open span bridging) in terms of its potential for disturbance and associated effects on receptors' water quality and hydromorphology. The onshore substation and temporary works areas represent the areas where construction works may result in effects on water environment receptors. A worst-case assessment allows for micro siting of the onshore substation within the PEIR Assessment Boundary.

Project phase and activity	Maximum assessment assumptions	Justification
	• duration of construction: 3 years; and • each of the onshore substation search areas has been considered.	
Operation and maintenance	Onshore landfall and cable corridor: • all permanent cable and TJB elements will be below ground; • cables are not oil-filled; and • minimal maintenance required (periodic testing at joint boxes every 2 to 5 years) for both preventive and corrective maintenance requirements. Onshore substation: • 5.9ha onshore substation with associated structures and infrastructure; and • around 30-year operational lifetime.	These areas and timescales represent the permanent infrastructure envelopes that could result in potential effects on the water environment during the operation and maintenance phase of the Proposed Development.
Decommissioning	Onshore substation: • if fully decommissioned and returned to baseline condition, maximum assessment assumptions as per	For the purposes of a maximum design scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase. It is anticipated that the onshore cables will be left in-situ with ends

Project phase and activity	Maximum assessment assumptions	Justification
	construction phase; and • left in-situ with ends cuts, sealed and buried.	cuts, sealed and buried to minimise effects associated with removal.

27.7.3 The assessment of effects in this PEIR takes into consideration the optionality that exists for flexibility at this stage of the design of the Proposed Development (as outlined in **Chapter 5: Approach to the EIA**). For example, this PEIR considers the effects that could result from construction from taking forward a specific 50m onshore temporary construction corridor within the larger (~100m) PEIR Assessment Boundary and either of the two potential onshore substation search areas. Each of the potential options have been considered and findings are presented for all potential receptors which have a connection to the relevant infrastructure type (covered under landfall, onshore cable corridor, onshore substation) as presented in **Sections 27.9** to **27.11**.

27.7.4 For instance, for the onshore temporary construction corridor each potential receptor with a connection to the PEIR Assessment Boundary has been considered, and on the basis of embedded environmental measures being implemented, a worst case magnitude of change assigned for the closest part of the PEIR Assessment Boundary with a hydrological connection. Similarly for the two onshore substation search area options, receptors have been identified and presented for both options and post-mitigation worst case magnitude of change assigned for the most proximate part of either search option which has a hydrological connection.

27.7.5 Therefore, effects that are more significant than those presented in this PEIR are not predicted to occur should any other development scenario within the project design envelope be taken forward in the final design of the Proposed Development.

Embedded environmental measures

27.7.6 As part of the Rampion 2 design process, a number of embedded environmental measures have been adopted to reduce the potential for impacts on the water environment. These embedded environmental measures will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process.

27.7.7 These embedded environmental measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements. As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the

design of Rampion 2 and are set out in this PEIR. **Table 27-15** sets out the relevant embedded environmental measures within the design and how these affect the water environment assessment.

Table 27-15 Relevant water environment embedded environmental measures

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-1	The onshore cable route will be completely buried underground for its entire length where practicable.	Scoping	Development Consent Order (DCO) works plans, description of development and requirements	This measure will minimise interactions with the surface water environment (changes in surface water flow pathways/rates and volumetric displacement of flood water).
C-3	At sensitive crossing locations the working width will be reduced as far as practicable.	Scoping	DCO works plans, description of development and requirements	These measures will minimise silt laden/contaminated runoff entering watercourses, changes in watercourse morphology and flow conveyance.
C-5	Main rivers, watercourses, railways and roads that form part of the Strategic Highways Network will be crossed by Horizontal Directional Drill (HDD) or other trenchless technology where this represents the best environment solution and is financially and technically feasible (see C-17).	Scoping - updated at PEIR	DCO works plans and order limits	
C-6	Where practical, sensitive sites will be avoided by the temporary and permanent onshore project footprint	Scoping - updated at PEIR	DCO works plans and order limits	This measure will minimise potential impacts on

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	including SSSIs, Local Nature Reserves, Local Wildlife Sites, ancient woodland, areas of consented development, areas of historic and authorised landfills and other known areas of potential contamination, National Trust Land, Listed Buildings, Scheduled monuments, and mineral resources (including existing mineral sites, minerals sites allocated in development plans and mineral safeguarding areas).			groundwater or surface water designated sites, ecosystems and features.
C-7	Post construction, the work area will be reinstated to pre-existing conditions as far as reasonably practical in line with the Outline Materials Management Plan (MMP) (C-69) and Defra 2009 Code of Construction Practice (COCP) for the Sustainable Use of Soils on Construction Sites PB13298.	Scoping - updated at PEIR	Outline Code of Construction Practice (COCP) and DCO requirement	This measure will minimise silt laden/contaminated runoff entering watercourses.
C-8	During both construction and operation, vehicle maintenance and refuelling of machinery will be undertaken within designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. These areas at	Scoping - updated at PEIR	Outline COCP and DCO requirement	This measure will minimise the potential for accidental contamination entering watercourses or groundwater.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	risk of spillage or containing hazardous materials, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) will comply with industry good practice, be bunded, have appropriate containment and segregation and will be risk assessed and carefully sited to minimise the risk of hazardous substances entering the drainage system, or the local watercourses or sensitive land based receptors. Where feasible, such areas will be sited at least 10m from a watercourse and away from areas at risk of flooding. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage.			
C-9	Joint bays will be completely buried, with the land above reinstated to pre-construction ground level, with the exception of link box chambers where access will be required from ground level (via manholes). Once constructed joint bays and link box chambers will be resilient to flooding	Scoping - updated at PEIR	DCO works plans, description of development and requirements	This measure will minimise changes in runoff rates/ new pathways and volumetric displacement of flood water.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-10	No blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods.	Scoping	Outline COCP and DCO requirement	These measures will minimise silt laden/contaminated runoff entering watercourses.
C-11	During construction topsoil and subsoil will be stored within the temporary working corridor of the onshore cable. The topsoil and subsoil will be stored in line with Defra 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites PB13298, including guidance on utilising separate stockpiles and giving due consideration to adverse weather conditions. Any suspected or confirmed contaminated soils will be separated, contained and tested before removed.	Scoping - updated at PEIR	Outline COCP and DCO requirement	
C-13	In areas (or during periods of adverse weather) there may be the requirement to import aggregates to create a stable surface for construction traffic movements. Options such as bog-matting and geotextils will be considered by the principal contractor for sensitive sections of the route to reduce impact.	Scoping	Outline COCP and DCO requirement	

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-17	Where trenchless techniques are not required or are not practical, the crossing of watercourses may be crossed by open cut techniques (with flows overpumped around the working area). Appropriate environmental permits or land drainage consents will be applied for works from the EA (e.g. for Main Rivers, works on or near sea defences/flood defence structures or in a flood plain) or from the Lead Local Flood Authority (LLFA) (for Ordinary Watercourse crossings) (see C-5).	Scoping - updated at PEIR	Outline COCP and DCO requirement	These measures will ensure appropriate crossing methodologies are in place to minimise changes in watercourse conveyance.
C-18	A crossing schedule will be prepared which includes crossing methodology for each crossing of road, rail, Public Rights of Way (PRoW) and watercourse	Scoping	COCP and DCO requirement	
C-19	The onshore cable will be constructed in discrete sections. The trenches will be excavated, the cable ducts will be laid, the trenches back-filled and the reinstatement process commenced in as short a timeframe as practicable. At regular intervals (typically 600m – 1,000m) along the route joint bays / pits	Scoping	Outline COCP and DCO requirement	These measures will minimise silt laden/contaminated runoff entering watercourses, changes in watercourse

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	will be installed to enable the cable installation and connection process.			morphology and flow conveyance.
C-20	The typical construction working area will be 50m along the onshore construction corridor to minimise the construction footprint. At other discrete locations this may be expanded to accommodate the working area for example for Horizontal Directional Drilling (HDD).	Scoping	Outline COCP and DCO articles/ requirement	
C-21	Vegetation will be retained where possible. Where necessary, vegetation removal will be scheduled over winter to avoid bird breeding season. If not possible for all areas, any vegetation removal will be undertaken in line with British Standard (BS) 5837:2012 (Trees in relation to design, demolition and construction). This will be carried out under supervision and will be appropriately managed to remove the risk of damaging or destroying active nests, young or eggs. Suitable methods will also be used to ensure vegetation supporting other legally protected	Scoping - updated at PEIR	Outline COCP and DCO articles/ requirement	These measures will minimise potential impacts on groundwater or surface water designated and undesignated sites, ecosystems and features.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	species is removed sensitively and in a legally compliant way.			
C-23	Where possible micro-siting will be undertaken during detailed design to avoid ponds.	Scoping	Outline COCP and DCO requirement	
C-25	All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2015.	Scoping	Outline COCP and DCO requirement	This measure will minimise changes to the water environment via good industry practices.
C-27	Following construction, construction compounds will be returned to the standard stipulated by the landowner and the relevant local authority.	Scoping	COCP and DCO requirement	These measures will minimise silt laden/contaminated runoff entering watercourses, changes in flow rates/pathways and watercourse conveyance.
C-28	Particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. Temporary cut-off drains will be installed parallel to the trench-line before the start of construction to intercept soil and groundwater before it reaches the	Scoping	Outline COCP and DCO requirement	

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	trench. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.			
C-29	A depth of cover of 1.2m is assumed. Deeper trenches may be required at specific crossing locations (such as watercourses).	Scoping - updated at PEIR	Outline COCP and DCO requirement	This measure will minimise the need for dewatering from trenched excavations, which will help limit potential effects upon groundwater availability.
C-30	Geotextiles or other membranes may be used to temporarily control and minimise erosion or transport of sediment from construction sites in areas that are considered unprotected.	Scoping	Outline COCP and DCO requirement	This measure will minimise silt laden/contaminated runoff entering watercourses.
C-33	An Outline COCP will be adopted to minimise temporary disturbance to residential properties, recreational users and existing land users. It will provide details of measures to protect environmental receptors.	Scoping	Outline COCP and DCO requirement	This measure will help protect PWS receptors.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-64	For temporary watercourse crossings the works will be designed to enable the free passage of fish and aquatic mammals including continuation of bed material through the culvert. Sections of the channel will need to be isolated using barriers that span the whole width of the channel. These isolation works will be kept to as short a duration as possible, and screening will take place to prevent fish being drawn into the pump.	PEIR	Outline COCP and DCO requirement	This measure will help minimise potential effects on water dependent features including fish and aquatic mammals.
C-73	Drainage design to manage, attenuate and, if necessary, treat surface water run-off will be included in all elements of temporary and permanent infrastructure. These will be designed in accordance with Sustainable Drainage (SuDS) principles including allowances for climate change and discharged at pre-development rates. Where the development intersects overland flow pathways or areas of known surface water flooding appropriate measures will be embedded into the design.	Scoping - updated at PEIR	Outline COCP and DCO requirement	This measure will help minimise changes to surface water flow rates/pathways and water quality.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-74	All sub-surface infrastructure will be designed to retain sub-surface flow pathways to avoid any localised increases in groundwater flooding.	Scoping - updated at PEIR	Outline COCP and DCO requirement	This measure will help maintain sub-surface groundwater water flow pathways.
C-75	Construction and permanent development in flood plains will be avoided wherever possible. Where this is not possible (for example, the landfall location) environmental measures will be developed to ensure the works are National Policy Statement compliant, including a sequential approach to siting of infrastructure and passing the Exception Test where appropriate.	Scoping - updated at PEIR	Outline COCP and DCO requirement	This measure will ensure a sequential approach to development is taken and the Exception Test is passed where necessary.
C-76	In line with good practice, Pollution Prevention Plans (PPPs) will be drawn up to detail how ground and surface waters will be protected in construction and operation. These will include information on the use and storage of any fuels, oils and other chemicals (in line with C-8 and C-167) and pollution incidence response planning. These will also include measures for the protection of licenced and private abstractions. This could include a monitoring regime	Scoping - updated at PEIR	Outline COCP and DCO requirement	This measure will minimise the potential for accidental contamination entering watercourses, or groundwater.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	associated with critical or very near receptors.			
C-77	Dewatering of excavations will be undertaken in line with good practise. Effects of dewatering on potential receptors will be incorporated into the proposed approaches for each piece of infrastructure. Appropriate treatment will be installed before discharge to surface or groundwater, and this could include the use of siltbusters (or similar) before discharge to surface waters. Appropriate licences and permits will be applied for if required.	Scoping	Outline COCP and DCO requirement	This measure will help minimise a decline in groundwater levels and an increase in flow within watercourses.
C-78	Licensed and private water supplies will be avoided where practicable; if any impacts are anticipated then appropriate measures will be put in place to avoid impact on the quantity and quality of the supply.	Scoping	Outline COCP and DCO requirement	This measure will help minimise potential effects on the quantity and quality of all abstractions.
C-117	Works will be programmed in the floodplain to occur in summer / early autumn if possible, to avoid interaction with known flooding periods to minimise	PEIR	Outline COCP and DCO requirement	This measure will avoid interaction with known flooding periods to minimise the potential for

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	the potential for displacement of floodwater.			displacement of floodwater.
C-118	Emergency Response Plans (ERPs) for flood events require preparation for all construction activities, working areas, access and egress routes in floodplain areas (tidal and fluvial). These plans will be provided for both construction and operation / maintenance phases.	PEIR	Outline COCP and DCO requirement	This measure will minimise the risk to construction staff working within the floodplain. It will also minimise the risk of silt/contaminants entering watercourses.
C-119	In the fluvial floodplain, temporary trackway (rather than raised stone roads) will be utilised for the temporary haul road and access routes wherever practicable.	PEIR	Outline COCP and DCO requirement	These measures will minimise the potential for displacement of floodwater and changes in surface water flow pathways.
C-120	Stone access routes / haul road and working areas will be constructed of semi-permeable aggregate material (similar to compounds as per C-129) where practical.	PEIR	Outline COCP and DCO requirement	
C-121	Run-off from access routes / haul road and working areas will be allowed to infiltrate wherever possible.	PEIR	Outline COCP and DCO requirement	

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-122	All permanent cable crossings will pass beneath the bed of watercourses (no within bank crossings). Sufficient depth between the bed of the watercourse and the top of the cable (whether trenchless or open cut) will be provided to ensure no potential for exposure of cable due to scour. The minimum depth of cable (top) beneath 'true cleaned bed' of the watercourses is to be advised at ES stage.	PEIR	Outline COCP and DCO requirement	This measure will minimise changes in watercourse conveyance and morphology.
C-123	Starter (and exit) pits for Horizontal Directional Drilling (HDD) and other trenchless technologies will be micro-sited outside of the floodplain where possible (by moving the pits further away from watercourses).	PEIR	Outline COCP and DCO requirement	These measures will minimise volumetric displacement of flood water and protect the construction staff.
C-124	Where start and/or exit pits for Horizontal Directional Drilling (HDD) and other trenchless technologies are located within in the floodplain the Contractor will develop procedures as part of the Emergency Response Plan (ERP) to be enacted.	PEIR	Outline COCP and DCO requirement	

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-125	Where the cable route crosses an Environment Agency flood defence, trenchless methodologies will be used.	PEIR	Outline COCP and DCO requirement	This measure will help minimise volumetric displacement of floodwater (by maintaining the structural integrity of the existing flood defences).
C-126	Minor watercourses (where open cut techniques are proposed for the permanent cable crossings) will also have temporary crossings for the haul road to provide vehicular access along the route. A mixture of culverts and / or clear span bridges could be employed based on crossing specific requirements (size of watercourse and flood risk). These will be subject to permits and consents with the Environment Agency and Lead Local Flood Authority.	PEIR	Outline COCP and DCO requirement	These measures will minimise the potential for silt laden/contaminated runoff entering watercourses, and changes in watercourse morphology and conveyance.
C-127	Temporary watercourse crossings will not be provided for the haul road where the cable crossing will be trenchless. Vehicular access will use existing public highways and bridges.	PEIR	Outline COCP and DCO requirement	

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-128	Any temporary crossings will be in place for the minimal time possible.	PEIR	Outline COCP and DCO requirement	
C-129	Compounds will be surfaced with semi-permeable aggregate material (similar to access roads as per C-120), where practical, with the exception of fuel storage areas and similar where pollution containment in the event of a spillage is the priority. Areas of construction compounds that are used for fuel storage, plant maintenance and refuelling will be surfaced with fully impermeable materials to prevent any infiltration of contaminated runoff and contain bunding in line with C-8 and C-167.	PEIR	Outline COCP and DCO requirement	This measure will help minimise changes to flow rates/pathways, and the potential for accidental contamination entering watercourses or groundwater.
C-130	During construction, no topsoil stockpiles will be stored within 8m of Ordinary Watercourses, within 8m of a non-tidal Main River, and within 16m of a tidal Main River.	PEIR	Outline COCP and DCO requirement	This measure will minimise the potential for silt laden runoff entering watercourses.
C-131	Where potential flood risk receptors could be impacted by a loss of floodplain storage and/or impacts on floodplain conveyance, soil stockpiles (associated	PEIR	Outline COCP and DCO requirement	These measures will help minimise the potential for

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	with both the cable construction and the temporary haul road) will be located outside of the fluvial floodplain wherever possible. Where not possible, further assessment will be undertaken in the Flood Risk Assessment (FRA) and further measures will be proposed to address this where necessary.			displacement of flood water.
C-132	Soil stockpiles in the tidal floodplain will have regular gaps to prevent floodplain compartmentalisation. The maximum continuous length of embankment is to be determined in the Flood Risk Assessment (FRA).	PEIR	Outline COCP and DCO requirement	
C-133	Stockpiles will be present for the shortest practicable timeframe, with stockpiles being reinstated as the construction work progresses. Stockpiles which remain present for six months or longer will be seeded to encourage stabilisation.	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for silt laden runoff entering watercourses.
C-134	During construction, dewatering activities (of excavations) will be halted if a flood alert or flood warning is in place downstream, in order to minimise any	PEIR	Outline COCP and DCO requirement	This measure will help minimise any impacts on watercourse conveyance.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	impacts on flood flow conveyance and to maintain access for watercourse maintenance.			
C-135	A standoff distance (distance to be determined based on biodiversity and pollution control considerations) will be applied from watercourse bank tops (other than for watercourse crossings) to account for potential issues such as water vole burrows, otter holts and pollution control.	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for silt laden runoff entering watercourses (to avoid knock on impacts on terrestrial ecology receptors).
C-136	Measures (if any) required to address risks at the permanent onshore substation will be identified as part of the Flood Risk Assessment (FRA).	PEIR	Outline COCP and DCO requirement	This measure will be considered at the ES stage to ensure safe development and prevent any increase in flood risk from the onshore substation.
C-137	All proposed infrastructure and construction activities will be sited outside of the inner Source Protection Zones (SPZ1) for the Southern Water Warningcamp and Burpham borehole public water supplies. Construction activities will also be steered as far as	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for effects on any public water supplies including Warningcamp and Burpham boreholes.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	practicable outside of their respective SPZ2s, and there will be no drilling activities or storage of hazardous materials including chemicals, oils and fuels within any SPZ.			
C-138	Details of the proposed trenchless watercourse crossing techniques will be discussed with the Environment Agency at the detailed design stage. The depth of the trenchless crossing will be such that the riverbed and watercourse is undisturbed by construction activities. Specific construction method statements will be prepared.	PEIR	Outline COCP and DCO requirement	This measure will minimise the potential for accidental contamination entering watercourses or groundwater.
C-139	Culverting activities and construction of cable circuit crossings will take place during periods of normal to low flow conditions to avoid conveyance-related flood risk effects and in accordance with the Outline COCP.	PEIR	Outline COCP and DCO requirement	This measure will minimise the potential for changes in watercourse conveyance.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-140	Temporary cut-off drains will be installed to prevent surface water and shallow groundwater ingress into excavations. Intercepted water will be encouraged to infiltrate into the ground, mimicking natural flow patterns in accordance with the principles of SuDS. Where discharge of cut-off drains to watercourses is the only practical option, appropriate measures will be employed to moderate runoff rates, and promote settlement of suspended sediment.	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for changes in runoff rates/ pathways and groundwater levels.
C-141	Dewatering of trench excavations will be carefully monitored and groundwater flow disruption and drawdown will be minimised as much as possible. The time any excavation is open will be kept to a minimum to minimise ingress of water and dewatering requirements.	PEIR	Outline COCP and DCO requirement	This measure will help minimise a decline in groundwater levels and an increase in flow within watercourses.
C-142	If water being pumped from excavations is suspected to be contaminated, appropriate measures will be taken in accordance with Environment Agency guidance and the Environmental Permitting Regulations to prevent uncontrolled or unauthorised releases of	PEIR	Outline COCP and DCO requirement	These measures will help minimise the potential for contaminated runoff to enter watercourses or groundwater.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	this water to ground or to the water environment.			
C-143	Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate / runoff drainage to prevent migration of contaminants from the stockpile. Materials will be segregated where possible to prevent cross-contamination occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the Outline Materials Management Plan (C-7).	PEIR	Outline COCP and DCO requirement	
C-144	In areas where there are groundwater seepages / flush zones identified along the access tracks at the detailed design stage, the Contractor will utilise geotextiles beneath the track material or bog-mat where necessary to prevent the track from settling into the ground to help maintain sub-surface flow.	PEIR	Outline COCP and DCO requirement	This measure will help minimise changes to the sub-surface groundwater flow regime.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-145	To enable access during construction, temporary clear span bridges will be used for those temporary watercourse crossings too wide or deep to be crossed using culverts.	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for changes to watercourse conveyance.
C-146	The location of statutory undertaker assets (including water supply and sewer pipes, water and waste treatment works etc.) will be confirmed through inspection of detailed plans from the undertakers. All assets potentially affected by the Proposed Development will be identified, with particular consideration to access roads and crossings.	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for disruption to existing water supply, sewerage and discharge infrastructure.
C-147	The Contractor will identify springs, abstractions and any sewerage infrastructure including treatment plants, septic tanks, soakaways, interconnecting pipes and outfalls, that require appropriate protection. These features will be mapped and appropriate exclusion zones will be applied to ensure that construction methods do not disturb the physical infrastructure layout. All appointed Contractor staff will be	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for impacts on existing abstractions, sewerage or discharge infrastructure.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	given training to protect abstractions deemed to be at risk. In the event that an abstraction is identified as being at risk of water quality deterioration, a comprehensive sampling programme will be agreed with the relevant authority for the abstraction in question. Furthermore in the event that there is an impact on a water supply, an alternative supply will be made available.			
C-148	During construction, a programme of visual inspections will be undertaken to ensure that the potential effects on the River Arun and Adur tributaries are appropriately monitored. The visual inspection points will be selected downstream of construction areas. See C-151 for response plan in the event that observations identify that an intervention is necessary.	PEIR	Outline COCP and DCO requirement	This measure will help ensure that any potential silt laden runoff is appropriately monitored and controlled.
C-149	In areas where there is a potential for hydrocarbon residues from run-off / isolated leakages, surface water drainage measures will be provided to capture hydrocarbons prior to discharge, such as hydrocarbon interceptors.	PEIR	Outline COCP and DCO requirement	These measures will help minimise the potential for accidental contamination entering watercourses or groundwater.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-150	Plant and machinery used during the construction and operation phases will be maintained to minimise the risks of oils leaks or similar, in line with C-8. Placing a drip tray beneath a plant and machinery during refuelling and the availability of spill kits will contain small spillages.	PEIR	Outline COCP and DCO requirement	
C-151	Contractors will be made aware of their statutory responsibility not to “cause or knowingly permit water pollution”. A Pollution Prevention Plan (PPP) and Pollution Incident Response Plan (PIRP) will be prepared for the Proposed Development, the latter in line with Pollution Prevention Guideline 21 (PPG 21, 2009), and all contractors will be briefed on these plans, with copies made available on site.	PEIR	Outline COCP and DCO requirement	
C-152	In the event that piling is selected for installation of the onshore substation foundations, a detailed piling risk assessment will be prepared This will be submitted to the Environment Agency for approval, prior to the commencement of construction.	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for contamination of groundwater.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-153	An Operations and Maintenance Plan will be developed with a Pollution Incident Control Plan (PICP) for implementation during the operational phase.	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for accidental contamination entering watercourses or groundwater.
C-154	In the fluvial floodplain and at surface water flow pathways, the permanent cable will be completely buried, with the land above reinstated to pre-construction ground level (some mounding may be appropriate to allow for settlement).	PEIR	DCO works plans, description of development and requirements	This measure will help minimise the potential for displacement of flood water or changes in runoff pathways.
C-167	Any tanks and associated pipe work containing oils, fuels and chemicals will be double skinned and provided with leak detection equipment. There will be a bunded capacity of 100% of the maximum tank volume for non-hazardous fluids. For hazardous chemicals, fuels or oils bund capacity will be the larger of 110% of the largest tank volume for single tank bunds, (or, in the case of multi tank bunds, 110% of the largest tank capacity or 25% of the combined tank capacity, whichever it is	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for accidental contamination entering watercourses or groundwater.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
	the largest). Fuel storage will be in accordance with the Control of Pollution (Oil Storage) (England) regulations 2001 and other Pollution Prevention Guidelines (PPGs). All stores of fuel will be located at least 20m from any watercourses and away from areas at risk of flooding.			
C-175	Where use of trackway is not possible and potential flood risk receptors could be impacted (to be identified in the Flood Risk Assessment), access routes (and working areas) in the fluvial floodplain will be as close to ground level as possible to avoid impacting flood flow conveyance and loss of floodplain storage (a slight raised surface is often required to allow for drainage).	PEIR	Outline COCP and DCO requirement	This measure will help minimise the potential for displacement of flood waters or changes in watercourse conveyance.
C-176	For temporary watercourse crossings, where culverts are to be used, these will be appropriately sized to maintain existing flow conveyance. Where existing culverts already exist nearby, similarly sized culverts may be suitable.	PEIR	Outline COCP and DCO requirement	These measures will help maintain watercourse conveyance.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-177	Where feasible multiple pipes will not be used for culverts of temporary watercourse crossings (culverts should have a single pipe/opening of an appropriate size for the watercourse cross section).	PEIR	Outline COCP and DCO requirement	
C-178	Circular culverts for temporary watercourse crossings will have concrete bedding in locations where ground conditions suggest that settlement could occur, e.g. Internal Drainage Board (IDB) district.	PEIR	Outline COCP and DCO requirement	
C-179	Stockpile gaps will be located at topographic low points to preserve existing flow paths.	PEIR	Outline COCP and DCO requirement	These measures will help minimise changes to surface flow pathways.
C-180	Where stockpiles are placed on both sides of the access routes/ haul road the gaps will coincide.	PEIR	Outline COCP and DCO requirement	
C-181	Access roads will have cross drainage provided where necessary at topographic low points.	PEIR	Outline COCP and DCO requirement	

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to the water environment assessment
C-182	Any works within 5m of any watercourse in the Internal Drainage Board (IDB) district will be subject to consent from the EA. Any works within 8m of a non-tidal Main River or 16m for a tidal Main River will be subject to consent from the Environment Agency (the majority of the Main Rivers are tidal for the majority of the cable route). Work within banktop of any other watercourse (not main river and outside of IDB) would require consent from the Lead Local Flood Authority (LLFA).	PEIR	Outline COCP and DCO requirement	This measure will help minimise any impacts to watercourse conveyance, and on silt laden runoff entering watercourses.

27.8 Methodology for PEIR assessment

Introduction

27.8.1 The assessment methodology for the water environment for the PEIR is consistent with that provided in the Scoping Report (RED, 2020), and no changes have been made since the scoping phase. The project-wide generic approach to assessment is set out in **Chapter 5: Approach to the EIA**, and whilst this has informed the approach that has been used in this water environment section, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the water environment assessment.

Significance evaluation methodology

Overview

27.8.2 The significance level attributed to each effect will be assessed based on the 'sensitivity' (value or importance) of the affected receptor and the magnitude of change resulting from the Proposed Development. The level of significance is then determined by the combination of value and magnitude.

27.8.3 Value is assessed on a scale of high, medium, low and very low, whilst magnitude is assessed on a scale of high, medium, low and negligible. The criteria for defining value and magnitude can be found in **Table 27-16** and **Table 27-17** respectively, along with example applications. These criteria are defined and applied based on professional judgement, using recognised approaches to classification relevant to the receptor types, including WFD, the NPPF and Design Manual for Roads and Bridges (DMRB), all of which represent good practice for water environment assessment within the EIA.

Value of receptor

27.8.4 Definitions of receptor value used in the assessment are provided in **Table 27-16** with examples of receptors placed in each class.

Table 27-16 Definitions of receptor value

Value	Criteria	Examples
High	Features with a high yield, quality or rarity, with little potential for substitution.	Conditions supporting a site with an international conservation designation (for example, Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall 'Good' status / potential.

Value	Criteria	Examples
		WFD groundwater body (or part thereof) with overall 'Good' status.
	Water use supporting human health and economic activity at a regional scale.	Regionally important public surface water or groundwater supply (and associated catchment / SPZ / Groundwater Management Unit (GWMU)).
	Features with a high vulnerability to flooding.	Land use type defined as 'Essential Infrastructure' (for instance, critical national infrastructure, such as essential transport and utility infrastructure) and 'Highly Vulnerable' (for example, police / ambulance stations that are required to operate during flooding, mobile homes intended for permanent residential use) in the NPPF flood risk vulnerability classification.
Medium	Features with a medium yield, quality or rarity, with a limited potential for substitution.	Conditions supporting a site with a national conservation designation (for example, SSSI, National Nature Reserve (NNR)), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall Moderate or lower status / potential. WFD groundwater body (or part thereof) with overall Poor status.
	Water use supporting human health and economic activity at a local scale.	Local public surface water and groundwater supply (and associated catchment / SPZ / GWMU) or permitted discharge. Licensed non-public surface water and groundwater supply abstraction (and associated groundwater catchment / SPZ / GWMU) which is relatively large relative to available resource, or where raw water quality is a critical issue, for example: industrial process water, or permitted discharge.

Value	Criteria	Examples
	Features with a moderate vulnerability to flooding.	Land use type defined as 'More Vulnerable' in the NPPF flood risk vulnerability classification (for example, hospitals and health centres, educational institutions, most types of residential development).
Low	Features with a low yield, quality or rarity, with some potential for substitution.	Conditions supporting a site with a local conservation designation (for example, Local Nature Reserve (LNR), County Wildlife Site (CWS)), where the designation is based specifically on aquatic features, or an undesignated but highly / moderately water-dependent site, including a Local Wildlife Site (LWS) and a Groundwater Dependent Terrestrial Ecosystem (GWDTE). Non-reportable WFD surface water or groundwater body (or part thereof), or non-WFD water body.
	Water use supporting human health and economic activity at household / individual business scale.	Licensed non-public surface water and groundwater supply abstraction (and associated catchment / SPZ / GWMU), which is relatively small relative to available resource, or where raw water quality is not critical, for example: cooling water, spray irrigation, mineral washing or permitted discharge. Unlicensed potable surface water and groundwater abstraction (and associated catchment) for example: private domestic water supply, well, spring or permitted discharge.
	Features with a low vulnerability to flooding.	Land use type defined as 'Less Vulnerable' in the NPPF flood risk vulnerability classification (for example, most types of business premises, including land and buildings used for agriculture).
Very Low	Commonplace features with very low yield or quality with good potential for substitution.	Conditions supporting an undesignated and low water-dependent site, including a LWS, GWDTE, LGS, spring and pond.

Value	Criteria	Examples
	Water use does not support human health, and of only limited economic benefit.	Unlicensed non-potable surface water and groundwater abstraction (and associated catchment) for example, livestock supply.
	Features that are resilient to flooding.	Land use type defined as 'Water-compatible development' in the NPPF flood risk vulnerability classification (for example: flood control infrastructure; water transmission infrastructure), and undeveloped land.

27.8.5 Based on information on baseline conditions in **Section 27.6** (informed by findings from **Appendices 21.1** and **21.2, Volume 4**) and the criteria from **Table 27-16**, an assessment of value is provided below in **Table 27-17** for each of the identified receptors, with identifier labels assigned to licensed abstraction, PWS and discharge receptors (for example A1, P1 and D1 respectively).

Table 27-17 Identified water environment receptors

Receptor type	Identified receptor	Value	Rationale
WFD Water Bodies	WFD Groundwater Bodies Littlehampton Anticline West GB40701G504900 Sussex Lambeth Group GB40701G505100 Lower Greensand Adur and Ouse GB40701G502400 Adur and Ouse Hastings Beds GB40702G502000	High	WFD groundwater bodies (or part thereof) with overall 'Good' status.
	WFD Surface Water and Groundwater Bodies Ryebank Rife GB107041006620 Black Ditch (West Sussex) GB107041012890 Littlehampton Anticline East GB40701G503400	Medium	WFD surface water, transitional and coastal water bodies (or part thereof) with overall Moderate or lower status / potential, and groundwater bodies (or part thereof) with overall Poor status.

Receptor type	Identified receptor	Value	Rationale
	Worthing Chalk GB40701G505300 Honeybridge Stream GB107041012120 Adur Lockbridge GB107041012200 Adur East (Sakeham) GB107041012900 Adur East, GB107041012180 Cowfold Stream GB107041012260 Arun Lower GB540704105000 Adur GB540704116000 Sussex GB640704540003		
Conservation Sites, Ponds and Springs	Designated Conservation Sites Arundel Park SSSI Amberly Mount to Sullington Hill SSSI	Medium	Conditions support sites with a national conservation designation, where the designation is based specifically on aquatic features.
	Undesignated Conservation Sites Arun Valley, Watersfield to Arundel LWS Bines Green LWS	Low	Conditions supporting sites with an undesignated but highly / moderately water-dependent site
	LGSs, Ponds and Springs Rock Common Sand Quarry LGS Undesignated ponds near Patching (Black Ditch catchment); Washington Road A283 (River Stor catchment); Buncton Manor Farm (Honeybridge Stream catchment); between Blakes	Very Low	Conditions supporting undesignated and low water-dependency site.

Receptor type	Identified receptor	Value	Rationale
	Farm and Sweethill Farm, near Eatons Farm (Ordinary Watercourse tributary of the tidal Arun); and south west of the Wineham Lane North onshore substation search area (Adur East (Sakeham) catchment) Undesignated springs near Hammerpot (Black Ditch catchment); between Kithurst Farm and Garston Farm (River Stor catchment); Water Lane, Buncton, Castle Farm Estate, and Hawking Soppers (Honeybridge Stream catchment)		
Water Resources	Public Water Supply Abstractions A15 24/063 Warningcamp PS Borehole A16 10/41/310210 Burpham PS Borehole 1 A17 10/41/310210 Burpham PS Borehole 2 A18 10/41/310210 Burpham PS Boreholes 3 & 4 A20 10/41/310210 Angmering PS Point 2 A21 10/41/310210 Angmering PS Point 1 A28 10/41/310210 Patching PS A33 10/41/310210 Findon PS A35 10/41/310210 Sompting PS A36 10/41/310210 Broadwater PS Borehole 1	High	Regionally important public surface water or groundwater supply (and associated catchment / SPZ / GWMU).

Receptor type	Identified receptor	Value	Rationale
	A37 10/41/310210 Broadwater PS Borehole 2 A38 10/41/310210 Broadwater PS Borehole 3 A39 10/41/310210 Broadwater PS Well		
	<u>Large Licensed Abstractions</u> A1 10/41/542009 Point A At New Barn, Climping A5 23/059 Point A St Alders Fish Farm A6 10/41/411021 River Arun – Estuary Tidal A9 24/060 Knucker Hole Fish Farm A19 10/41/414101 Lee Farm, Patching A45 23/059 Point A at Alders Fish Farm A46 10/41/312103 Wappingthorn Farm, Steyning Borehole A A47 10/41/312010 Huddlestone Farm, Steyning A48 10/41/312010 Huddlestone Farm, Steyning	Medium	Licensed non-public surface water and groundwater supply abstraction (and associated catchment / SPZ / GWMU) which is relatively large relative to available resource, or where raw water quality is a critical issue, for example: industrial process water, or permitted discharge.
	<u>Small Licensed Abstractions</u> A11 10/41/411010 Church Farm, Lyminster A12 10/41/411102 Broomhurst Farm A42 25/084 Point A, Sandgate Pit, Storrington	Low	Licensed non-public surface water and groundwater supply abstraction (and associated catchment / SPZ / GWMU), which is relatively small relative to available resource, or where raw water quality is not critical, for example: cooling water,

Receptor type	Identified receptor	Value	Rationale
	A43 25/084 Point B, Sandgate Pit, Storrington A44 23/073 Washington Garden Centre		spray irrigation, mineral washing or permitted discharge.
	Private Water Supplies P1 The Old Rectory P2 Brookbarn House P3 Pauls House P6 Lample House;P7 Upper Barpham P8 Turners Dairies P9 Long Furlong Barn P10 The Chantry Mere P11 Wappingthorn Farm P12 Huddlestone Farm P18 Unknown	Low	Unlicensed surface water and groundwater PWS abstractions
	Unregistered Mapped Wells Near Godmarks Farm (unnamed Ordinary Watercourse tributary of River Adur catchment); two between Frylands and Waterperry House along Frylands Lane (Adur East (Sakeham) catchment); the Hangers, Ewhurst Cottages, the Rectory, Park Farm, and the Fodges, Kent Street (Cowfold Stream catchment)	Low	Unlicensed, unregistered, mapped wells considered as potential receptors as part of a precautionary approach
	Consented Discharges D1 St. Mary at Clymping School (P03693); D2 St. Mary at Clymping School (P07396); D3 H M Prison, Ford, Arundel (P06977); D4 Clay Lane, Warningcamp (P01142); Turkey breeding unit, Rock Cross Road	Low	Permitted Discharges

Receptor type	Identified receptor	Value	Rationale
	(S01785); Gratwicke Farm, Partridge Green (D01392); Bolney sub-station, Bob Lane (P11968); Bolney substation, Wineham Lane (S01525).		
Flood Risk Receptors	Essential Infrastructure Arundel Station Highly Vulnerable Land Use Brookside caravan park	High	Land use type defined as 'Essential Infrastructure' (for instance, critical national infrastructure). Land defined as 'Highly Vulnerable' (for mobile homes intended for permanent residential use)
	More Vulnerable Land Use Residential properties within Atherington; The Mill, Climping. Residential and mixed-use properties on Church Lane, Lyminster Mixed-use properties on Sandhill Lane, Washington, and Springlands, Wineham.	Medium	Land use type defined as 'More Vulnerable' in the NPPF flood risk vulnerability classification (for example, most types of residential development).
	Less Vulnerable Land Use Climping Park, Priory Farm, Old Waterworks Farm, Rock Business Park, Washington, and Yokenclose Barn, Bines Green	Low	Land use type defined as 'Less Vulnerable' in the NPPF flood risk vulnerability classification (for example, most types of business premises, including land and buildings used for agriculture).

Magnitude of change

27.8.6 The magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change, and relevant legislation, policy standards and guidance. **Table 27-18** provides examples of how various magnitudes of change are determined with respect to water features.

27.8.7 Magnitude of change may be either positive or negative. The criteria and examples in **Table 27-18** focus on negative changes, but positive changes may also occur and will be considered on a case-by-case basis as required.

Table 27-18 Definitions of magnitude of change

Magnitude	Criteria	Examples
High	Results in complete loss or major change to feature, of sufficient magnitude to affect its use / integrity.	Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant conservation objectives (COs) or non-temporary downgrading (deterioration) of WFD surface water body status (including downgrading of individual WFD elements), or resulting in the inability of the surface water body to attain Good status by the relevant deadline in line with the measures identified in the RBMP. Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of WFD groundwater body status, or the inability of the groundwater body to attain Good status in line with the measures identified in the RBMP. Complete or severely reduced water availability and / or quality, compromising the ability of water users to abstract. Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.
Medium	Results in partial loss or noticeable change to feature, of sufficient magnitude to affect its use / integrity in some circumstances.	Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of surface water body status (including potential temporary downgrading of individual WFD elements), although not affecting the ability of the surface water body to achieve future WFD objectives. Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of WFD groundwater body status, although not affecting the ability of the groundwater body to achieve future WFD objectives. Moderate reduction in water availability and / or quality, which may compromise the ability of the water user to abstract on a temporary basis or for

Magnitude	Criteria	Examples
		limited periods, with no longer-term impact on the purpose for which the water is used. Change in flood risk resulting in potential for moderate damage to the property or infrastructure.
Low	Results in minor change to feature, with insufficient magnitude to affect its use / integrity in most circumstances.	Measurable effect on river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term or permanent change to WFD surface water body status (of overall status or element status). Measurable effect on groundwater levels, flows or water quality, but with no short-term or permanent downgrading of WFD groundwater body status. Minor reduction in water availability and / or quality, but unlikely to affect the ability of a water user to abstract. Change in flood risk resulting in potential for minor damage to property or infrastructure.
Negligible	Results in little or no change to feature, with insufficient magnitude to affect its use / integrity.	No measurable effect on river flow regime, morphology or water quality, and no consequences in terms of COs or surface water body status. No measurable effect on groundwater levels, flows or water quality, and no consequences in terms of WFD groundwater body status. No measurable change in water availability or quality and no change in ability of the water user to exercise licensed rights. Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.

Significance evaluation

27.8.8 During the assessment of effects the receptor values in **Table 27-16** are combined with the magnitude of change from **Table 27-18** to produce an overall significance rating based on the evaluation matrix shown in **Table 27-19**. A 'significant' effect is assessed as a Major rating whereas a Moderate rating is considered to be 'potentially significant' at this stage of the EIA process. The latter will be subject to further investigation as part of the ES following refinement of design information. This approach is based on professional judgement and carried out on a

precautionary basis. It is important to note that significance of effect, like magnitude of effect, can be positive and negative, with the focus here again on the negative.

Table 27-19 Significance evaluation matrix

		Magnitude of change			
		High	Medium	Low	Negligible
Value	High	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Moderate (Potentially Significant)	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

27.8.9 **Sections 27.9** to **27.11** set out the assessment of potential effects upon water environment receptors that could result during the construction, operation and maintenance, and decommissioning phases of the Proposed Development respectively.

27.8.10 To avoid repetition, the assessment of potential effects has been undertaken for the three main infrastructure types, comprising the proposed landfall, the onshore temporary construction corridor and the onshore substation. Given the wide variety of potential receptors identified in **Table 27-17**, where receptor values vary, the highest value has been specified for each identified potential effect. Effects from the individual infrastructure types will in general be the same across different sections of the extensive onshore temporary construction corridor, and so no section-specific infrastructure assessment is required.

27.8.11 Effects on the water environment will principally be associated with the construction phase as this will involve the greatest change from baseline conditions. Once constructed, the Proposed Development is expected to result in relatively limited effects. After the lifetime of Proposed Development (assumed to be around 30 years), it is possible that the onshore substation may be retained and not decommissioned. However, in accordance with the Scoping Report and Scoping Opinion, the most likely decommissioning scenario for the Proposed Development is also considered here. Decommissioning effects will be similar to

construction phase effects, albeit in reverse and of a lower magnitude as sub-surface cable infrastructure will be left in-situ.

27.9 Preliminary assessment: Construction phase

Overview

27.9.1 The construction phase includes all activities that are required to construct the sub-surface onshore cable circuits and installation of a new onshore substation. This will comprise the excavation of trenches for the installation of two underground cable circuits between the proposed landfall at Climping through to a proposed new onshore substation and then onto the existing National Grid substation at Bolney. As noted in the maximum design scenario part of **Section 27.7** (see **paragraphs 27.7.3** to **27.7.5**), a reasonable worst case assessment has been carried out within the maximum assessment assumptions described in **Table 27-14** to ensure that the various onshore cable corridor options and two onshore substation search areas have each been fully taken into account within the following assessment sections.

Landfall

27.9.2 Relevant landfall construction works will comprise a single site using HDD installation techniques, use of a landfall temporary construction compound, excavation and reinstatement of Transitional Joint Bays (TJBs) for the jointing of transitional offshore and onshore cables and construction access via a temporary haul route.

27.9.3 These works lie within the sub-catchment of the Ryebank Rife tributary of the Transitional Arun, and adjacent to the Coastal Sussex water body as identified within **Section 27.6**. Within these catchments there are several licensed abstractions (A1, A5 and A6), a PWS (P1) and two consented discharges (D1 and D2) from **Table 27-17** that have been screened in for assessment.

27.9.4 The landfall (as well as the subsequent onshore temporary construction corridor up to the crossing of the River Arun) is partially sited in a tidal floodplain in Flood Zone 3 behind an existing EA sea defence. As noted in **Chapter 3: Alternatives**, this location was selected for landfall as a result of other surrounding constraints, including surrounding residential and protected areas, which have prevented the selection of a corridor outside of a flood risk zone. As reported in **Section 27.6,** the EA has also advised that its long-term strategy could be to allow natural processes to reform the man-made section of the sea defence into a natural embankment. This could potentially result in a shift of the coastline landwards as part of natural realignment. The landfall temporary construction compound containing the TJBs has been carefully sited inland from this on higher ground to mitigate any potential effect. In addition to this, it is understood that the TJB and other joint bays will not have a solid surface, will be backfilled and finished level with the ground surface (i.e. with no raised structure), and be designed to be resilient to submergence and flooding once built.

27.9.5 **Table 27-20** lists all of the potential effects associated with the construction of the landfall. As presented within the Scoping Report, landfall works are not anticipated

to result in potential effects on groundwater levels during construction. This has been scoped out on the basis that works will be limited to the coastal area and the local water table will be connected to the sea levels, and therefore unlikely to be altered much by the site works. None of the potential effects identified for the landfall relate to conservation sites, ponds and springs, given that there are none of these features in the vicinity of the proposed works.

27.9.6 An indication is provided in of the range of the value, magnitude and significance definitions for each potential effect based on **Table 27-16**, **Table 27-18** and **Table 27-19** and the receptor value assessments in **Table 27-17**. The magnitude, and hence the significance, of potential effects have been assessed on the assumption that the embedded environmental measures listed in **Table 27-15**including COCP measures are successfully implemented as part of the Proposed Development (i.e. the assessment is of residual (post-embedded environmental measures) effects).

Table 27-20 Potential residual effects during the construction of the landfall

Receptors	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Groundwater and Surface WFD Water Bodies (River, Transitional and Coastal) **Littlehampton Anticline West GB40701G504900** **Ryebank Rife GB10704100662** **Arun Lower GB540704105000** **Sussex GB640704540003**	Potential for accidental contamination entering watercourses or groundwater, associated with spillage or leakage of fuels, lubricants or other chemicals. This includes the potential for leakage of bentonite during HDD.	C-8, C-76, C-135, C-142, C-148, C-149, C-150, C-151, C-167, C-182	Medium – High	Negligible	Negligible – Minor (**Not Significant**)
Surface WFD Water Bodies (River, Transitional and Coastal) **Ryebank Rife GB10704100662** **Arun Lower GB540704105000**	Ground disturbance and mobilisation of sediments / contaminants leading to silt laden or otherwise contaminated runoff entering watercourses and / or intertidal areas.	C-3, C-7, C-8, C-10, C-11, C-13, C-19, C-25, C-27, C-28, C-30, C-33, C-73, C-75, C-76, C-77, C-120, C-C-122, C-125, C-126, C-127, C-128, C-129, C-130, C-131, C-133, C-135, C-137, C-138, C-139, C-140, C-141,	Medium	Negligible – Low	Negligible – Minor (**Not Significant**)

Receptors	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Sussex GB640704540003		C-142, C-143, C-144, C-145, C-148, C-182			
	Changes to watercourse morphology as a result of works in or near watercourses (e.g. installation of landfall cable and associated earthworks).	C-3, C-7, C-8, C-10, C-11, C-13, C-19, C-25, C-27, C-28, C-30, C-33, C-73, C-75, C-76, C-77, C-120, C-122, C-125, C-126, C-127, C-128, C-129, C-130, C-131, C-133, C-135, C-137, C-138, C-139, C-140, C-141, C-142, C-143, C-144, C-145, C-148, C-182	Medium	Negligible	Negligible (**Not Significant**)
Water Resources **Licensed abstractions (A1, A5 and A6)**	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quantity and / or quality effects. This could arise from dewatering of the excavations for cabling, ground disturbance for the development of temporary access track / temporary construction compound establishment, or the leakage / spillage of fuels and chemicals onsite.	C-3, C-7, C-8, C-10, C-11, C-13, C-19, C-25, C-27, C-28, C-30, C-33, C-73, C-74, C-75, C-76, C-77, C-78, C-120, C-121, C-122, C-125, C-126, C-127, C-128, C-129, C-130, C-131, C-133, C-134, C-135, C-137, C-138, C-140, C-141, C-142, C-143, C-144, C-145,	Medium	Negligible – Low	Negligible – Minor (**Not Significant**)
PWSs (P1)			Low	Negligible	Negligible (**Not Significant**)

Receptors	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
		C-146, C-147, C-149, C-150, C-151, C-167, C-179, C-181, C-182			
Consented discharges (D1 and D2)	Physical disruption to existing discharge infrastructure (e.g. septic tank soakaways or discharge outfalls) from trenching and temporary access track / temporary construction compound establishment.	C-28, C-33, C-146, C-151	Low	Negligible	Negligible (**Not Significant**)
Flood Risk Receptors **Residential properties (Atherington, The Mill, Climping and Climping Park)**	Volumetric displacement of flood water associated with the construction of temporary stockpiles and raised access tracks within floodplain areas.	C-11, C-19, C-20, C-21, C-75, C-119, C-120, C-121, C-122, C-123, C-124, C-127, C-128, C-130, C-131, C-132, C-133, C-134, C-175, C-179, C-180, C-181	Low – Medium	Negligible	Negligible (**Not Significant**)
	Changes in runoff rates and new flow pathways associated with ground disturbance and the development of temporary access tracks and temporary construction compound areas.	C-3, C-11, C-13, C-17, C-18, C-19, C-20, C-21, C-27, C-28, C-33, C-73, C-74, C-75, C-77, C-117, C-119, C-120, C-121, C-122, C-123, C-124, C-125, C-126, C-127, C-128,	Low – Medium	Negligible	Negligible (**Not Significant**)

Receptors	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
		C-129, C-130, C-131, C-132, C-133, C-134, C-138, C-139, C-140, C-144, C-148, C-175, C-176, C-177, C-178 C-179, C-190, C-181, C-182.			
	Increases in flow in watercourses due to dewatering of excavations.	C-29, C-77, C-118, C-134, C-141	Low – Medium	Negligible	Negligible (**Not Significant**)

Onshore cable corridor

27.9.7 During construction, two separate parallel trenches and a number of joint bays will be excavated and backfilled to install the cable circuit. Access tracks will also be constructed to facilitate the movement of construction vehicles and plant.

27.9.8 The onshore temporary cable construction corridor is approximately 36km in length. The temporary working width for cable circuit installation (the cable corridor) will be 50m (widened in locations where there is a technical necessity, such as at HDD sites), while the target excavation depth of the cable will be on average 1.2 m (to the top of the ducting). Access tracks will generally be installed with aggregate along the designated route, following initial topsoil stripping activities. Installation of the cable circuits, and possible the haul route / access tracks, will require watercourse crossings. The works will require a number of temporary site compounds, which will also require topsoil stripping to provide a suitable area. Temporary construction compound areas will include storage of material / waste and equipment, and welfare facilities.

27.9.9 The onshore temporary construction corridor lies within all of the sub-catchments of the River Arun and River Adur identified in **Section 27.6**. Therefore, each of the water environment receptors that were screened in in **Table 27-17** have a potential connection to the onshore temporary cable construction corridor. For the purposes of clear presentation below (**Table 27-21**) the receptors have been grouped into their generic types.

27.9.10 The onshore temporary cable construction corridor has been carefully routed to try and avoid the numerous water supplies along with other aspect constraints (such as conservation and heritage sites) distributed throughout the wider area of the South Downs, and in addition a number of key embedded environmental measures have been put in place to ensure that such receptors are adequately protected. The other area of potential concern relates to the watercourse crossings and interactions with fluvial and tidal flood zones that have been identified along the onshore temporary cable corridor and given careful consideration at the outline design process, as documented within the draft crossing schedule in **Volume 4, Appendix 4.2: Crossing schedule**.

27.9.11 **Table 27-21** lists the potential negative effects associated with the cable laydown in relation to the water environment. An indication is provided in of the range of the value, magnitude and significance definitions for each potential effect based on **Table 27-16**, **Table 27-18** and **Table 27-19** and the receptor value assessments in **Table 27-17**. The magnitude, and hence the significance, of potential effects have been assessed on the assumption that the embedded environmental measures listed in **Table 27-15**including COCP measures are successfully implemented as part of the Proposed Development (i.e. the assessment is of residual (post-embedded mitigation) effects). On the basis of these measures being successfully implemented there would be no material change in the predicted magnitude and significance of effect assessed between the different onshore temporary cable corridor options.

Table 27-21 Potential residual effects during the cable laydown

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Groundwater WFD Water Bodies	A decline in groundwater levels arising from dewatering of the trenched excavations for cabling or the development of less permeable access track / temporary construction compound establishment reducing infiltration.	C-7, C-19, C-20, C-27, C-29, C-73, C-74, C-77, C-120, C-121, C-129, C-133, C-140, C-141, C-144, C-147	Medium - High	Negligible – Low	Negligible – Minor (**Not Significant**)
Groundwater and Surface Water WFD Water Bodies (River, Transitional and Coastal)	Potential for accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals. This includes the potential for leakage of bentonite during HDD.	C-8, C-76, C-135, C-142, C-148, C-149, C-150, C-151, C-167, C-182	Medium – High	Negligible	Negligible – Minor (**Not Significant**)
Surface Water WFD Water Bodies (River, Transitional and Coastal)	Ground disturbance and mobilisation of sediments / contaminants leading to silt laden or otherwise contaminated runoff entering watercourses.	C-3, C-7, C-8, C-10, C-11, C-13, C-19, C-25, C-27, C-28, C-30, C-33, C-73, C-75, C-76, C-77, C-120, C-122, C-125, C-126, 127, C-128, C-129, C-130, C-131, C-133, C-135, C-137, C-138, C-139, C-140, C-141, C-142, C-143,	Medium	Negligible – Low	Negligible – Minor (**Not Significant**)

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
		C-144, C-145, C-148, C-182			
	Changes to watercourse morphology as a result of works in or near watercourses (e.g. installation of watercourse crossings and associated earthworks).	C-3, C-7, C-8, C-10, C-11, C-13, C-19, C-25, C-27, C-28, C-30, C-33, C-73, C-75, C-76, C-77, C-120, C-122, C-125, C-126, C-127, C-128, C-129, C-130, C-131, C-133, C-135, C-137, C-138, C-139, C-140, C-141, C-142, C-143, C-144, C-145, C-148, C-182	Medium	Negligible	Negligible (**Not Significant**)
Conservation Sites, Ponds and Springs	Reduction of water availability to support existing groundwater or surface water designated or undesignated sites, ecosystems and features. This could arise from dewatering of the trenched excavations for cabling, ground disturbance for the development of temporary access track establishment, or the leakage / spillage of fuels and chemicals onsite.	C-3, C-6, C-7, C-8, C-10, C-11, C-13, C-17, C-18, C-19, C-20, C-21, C-23, C-27, C-28, C-29, C-30, C-33, C-64, C-73, C-74, C-76, C-77, C-120, C-121, C-122, C-124, C-125, C-126, C-127, C-128, C-129, C-130, C-131,	Very Low – Medium	Negligible – Low	Negligible (**Not Significant**)

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
		C-133, C-134, C-135, C-137, C-138, C-139, C-140, C-141 C-142, C-143, C-144, C-145, C-146, C-147, C-148, C-149, C-150, C-151, C-167, C-176, C-179, C-181, C-182, C-183			
Water Resources **Licensed abstractions – Southern Water public water supplies**	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quantity and / or quality effects. This could arise from dewatering of the trenched excavations for cabling, ground disturbance for the development of temporary access track / temporary construction compound establishment, or the leakage / spillage of fuels and chemicals onsite.	C-3, C-7, C-8, C-10, C-11, C-13, C-18, C-19, C-20, C-21, C-25, C-27, C-28, C-29, C-30, C-33, C-73, C-74, C-75, C-76, C-77, C-78, C-120, C-121, C-122, C-125, C-126, C-127, C-128, C-129, C-130, C-131, C-133, C-134, C-135, C-137, C-138, C-140, C-141, C-142, C-143, C-144, C-145, C-146, C-147, C-149, C-150, C-151, C-167, C-179, C-181, C-182	High	Negligible	Minor (**Not Significant**)
Other (non-public) licensed abstractions			Low – Medium	Negligible – Low	Negligible – Minor (**Not Significant**)
PWSs and unregistered mapped wells			Low	Negligible – Low	Negligible (**Not Significant**)

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Consented discharges	Physical disruption to existing discharge infrastructure (e.g. septic tank soakaways or discharge outfalls) from trenching and temporary access track / temporary construction compound establishment.	C-28, C-33, C-146, C-151	Low	Negligible	Negligible (**Not Significant**)
Flood Risk Receptors	Changes in watercourse conveyance associated with temporary watercourse crossings.	C-3, C-5, C-17, C-18, C-20, C-118, C-126, C-127, C-128, C-130, C-131, C-132, C-133, C-134, C-139, C-145, C-148, C-176, C-177, C-178, C-182.	Low – High	Negligible	Negligible - Minor (**Not Significant**)
	Volumetric displacement of flood water associated with the construction of temporary stockpiles and raised access tracks within floodplain areas.	C-11, C-19, C-20, C-21, C-75, C-119, C-120, C-121, C-122, C-123, C-124, C-127, C-128, C-130, C-131, C-132, C-133, C-134, C-175, C-179, C-180, C-181	Low – High	Negligible	Negligible - Minor (**Not Significant**)
	Changes in runoff rates and new flow pathways associated with ground disturbance and the development of temporary access tracks and	C-3, C-11, C-13, C-17, C-18, C-19, C-20, C-21, C-27, C-28, C-33, C-73, C-74,	Low – High	Negligible	Negligible - Minor (**Not Significant**)

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
	temporary construction compound areas.	C-75, C-77, C-117, C-119, C-120, C-121, C-122, C-123, C-124, C-125, C-126, C-127, C-128, C-129, C-130, C-131, C-132, C-133, C-134, C-138, C-139, C-140, C-144, C-148, C-175, C-176, C-177, C-178 C-179, C-190, C-181, C-182.			
	Increases in flow in watercourses due to dewatering of excavations.	C29, C-77, C-118, C-134, C-141	Low – High	Negligible	Negligible - Minor (**Not Significant**)

Onshore substation

27.9.12 Construction of the onshore substation will include the establishment of a temporary construction compound with associated storage and offices / welfare facilities, topsoil storage, installation of drainage systems and the development of below ground earth grid and onshore substation support structures. For the purposes of assessment, the entire onshore substation footprint Is assumed to be approximately 59,000m^2, whilst the temporary works area including the temporary construction compound area is 2,500m^2. The foundations will necessitate excavations and may require piling depending on ground conditions.

27.9.13 The two onshore substation search areas under consideration are Bolney Road / Kent Street and Wineham Lane North. As shown in **Figure 27.2, Volume 3** each of the two onshore substation search areas are situated within tributary catchments of the River Adur. The Bolney Road / Kent Street onshore substation search area is located within the catchment of Cowfold Stream, whilst the Wineham Lane North onshore substation search area is within the River Adur East (Sakeham) / Adur (East) catchment, together with the River Adur.

27.9.14 All surface water WFD receptors as listed in **Table 27-17**. The nearest groundwater WFD water body is the Adur and Ouse Hastings Beds situated approximately 500m from the Bolney Road / Kent Street onshore substation option and 1.5km from the Wineham Lane North onshore substation search area. None of the potentially water dependent conservation sites, ponds or springs have a potential connection to the onshore substation search areas. The majority of registered water resources receptors do not have a potential connection to the onshore substation search areas, other than P18 which is a surface water PWS abstraction on the Adur (East) branch situated downgradient of Wineham Lane North onshore substation search area, and two discharges (D7 and D8) which are situated on the borders of the Wineham Lane North onshore substation search area. There are also seven unregistered wells which have been identified on OS mapping within the catchments of Adur East (Sakeham) and the Cowfold Stream which have been considered as potential receptors as part of a precautionary approach. A potential flood risk receptor identified at Springlands, Wineham was also identified within **Appendix 27.2**.

27.9.15 **Table 27-22** lists the potential effects associated with the construction of each the proposed onshore substation search areas in relation to the water environment. Note that the table lists the potential effects for the two onshore substation search area options in one combined assessment. An indication is provided in of the range of the value, magnitude and significance definitions for each potential effect based on **Table 27-16**, **Table 27-18** and **Table 27-19** and the receptor value assessments in **Table 27-17**. The magnitude, and hence the significance, of potential effects have been assessed on the assumption that the embedded environmental measures listed in **Table 27-15**including COCP measures are successfully implemented as part of the Proposed Development (i.e. the assessment is of residual (post-embedded mitigation) effects). On the basis of these measures being successfully implemented there would be no material change in the predicted magnitude of change and significance of effect assessed between the different onshore substation search areas.

Table 27-22 Potential residual effects during construction of the onshore substation search areas

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Groundwater WFD Water Body **Adur and Ouse Hastings Beds GB40702G502000**	A decline in groundwater levels arising from of the trenched excavations for the onshore substation or piling if it is required for the installation of sub-surface foundations.	C-27, C-33, C-73, C-74, C-76, C-77, C-120, C-121, C-129, C-140, C-141, C-144, C-152	High	Negligible	Minor (**Not Significant**)
Groundwater and Surface Water WFD Water Bodies (River and Transitional) **Adur and Ouse Hastings Beds GB40702G502000** **Adur East (Sakeham) GB107041012900** **Adur (East) GB107041012180** **Cowfold Stream GB107041012260** **Adur GB540704116000**	Potential for accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals.	C-8, C-33, C-76, C-149, C-150, C-151, C-167, C-182	Medium – High	Negligible	Negligible – Minor (**Not Significant**)

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Surface Water WFD Water Bodies (River and Transitional) **Adur East (Sakeham) GB107041012900** **Adur (East) GB107041012180** **Cowfold Stream GB107041012260** **Adur GB540704116000**	Ground disturbance and mobilisation of sediments / contaminants leading to silt laden or otherwise contaminated runoff entering watercourses.	C-7, C-8, C-11, C-13, C-21, C-25, C-27, C-30, C-33, C-73, C-76, C-77, C-120, C-121, C-130, C-133, C-135, C-140, C-142, C-143, C-148, C-151, C-152, C-167, C-182	Medium	Negligible – Low	Negligible – Minor (**Not Significant**)
	Changes to watercourse morphology as a result of works in or near watercourses (e.g. associated with earthworks for establishment of temporary construction compounds).	C-7, 8, 11,13, 21, 25, 27, 30, 33, 73, 76, 77,120, 130, 133, 135, 140, 148, 161 152, 182.	Medium	Negligible	Negligible (**Not Significant**)
Water Resources **P18 registered PWS surface water abstraction** **Unregistered mapped wells (Frylands Lane (2), The Hangers, Ewhurst Cottages,**	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quantity and / or quality effects. This could arise from dewatering of the excavations or piling for installation of onshore substation foundations, ground disturbance for the development of temporary construction compound establishment,	C-7, C-8, C-11, C-13, C-21, C-25, C-27, C-28, C-30, C-33, C-73, C-74, C-76, C-77, C-78, C-120, C-121, C-130, C-133, C-135, C-140, C-141, C-142, C-143, C-144, C-145, C-146, C-147, C-148, C-150, C-151, C-152, C-154, C-167, C-182	Low	Negligible	Negligible (**Not Significant**)

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
The Rectory, Park Farm, and The Fodges on Kent Street)	or the leakage / spillage of fuels and chemicals onsite.				
Consented discharges (D7 and 8)	Physical disruption to existing discharge infrastructure (e.g. septic tank soakaways or discharge outfalls) from trenching and temporary access track / temporary construction compound establishment.	C-28, C-33, C-146, C-151	Low	Negligible	Negligible (**Not Significant**)
Flood Risk Receptors **Springlands, Wineham**	Volumetric displacement of flood water associated with the construction of temporary stockpiles within floodplain areas.	C-11, C-21, C-27, C-75, C-130, C-131, C-132, C-133, C-136, C-179	Medium	Negligible	Negligible (**Not Significant**)
	Changes in runoff rates and new flow pathways associated with ground disturbance and the development of temporary construction compound areas and onshore substation search areas.	C-11, C-21, C-27, C-73, C-74, C-75, C-77, C-118. C-120, C-121, C-129, C-130, C-134, C-140, C-141, C-144, C-152, C-175, C-179, C-182	Medium	Negligible	Negligible (**Not Significant**)

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
	Increases in flow in watercourses due to dewatering of excavations.	C29, C-77, C-118, C-134, C-141	Medium	Negligible	Negligible (**Not Significant**)

27.10 Preliminary assessment: Operation and maintenance phase

Landfall and onshore cable circuits

27.10.1 The operation and maintenance phase will include the maintenance and refurbishment (if / as required) during the lifespan of the Proposed Development. The landfall TJBs, cable circuits and link boxes will be installed with protection and it is considered that their operation will largely be maintenance-free (non-intrusive routine testing will be undertaken). Should damage or a fault occur, testing will identify its specific location so that any excavations or infrastructure replacement can be isolated. Given the minimal extent and similarity of activities for the landfall and cable circuits, they are both considered together within this sub-section. As such, each of the potential receptors that were considered for the landfall and onshore cable corridor infrastructure types during the construction phase are also considered in this section.

27.10.2 It has been assumed that the temporary access tracks and associated watercourse crossings utilised during construction will not be required during the operation and maintenance phase. Should repairs be necessary, there could be potential for localised ground disturbance or potential for accidental contamination from machinery. Otherwise, potential effects during the operation and maintenance phase are expected to be considerably reduced and limited in scale in comparison to the construction phase due to this targeted approach.

27.10.3 As outlined in the Scoping Report, it is unlikely that there will any dewatering during the operation and maintenance phase given that the work onsite is to be targeted on isolated repairs. The only potential effect on the sub-surface and groundwater flow pathway regime will be associated with the presence of protective covers / ducts and a selected backfill (either originally excavated material or Cement Bound Sand (CBS)) surrounding material for thermal insulation around the buried cable circuits. The ducts will be covered by metallic exterior and connected to concrete lined joint bays, which will be limited in extent. It has been assumed that the associated cable watercourse crossings are also likely to be similarly lined with a layer of impermeable material for protection against erosion.

27.10.4 The proposed landfall lies within the sub-catchment of the Ryebank Rife tributary of the Transitional Arun, and adjacent to the Coastal Sussex water body, whilst the onshore temporary cable corridor lies within all of the sub-catchments of the River Arun and River Adur identified in **Section 27.6**. Therefore, each of the water environment receptors that were screened in in **Table 27-17** are potentially affected by the operation and maintenance works. For the purposes of clear presentation below (**Table 27-23**), the receptors have been grouped into their generic types.

27.10.5 **Table 27-23** lists the potential effects associated with the operation and maintenance of the proposed landfall and the cable circuits in relation to the water environment. An indication is provided in of the range of the value, magnitude and significance definitions for each potential effect based on **Table 27-16**, **Table 27-18** and **Table 27-19** and the receptor value assessments in **Table 27-17**. The magnitude, and hence the significance, of potential effects have been assessed on

the assumption that the embedded environmental measures listed in **Table 27-15**including COCP measures are successfully implemented as part of the Proposed Development (i.e. the assessment is of residual (post-embedded measures) effects). On the basis of these measures being successfully implemented there would be no material change in the predicted magnitude of change and significance of effect assessed between the different cable corridor options.

Table 27-23 Potential residual effects during the operation and maintenance of the landfall and cable circuits

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Groundwater and Surface Water WFD Water Bodies (River, Transitional and Coastal)	Potential for accidental contamination entering groundwater or watercourses. This could arise from isolated cable repairs or the leakage / spillage of fuels and chemicals from vehicles onsite.	C-8, C-149, C-150, C-151, C-153, C-182	Medium – High	Negligible	Negligible – Minor (**Not Significant**)
Surface Water WFD Water Bodies (River and Transitional)	Changes to watercourse morphology due to the permanent presence of erosion protection around cable crossings. Cable crossings may exacerbate downstream or upstream bank and bed erosion and sediment deposition.	C-7, C-9, C-25, C-122, C-151, C-153	Medium	Negligible	Negligible (**Not Significant**)
Conservation Sites, Ponds and Springs	Reduction of water availability to support existing groundwater or surface water designated or undesignated sites, ecosystems and features as a consequence of quantity / quality effects from isolated repairs, and the leakage / spillage of fuels and chemicals from vehicles onsite or from diversion of sub-surface land drainage flow pathways due to the permanent presence of limited below ground	C-6, C-8, C-9, C-21, C-23, C-25, C-29, C-33, C-74, C-147, C-149, C-150, C-151, C-153, C-167, C-182	Very Low – Medium	Negligible	Negligible (**Not Significant**)

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
	concrete-lined joint bays and backfilled material around cable circuits.				
Water Resources **Licensed abstractions – Southern Water public water supplies**	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quality and / or quantity effects. This could arise from isolated repairs, and the leakage / spillage of fuels and chemicals from vehicles onsite; or from diversion of sub-surface land drainage flow pathways due to the permanent presence of limited below ground concrete lined joint bays and backfilled material around cable circuits.	C-8, C-21, C-29, C-33, C-74, C-137, C-147, C-149, C-150, C-151, C-153, C-167, C-182	High	Negligible	Minor (**Not Significant**)
Other (non-public) licensed abstractions			Low – Medium	Negligible	Negligible (**Not Significant**)
PWSs and unregistered mapped wells			Low	Negligible	Negligible (**Not Significant**)
Flood Risk Receptors	Volumetric displacement of flood water associated with maintenance works in floodplains during isolated repairs of the landfall TJB or cable circuits.	C-11, C-19, C-20, C-21, C-75, C-119, C-120, C-121, C-122, C-130, C-132, C-133, C-153, C-154, C-175	Low – High	Negligible	Negligible - Minor (**Not Significant**)

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
	Changes in runoff rates and new flow pathways associated with ground disturbance during isolated repairs of landfall TJB or cable circuits.	C-3, C-11, C-13, C-19, C-20, C-21, C-27, C-28, C-30, C-73, C-74, C-75, C-119, C-120, C-121, C-130, C-131, C-133, C-153, C-175, C-182	Low – High	Negligible	Negligible - Minor (**Not Significant**)

Onshore substation

27.10.6 The onshore substation will not be permanently staffed, and it will typically be monitored remotely using CCTV. Inspection and minor servicing may be required for the electrical plant, but it is anticipated that the onshore substation will require minimal scheduled operation and maintenance activities. It has also been assumed that access to any of the two onshore substation search areas will primarily be along existing transport routes to Bolney Road / Kent Street, and Wineham Lane North. Therefore, the type and small magnitude of effects are likely to be similar to those described above for the operation and maintenance of the landfall and cable circuits.

27.10.7 The drainage from the impermeable onshore substation footprint and the presence of a below ground grid have the potential to disrupt infiltration and displace shallow groundwater. **Table 27-24** lists the potential effects associated with the operation and maintenance of the onshore substation in relation to the water environment. Note that the table lists the potential effects for the two onshore substation search area options in one combined assessment. An indication is provided in of the range of the value, magnitude and significance definitions for each potential effect based on **Table 27-16**, **Table 27-18** and **Table 27-19** and the receptor value assessments in **Table 27-17**. The magnitude, and hence the significance, of potential effects have been assessed on the assumption that the embedded environmental measures listed in **Table 27-15**including COCP measures are successfully implemented as part of the Proposed Development (i.e. the assessment is of residual (post-embedded mitigation) effects). On the basis of these measures being successfully implemented there would be no material change in the predicted magnitude of change and significance of effect assessed between the different onshore substation search areas.

Table 27-24 Potential residual effects during the operation and maintenance of the onshore substation

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Groundwater WFD Water Body **Adur and Ouse Hastings Beds GB40702G502000**	A reduction in groundwater levels arising from the presence of a below ground grid, onshore substation support structures and impermeable surfaces.	C-73, C-74, C-140	High	Negligible	Minor (**Not Significant**)
Groundwater and Surface Water WFD Water Bodies (River and Transitional) **Adur and Ouse Hastings Beds GB40702G502000** **Adur East (Sakeham) GB107041012900** **Adur (East) GB107041012180** **Cowfold Stream GB107041012260** **Adur**	Potential for accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals during occasional maintenance visits.	C-8, C-149, C-151, C-153, C-167	Medium – High	Negligible	Negligible – Minor (**Not Significant**)

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
GB540704116000					
Water Resources **P18 registered PWS surface water abstraction** **Unregistered, mapped wells (Frylands Lane (2), The Hangers, Ewhurst Cottages, The Rectory, Park Farm, Fodges on Kent Street)**	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quantity and / or quality effects. This could arise from the presence of a below ground grid, onshore substation support structures and impermeable surfaces or spillages from fuels / chemicals during occasional maintenance visits.	C-8, C-73, C-74, C-76, C-140, C-146, C-147, C-151, C-153, C-167	Low	Negligible	Negligible (**Not Significant**)
Flood Risk Receptors Springlands, Wineham	Changes in runoff rates and new flow pathways associated with the impermeable onshore substation footprint.	C-73, C-74, C-120, C-121, C-124, C-136, C-153	Medium	Negligible	Negligible (**Not Significant**)

27.11 Preliminary assessment: Decommissioning phase

Landfall and onshore cable circuits

27.11.1 At the decommissioning stage, it is anticipated that the landfall TJB and cable circuits will be left buried in-situ with circuit ends being cut and sealed. On this basis, **Table 27-25** lists the potential effects associated with the decommissioning of the landfall and cable circuits in relation to the water environment. An indication is provided in of the range of the value, magnitude and significance definitions for each potential effect based on **Table 27-16**, **Table 27-18** and **Table 27-19** and the receptor value assessments in **Table 27-17**. On the basis of measures being successfully implemented there would be no material change in the predicted magnitude of change and significance of effect assessed between the different onshore temporary cable corridor options.

Table 27-25 Potential residual effects during decommissioning of the landfall and cable circuits

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Groundwater and Surface Water WFD Water Bodies (River, Transitional and Coastal)	Potential for accidental contamination entering groundwater or watercourses. This could arise from isolated decommissioning works and the leakage / spillage of fuels and chemicals from vehicles onsite.	C-8, C-149, C-150, C-151, C-167, C-182	Medium – High	Negligible	Negligible – Minor (**Not Significant**)
Surface Water WFD Water Bodies (River and Transitional)	Changes to watercourse morphology due to the permanent presence of erosion protection around cable crossings. Cable crossings may exacerbate downstream or upstream bank and bed erosion and sediment deposition.	C-7, C-9, C-25, C-122, C-151	Medium	Negligible	Negligible (**Not Significant**)
Conservation Sites, Ponds and Springs	Reduction of water availability to support existing groundwater or surface water designated or undesignated sites or ecosystems as a consequence of quantity / quality effects from isolated decommissioning works, and the leakage / spillage of fuels and chemicals from vehicles onsite or from diversion of sub-surface land drainage flow pathways due to the permanent presence of limited	C-6, C-8, C-9, C-21, C-23, C-25, C-29, C-33, C-74, C-147, C-149, C-150, C-151, C-167, C-182	Very Low – Medium	Negligible	Negligible (**Not Significant**)

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
	below ground concrete-lined joint bays and backfilled material around cable circuits.				
Water Resources **Licensed abstractions – Southern Water public water supplies**	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quality and / or quantity effects. This could arise from isolated decommissioning works, and the leakage / spillage of fuels and chemicals from vehicles onsite; or from diversion of sub-surface land drainage flow pathways due to the permanent presence of limited below ground concrete-lined joint bays and backfilled material around cable circuits.	C-8, C-21, C-29, C-33, C-74, C-137, C-147, C-149, C-150, C-151, C-167, C-182	High	Negligible	Minor (**Not Significant**)
Other (non-public) licensed abstractions			Low – Medium	Negligible	Negligible (**Not Significant**)
PWSs and unregistered mapped wells			Low	Negligible	Negligible (**Not Significant**)
Consented discharges	Physical disruption to existing discharge infrastructure (e.g. septic tank soakaways or discharge outfalls) from temporary access track / temporary construction compound establishment.	C-28, C-33, C-146, C-151	Low	Negligible	Negligible (**Not Significant**)

Receptor groups	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Flood Risk Receptors	Volumetric displacement of flood water associated with maintenance works in floodplains during decommissioning of the landfall TJB or cable circuits.	C-11, C-19, C-20, C-21, C-75, C-119, C-120, C-121, C-122, C-130, C-132, C-133, C-154, C-175	Low – High	Negligible	Negligible - Minor (**Not Significant**)
	Changes in runoff rates and new flow pathways associated with ground disturbance during decommissioning of the landfall TJB and the cable circuits.	C-3, C-11, C-13, C-19, C-20, C-21, C-27, C-28, C-30, C-73, C-74, C-75, C-119, C-120, C-121, C-130, C-131, C-133, C-175, C-182	Low – High	Negligible	Negligible - Minor (**Not Significant**)

Onshore substation

27.11.2 The onshore substation may be used as a substation site after decommissioning of the Proposed Development, or it may be upgraded for use by other future offshore wind projects, which would be subject to a separate planning application.

27.11.3 Should the onshore substation need to be decommissioned fully, then the decommissioning works are likely to be the reverse of the construction works, and involve similar levels of equipment and enabling works infrastructure. On this basis **Table 27-26** lists the potential effects associated with the decommissioning of the onshore substation in relation to the water environment, and an indication is provided in of the range of the value, magnitude and significance definitions for each potential effect based on **Table 27-16, Table 27-18** and **Table 27-19** and the receptor value assessments in **Table 27-17**. On the basis of measures being successfully implemented there would be no material change in the predicted magnitude of change and significance of effect assessed between the different onshore substation search areas. Note that the table lists the potential effects for the two onshore substation search area options in one combined assessment.

Table 27-26 Potential residual effects during decommissioning of the onshore substation

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Groundwater and Surface Water WFD Water Bodies (River and Transitional) **Adur and Ouse Hastings Beds GB40702G502000** **Adur East (Sakeham) GB107041012900** **Adur (East) GB107041012180** **Cowfold Stream GB107041012260** **Adur GB540704116000**	Potential for accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals.	C-8, C-27, C-76, C-129, C-149, C-150, C-151, C-167	Medium – High	Negligible	Negligible – Minor (**Not Significant**)
Surface Water WFD Water Bodies **Adur and Ouse Hastings Beds GB40702G502000**	Ground disturbance and mobilisation of sediments / contaminants leading to silt laden or otherwise contaminated runoff entering watercourses.	C-7, C-8, C-11, C-13, C-21, C-25, C-27, C-30, C-33, C-73, C-76, C-77, C-120, C-121, C-130, C-133, C-135, C-140, C-142,	Medium	Negligible – Low	Negligible – Minor (**Not Significant**)

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Adur East (Sakeham) GB107041012900 Adur (East) GB107041012180 Cowfold Stream GB107041012260 Adur GB540704116000		C-143, C-148, C-151, C-152, C-167, C-182			
	Changes to watercourse morphology as a result of works in or near watercourses (e.g. associated with earthworks for establishment of compounds).	C-7, 8, 11,13, 21, 25, 27, 30, 33, 73, 76, 77,120, 130, 133, 135, 140, 148, 161 152, 182.	Medium	Negligible	Negligible – Minor (**Not Significant**)
Water Resources **P18 registered PWS surface water abstraction** **Unregistered, mapped wells (Frylands Lane (2), The Hangers, Ewhurst Cottages, The Rectory, Park Farm, Fodges on Kent Street)**	Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quantity and / or quality effects. This could arise from disturbance for the development of temporary decommissioning access/ temporary construction compound establishment, or the leakage / spillage of fuels and chemicals onsite.	C-7, C-8, C-11, C-13, C-21, C-25, C-27, C-28, C-30, C-33, C-73, C-74, C-76, C-77, C-78, C-120, C-121, C-130, C-133, C-135, C-140, C-141, C-142, C-143, C-144, C-146, C-147, C-148, C-150, C-151, C-152, C-167, C-182	Low	Negligible	Negligible (**Not Significant**)

Receptor	Activity and potential effect	Embedded environmental measures	Value	Magnitude of effect	Significance of effect
Consented discharges (D7 and 8)	Physical disruption to existing discharge infrastructure (e.g. septic tank soakaways or discharge outfalls) from temporary access track / temporary construction compound establishment.	C-28, C-33, C-146, C-151	Low	Negligible	Negligible (**Not Significant**)
Flood Risk Receptors **Springlands, Wineham**	Volumetric displacement of flood water associated with the placement of temporary stockpiles within floodplain areas.	C-11, C-21, C-27, C-75, C-130, C-131, C-132, C-133, C-136, C-179	Medium	Negligible	Negligible (**Not Significant**)
	Changes in runoff rates and new flow pathways associated with ground disturbance and the development of temporary access track/ temporary construction compound areas.	C-11, C-21, C-27, C- C-73, C-74, C-75, C-77, C-120, C-118, C-121, C-129, C-130, C-134, C-140, C-141, C-144, C-152, C-175, C-179, C-182	Medium	Negligible	Negligible (**Not Significant**)

27.12 Preliminary assessment: Cumulative effects

Approach

27.12.1 A preliminary cumulative effects assessment (CEA) has been undertaken for Rampion 2 which examines the result from the combined effects of Rampion 2 with other developments on the same single receptor or resource and the contribution of Rampion 2 to those impacts. The overall method followed when identifying and assessing potential cumulative effects in relation to the onshore environment is set out in **Chapter 5** and **Appendix 5.3: Cumulative effects assessment detailed onshore search and screening criteria, Volume 4**.

27.12.2 The onshore screening approach has followed the Planning Inspectorate's Advice Note Seventeen (Planning Inspectorate, 2019) which is an accepted process for NSIPs, and has adopted the four-stage approach set out in the guidance.

Cumulative effects assessment

27.12.3 For the water environment, a Zone of Influence (ZOI) has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed. The water environment ZOI is delineated based upon the watercourses which intersect the PEIR Assessment Boundary, including a 1km upstream extent from the PEIR Assessment Boundary, and the downstream extents of the watercourses to their discharge to sea.

27.12.4 A short list of other developments that may interact with the Rampion 2 ZOIs during their construction, operation or decommissioning is presented in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** and on **Figure 5.4.2, Volume 4**. This list has been generated by applying criteria set out in **Chapter 5** and **Appendix 5.3: Cumulative effects assessment detailed onshore search criteria, Volume 4** and has been collated up to the finalisation of the PEIR through desk study, consultation and engagement.

27.12.5 Only those developments in the short list that fall within the water environment ZOI have the potential to result in cumulative effects with the Proposed Development. The water environment ZOI is shown in **Figure 27.9, Volume 3**. All developments falling outside the water environment ZOI are excluded from the CEA.

27.12.6 A tiered approach to the CEA has been set out in **Table 5.3** in **Chapter 5** and can be summarised as follows:

- Tier 1: developments under construction, permitted applications, and submitted applications;
- Tier 2: Other developments on the PINS Programme of Projects where a Scoping Report has been submitted; and
- Tier 3: Other developments on the PINS Programme of Projects where a Scoping Report has not been submitted, or where developments are identified in Development Plans or other plans as appropriate.

27.12.7 On the basis of the above, the following specific other developments contained within the short list in **Appendix 5.4, Volume 4** are considered in this CEA, as

discussed below in **Table 27-27**. The cumulative project design envelope for the water environment is described in **Table 27-28**.

Table 27-27 Developments to be considered as part of the CEA

ID (Figure 5.4.2)	Development type	Project	Status	Confidence in assessment	Tier	Level of detail of CEA to be adopted
8	Mixed Use Demolition of existing buildings and erection of new offices in Clifton Road, Littlehampton	Emsdale Residential Limited (LU/287/17/PL)	Application approved (with conditions) 19/12/2017	High	1	The infrastructure development is situated in the same catchment and 2.3km downstream of a proposed trenchless cable crossing of the River Arun. A simple qualitative level of assessment is carried out (in **Table 27-29**) on the basis that a successful implementation of embedded and standard good industry practice measures will offset any potential significant effects.
27	Mixed Use Demolition of existing treatment works and redevelopment to provide up to 105 homes	Hampton Quay Holdings (LU/238/20/OUT)	Application submitted 03/09/2020, awaiting decision	High	1	The property development is situated approximately 300m from the indicative onshore cable corridor and on the edge of the River Arun downstream of a trenchless crossing. A simple qualitative level of assessment is carried out (in **Table 27-29**) on the basis that a successful implementation of embedded and standard good industry practice measures will offset any potential significant effects.

ID (Figure 5.4.2)	Development type	Project	Status	Confidence in assessment	Tier	Level of detail of CEA to be adopted
22	Non Residential Infrastructure	Dudman Investments Limited, Unit H6 Rudford Estate, Ford Road, BN18 0BD (CM/56/19/PL)	Application approved (with conditions) 29/05/2020	High	1	The residential development is situated approximately 180m to the west of the PEIR Assessment Boundary of a proposed access point for the River Arun trenchless crossing. It is situated within the same catchment (i.e. that of Ryebank Rife). A simple qualitative level of assessment is carried out (in **Table 27-29**) on the basis that a successful implementation of embedded and standard good industry practice measures will offset any potential significant effects.
6	Residential 68 dwellings	WSCC, Land South of Littlehampton Academy LU/55/15/OUT	Application approved (with conditions) 28/09/2016	High	1	The residential development is situated on the PEIR Assessment Boundary edge of a proposed access point for the River Arun trenchless crossing. It is situated within the same catchment (i.e. that of Ryebank Rife). A simple qualitative level of assessment is carried out (in **Table 27-29**) on the basis that a successful implementation of embedded and standard good industry practice measures will offset any potential significant effects.

ID (Figure 5.4.2)	Development type	Project	Status	Confidence in assessment	Tier	Level of detail of CEA to be adopted
12	Mixed Use 300 dwellings and ancillary infrastructure	Mulgrave Properties LLP, Land West of Church Lane and South of Horesmere Green, Climping, (CM/1/17/OUT)	Application approved (with conditions) 28/09/2018	High	1	The south western corner of the property development overlaps with the footprint of the proposed temporary construction compound for the proposed landfall works. The development is situated on the PEIR Assessment Boundary edge of a proposed access point for the River Arun trenchless crossing. It is situated within the same catchment (i.e. that of Ryebank Rife). A simple qualitative level of assessment is carried out (in **Table 27-29**) on the basis that a successful implementation of embedded and standard good industry practice measures will offset any potential significant effects.
1	Transport A new dual carriageway bypass	Highways England, A27 Arundel Bypass	Pre-application, no scoping report yet submitted. Preferred alignment issued	Medium	3	The preferred alignment of the bypass crosses the River Arun approximately 2.7km upstream of a proposed trenchless crossing. A simple qualitative level of assessment is carried out (in **Table 27-29**) on the basis that a successful implementation of embedded and standard good industry practice

ID (Figure 5.4.2)	Development type	Project	Status	Confidence in assessment	Tier	Level of detail of CEA to be adopted
						measures will offset any potential significant effects.
29	Housing 90 dwellings and amenity land	The Norfolk Estate, Land at Ford Road, Arundel (AB/135/20/OUT)	Application submitted 14/12/2020, awaiting decision	High	1	The housing development is situated in the same catchment and approximately 3.1km upstream of a proposed trenchless cable crossing of the Arun. A simple qualitative level of assessment is carried out (in **Table 27-29**) on the basis that a successful implementation of embedded and standard good industry practice measures will offset any potential significant effects.
21	Non – residential infrastructure Equestrian and agricultural buildings	Wiston Estate, North Farm (A24) Washington SDNP/18/04995/FUL	Application approved 14/03/2019	High	1	This non-residential development is situated within the Teville Stream catchment which is not hydrologically connected to the Proposed Development. A CEA will therefore not need to be carried out.
23	Housing 81 new dwellings	Reside Developments Ltd. Land North of Rosary Church Road, Partridge	Application submitted 07/09/2020,	High	1	The housing development is 800m to the north west of a proposed construction site and indicative onshore cable corridor section near Partridge Green within the Adur (lockbridge) catchment. In addition,

ID (Figure 5.4.2)	Development type	Project	Status	Confidence in assessment	Tier	Level of detail of CEA to be adopted
		Green West, (DC/20/1697)	awaiting decision			it is in the same catchment and approximately 3.8km upstream of the proposed trenchless cable crossing of the River Adur. A simple qualitative level of assessment is carried out on the basis that a successful implementation of embedded and standard good industry practice measures will offset any potential significant effects.
26	Residential Development Land north east of Henfield, around 7000 dwellings	Horsham Regulation 18 Consultation Sites SA414 Mayfield Proposal	Proposed Local Plan site[7]	Low	3	This land is situated 2.2km to the south east of the section of the PEIR Assessment Boundary (near Bines Green), within a different catchment (Chess Stream) which is hydrologically disconnected to the proposals. A CEA will therefore not need to be carried out.
28	Energy	British Solar Renewables, Land at Coombe Farm, Bob	Application approved 17/02/2017	High	1	This solar farm is situated approximately 410m to the east of the Wineham Lane North onshore substation search area, and within the same catchment. A simple

[7] In general, local plan sites should only be included in the CEA if a planning application has been submitted, however due to the size and proximity of this development it has been included by exception.

ID (Figure 5.4.2)	Development type	Project	Status	Confidence in assessment	Tier	Level of detail of CEA to be adopted
	Solar Photovoltaic panels and infrastructure	Lane, Twineham, DM/15/0644				qualitative level of assessment is carried out (in **Table 27-29**) on the basis that a successful implementation of embedded and standard good industry practice measures will offset any potential significant effects.

Table 27-28 Cumulative project design envelope for the water environment

Project phase and activity / effect	Scenario	Justification
Potential effects relating to the landfall and indicative onshore cable corridor during the construction, operation and maintenance and decommissioning phases	Each of the Tier 1 and 3 projects identified as needing a CEA in **Table 27-27**.	The potential effects identified in **Sections 27.9**, **27.10** and **27.11** for the landfall and onshore cable corridor could be relevant as a result of the activities which are adjacent to and within the same surface water and groundwater catchments as the Proposed Development.
Potential effects relating to the onshore substation during the construction, operation and maintenance and decommissioning phases	The Solar Renewables, Land at Coombe Farm, Bob Lane, Twineham, DM/15/0644 (Tier 1) for Solar Photovoltaic panels and infrastructure identified in **Table 27-27**.	The potential effects identified in **Sections 27.9**, **27.10** and **27.11** for the onshore substation could be relevant as a result of the activities which are adjacent to and within the same surface water (Adur East) catchment and groundwater (Adur and Ouse Hastings Beds) catchment as the Wineham Lane North onshore substation search area of the Proposed Development.

27.12.8 A further stage of the CEA is to carry out a simple qualitative assessment (as justified in **Table 27-27**) of the potential for any significant cumulative effects to arise. A preliminary CEA assessment is carried out below in **Table 27-29**.

Table 27-29 Preliminary CEA for the water environment

Project	Discussion	Likely Significant Cumulative Effect?
Emsdale Residential Limited (LU/287/17/PL) Demolition of existing buildings and erection of new offices and dwellings in Clifton Road	The overall site area is approximately 0.16ha which in the context of the River Arun catchment of 149,000ha within which it lies is small. The site lies approximately 2.3km downstream of a trenchless crossing associated with the Proposed Development. At present there are no confirmed demolition and construction dates for the Emsdale	No

Project	Discussion	Likely Significant Cumulative Effect?
	Limited project, therefore it is not certain that the potential impacts from the schemes will overlap. It is assumed that good industry practice measures will be successfully implemented on its site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2018), along with other mitigation measures set out within the FRA (Ambiental, 2017) to ensure there are no significant effects. On this basis there is no potential for significant cumulative effects to arise.	
Hampton Quay Holdings (LU/238/20/OUT) Demolition of existing treatment works and redevelopment to provide up to 105 homes	The overall site area is approximately 0.074ha, which in the context of the River Arun catchment (149,000ha) is small. The property development is situated approximately 300m from the onshore temporary construction corridor and on the edge of the River Arun downstream of a trenchless crossing. At present there are no confirmed demolition and construction dates for the Hampton Quay Holdings project, therefore it is not certain that the potential impacts from the schemes will overlap. It is assumed that best practice measures will be successfully implemented on their site, along with other mitigation measures set out within the FRA and Surface Water Drainage Statement (Ambiental, 2020) to ensure there are no significant effects. On this basis there is no potential for significant cumulative effects to arise.	No
Dudman Investments (CM/56/19/PL) Unit H6 Rudford Industrial Estate Ford Road Non-residential infrastructure Erection & operation of concrete batching plant and distribution of concrete from the facility.	The overall site area is approximately 0.002ha, which in the context of the Ryebank Rife catchment of 1318ha is small. The non - residential development is situated approximately 180m to the west of the PEIR Assessment Boundary of a proposed access point for the River Arun trenchless crossing. At present there are no confirmed construction dates for the Rudford Industrial Estate project, therefore it is not certain that the potential impacts from the schemes will overlap. It is assumed that good industry practice measures will be successfully implemented on its site, to ensure there are no significant effects. On	No

Project	Discussion	Likely Significant Cumulative Effect?
	this basis there is no potential for significant cumulative effects to arise.	
WSCC, Land South of Littlehampton Academy LU/55/15/OUT 68 Dwellings	The overall site area is approximately 2.41ha, which in the context of the Ryebank Rife catchment of 1318ha is small. The residential development is situated on the PEIR Assessment Boundary edge of a proposed access point for the River Arun trenchless crossing. At present there are no confirmed construction dates for the land south of Littlehampton Academy project, therefore it is not certain that the potential impacts from the schemes will overlap. It is assumed that good industry practice measures will be successfully implemented on their site, along with other mitigation measures set out within the FRA (Civil Engineering Practice, 2014) to ensure there are no significant effects. On this basis there is no potential for significant cumulative effects to arise.	No
Mulgrave Properties LLP, Land West of Church Lane and South of Horesmere Green, Climping, (CM/1/17/OUT) 300 dwellings and ancillary infrastructure	The overall site area is approximately 0.14ha which in the context of the Ryebank Rife catchment (1318ha) within which it lies is small. The south western corner of the property development overlaps with the footprint of the proposed temporary construction compound for the proposed landfall works. At present there are no confirmed construction dates for the land at Horesmere Green, Climping, therefore it is not certain that the potential impacts from the schemes will overlap. It is assumed that good industry practice measures will be successfully implemented on their site, along with other mitigation measures set out within the FRA and Surface Water Drainage Assessment Report (Ambiental, 2016) to ensure there are no significant effects. On this basis there is no potential for significant cumulative effects to arise.	No
Highways England, A27 Arundel Bypass Dual Carriageway bypass	This project is at the pre-application stage awaiting the preferred route. The preferred alignment of the bypass crosses the River Arun approximately 2.7km upstream of a proposed trenchless crossing. There is likely to be an overlap in timescales for the construction and	No

Project	Discussion	Likely Significant Cumulative Effect?
	operational periods of the bypass which currently has a planned construction start date between 2023 – 24 and an end date between 2025 -2030. It is assumed that good industry practice measures will be successfully implemented on site in accordance with the Drainage Manual Roads and Bridges (DMRB) (Highways England, 2021) to ensure there are no significant effects. On this basis there is no potential for significant cumulative effects to arise.	
The Norfolk Estate, Land at Ford Road, Arundel (AB/135/20/OUT) 90 dwellings and amenity land	The overall site area is approximately 9.8ha, which in the context of the River Arun catchment (149,000ha) is small. The housing development is situated in the same catchment and approximately 3.1km upstream of a proposed trenchless cable crossing of the River Arun. The ES indicates that proposals are for the Norfolk Estate to be constructed by 2029, therefore there could be overlap between the construction and operational periods of both schemes. It is assumed that good industry practice measures will be successfully implemented on their site, along with other mitigation measures set out within the FRA and Drainage Strategy (Ardent, 2020) to ensure there are no significant effects. On this basis there is no potential for significant cumulative effects to arise.	No
Reside Developments Ltd. Land North of Rosary Church Road, Partridge Green West, (DC/20/1697) 81 new dwellings	The overall site area is approximately 1.5ha, which in the context of the Adur (lockbridge) catchment (1505ha) is small. The housing development is 800m to the north west of a proposed construction site and indicative onshore cable corridor section. At present there are no confirmed construction dates for the land at Rosary Church Road, therefore it is not certain that the potential impacts from the schemes will overlap. It is assumed that good industry measures will be successfully implemented on this site, along with other mitigation measures set out within the FRA and Indicative Surface Water Strategy (RSK, 2020) to ensure there are no significant effects. On this basis there is no potential for significant cumulative effects to arise.	No

Project	Discussion	Likely Significant Cumulative Effect?
British Solar Renewables, Land at Coombe Farm, Bob Lane, Twineham, DM/15/0644 Photovoltaic cells and infrastructure	The overall site area is approximately 44.5ha, which in the context of the catchment (1454ha) is small. This solar farm is situated approximately 410m to the east of the Wineham Lane North onshore substation search area. It is assumed that good industry practice measures will be successfully implemented on this site, along with other mitigation measures set out within the FRA (Clarkebond, 2015) to ensure there are no significant effects. On this basis there is no potential for significant cumulative effects to arise.	No

27.12.9 Baseline data and further information on other developments will continue to be collected prior to the finalisation of the ES and iteratively fed into the CEA. An updated CEA will be reported in the ES.

27.13 Transboundary effects

27.13.1 Transboundary effects arise when impacts from a development within one European Economic Area (EEA) state affects the environment of another EEA state(s). A screening of transboundary effects has been carried out and is presented in Appendix B of the Scoping Report (RED, 2020). There are no transboundary effects upon other EEA states relevant to the water environment aspect, and therefore these are not considered any further as part of this chapter.

27.14 Inter-related effects

27.14.1 The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and decommissioning of Rampion 2 on the same receptor, or group of receptors.

27.14.1 The potential inter-related effects include:

- Proposed Development lifetime effects: i.e., those arising throughout more than one phase of the Proposed Development (construction, operation and maintenance, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just one phase were assessed in isolation; and
- Receptor-led effects: assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor (or group). Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

27.14.2 The potential inter-related effects that could arise in relation to water environment are presented in **Table 27-30**. A description of the process to identify and assess these effects is presented in **Chapter 5**.

Table 27-30 Inter-related effects assessment for water environment

Project phase(s)	Nature of inter-related effect	Assessment alone	Inter-related effects assessment
Proposed Development lifetime effects			
Construction, operation and maintenance, and decommissioning	Changes to surface water, water resources, groundwater, flood risk and other effects outlined in **Section 27.4**.	Residual impacts are Not Significant	Water environment effects described in this chapter will be confined to each phase of the Proposed Development. As the phases do not overlap temporally, there is no potential for any water environment inter-related lifetime effects.
Receptor-led effects			
Inter-related effects on water environment receptors, such as such as WFD water bodies, water dependent conservation sites and water resources		The assessment of effects on water environment receptors as presented in **Sections 27.9**, **27.10**, and **27.11** has taken into account the potential for multiple impacts from Rampion 2 affecting these receptors and no significant inter-related effects are anticipated. For example, water quality effects on water environment receptors resulting from mobilisation of ground contaminants have been considered together.	
Designated ecological sites		This chapter does not identify any likely significant effects on the hydrological regimes across designated sites or groundwater dependent terrestrial ecosystems due to the construction, operation or decommissioning of the Proposed Development. Therefore, the ecological features that these designated sites and habitats support will also not be subject to likely significant inter-related effects.	

27.15 Further work to be undertaken for the ES

Introduction

27.15.1 Further work that will be undertaken to support the water environment assessment and presented within the ES is set out below.

Desk study

27.15.2 The key data supporting the baseline will be updated at ES stage, including EA daily rainfall, tidal level, maximum daily river flow, WFD water body status, abstraction and counted discharge database; Natural England citations and online information; and ADC, HDC, AWDC and MSDC PWS records.

Site walkover

27.15.3 For the purposes of the ES a site walkover will be undertaken of the entire onshore temporary construction corridor, with particular focus on the landfall and watercourse crossing points and those sections within SPZs.

Assessment

27.15.4 An FRA will build upon the findings of the initial screening assessment in **Appendix 27.2, Volume 4**, and will set out measures that may be necessary to address flood risk as a result of the Proposed Development.

27.15.5 The preliminary WFD Assessment in **Appendix 27.3, Volume 4** will also be updated at the ES stage based on any changes in the outline design and additional information including refinements to existing embedded environmental measures. The preliminary conclusions of **Appendix 27.3, Volume 4** indicate that there will be no potential effects which will lead to a deterioration in the overall health of the water environment relative to the current conditions. The assessment also indicates that the Proposed Development will not result in any conflicts with the planned improvement measures required as part of the WFD to improve the water environment to the required standard by 2027 at the latest.

Consultation and engagement

27.15.6 Further consultation and engagement that will be undertaken to inform the water environment assessment and presented within the ES is set out in **Table 27-31**.

Table 27-31 Further consultation and engagement

Consultee	Topics to be discussed	Relevance to assessment
EA	Discussions on technical assessment approaches	To discuss the findings of the FRA and WFD Assessment and agree any bespoke mitigation if required.
EA	Engagement on outline designs of relevant onshore infrastructure, for instance around watercourse crossing, drainage and landfall proposals	To ensure that proposals for key infrastructure help avoid significant impacts on potential water environment receptors and other aspect receptors.

Consultee	Topics to be discussed	Relevance to assessment
EA	Continued engagement on the long - term future of the sea defence at Climping	To ensure that flood risk implications towards the Proposed Development assets are managed whilst avoiding flood risk to other third - party receptors.
EA, and WSCC	Permitting approaches around Environmental Permits and Ordinary Watercourse Consents	To underpin how embedded environmental measures will be secured as part of DCO requirements.
Local Councils and PWS Users	Where necessary contacting the district councils and PWS users to get clarification on source locations	To provide further assessment on abstractions identified as potentially at risk from the Proposed Development.

Environmental measures

27.15.7 Further environmental measures that will be considered and presented within the ES are set out in **Table 27-32**. These measures have been captured at the PEIR stage within **Section 27.7**, but will be further developed based on the findings of the FRA and WFD Assessment at the ES stage.

Table 27-32 Further environmental measures

Receptor	Changes and effects	Environmental measures and influence on assessment
Flood Risk Receptors	Volumetric displacement of flood water associated with the construction of temporary stockpiles and raised access tracks within floodplain areas.	Any works in a floodplain will incorporate measures to minimise possible obstruction or deviation of floodwater. For example, this will include leaving gaps in soil stockpiles, minimising the height of possible raised structures (e.g. access tracks and working areas). Where possible access routes and working areas will be at the same level as surrounding ground levels and soil

Receptor	Changes and effects	Environmental measures and influence on assessment
		stockpiles will be located outside of floodplain areas.
	Changes in runoff rates and new flow pathways associated with ground disturbance and the development of temporary access tracks and temporary construction compound areas.	Measures to control the rate and quality of water running off from the onshore temporary construction corridor will be implemented, including the use of permeable hardstanding material (so water drains through the material into the ground beneath) and interceptor drains and soakaway ditches (to allow water to infiltrate into the ground), where necessary.
		Preliminary drainage strategies will support the FRA, setting out proposed approaches to managing runoff. This will be developed by the Contractor as part of a DCO requirement.
Surface WFD Water Bodies	Changes to watercourse morphology as a result of works in or near watercourses (e.g. installation of watercourse crossings and associated earthworks). Ground disturbance and mobilisation of sediments / contaminants leading to silt laden or otherwise contaminated runoff entering watercourses.	Temporary access track crossings over WFD rivers will be designed as clear span bridges (i.e. they will span the entire watercourse from bank top to bank top) to minimise disturbance of the channel and maintain water flowing along the watercourse.
		Watercourse crossings will be designed to suit the type of watercourse that is being crossed and will be

Receptor	Changes and effects	Environmental measures and influence on assessment
		constructed in a way that minimises the disturbance of channel bed and banks as far as possible.
		The number of access routes crossing watercourses will be minimised. If the locations of watercourse crossings are modified by the Contractor, then additional crossings of watercourses will be minimised where practicable.

27.16 Glossary of terms and abbreviations

Table 27-33 Glossary of terms and abbreviations

Term (acronym)	Definition
Abstraction	Removal of water from surface water or groundwater
ADC	Arun District Council
Alluvium	Material transported by rivers and deposited along its course
Annual Exceedance Probability	In flood risk management, the likelihood of a rainfall total, runoff or flow rate of a certain magnitude being exceeded each year
AStGWF	Areas Susceptible to Groundwater Flooding
AWDC	Adur and Worthing District Council
Baseline	Refers to existing conditions as represented by latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of development.
Baseline conditions	The environment as it appears (or would appear) immediately prior to the implementation of the Proposed

Term (acronym)	Definition
	Development together with any known or foreseeable future changes that will take place before completion of the Proposed Development.
BFI	Base Flow Index
BGS	British Geological Survey
BS	British Standards
Bund	A barrier, dam or mound used to contain or exclude water (or other liquids). Can either refer to a bund made from earthworks material, sand etc. or a metal / concrete structure surrounding, for example, a fuel tank
CBS	Cement Bound Sand
CDM	Construction, Design and Management
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEH	Centre of Ecology and Hydrology.
CIRIA	Construction Industry Research and Information Association
Code of Construction Practice (COCP)	The code sets out the standards and procedures to which developers and contractors must adhere to when undertaking construction of major projects. This will assist with managing the environmental impacts and will identify the main responsibilities and requirements of developers and contractors in constructing their projects.
Construction Effects	Used to describe both temporary effects that arise during the construction phases as well as permanent existence effects that arise from the physical existence of development (for example new buildings).
COs	Conservation Objectives
Cumulative effects	Additional changes caused by a Proposed Development in conjunction with other similar developments or as a combined effect of a set of developments, taken together' (SNH, 2012)
Cumulative Effects Assessment (CEA)	Assessment of impacts as a result of the incremental changes caused by other past, present and reasonably foreseeable human activities and natural processes together with the Proposed Development.

Term (acronym)	Definition
CWS	County Wildlife Site
DCLG	Department for Communities and Local Government
DCO Application	An application for consent to undertake a Nationally Significant Infrastructure Project made to the Planning Inspectorate who will consider the application and make a recommendation to the Secretary of State, who will decide on whether development consent should be granted for the Proposed Development.
Decommissioning	The period during which a development and its associated processes are removed from active operation.
Defra	Department for Environment, Food and Rural Affairs
Development Consent Order (DCO)	This is the means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects, under the Planning Act 2008.
Discharge	Release of effluent waste into a watercourse or water body
DMRB	Design Manual for Roads and Bridges
DTM	Digital Terrain Model
DWPAs	Drinking Water Protected Areas
EA	Environment Agency
EEA	European Economic Area
Embedded environmental measures	Equate to 'primary environmental measures' as defined by Institute of Environmental Management and Assessment (2016). They are measures to avoid or reduce environmental effects that are directly incorporated into the preferred masterplan for the Proposed Development.
EN	Electricity Networks
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Environmental Measures	Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible, remedy identified effects.

Term (acronym)	Definition
Environmental Statement (ES)	The written output presenting the full findings of the Environmental Impact Assessment.
ERPs	Emergency Response Plans
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach and the information required to support the EIA and HRA for certain aspects.
Formal consultation	Formal consultation refers to statutory consultation that is required under Section 42 and Section 47 of the Planning Act 2008 with the relevant consultation bodies and the public on the preliminary environmental information.
FRA	Flood Risk Assessment
FRAP	Flood Risk Activity Permits
Future Baseline	Refers to the situation in future years without the Proposed Development.
GDPR	General Data Protection Regulations
GPPs	Guidance for Pollution Prevention
GWDTE	Groundwater Dependent Terrestrial Ecosystem
GWMU	Groundwater Management Unit
Ha	Hectares
HDC	Horsham District Council
Horizontal Directional Drill (HDD)	An engineering technique avoiding open trenches.
IDB	Internal Drainage Board
Impact	The changes resulting from an action.
Impact pathway	A change descriptively assessed by one aspect, used by another aspect to inform a related assessment.
Indirect effects	Effects that result indirectly from the Proposed Development as a consequence of the direct effects, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects.

Term (acronym)	Definition
	Often used to describe effects on landscape character that are not directly impacted by the Proposed Development such as effects on perceptual characteristics and qualities of the landscape.
Informal consultation	Informal consultation refers to the voluntary consultation that RED undertake in addition to the formal consultation requirements.
IPC	Infrastructure Planning Commission
LFRMS	Local Flood Risk Management Strategy
LGS	Local Geological Site
Likely Significant Effects	It is a requirement of Environmental Impact Assessment Regulations to determine the likely significant effects of the Proposed Development on the environment which should relate to the level of an effect and the type of effect.
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
LPA	Local Planning Authority
LWS	Local Wildlife Site
MAFF	Ministry of Agriculture, Fisheries and Food (now Defra)
MAGIC	Multi-Agency Geographic Information for the Countryside
Magnitude (of change)	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short term or long term in duration'. Also known as the 'degree' or 'nature' of change.
mAOD	Metres above Ordnance Datum
mbgl	Metres below ground level
Met. Office	Meteorological Office
MHWS	Mean high-water springs
MLWS	Mean low-water springs
MMO	Marine Management Organisation

Term (acronym)	Definition
Outline MMP	Outline Materials Management Plan
MSDC	Mid Sussex District Council
Nationally Significant Infrastructure Project (NSIP)	Nationally Significant Infrastructure Projects are major infrastructure developments in England and Wales which are consented by DCO. These include proposals for renewable energy projects with an installed capacity greater than 100MW.
NGR	National Grid Reference
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statements
NRFA	National River Flow Archive
Onshore part of the PEIR Assessment Boundary	An area that encompasses all planned onshore infrastructure.
OS	Ordnance Survey
OWC	Ordinary Watercourse Consent
Particulate Matter	Microscopic portions of solid matter suspended in air. PM_{10} -microscopic particles with an aerodynamic diameter of 10 microns or less. $PM_{2.5}$ - microscopic particles with an aerodynamic diameter of 2.5 microns or less.
PEIR Assessment Boundary	The PEIR Assessment Boundary combines the search areas for the offshore and onshore infrastructure associated with the Proposed Development. It is defined as the area within which the Proposed Development and associated infrastructure will be located, including the temporary and permanent construction and operational work areas.
PICP	Pollution Incident Control Plan
PINS	Planning Inspectorate
PIRP	Pollution Incident Response Plan
PPG	Pollution Prevention Guidance
PPPs	Pollution Prevention Plans

Term (acronym)	Definition
Preliminary Environmental Information Report (PEIR)	The written output of the Environmental Impact Assessment undertaken to date for the Proposed Development. It is developed to support formal consultation and presents the preliminary findings of the assessment to allow an informed view to be developed of the Proposed Development, the assessment approach that has been undertaken, and the preliminary conclusions on the likely significant effects of the Proposed Development and environmental measures proposed.
Proposed Development	The development that is subject to the application for development consent, as described in Chapter 4.
PROW	Public Rights of Way
PS	Public Supply
PWS	Private Water Supply
Q_{95}	Flow rate is referred to as 'Q', and the exceedance value as a subscript number, so Q_{95} means the flow rate equalled or exceeded for 95% of the time
RAMSAR	Ramsar Convention on Wetlands
RBMP	River Basin Management Plan
Receptor	These are as defined in Regulation 5(2) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape that may be at risk from exposure to pollutants which could potentially arise as a result of the Proposed Development.
RED	Rampion Extension Development
RoFSW	Risk of Flooding from Surface Water
S	Storage Coefficient
SAC	Special Area of Conservation
SCC	Somerset County Council
Scoping Opinion	A Scoping Opinion is adopted by the Secretary of State for a Proposed Development.

Term (acronym)	Definition
Scoping Report	A report that presents the findings of an initial stage in the Environmental Impact Assessment process.
Secretary of State (SoS)	The body who makes the decision to grant development consent.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
SFRA	Strategic Flood Risk Assessment
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
Significant effects	It is a requirement of the EIA Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated. The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described. Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement. Significant – 'noteworthy, of considerable amount or effect or importance, not insignificant or negligible'. The Concise Oxford Dictionary. Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
Storage Coefficient	The volume of water released from storage in an aquifer per unit surface area per unit decrease in the hydraulic head

Term (acronym)	Definition
STP	Sewage Treatment Plant
SuDS	Sustainable Drainage Systems
Temporal Scope	The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur and are typically defined as either being temporary or permanent.
Temporary or permanent effects	Effects may be considered as temporary or permanent. In the case of wind energy development the application is for a 30 year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.
The Applicant	Rampion Extension Development Limited (RED)
The Proposed Development / Rampion 2	The onshore and offshore infrastructure associated with the offshore wind farm comprising of installed capacity of up to 1,200MW, located in the English Channel in off the south coast of England.
TJB	Transition Joint Bay
Transmissivity	Describes the ability of the aquifer to transmit groundwater throughout its entire saturated thickness
UKCP	UK Climate Projections
WFD	Water Framework Directive
WSCC	West Sussex County Council
Zone of Influence (ZOI)	The area surrounding the Proposed Development which could result in likely significant effects.

27.17 References

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