4.27

Rampion 2 WIND FARM

Volume 4, Chapter 27

Water Environment Appendices

GoBe wood.

Contents

Appendix 27.1	Detailed water environment baseline information
Appendix 27.2	Flood Risk Screening Assessment
Appendix 27.3	Preliminary Water Framework Directive Assessment

4.27.1

Rampion 2 WIND FARM

Volume 4, Appendix 27.1

Detailed water environment baseline information

GoBe wood.

Contents

1.	**Introduction**	**3**
2.	**Detailed baseline**	**4**
2.1	Aquatic environment	4
	Conservation sites	4
2.2	Water resources	22
3.	**Glossary of terms and abbreviations**	**66**
4.	**References**	**68**

Table 2-1	Conservation sites within the water environment study area with potential water dependency or geological features of interest	5
Table 2-2	WFD water bodies across the water environment study area	9
Table 2-3	Registered PWSs within the water environment study area	23
Table 2-4	Licences abstractions within the water environment study area	36
Table 2-5	Consented discharges within the PEIR Assessment Boundary	63
Table 3-1	Glossary of terms and abbreviations	66

1. Introduction

1.1.1 As part of the works in support of the Rampion 2 Preliminary Environmental Information Report (PEIR), this technical appendix presents detailed results of the desktop studies to establish the existing water environment conditions within the Water Environment study area. The detailed information on water dependent conservation sites, Water Framework Directive (WFD) Classifications and water resources within this report informs the summary of baseline information and the assessment of potential effects in **Chapter 27: Water environment, Volume 2**. Background information on the approach to the assessment including the study area and data gathering methodologies are also presented in **Chapter 27, Volume 2** of the PEIR for reference.

2. Detailed baseline

2.1 Aquatic environment

Conservation sites

Overview

2.1.1 This section provides details of designated conservation sites where hydrological or hydrogeological conditions support water dependent features. A complete list of other designated sites (including non - water dependent sites) is provided in **Chapter 23: Terrestrial ecology and nature conservation, Volume 2**.

2.1.2 Within the water environment study area five statutory designated sites and three designated non - statutory sites have been identified as being potentially water dependent. **Table 2-1** provides details of their potential water dependency and location in relation to the PEIR Assessment Boundary to help determine whether they have a potential hydrological or hydrogeological connection to the Proposed Development. The table also identifies Local Geological Sites (LGSs) or the same reason. The sites are presented in **Chapter 27, Volume 2** and within **Figure 27.2, Volume 3**.

2.1.3 From the sites presented in **Table 2-1**, it is considered that the only sites which are to be 'screened in' for further assessment within **Chapter 27, Volume 2** are Arundel Park Site of Special Scientific Interest (SSSI) and Arun Valley, Watersfield to Arundel Local Wildlife Site (LWS) within the southern section of the PEIR Assessment Boundary and Amberly Mount to Sullington Hill SSSI, Bines Green LWS and Washington Chalk Pit LGS within the central section of the PEIR Assessment Boundary.

Table 2-1 Conservation sites within the water environment study area with potential water dependency or geological features of interest

Designated conservation site	Description and water dependency	Potential connection to the PEIR Assessment Boundary
Statutory designated sites with potential for water dependency		
Arundel Park SSSI	Groundwater dependent Chalk grassland with a rich invertebrate assemblage which includes an artificial lake (Swanbourn Lake) and marsh.	The site is positioned along the valley floor, and 1.1km to the north west of the PEIR Assessment Boundary, downstream of the Burpham Tributary, and overlying the same Sussex White Chalk bedrock geology as the onshore temporary construction corridor. Screened in.
Chanctonbury Hill SSSI	Although not designated as groundwater dependent, this site has an artificially constructed dew pond (surface water fed by rainfall) which supports species of newts.	The site is approximately 610m to the south east and upgradient of the PEIR Assessment Boundary, therefore the surface water-fed habitats are highly unlikely to be hydrologically linked. Screened out.
Amberly Mount to Sullington Hill SSSI	Groundwater dependent Chalk grassland on scarp slopes including juniper scrub habitat and rare invertebrates.	The nearest unit which lies on the northern slopes of Sullington Hill encroaches on the edge of the PEIR Assessment Boundary and access track and is approximately 220m and directly downgradient of the onshore temporary construction corridor. Screened in.
Beeding Hill to Newtimber Hill SSSI	Groundwater dependent Chalk grassland which has a spring and an area of willow carr, scrub and heath.	The site is approximately 6km to the south of the PEIR Assessment Boundary and the onshore temporary construction corridor near Ashurst. It is fed by a flush formed at the bottom of

Designated conservation site	Description and water dependency	Potential connection to the PEIR Assessment Boundary
	There is also an artificially constructed dew pond (surface water-fed).	the easterly slopes of Beeding Hill where there are localised Chalk groundwater catchments with no hydrogeological pathways from Rampion 2. Screened out.
Adur Estuary SSSI	This SSSI is designated as a rare intertidal mudflat within the tidal part of the River Arun. It is also identified as groundwater dependent.	The site is situated downstream of the Proposed Development approximately 8.2km from the nearest part of the PEIR Assessment Boundary which is the onshore temporary construction corridor near Ashurst. Given its distance, the large potential for dilution and because the mudflat is tidally influenced it is highly unlikely that there will be any potential for effects from Rampion 2. Screened out.
Non-statutory designated sites with potential for water dependency		
Arun Valley, Watersfield to Arundel LWS	Features includes a system of flood meadows dissected by ditches which are botanically rich, supporting species including water beetles/ dragonflies.	The site is associated with the western floodplain of the River Arun and its ditches, which at their closest point 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. Screened in.
Bines Green LWS	Features include neutral grassland and a surface water pond with high botanical interest.	The associated surface water pond is situated at a similar gradient approximately 200m to the north east of the Bines Green access point of the PEIR Assessment Boundary. Screened in.

Designated conservation site	Description and water dependency	Potential connection to the PEIR Assessment Boundary
Lancing Ring Local Nature Reserve (LNR)	Features include a surface water fed dew pond which supports newts.	The site is approximately 7.2km to the south east of the PEIR Assessment Boundary, and these surface water-fed habitats are highly unlikely to be hydrologically linked. Screened out.
Local Geological Sites		
Warningcamp Quarry	Disused Chalk quarry exposing higher part of the Culver Chalk Formation.	340m to the south east and upgradient of the PEIR Assessment Boundary, therefore unlikely to be affected. Screened out.
Climping Sand Dune System	One of the few good sand dune systems preserved in Sussex.	350m to the east of the landfall PEIR Assessment Boundary, therefore unlikely to be affected. Screened out.
Washington Chalk Pit, Horsham	Spans the Cenomanian/Turonian (CT) Junction.	550m to the south and upgradient of the PEIR Assessment Boundary, so unlikely to be affected. Screened out.
Rock Common Sand Quarry, Washington	This large quarry is of importance for paleoenvironmental studies.	The south western corner of the quarry overlaps with the PEIR Assessment Boundary near Washington, West Sussex. Screened in.
Combe Croft Quarry, Henfield	Disused sandstone quarry in Hythe Beds, Lower Greensand.	1km to the south west and upgradient of the PEIR Assessment Boundary near Bines Green so unlikely to be affected. Screened out.

WFD classifications

2.1.4 The current (2016) status of all WFD water bodies within the water environment study area are presented in **Table 2-2**, together with an indication of which water bodies relate to which parts of the PEIR Assessment Boundary. The table also identifies which WFD water bodies are not considered to have a potential hydrogeological or hydrogeological connection with the Proposed Development and have been screened out from further assessment within **Chapter 27, Volume 2** on the basis that it is unlikely that they will be affected. Those which are identified as having a potential connection to the Proposed Development will be considered together with offshore aspects within a standalone WFD Assessment at the Environmental Statement (ES) stage. **Figures 27.1, 27.2** and **27.5, Volume 3** show each of the water bodies in relation to the PEIR Assessment Boundary.

Table 2-2 WFD water bodies across the water environment study area

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
Ryebank Rife (GB107041006620) **Arun and Western Streams**	River	Moderate Status (2016): Moderate Ecological Potential, Good Chemical Status	Dissolved oxygen	Drought	River is intersected by the PEIR Assessment Boundary within the southern coastal area of the proposed onshore temporary construction corridor. Screened in.
Black Ditch (West Sussex) GB107041012890 **Arun and Western Streams**	River	Poor Status (2016): Poor Ecological Potential, Good Chemical Status	Macrophytes and Phytobenthos Combined - Moderate Fish - Poor	Natural conditions - sediment and morphology Land drainage – operational management	Ditch is intersected by the PEIR Assessment Boundary within the southern area of the onshore temporary construction corridor. Screened in.
Burpham Tributary (River Arun) GB107041011990	River	Moderate status (2016): Moderate Ecological Status, Good Chemical Status	Hydrological regime Dissolved oxygen - Poor	Unknown (pending Environment Agency investigation) Drought	Tributary is approximately 180m to the west and downgradient of the PEIR Assessment

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
Arun and Western Streams					Boundary within the southern area of the onshore temporary construction corridor. Given the distance there between source and receptor there is unlikely to be any potential for a hydrological connection. Screened out.
Littlehampton Anticline East GB40701G503400	Groundwater	Good status (2016): Good Quantitative Status, Good Chemical Status	n/a	n/a	Water body is intersected by the PEIR Assessment Boundary within the southern coastal area of the landfall and onshore temporary construction corridor near Climping. Screened in.

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
Littlehampton Anticline West GB40701G504900	Groundwater	Poor status (2016): Poor Quantitative Status, Good Chemical Status	Quantitative Dependent Surface Water Body Status	No data available	Water body is intersected by the PEIR Assessment Boundary within the southern coastal area of the onshore temporary construction corridor area near Wick. Screened in.
Sussex Lambeth Group GB40701G505100	Groundwater	Poor status (2016): Poor Quantitative Status, Good Chemical Status	Quantitative Dependent Surface Water Body Status	No data available	Water body is intersected by the PEIR Assessment Boundary within the southern area of the onshore temporary construction corridor area around Crossbush. Screened in.
Worthing Chalk GB40701G505300	Groundwater	Poor Status (2016): Poor Quantitative	Quantitative Water Balance, Quantitative	Pollution from rural areas	Water body is intersected by the PEIR Assessment

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
		Status, Poor Chemical Status	Dependent Surface Water Body Status Chemical Drinking Water Protected – fail, General Chemical Test – fail		Boundary within the southern and central section of the onshore temporary construction corridor between Warningcamp and Washington, West Sussex. Screened in.
Stor **Arun and Western Streams GB107041012100**	River	Moderate status (2016): Moderate Ecological Status, Good Chemical Status	Phosphate	Water industry - sewage discharge (continuous) Agriculture and rural land management - poor nutrient management	Although a small part of the upper catchment boundary is crossed by the PEIR Assessment Boundary, there are no tributaries of the Stor intersected by the onshore temporary construction corridor and the nearest tributary is approximately 750m to the north of an existing access track.

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
					Therefore, it is considered there is no potential for hydrological connection. Screened out.
Honeybridge Stream GB107041012120 **Adur and Ouse**	River	Poor status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate Fish – Poor Phosphate - Moderate	Pollution from rural areas Pollution from waste water Physical modifications	Stream has several tributaries which are intersected by the PEIR Assessment Boundary within the central section of the onshore temporary construction corridor between Washington, West Sussex and Wiston. Screened in.
Adur Lockbridge GB107041012200 **Adur and Ouse**	River	Poor status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined - Moderate Fish - Poor	Pollution from rural areas Pollution from waste water	River is intersected by the PEIR Assessment Boundary within the north eastern section of the onshore

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
				Physical modifications	temporary construction corridor near Bines Green. Screened in.
Adur East (Sakeham) GB107041012900 **Adur and Ouse**	River	Poor status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate Phosphate - Moderate	Pollution from waste water Physical modifications	River has several tributaries which are intersected by the PEIR Assessment Boundary within the north eastern section of the onshore temporary construction corridor between Partridge Green and Wineham. Screened in.
Adur East, GB107041012180 **Adur and Ouse**	River	Poor status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate Dissolved Oxygen – Moderate	Pollution from waste water	River has several tributaries which are intersected by the PEIR Assessment Boundary within the north eastern section of the onshore

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
			Phosphate - Bad		temporary construction corridor between Wineham and Twineham Green. The Wineham Lane North substation search area is intersected. Screened in.
Chess Stream GB107041012110 **Adur and Ouse**	River	Moderate Status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate Fish - Moderate	Pollution from waste water	No potential for pathways to reach the stream from the PEIR Assessment Boundary as it is approximately 350m and upstream on the other side of a valley. Screened out.
Cowfold Stream GB107041012260 **Adur and Ouse**	River	Poor Status (2016): Poor Ecological Status, Good Chemical Status	Ecological: Macrophytes and Phytobenthos Combined -Poor	Pollution from rural areas Pollution from waste water	Stream is intersected by the PEIR Assessment Boundary and the north eastern section

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
			Phosphate - Moderate		of the onshore temporary construction corridor near Cowfold. Screened in.
Herrings Stream GB107041012150 **Adur and Ouse**	River	Moderate Status (2016): Poor Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Poor Phosphate - Moderate	Pollution from waste water Physical modifications	No potential for pathways to reach the stream from the PEIR Assessment Boundary as it is approximately 850m and upgradient of onshore temporary construction corridor. Screened out.
Black Sewer GB107041012110 **Adur and Ouse**	River	Moderate Status (2016): Moderate Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate	Pollution from rural areas	No potential for pathways to reach the feature from the PEIR Assessment Boundary as its nearest tributary stream is approximately 450m

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
					from the onshore temporary construction corridor. Screened out.
Bolney Sewer GB107041012250 **Adur and Ouse**	River	Moderate Status (2016): Moderate Ecological Status, Good Chemical Status	Macrophytes and Phytobenthos Combined – Moderate	Pollution from waste water	Although the Wineham Lane North substation search area is situated on the catchment boundary there is no pathway between Bolney Sewer and the PEIR Assessment Boundary. Note the ditch that drains the substation search area discharges into Adur (East) and not Bolney Sewer. Therefore, Screened out.
Lower Greensand GB40701G502400	Groundwater	Good Status (2016): Good Quantitative	n/a	n/a	Intersected by the PEIR Assessment

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
Adur and Ouse		Status, Good Chemical Status			Boundary within the central section of the onshore temporary construction corridor near Buncton and Ashurst. Screened in.
Adur & Ouse Hastings Beds GB40702G502000	Groundwater	Good Status (2016): Good Quantitative Status, Good Chemical Status	n/a	n/a	Although it is not intersected by the PEIR Assessment Boundary and its edge is approximately 30m to the east from the outer limit of a short section of the onshore temporary construction corridor, 480m to the east from the Bolney Road/ Kent Street substation search area and 1.3km to the north west of the Wineham Lane North

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
					substation search area. Screened in.
Teville Stream GB107041011940 **Teville**	River (Heavily Modified Water Body (HMWB) - Urbanisation)	Moderate Status (2016): Bad Ecological Status, Good Chemical Status	Mitigation measures assessment - Moderate or less Fish – Bad Ammonia (physical-chemical) – Moderate Dissolved oxygen - Bad	Physical modifications Pollution from towns, cities and transport Non-native invasive species	No potential for pathways to reach the stream from the PEIR Assessment Boundary and nearest tributary stream is approximately 9.2km away. Screened out.
Arun Lower GB540704105000 **South East Transitional (TraC)**	Transitional (HMWB – Flood Protection)	Moderate Status (2016): Moderate Ecological Potential, Good Chemical Status	Mitigation measures assessment - Moderate or less	Physical modifications	Transitional watercourse intersected by the PEIR Assessment Boundary and the southern section of the onshore temporary construction corridor near Littlehampton

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
					Industrial Estate. Screened in.
Adur GB540704116000 **South East TraC**	Transitional (HMWB – Flood Protection)	Moderate Status (2016): Moderate Ecological Potential, Fail Chemical Status	Mitigation measures assessment – Moderate or less Angiosperms – Moderate Fish – Moderate Tributyltin compounds - Fail	Physical modifications	Several tributaries are intersected by the PEIR Assessment Boundary and the central to north eastern section of the onshore temporary construction corridor near Ashurst. Screened in.
Sussex GB640704540003 **South East TraC**	Coastal (HMWB – Coastal Protection)	Moderate Status (2016): Moderate Ecological Potential, Good Chemical Status	Mitigation measures assessment – Moderate or less	Physical modifications	The coastal water body lies adjacent to the PEIR Assessment Boundary for the onshore landfall. Note that whilst there is some potential for the trenchless landfall to affect the coastal water body there has also been an

Water body ID / management catchment	Water body type	Status	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Potential connection to the PEIR Assessment Boundary
					assessment carried out for potential on marine water quality effects within **Chapter 6: Coastal processes, Volume 2** and **Chapter 14: Nature conservation, Volume 2**. A preliminary standalone WFD Assessment is also presented in **Appendix 27.3, Volume 4** and this will be refined and updated at the ES stage.

2.2 Water resources

Private water supplies

2.2.1 A total of eighteen private water supplies (PWSs) have been identified within the water environment study area, comprising nine within Arun District Council (ADC), five in Horsham District Council (HDC), three within Adur and Worthing District Council (AWDC) and one within West Sussex District Council (WSDC) (**Table 2-3**). There are seventeen groundwater supplies and one surface water supply as shown along with **Chapter 27, Volume 2** and in **Figure 27.6, Volume 3**.

2.2.2 The level of information available regarding these supplies varies in terms of its level of detail, and where its purpose is unknown a PWS has been assumed as potable as part of the precautionary approach adopted within the assessment of effects in **Chapter 27, Volume 2**. From the eighteen PWSs identified, eleven are assessed as having a potential connection to the PEIR Assessment Boundary. The other eight are assessed as not being connected and therefore have been screened out of the assessment.

Table 2-3 Registered PWSs within the water environment study area

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
P1	The Old Rectory	502687, 101256	ADC	Groundwater (borehole)	Domestic	Single domestic - exempt	Screened in: groundwater abstraction, ~ 1.1km to the west of the landfall PEIR Assessment Boundary and within the same geology (Chalk). Also within the same surface water catchment (Arun) as the PEIR Assessment Boundary.
P2	Brookbarn House	501581, 103990	ADC	Groundwater (borehole)	Unknown	2.3 m^3/ day	Screened in: groundwater abstraction, within very close proximity of PEIR Assessment Boundary (~ 80m) near Littlehampton Junction, with the

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							same geology (Chalk).
P3	Pauls House	502392, 104768	ADC	Groundwater (borehole)	Domestic	2.8m^3/ day	Screened in: groundwater abstraction, within very close proximity of PEIR Assessment Boundary (< 0.1km) near Lyminster, and with the same geology (Chalk).
P4	The Decoy	505857, 105344	ADC	Groundwater (borehole)	Single domestic	Unknown	Screened out: groundwater abstraction ~ 2.1km west of PEIR Assessment Boundary (Warningcamp C) with a band of the same geology (Lambeth Group comprising clay, silt, sand and gravel) which is low in

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							permeability. It is within the upper reaches of the Black Ditch surface water catchment, and situated upgradient of the PEIR Assessment Boundary.
P5	Angmering Park Stud Farm	506195, 105863	ADC	Groundwater (borehole)	Small supplies, including small shared supplies and those to single dwellings only	Unknown	Screened out: groundwater abstraction ~ 2.4km west of PEIR Assessment Boundary (Warningcamp C) and within a band of the same geology (Lambeth Group comprising clay, silt, sand and gravel) which is low in permeability. It is within upper reaches of the Black Ditch surface water

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							catchment, and situated upgradient of the PEIR Assessment Boundary.
P6	Lample House	504401, 108559	ADC	Groundwater (borehole)	Large supplies and those used as part of a commercial or public activity (including some supplies to tenanted single dwellings)	1m^3/ day	Screened in: groundwater abstraction near Burpham, in very close proximity to the north of PEIR Assessment Boundary (90m) and with the same geology (Chalk).
P7	Upper Barpham	506729, 108945	ADC	Groundwater (borehole)	Small supplies, including small shared supplies and those to single dwellings only	Unknown	Screened in: groundwater abstraction, ~ 1.1km to the south west of the PEIR Assessment Boundary and with same geology (Chalk).

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
P8	Turners Dairies	509071, 108497	ADC	Groundwater (public supply)	Where a public supply is onwardly distributed to non-water company consumers on a secondary premises	Unknown	Screened in: groundwater public supply near Patching, ~ 2.4km to the south of the PEIR Assessment Boundary and with same geology (Chalk).
P9	Long Furlong Barn	509571, 107528	ADC	Groundwater (borehole)	Large supplies and those used as part of a commercial or public activity (including some supplies to tenanted single dwellings)	Unknown	Screened in: groundwater abstraction between Patching and Clapham with same geology as the PEIR Assessment Boundary (Chalk), ~ 3.4km to the south of the PEIR Assessment Boundary (and adjacent to licensed abstraction source protection zones (SPZs) for Patching

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							and Clapham (see section on licensed abstractions).
P10	The Chantry Mere	509265, 112867	HDC	Groundwater	Domestic - potable	8m^3/ day	Screened in: groundwater abstraction within 50m of proposed site access on along existing road (Chantry Lane) with the same geology (Gault formation and Upper Greensand Formation comprising mudstone, sandstone and limestone).
P11	Wappingthorn Farm	516527, 113555	HDC	Groundwater	Domestic - potable	16m^3/ day	Screened in: groundwater abstraction near Steyning, within 940m south west of the PEIR Assessment

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							Boundary, within same geology (Lower Greensand comprising of sandstone and mudstone).
P12	Huddlestone farm	518091, 113566	HDC	Groundwater	Domestic - potable	3 m^3/ day	Screened in: groundwater abstraction, ~ 1.4km to the south west of the PEIR Assessment Boundary and with same geology (Lower Greensand comprising sandstone and mudstone).
P13	Truleigh Hill Youth Hostel Assoc	522048, 110727	HDC	Groundwater	Domestic - potable	22m^3/ day	Screened out: groundwater abstraction 6.2km to the south west of the PEIR Assessment Boundary. There are several bands of

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							different geology forming a 'barrier' between the PEIR Assessment Boundary that overlies mudstone and the supply which abstracts from White Chalk on the opposite side of the tidal Arun and Woodsmill Stream.
P14	10 Properties Truleigh Hill	522048, 110729	HDC	Groundwater	Domestic - potable	25m^3/ day	Screened out: groundwater abstraction 6.2km to the south west of the PEIR Assessment Boundary. There are several bands of different geology forming a barrier between the PEIR Assessment Boundary that overlies mudstone and the supply which

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							abstracts from White Chalk on the opposite side of the tidal Arun and Woodsmill Stream.
P15	Church Farm	519095, 108256	AWDC	Groundwater	Large supplies and those used as part of a commercial or public activity (including some supplies to tenanted single dwellings)	Estimated residential population is ten; estimated temporary population is 400	Screened out: groundwater abstraction 6.4km to the south east of PEIR Assessment Boundary and within the adjacent tidal Arun catchment. Works within the PEIR Assessment Boundary are located in different, less permeable strata (including the Wealden Group comprising mudstone, siltstone and sandstone) than the abstraction (White Chalk). Therefore, due to the

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							distance and differences in geology there is no potential for connection.
P16	The Old Rectory	519166, 108105	AWDC	Groundwater	Small supplies, including small shared supplies and those to single dwellings only	Estimated residential population is four	Screened out: groundwater abstraction 6.6km to the south west of PEIR Assessment Boundary and within adjacent tidal Arun catchment. Works within the PEIR Assessment Boundary are located in different, less permeable strata (of the Wealden Group comprising mudstone, siltstone and sandstone) than abstraction (White Chalk). Therefore, due to the distance and differences in

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							geology there is no potential for connection.
P17	Applesham Farm	519342, 106864	AWDC	Groundwater	Small supplies, including small shared supplies and those to single dwellings only	Estimated residential population is 30	Screened out: groundwater abstraction 7.7km to the south west of PEIR Assessment Boundary and within adjacent tidal Arun catchment. Works within the PEIR Assessment Boundary are located in different, less permeable strata (of the Wealden Group comprising mudstone, siltstone and sandstone) than abstraction (White Chalk). Therefore, due to the distance and differences in geology there is no

ID	Supply name	NGR	LPA	Source	Use and property type	Estimated volume (m^3/ day) and population served	Potential connection to the PEIR Assessment Boundary
							potential for connection.
P18	Unknown	523845, 119605	MSDC	Surface water - Herring Stream, tributary of the River Adur	Unknown	Unknown	Screened in: surface water abstraction situated ~ 640m to the south of the PEIR Assessment Boundary, within the same surface water catchment, and downgradient of the Wineham Lane North substation search area. There are surface water flow pathways in-between these substation locations and the supply, and therefore there is a potential connection.

Licensed abstractions

2.2.3 The Environment Agency (EA) has provided information for licensed abstractions. Within the water environment Study Area 72 licensed abstractions have been identified as indicated in **Table 2-4.** 27 are assessed as having a potential connection to the PEIR Assessment Boundary and have been considered for further assessment within **Chapter 27, Volume 2**. The other 45 are assessed as not being connected and therefore have been screened out of the assessment. **Figure 27.6, Volume 3** shows the locations of each of the licensed abstractions

2.2.4 The majority of the licensed abstractions that have been screened in are to the south of the central section of the Onshore Construction Corridor across the South Downs between Warningcamp and Sullington Hill, where there are seven SPZs with the same permeable geology (White Chalk) type as the PEIR Assessment Boundary. Although many of these SPZs are distant (>3km from the PEIR Assessment Boundary), they have been screened in as part of a precautionary approach on account of the importance of the abstractions as public water supplies operated by Southern Water.

2.2.5 The nearest SPZs identified are for the Warningcamp Borehole (A15, GWSGZ0141) and Burpham Boreholes 1 -4 (A16 - A18, GWSGZ014), situated approximately 380 – 400m and 420– 530m from the PEIR Assessment Boundary respectively. The corridor has been sited outside of the edge of their SPZ1s, but situated within areas of the SPZ2s and SPZ3s. The route has been selected to avoid SPZ1s, whilst taking into account other environmental constraints including biodiversity LWSs and the Ancient Woodland on Warningcamp Hill, and a site of archaeological interest near Norfolk Clump. Appropriate environmental measures have been embedded within **Section 27.7** of **Chapter 27, Volume 2** to ensure the protection of these public water supplies (along with other licensed abstractions and PWSs) during proposed works.

Table 2-4 Licences abstractions within the water environment study area

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A1	10/41/542009 Point A At New Barn, Climping	Baird	499260, 101290	Groundwater	Agriculture - general farming and domestic	Screened in: groundwater abstraction ~ 1.1km to the west of the PEIR Assessment Boundary landfall, and in the same geology type (Chalk).
A2	10/41/411016 Elmer Rife	James D Baird (Home Farm) Ltd	499270, 101180	Surface water	Agriculture - spray irrigation - direct	Screened out: abstraction from Ryebank Rife ~ 1.1km upstream and to the west of the PEIR Assessment Boundary.
A3	27/209/R01 Ryebank Rife, Point A, Bilsham	Langmead Farms Ltd	496359, 101855	Surface water	Agriculture - spray irrigation - storage	Screened out: abstraction from Ryebank Rife ~ 3.9km upstream and to the west of the PEIR Assessment Boundary.
A4	SO/041/0024/005 Ryebank Rife – Stakers Farm, Yapton	Langmead Farms Ltd	495837, 102285	Surface water	Agriculture - spray irrigation - storage	Screened out: abstraction from Ryebank Rife ~ 4.4km upstream and to the west of the PEIR Assessment Boundary.
A5	23/059 Point A St Alders Fish Farm	Thomas	516960, 112740	Surface water	Agriculture - fish farm/cress pond throughflow	Screened in: surface water abstraction situated ~ 380m downstream of the onshore temporary construction corridor crossing of the Ryebank Rife watercourse.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A6	10/41/411021 River Arun – Estuary Tidal	ARC Ltd (Solent Aggregates Ltd)	501910, 102330	Tidal	Industrial, commercial and public services - general washing/process washing	Screened in: surface water abstraction situated on the Arun tidal estuary at a confluence which is approximately 560m downstream of the onshore temporary construction corridor crossing of the Ryebank Rife watercourse.
A7	24/065 Torri House	Molica Esq	502320, 104020	Groundwater	Agriculture - horticultural watering	Screened out: groundwater abstraction in Littlehampton, situated 420m to the south of a proposed access point. Although the abstraction is in the same Chalk geology, the agricultural supply is situated upgradient of the PEIR Assessment Boundary and therefore unlikely to be connected.
A8	24/064 Marina House	Molica Esq	502320, 104060	Groundwater	Agriculture - horticultural watering	Screened out: groundwater abstraction in Littlehampton, situated 380m to the south of a proposed access point. Although the abstraction is in the same Chalk geology, the agricultural supply is situated upgradient of the PEIR Assessment Boundary and therefore unlikely to be connected.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A9	24/060 Knucker Hole Fish Farm	Biddlecombe	502250, 105050	Groundwater	Agriculture - fish farm/cress pond throughflow	Screened in: groundwater abstraction used for aquaculture situated within very close proximity (180m) and in the same geology (Chalk) to the onshore temporary construction corridor.
A10	10/41/411020 Internal Ditches at Tortington	Luckin & Son	500460, 104870	Surface water	Agriculture - spray irrigation - direct	Screened out: surface water abstraction ~ 1.1km to the east of the PEIR Assessment Boundary and situated on the opposite side of the River Arun, therefore it has no potential connection.
A11	10/41/411010 Church Farm, Lyminster	Longhurst Esq	501230, 105650	Surface water	Agriculture - spray irrigation - direct	Screened in: surface water abstraction. Situated within the same surface water catchment as the PEIR Assessment Boundary, and is downgradient and approximately 990m to the west of the onshore temporary construction corridor.
A12	10/41/411102 Broomhurst Farm	A M Harriot & Son	501510, 105670	Surface water	Agriculture - spray irrigation - direct	Screened in: surface water abstraction. Situated within the same surface water catchment as the PEIR Assessment Boundary, and is downgradient and ~ 660m to

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						the west of the onshore temporary construction corridor.
A13	10/41/310210 Arundel Pumping Station (PS)	Southern Water Services Ltd	501760, 107770	Groundwater	Water supply - public water supply, potable	Screened out: qroundwater abstraction situated ~ 1.6km to the west of an access point near Warningcamp. Although the supply is in the same geology (Chalk), it is situated on the opposite side of the River Arun, and takes from a different part of the catchment (as indicated by its SPZ mapping), therefore there is no connection.
A14	10/41/413003 Arundel Wildfowl Reserve	Wildfowl & Wetlands Trust	501870, 107940	Groundwater	Environmental - lake and pond throughflow	Screened out: groundwater abstraction situated ~ 1.6km to the west of an access point near Warningcamp. Although the supply is in the same geology (Chalk), it is situated on the opposite side of the River Arun, therefore there is no connection.
A15	24/063 Warningcamp Borehole	Southern Water Services Ltd	504590, 107250	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction within close proximity to the onshore construction corridor near Norfolk Clump (~ 380 – 400m away) and in the same geology (Chalk). The PEIR Assessment

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						Boundary is on the outer edge of SPZ1 and some temporary trenching works are proposed within SPZ2 and SPZ3.
A16	10/41/310210 Burpham PS Borehole 1	Southern Water Services Ltd	505050, 109450	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction situated in close proximity to the PEIR Assessment Boundary near Norfolk Clump (~ 420m to the north west) and in the same geology (Chalk). The PEIR Assessment Boundary is on the outer edge of SPZ1 and some temporary trenching works are proposed within SPZ2 and SPZ3.
A17	10/41/310210 Burpham PS Borehole 2	Southern Water Services Ltd	504970, 109370	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction situated in close proximity to the PEIR Assessment Boundary near Norfolk Clump (~ 470m to the north west) and in the same geology (Chalk). The PEIR Assessment Boundary is on the outer edge of SPZ1 and some temporary trenching works are proposed within SPZ2 and SPZ3.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A18	10/41/310210 Burpham PS Boreholes 3 & 4	Southern Water Services Ltd	504850, 109280	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction situated in close proximity to the PEIR Assessment Boundary near Norfolk Clump (~ 530m to the north west) and in the same geology (Chalk). The PEIR Assessment Boundary is on the outer edge of SPZ1 and some temporary trenching works are proposed within SPZ2 and SPZ3.
A19	10/41/414101 Lee Farm, Patching	Angmering Park Farms LLP	506730, 108950	Groundwater	Agriculture - general farming and domestic	Screened in: groundwater abstraction ~ 1.1km to the south east of the PEIR Assessment Boundary near Norfolk Clump and in the same geology (Chalk).
A20	10/41/310210 Angmering PS Point 2	Southern Water Services Ltd	506000, 106000	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction ~ 2km to the south east of the PEIR Assessment Boundary traverse of Warningcamp Hill, and in the same geology (Chalk). The PEIR Assessment Boundary crosses the SPZ2 and SPZ3 of this supply.
A21	10/41/310210 Angmering PS Point 1	Southern Water	505000, 106000	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction ~ 1.2km to the south east of the PEIR Assessment

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
		Services Ltd				Boundary traverse of Warningcamp Hill, and in the same geology (Chalk). The PEIR Assessment Boundary crosses the SPZ2 and SPZ3 of this supply.
A22	10/41/414009 Black Ditch At Ham Manor Golf Club	Ham Manor Golf Club Ltd	505870, 103890	Groundwater	Industrial, commercial and public services - spray irrigation - direct	Screened out: groundwater abstraction. ~ 3.3km to the west of the PEIR Assessment Boundary and overlying the same geology (Chalk). Given that the abstraction is upgradient from the proposals, within the upper reaches of the Black Ditch catchment, there is no potential for connection.
A23	24/066 Old Place Farm	F W Longhurst & Son Ltd	505370, 104580	Groundwater	Agriculture - spray irrigation - direct	Screened out: groundwater abstraction used for irrigation. ~ 2.8km to the west of the PEIR Assessment Boundary and in the same geology (Chalk). Given that the abstraction is upgradient from the proposals, within the upper reaches of the Black Ditch catchment, there is no potential for connection.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A24	24/066 Old Place Farm	F W Longhurst & Son Ltd	505370, 104580	Groundwater	Agriculture - general farming and domestic	Screened out: groundwater abstraction ~ 2.8km to the west of the PEIR Assessment Boundary and in the same geology (Chalk). Given that the abstraction is upgradient from the proposals, within the upper reaches of the Black Ditch catchment, there is no potential for connection.
A25	10/41/414021 Black Ditch at Ham Manor Farm, Rustington	Rustington Golf Centre Ltd	505620, 104190	Surface water	Industrial, commercial and public services - spray irrigation - storage	Screened out: surface water abstraction ~ 3km upstream of the Black Ditch crossing of the PEIR Assessment Boundary, hence there is no potential connection.
A26	10/41/414021 Black Ditch at Ham Manor Farm, Rustington	Rustington Golf Centre Ltd	505620, 104190	Surface water	Industrial, commercial and public services - spray irrigation - direct	Screened out: surface water abstraction ~ 3km upstream of the Black Ditch crossing of the PEIR Assessment Boundary, hence there is no potential connection.
A27	24/068/R01 Side Channel Of The Black Ditch at Manor Farm, Poling	Langmead	505164, 104596	Surface water	Agriculture - spray irrigation - storage	Screened out: surface water abstraction ~ 3.2km upstream of the Black Ditch crossing of the PEIR Assessment Boundary, hence there is no potential connection.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A28	10/41/310210 Patching PS	Southern Water Services Ltd	509160, 107450	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction ~ 3.9km to the south east of the PEIR Assessment Boundary section near Wepham Down. It is in the same geology (Chalk) and lies to the south and downgradient of the onshore temporary construction corridor which overlaps with parts of the abstraction's SPZ3.
A29	10/41/310112 Roundstone Farm Ferring	Langmead	508580, 104120	Groundwater	Agriculture - spray irrigation - direct	Screened out: groundwater abstraction ~ 5km to the south east of the PEIR Assessment Boundary. Although it is in the same geology (Chalk) the abstraction is situated upgradient of the Proposed Development, and within a different (Ferring Rife) catchment, therefore there is no connection.
A30	10/41/310106 Roundstone Nursery	Roundstone Garden Centre Ltd	507640, 103240	Groundwater	Agriculture - spray irrigation - direct	Screened out: groundwater abstraction ~ 4.9km to the south east of the PEIR Assessment Boundary. Although it overlies the same geology (Chalk), the abstraction is situated upgradient of the Proposed Development, and within a different (Ferring Rife)

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						catchment, therefore there is no connection.
A31	10/41/310210 Stanhope Lodge PS	Southern Water Services Ltd	511000, 105000	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction ~ 6.8km to the south east of the PEIR Assessment Boundary. It is in the same geology (clay, silt sand and gravel), which is low in permeability, and it is situated upgradient of proposals, and within a different (Ferring Rife) catchment, and therefore there is no connection.
A32	SO/041/0024/012 Borehole at Romany Road Worthing	David Lloyd Leisure Ltd	510754, 104162	Groundwater	Industrial, commercial and public services - drinking, cooking, sanitary, washing, Small Garden - commercial/industrial/ public services	Screened out: groundwater abstraction ~ 7.1km to the south east of the PEIR Assessment Boundary. It is in the same geology (Lambeth Group comprising clay, silt sand and gravel), which is low in permeability, and it is situated upgradient of proposals, and within a different (Ferring Rife) catchment, and therefore there is no connection.
A33	10/41/310210 Findon PS	Southern Water	512510, 107580	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction ~ 5km to the south of the PEIR Assessment Boundary

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
		Services Ltd				section near Sullington Hill. It is in the same geology (Chalk) and lies to the south and downgradient of the onshore temporary construction corridor, which overlaps with parts of the abstraction's SPZ3.
A34	10/41/310213 Links Road Golf Club	Links Road Golf Club Ltd	513499, 106210	Groundwater	Industrial, commercial and public services - spray irrigation - direct	Screened out: groundwater abstraction 6.6km to the south of the PEIR Assessment Boundary, and in the same geology (Chalk). It is, however, in a different surface water catchment (Teville Stream) and given the distance and the type of abstraction (irrigation), there is limited potential for any connection.
A35	10/41/310210 Sompting PS	Southern Water Services Ltd	516760, 106310	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction ~ 8.9km to the south east of the PEIR Assessment Boundary section near Sullington Hill. It is in the same geology (Chalk) and lies to the south and downgradient of the onshore temporary construction corridor, which overlaps with parts of the abstraction's SPZ3.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A36	10/41/310210 Broadwater PS Borehole 1	Southern Water Services Ltd	514380, 105470	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction ~ 7.8km to the south east of the PEIR Assessment Boundary section near Sullington Hill. It is in the same geology (Chalk) and lies to the south and downgradient of the onshore temporary construction corridor which overlaps with parts of the abstraction's SPZ3.
A37	10/41/310210 Broadwater PS Borehole 2	Southern Water Services Ltd	514380, 105470	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction ~ 7.8km to the south east of the PEIR Assessment Boundary section near Sullington Hill. It is in the same geology (Chalk) and lies to the south and downgradient of the onshore temporary construction corridor, which overlaps with parts of the abstraction's SPZ3.
A38	10/41/310210 Broadwater PS Borehole 3	Southern Water Services Ltd	514350, 105410	Groundwater	Water supply - public water supply, potable	Screened in: groundwater abstraction ~ 7.8km to the south east of the PEIR Assessment Boundary section near Sullington Hill. It is in the same geology (Chalk) and lies to the south and downgradient of the onshore

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						temporary construction corridor, which overlaps with parts of the abstraction's SPZ3.
A39	10/41/310210 Broadwater PS Well	Southern Water Services Ltd	514350, 105410	Groundwater	Water supply - public water supply, potable	Screened in. groundwater abstraction ~ 7.8km to the south east of the PEIR Assessment Boundary section near Sullington Hill. It is in the same geology (Chalk) and lies to the south and downgradient of the onshore temporary construction corridor, which overlaps with parts of the abstraction's SPZ3.
A40	10/41/310210 Northbrook PS Point 2 (Sussex)	Southern Water Services Ltd	515000, 104000	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction ~ 9.5km to the south east of the PEIR Assessment Boundary section near Sullington Hill. It is in different, less permeable geology (Lambeth Group comprising clay, silt sand and gravel) and therefore there is limited potential for connection.
A41	10/41/310210 Northbrook PS Point 1 (Sussex)	Southern Water Services Ltd	515000, 104000	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction ~ 9.3km to the south east of the PEIR Assessment Boundary section near Sullington

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						Hill. It is in different, less permeable geology (Lambeth Group comprising clay, silt sand and gravel) and therefore there is limited potential for connection.
A42	25/084 Point A, Sandgate Pit, Storrington	Cemex UK Materials Ltd	510200, 114300	Groundwater	Industrial, commercial and public services - mineral washing	Screened in: groundwater abstraction ~ 530m to the north west of the PEIR Assessment Boundary access point and overlying the same geology (Lower Greensand comprising mudstone and sandstone).
A43	25/084 Point B, Sandgate Pit, Storrington	Cemex UK Materials Ltd	510580, 114120	Groundwater	Industrial, commercial and public services - mineral washing	Screened in: groundwater abstraction ~ 340m to the north east of the PEIR Assessment Boundary access point and overlying the same geology (Lower Greensand comprising mudstone and sandstone).
A44	23/073 Washington Garden Centre	D J Squire & Company Ltd	512250, 114240	Groundwater	Agriculture - spray irrigation - direct	Screened in: groundwater abstraction ~ 215m to the north west and downgradient of the PEIR Assessment Boundary in the same geology (Lower Greensand comprising mudstone and sandstone).

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A45	23/059 Point A at Alders Fish Farm	Thomas	516960, 112740	Surface water	Agriculture - fish farm/cress pond throughflow	Screened in: surface water abstraction ~3.4km downstream to the north east of Honeybridge Stream tributaries which are crossed by the onshore temporary construction corridor near Buncton and Washington, West Sussex in several places.
A46	10/41/312103 Wappingthorn Farm, Steyning Borehole A	Y de Boer & Partners	516520, 113560	Groundwater	Agriculture - general farming and domestic	Screened in: groundwater abstraction situated ~ 920km to the south east of the PEIR Assessment Boundary and in the same geology (Lower Greensand comprising mudstone and sandstone).
A47	10/41/312010 Huddlestone Farm, Steyning	Huddleston e Farmers Ltd	517962, 113387	Groundwater	Agriculture - general farming and domestic	Screened in: groundwater abstraction situated ~ 1.5km to the south west of the PEIR Assessment Boundary and within same type of geology (Lower Greensand comprising mudstone and sandstone).
A48	10/41/312010 Huddlestone Farm, Steyning	Huddleston e Farmers Ltd	517962, 113387	Groundwater	Water supply - drinking, cooking, sanitary, washing,	Screened in: groundwater abstraction situated ~ 1.5km to the south of the PEIR Assessment Boundary and within same type of geology (Lower Greensand

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
					Small Garden - household	comprising mudstone and sandstone).
A49	23/059 Point A at Alders Fish Farm	Thomas	516960, 112740	Surface water	Agriculture - fish farm/cress pond throughflow	Screened out: surface water abstraction situated 1.7km to the south east of the PEIR Assessment Boundary and within a different surface water catchment, and therefore is considered to be hydrologically disconnected.
A50	23/068 Point A at Alderwood Pond, Horsham Road, Steyning	Alderwood Pond	517050, 112900	Surface water	Agriculture - fish farm/cress pond throughflow	Screened out: surface water abstraction situated 1.7km to the south east of the PEIR Assessment Boundary and within a different surface water catchment, and therefore is considered to be hydrologically disconnected.
A51	10/41/311008 Steyning PS Well (with Boreholes)	Southern Water Services Ltd	520550, 110220	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction situated ~ 5.6km to the south east of the nearest section of the onshore temporary construction corridor near Ashurst. There is different bedrock geology beneath the PEIR Assessment Boundary (of

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						the Wealden Group comprising mudstone, siltstone and sandstone) compared to that at the abstraction (Grey Chalk), and therefore they are hydrogeologically disconnected. The supply has a separate groundwater catchment on the western slopes of Truleigh Hill, as indicated by its SPZ.
A52	10/41/311008 Steyning PS Well 1	Southern Water Services Ltd	520550, 110220	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction situated ~ 5.6km to the south east of the nearest section of the onshore temporary construction corridor near Ashurst. There is different bedrock geology beneath the PEIR Assessment Boundary (of the Wealden Group comprising mudstone, siltstone and sandstone) compared to that at the abstraction (Grey Chalk), and therefore they are hydrogeologically disconnected. The supply has a separate groundwater catchment on the western slopes of Truleigh Hill, as indicated by its SPZ.
A53	10/41/311008 Steyning PS Well 2	Southern Water	520550, 110220	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction situated ~ 5.6km to the

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
		Services Ltd				south east of the nearest section of the onshore temporary construction corridor near Ashurst. There is different bedrock geology beneath the PEIR Assessment Boundary (of the Wealden Group comprising mudstone, siltstone and sandstone) compared to that at the abstraction (Grey Chalk), and therefore they are hydrogeologically disconnected. The supply has a separate groundwater catchment on the western slopes of Truleigh Hill, as indicated by its SPZ.
A54	10/41/311002 Shoreham Cement Works Point 2	Dudman Aggregates Ltd	520109, 108681	Groundwater	Industrial, commercial and public services - effluent/slurry dilution	Screened out: groundwater abstraction situated 6.7km to the south east and within differing geology from the PEIR Assessment Boundary near Ashurst. Much of the strata to the north is less permeable than the Chalk, resulting in a hydrogeological disconnection between the PEIR Assessment Boundary and this abstraction.
A55	10/41/311002 Shoreham Cement Works Point 1	Dudman Aggregates Ltd	519903, 108579	Groundwater	Industrial, commercial and public services - effluent/slurry dilution	Screened out: groundwater abstraction situated 6.7km to the south east and within differing

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						geology from the PEIR Assessment Boundary near Ashurst. Much of the strata to the north is less permeable than the Chalk, resulting in a hydrogeological disconnection between the PEIR Assessment Boundary and this abstraction.
A56	10/41/311006 Church Farm Coombes	Passmore Coombes	519090, 108260	Groundwater	Agriculture - general farming and domestic	Screened out: groundwater abstraction situated 6.3km to the south east and within differing geology from the PEIR Assessment Boundary near Buncton. Much of the strata to the north is less permeable than the Chalk, resulting in a hydrogeological disconnection between the PEIR Assessment Boundary and this abstraction.
A57	10/41/311004 Applesham Farm	W D Passmore & Sons	519340, 106880	Groundwater	Agriculture - general farming and domestic	Screened out: groundwater abstraction situated 7.7km to the south east and within differing geology from the PEIR Assessment Boundary near Buncton. Much of the strata to the north is less permeable than the Chalk, resulting in a hydrogeological disconnection between the PEIR Assessment Boundary and this abstraction.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A58	10/41/260103 Mossy Bottom PS Borehole 1	Southern Water Services Ltd	522040, 107750	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction situated ~ 8.5km to the south east of the nearest section of the onshore temporary construction corridor near Ashurst. There is different bedrock geology beneath the PEIR Assessment Boundary (of the Wealden Group comprising mudstone, siltstone and sandstone) compared to that at the abstraction (Grey Chalk), and therefore they are hydrogeologically disconnected. The supply has a separate groundwater catchment on the western slopes of Thundersbarrow Hill as indicated by its SPZ.
A59	10/41/260103 Shoreham PS Borehole 1	Southern Water Services Ltd	521090, 106870	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction situated ~ 8.7km to the south east of the nearest section of the onshore temporary construction corridor near Ashurst. There is different bedrock geology beneath the PEIR Assessment Boundary (of the Wealden Group comprising mudstone, siltstone and sandstone) compared to that at the abstraction (Grey Chalk), and therefore they are hydrogeologically disconnected.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						The supply has a separate groundwater catchment on the western slopes of Slonk Hill and Thundersbarrow Hill as indicated by its SPZ.
A60	10/41/260103 Shoreham PS Borehole 2	Southern Water Services Ltd	521090, 106870	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction situated ~ 8.7km to the south east of the nearest section of the onshore temporary construction corridor near Ashurst. There is different bedrock geology beneath the PEIR Assessment Boundary (of the Wealden Group comprising mudstone, siltstone and sandstone) compared to that at the abstraction (Grey Chalk), and therefore they are hydrogeologically disconnected. The supply has a separate groundwater catchment on the western slopes of Slock Hill and Thundersbarrow Hill as indicated by its SPZ.
A61	10/41/260103 Shoreham PS Springs	Southern Water Services Ltd	521090, 106870	Groundwater	Water supply - public water supply, potable	Screened out: groundwater abstraction situated approximately 8.7km to the south east of the nearest section of the onshore construction corridor near Ashurst.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						There is different bedrock geology beneath the PEIR Assessment Boundary (of the Wealden Group comprising mudstone, siltstone and sandstone) compared to that at the abstraction (Grey Chalk), and therefore they are hydrogeologically disconnected. The supply has a separate groundwater catchment on the western slopes of Slonk Hill and Thundersbarrow Hill as indicated by its SPZ.
A62	SO/041/0022/016 Relief Channel at River Adur Estuary, New Monks Farm	J.T.Mackley & Co. Ltd	520415, 105950	Surface water	Agriculture - dewatering	Screened out: surface water abstraction from the tidal Arun situated ~ 9.1km and indirectly downstream of where an unnamed tributary headwater intersects the PEIR Assessment Boundary near Ashurst. It is highly unlikely that there is any potential for hydrological connection given the distance and dilution along the tidal stretch of the Arun between the PEIR Assessment Boundary and the abstraction.
A63	SO/041/0022/019 Pump Station	J.T.Mackley & Co. Ltd	520508, 105801	Groundwater	Agriculture - dewatering	Screened out: groundwater abstraction situated 9.2km to the

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
	Cofferdam Area at New Monks Farm					south east and within differing geology from the PEIR Assessment Boundary near Buncton. Much of the strata to the north is less permeable than the Chalk, resulting in a hydrogeological disconnection between the PEIR Assessment Boundary and this abstraction.
A64	SO/041/0022/015 Underground strata at Free Wharf Shoreham-By-Sea	Wates Construction Ltd	522110, 105129	Groundwater	Industrial, commercial and public services - transfer between sources (post Water Act 2003)	Screened out: groundwater abstraction situated 10.8km to the south east and within differing geology from the PEIR Assessment Boundary near Ashurst. Much of the strata to the north is less permeable than the Chalk, resulting in a hydrogeological disconnection between the PEIR Assessment Boundary and this abstraction.
A65	10/41/321102 Mill Field, The Common, Henfield	White Esq	521900, 115480	Groundwater	Agriculture - spray irrigation - direct	Screened out: groundwater abstraction situated ~ 2.59km to the south east of the PEIR Assessment Boundary near Ashurst. The supply is within the same geology (Lower Greensand group comprising sandstone and mudstone) as the PEIR Assessment Boundary. However, the supply is positioned

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
						upgradient of the onshore temporary construction corridor, on the opposite side of the Tidal Arun within a different surface water catchment (Chess Stream). Hence there is no potential for a hydrogeological connection.
A66	10/41/321101 Tributary of Chess Stream at Swains Farm, Woodmancote	Hills Esq	522420, 115630	Surface water	Agriculture - spray irrigation - direct	Screened out: surface water abstraction from a tributary of the Chess Stream which is in a different surface water catchment and approximately 3.5km upstream of the PEIR Assessment Boundary, such that it is hydrologically disconnected.
A67	10/41/322202 Herrings Stream at Hickstead Place	Hickstead Ltd	526530, 119720	Surface water	Agriculture - spray irrigation - direct	Screened out: surface water abstraction from tributary of the Herrings Stream which is in a different surface water catchment and approximately 2.1km upstream of the PEIR Assessment Boundary, such that it is hydrologically disconnected.
A68	10/41/323103 Tributary of Adur	Hutchings	525350, 122990	Surface water	Agriculture - spray irrigation - direct	Screened out: surface water abstraction from a tributary of the Bolney Sewer 1.5km to the north

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
	East at Bookers Farm					east and upgradient of the PEIR Assessment Boundary (Wineham Lane North), such that it is hydrologically disconnected.
A69	10/41/323101 Tributary of Cowfold Stream (B)	Lee	524740, 124230	Surface water	Agriculture - spray irrigation - direct	Screened out: surface water abstraction from tributary of the Bolney Sewer, 1.9km to the north east and upgradient of the PEIR Assessment Boundary (Bolney Road/ Kent Street), such that it is hydrologically disconnected.
A70	22/042 Shoreham Power Station	Drax Generation Enterprise Ltd	524160, 104780	Tidal	Industrial, commercial and public services - non-evaporative cooling	Screened out: surface water abstraction from tributary of the Bolney Sewer, 1.9km to the north east and upgradient of the PEIR Assessment Boundary (Bolney Road/ Kent Street), such that it is hydrologically disconnected.
A71	10/41/323101 Tributary of Cowfold Stream (C)	Lee	524520, 124130	Surface water	Agriculture - spray irrigation - direct	Screened out: surface water abstraction from tributary of the Bolney Sewer, 1.8km to the north east and upgradient of the PEIR Assessment Boundary (Bolney Road/ Kent Street), such that it is hydrologically disconnected.

ID	Licence no. and name	Operator	NGR	Source	Use	Potential connection to the PEIR Assessment Boundary
A72	10/41/323101 Tributary of Cowfold Stream (A)	Lee	524350, 124310	Surface water	Agriculture - spray irrigation - direct	Screened out: surface water abstraction from tributary of the Bolney Sewer, 1.8km to the north east and upgradient of the PEIR Assessment Boundary (Bolney Road/ Kent Street), such that it is hydrologically disconnected.

Consented discharges

2.2.6 The EA has provided information on consented discharges. Within the PEIR Assessment Boundary eight consented discharges have been identified as shown in **Table 2-5** and **Volume 3, Figure 27.6** presented within **Chapter 27**. Each of these consented discharges are situated within the within the PEIR Assessment Boundary, are considered as having a potential connection to the Proposed Development, and therefore have been taken screened in for further assessment within **Chapter 27**.

Table 2-5 Consented discharges within the PEIR Assessment Boundary

ID	Permit no. and site name	Operator	Discharge outlet NGR	Receiving environment	Discharge category	Location along the PEIR Assessment Boundary
D1	P03693 St. Mary at Clymping C of E School, Brookpit Lane, Clymping, West Sussex	Reverend D Farrant	500460, 101750	Freshwater river	Education/nursery/school/college/university/training venue Sewage discharge – final/treated effluent – not water company	At southern end of the route near the landfall adjacent to two access points for construction traffic. The nearest freshwater river is the Ryebank Rife (410m to the south east of D1) near the landfall access route.
D2	P07396 St. Mary at Clymping C of E School, Crookthorn Lane, Clymping, Littlehampton	Chairman of the Governors	500440, 101720	Freshwater river	Education/nursery/school/college/university/training venue Sewage discharge – final/treated effluent – not water company	At southern end of the route near the landfall adjacent to two access points for construction traffic. The nearest freshwater river is the Ryebank Rife (420m to the south east of D2) near the landfall access route.
D3	P06977 H M Prison, Ford, Arundel, West Sussex	H M Prison	501250, 103200	Estuary/ tidal river	Wastewater Treatment Works (WwTW) (not water company) (not Sewage Treatment Plant (STP) at a private premises)	At southern end of the route where the onshore temporary construction corridor crosses the tidal section of the River

ID	Permit no. and site name	Operator	Discharge outlet NGR	Receiving environment	Discharge category	Location along the PEIR Assessment Boundary
					Sewage discharge – final/treated effluent – not water company	Arun to the north east of Climping.
D4	P01142 Furzetor, Clay Lane, Warningcamp , West Sussex	Dr P K D Bush	503800, 106500	Into land	Domestic property (single) (including farm house) Sewage discharge – final/treated effluent – not water company	Into land (groundwater infiltration system) along the southern end of the onshore temporary construction corridor on the eastern edge of Warningcamp C corridor option.
D5	S01785 Turkey breeding unit, Rock Cross Road's Pulborough, West Sussex	The Occupier	512550, 114030	Freshwater river	Undefined or other miscellaneous discharges – surface water	Drains to an unnamed tributary of the Honey bridge Stream within the central section of the PEIR Assessment Boundary associated with a potential access point for a compound north of Washington, West Sussex.
D6	D01392 Gratwicke Farm, Partridge Green,	R W H Reid	521140, 120670	Freshwater river	Undefined or other sewage discharge – final/treated effluent – not water company	Within the north-east of the PEIR Assessment Boundary along a construction access point for Bolney Road/ Kent Street Route 1A and 1B.

ID	Permit no. and site name	Operator	Discharge outlet NGR	Receiving environment	Discharge category	Location along the PEIR Assessment Boundary
	Horsham, West Sussex					Drains to a tributary ditch of the Cowfold Stream.
D7	P11968 Bolney sub-station, Bob Lane, Henfield, West Sussex	The National Grid Co. PLC	523880, 120800	Freshwater river	Sub-station/electricity/gas/air conditioning supply Trade discharges – site drainage	Within the north-east of the PEIR Assessment Boundary along the onshore temporary construction corridor for Wineham Lane South Route 1A and 1B. Discharge to a tributary ditch of the River Adur East (Sakeham).
D8	S01525 Bolney substation, Wineham Lane, Twineham, West Sussex. Operated by National Grid PLC	The National Grid Trans Co. PLC	524290, 121100	Freshwater river	Water collection/treatment/supply Miscellaneous discharges – surface water	Within the north-east of the PEIR Assessment Boundary along the onshore temporary construction corridor for Wineham Lane South Route 1A and 1B. Discharge to a tributary ditch of the River Adur East (Sakeham).

3. Glossary of terms and abbreviations

Table 3-1 Glossary of terms and abbreviations

Term (acronym)	Definition
ADC	Arun District Council
AWDC	Adur and Worthing District Council
EA	Environment Agency
ES	Environmental Statement
HDC	Horsham District Council
HMWB	Heavily Modified Water Body
LGS	Local Geological Sites
LNR	Local Nature Reserve
LWS	Local Wildlife Site
PEIR	Preliminary Environmental Information Report
PS	Pumping station
PWS	private water supplies
SPZ	source protection zones
SSSI	Site of Special Scientific Interest
STP	Sewage Treatment Plant
WFD	Water Framework Directive
WSDC	West Sussex District Council

Term (acronym)	Definition
WwTW	Wastewater Treatment Works

4. References

Environment Agency, (2016). River Basin Management Plan, South East River Basin District, February 2016. Last updated June 2018. [online] Available at: South_East_RBD_Part_1_river_basin_management_plan.pdf (publishing.service.gov.uk) [Accessed 27 May 2021]

Environment Agency, (2020). Catchment Data Explorer [on-line] Available at: https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/7 [Accessed: 27 May 2021]

MAGIC Map. [online] Available at http://magic.defra.gov.uk/MagicMap.aspx [Accessed 27 May 2021]

Natural England, (2018). Designated Sites [online] Available at: https://designatedsites.naturalengland.org.uk/ [Accessed 27 May 2021]

wood.

4.27.2

Rampion 2 WIND FARM

Volume 4, Appendix 27.2

Flood Risk Screening Assessment

GoBe wood.

Contents

1.	**Introduction**	**6**
1.1	Context	6
1.2	Scope	7
1.3	Sources of information and consultation	8
1.4	Flood event probability and Flood Zone definitions	9
1.5	Structure of this FRSA	10
2.	**Planning context and requirements**	**12**
2.1	Introduction	12
2.2	National policies	12
	National Policy Statement (NPS) for Energy (EN-1)	12
	The Sequential Test	17
	The Exception Test	17
	National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3)	18
	National Policy Statement (NPS) for Electricity Networks Infrastructure (EN-5)	19
	National Planning Policy Framework	19
2.3	Regional policies and guidance	19
	Environment Agency	19
	Arun Internal Drainage Board	19
	Lead Local Flood Authority	20
	Culvert Policy	21
2.4	Local policies and guidance	22
3.	**Site characteristics**	**24**
3.1	Study area and location	24
3.2	Land use	24
3.3	Topography	24
3.4	Hydrological setting	24
	River Arun catchment	25
	River Adur catchment	26
3.5	Flood defence assets	27
	Coastal defences at Climping	27
	River defences	28
3.6	Geology	28
	Overview of geology	28
	Detailed geological description	29
3.7	Hydrogeology	29
4.	**Description of the onshore elements of the Proposed Development**	**32**

4.1 Overview 32

4.2 Programme of development and lifetime 32

4.3 Description of the permanent onshore infrastructure 33
Onshore cable corridor 33
Onshore cable design 33
Onshore substation 34

4.4 Construction phase 35
Landfall 35
Onshore substation installation 35
Onshore cable construction 36
Permanent onshore cable crossings 36
Temporary construction access and haul road 37
Temporary construction compounds 38
Land drainage 39

4.5 Operation and maintenance phase 39

4.6 Decommissioning phase 39

4.7 Vulnerability classification 40

5. Flood sources 44

5.1 Screening of potential sources of flooding 44

5.2 Tidal and fluvial sources 45
Overview 45
Tidal sources 50
Fluvial sources 51
Model results summary 54

5.3 Surface water 57
Run-on 59
Run-off 60

5.4 Sewer flooding 60

5.5 Groundwater 61

5.6 Artificial sources 62

5.7 Climate change 63
Fluvial climate change allowances 63
Tidal climate change allowances 68
Pluvial sources 71
Groundwater sources 71

6. Assessment of flood risk 72

6.1 Introduction 72

6.2 Receptors scoped out 72

6.3 Receptors scoped in 72

6.4 Risks during the construction phase 74
Combined tidal and fluvial flood risk 74
Surface water flood risk 77

	Groundwater flood risk	79
	Artificial flood risk	80
6.5	Risks during the operation and maintenance phase	80
6.6	Risks during the decommissioning phase	82
7.	**Flood risk management**	**83**
7.1	Delivery of embedded environmental measures	83
7.2	Emergency response plan for flood events	95
7.3	Construction phase	96
7.4	Operation and maintenance phase	97
7.5	Maintenance works	98
7.6	Decommissioning phase	98
7.7	Residual risk	98
8.	**Planning requirements**	**100**
8.1	Sequential Test	100
	The need for development at this location	100
	Onshore cable corridor and onshore substation selection process	100
8.2	Sequential approach	101
	Route options included in the PEIR	101
	Onshore substation options	102
8.3	Application of the Exception Test	102
	Wider sustainability benefits	102
	Flood risk	103
8.4	Functional floodplain	103
9.	**Summary and conclusions**	**104**
9.1	Summary	104
9.2	Conclusions	106
10.	**Glossary of terms and abbreviations**	**107**
11.	**References**	**110**

Tables

Table 1-1	Sources of data	8
Table 1-2	Annual probability and Flood Zone definitions	10
Table 2-1	NPS EN-1 minimum FRA requirements	13
Table 2-2	NPS EN-1 flood risk specific requirements	14
Table 2-3	Relevant West Sussex County Council (LLFA) flood and drainage documents	20

Table 2-4	Relevant flood and drainage policies within local authorities Local Plan documents.	23
Table 3-1	Aquifer designations	30
Table 4-1	Flood risk vulnerability and flood zone compatibility (Table 3 of the Planning Practice Guidance)	40
Table 4-2	Application of the flood risk vulnerability and flood zone compatibility matrix to the Proposed Development	41
Table 5-1	Initial screening of potential sources of flood risk	44
Table 5-2	The PEIR Assessment Boundary interaction with Environment Agency flood zones	45
Table 5-3	Environment Agency flood models	46
Table 5-4	Model data summary	47
Table 5-5	Extreme sea level values at Littlehampton Estuary	50
Table 5-6	Model results summary	54
Table 5-7	Project interaction with RoFSW Zones	57
Table 5-8	Onshore substation search area percentage overlap with RoFSW Zones	58
Table 5-9	Peak river flow climate change allowances for the south east river basin district	64
Table 5-10	Available climate change model outputs and current NPPF guidance	66
Table 5-11	Sea level climate change allowances for the south east river basin district (mm per year)	68
Table 5-12	Extreme peak sea level values at Littlehampton Estuary, including climate change	69
Table 6-1	Potential sources of flood risk to the Proposed Development	72
Table 7-1	Proposed flood risk management measures	83
Table 7-2	Summary of selected key flood risk management measures to address specific mechanisms during the construction phase	96

Annex A Meeting Minutes
Annex B Figures:

Figure 27.2.1a-e	Water Environment
Figure 27.2.2	Flood map for planning overview
Figure 27.2.3	Tidal flood risk: Littlehampton
Figure 27.2.4	Fluvial flood extents: Littlehampton
Figure 27.2.5a-e	Risk of flooding from surface water extents: Overview
Figure 27.2.6a-b	Risk of flooding from surface water extents: Onshore substation search areas
Figure 27.2.7	Fluvial and tidal flood risk receptors
Figure 27.2.8a-b	Surface water flood risk receptors

1. Introduction

1.1 Context

1.1.1 This Flood Risk Screening Assessment (FRSA) accompanies **Chapter 27: Water environment, Volume 2** of the Preliminary Environmental Information Report (PEIR). The PEIR is the written output of the Environmental Impact Assessment (EIA) undertaken to date for Rampion 2 Offshore Wind Farm (Rampion 2) located adjacent to the existing Rampion Offshore Wind Farm in the English Channel in the south of England.

1.1.2 Rampion 2 (the 'Proposed Development') comprises of both onshore and offshore infrastructure associated with the proposed offshore wind farm including:

- offshore wind turbine generators (WTGs) and associated foundations with an installed capacity of above 100MW but not exceeding the number of WTGs installed at Rampion 1;
- inter-array cables connecting the WTGs to up to three offshore substations;
- up to four offshore export cables will be buried under the seabed within the final cable corridor;
- a single landfall site connecting offshore and onshore cables using Horizontal Directional Drill (HDD) installation techniques;
- buried onshore cables in a single corridor approximately 36km in length using HDD, and trenching and backfilling installation techniques; and
- a new onshore substation that will connect to the existing National Grid substation at Bolney, Mid Sussex.

1.1.3 The FRSA should also be read in conjunction with the full description of the Proposed Development provided in **Chapter 4: The Proposed Development, Volume 2**. The FRSA considers potential sources of flood risk on the onshore elements of the Proposed Development from tidal, fluvial, surface water, groundwater, sewers and artificial sources. It also considers any potential impacts on flood risk exerted by the onshore elements of the Proposed Development towards other receptors. Throughout the FRSA considers the influence of climate change pressures.

1.1.4 Rampion 2 is a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008 (the 'Act'). Under Section 31 of the Act, development consent is required for development to the extent that it is or forms part of an NSIP. Development consent is granted by the making of a Development Consent Order (DCO) for which an application may be made under Section 37 of the Act to the Secretary of State (delegated to the Planning Inspectorate (PINS)). The FRSA accompanies the Section 42 formal pre-application consultation, ahead of the DCO application itself.

1.1.5 This FRSA provides an overview of the potential flood risks to the onshore elements of the Proposed Development and its potential impact elsewhere. This assessment will be further revised and developed in line with emerging design

information and feedback from Section 42 consultation to form a full Flood Risk Assessment (FRA) to accompany the subsequent Environmental Statement (ES) which will accompany the DCO application submission.

1.1.6 This FRSA has been prepared in accordance with the National Policy Statement (NPS) EN-1 of Energy and Climate Change, (Department of Energy and Climate Change (DECC), 2011a), and NPS EN-3 (DECC, 2011b) and NPS EN-5 (DECC, 2011c) which cover renewable energy infrastructure and electricity transmission and distribution, respectively. Reference has also been made to the *National Planning Policy Framework (NPPF)* (Ministry of Housing, Communities & Local Government, 2019a) and associated *Planning Practice Guidance* (Ministry of Housing, Communities & Local Government, 2019b) where relevant for additional guidance regarding flood risk and development, as appropriate. Consultation and engagement with key stakeholders, including the Environment Agency, and West Sussex County Council (the Lead Local Flood Authority) has also informed the development of this assessment.

1.2 Scope

1.2.1 This FRSA accompanies the PEIR, and as such does not provide the final flood risk assessment as will be necessary to accompany the Environmental Statement (ES) for the DCO Application submission. This FRSA seeks to present preliminary flood risk information, namely the flood risk baseline, the relevant onshore elements of the Proposed Development, and the potential environmental measures that could be embedded within the final design (and / or enacted / implemented during the construction phase) to facilitate comment from stakeholders on the emerging design and therefore influence the FRA that will accompany the DCO Application.

1.2.2 This FRSA considers the flood risks associated with the construction, operation and maintenance and decommissioning phases of the onshore elements of the Proposed Development (landward of Mean High Water Springs (MHWS)). Both flood risks 'to' and flood risks 'from' the onshore elements of the Proposed Development are considered. The FRSA covers the 'onshore part of the PEIR Assessment Boundary' (indicated as a red line boundary in the various Figures associated with this FRSA), which is the anticipated maximum extent of land in which the onshore elements of the Proposed Development, including construction works, will take place. The onshore part of the PEIR Assessment Boundary is also illustrated in **Figure 1.1, Volume 3**. For ease of reference throughout this FRSA, the onshore part of the PEIR Assessment boundary will be referred to as the 'PEIR Assessment Boundary' and the onshore part of the Proposed Development will be referred to as the 'Proposed Development'.

1.2.3 This FRSA follows a source-pathway-receptor led approach to the assessment of flood risk. Sources are defined as the source of the flood risk, such as direct rainfall, watercourses, the sea, groundwater, sewers or artificial sources. Pathways define the means by which the source of flood risk can impact receptors. Examples of pathways include the floodplain of the River Arun and overtopping or breaching of defences. A specific combination of sources and pathways is referred to as a flood mechanism, such as tidal overtopping of the sea

defences as a result of high tides and storm surge. Receptors comprise those persons or assets that could be vulnerable to the flood mechanisms identified.

1.2.4 With due consideration of the temporary nature of many of the onshore elements of the Proposed Development, which is only required during construction of the onshore cable corridor, the approach taken in this assessment is considered to be proportionate to the risk and appropriate to the scale, nature and location of the onshore elements of the Proposed Development.

1.3 Sources of information and consultation

1.3.1 Consultation and engagement with key stakeholders regarding the scope of this FRSA and acquisition of data to support these studies has included the following activities:

- a first Expert Topic Group (ETG) meeting as part of the Evidence Plan Process (EPP) including the Environment Agency, West Sussex County Council and various key stakeholders on 28 October 2020 to discuss the EPP and roadmap for future ETG meetings;
- a meeting with the Environment Agency on 09 November 2020 to discuss general flood risk matters, Climping sea flood defences, and the Internal Drainage Board. Minutes of this meeting are included in **Annex A**;
- email communications with the Environment Agency regarding flood model data (15 July 2020 and 02 December 2020);
- email communications with Southern Water regarding historic flood incidents and sewer flooding (03 September 2020 and 29 October 2020); and
- a second ETG meeting with various key stakeholders (including Environment Agency and West Sussex County Council) on 23 March 2021 to provide a project update and set expectations for content of FRSA for PEIR.

1.3.2 Sources of wider data and information consulted as part of this FRSA are detailed within **Table 1-1** below.

Table 1-1 Sources of data

Data	Source	Purpose
Environment Agency Statutory Main River Map	https://data.gov.uk/ accessed 14 May 2021	Definition of watercourses, in relation to the development
Flood Map for Planning	https://flood-map-for-planning.service.gov.uk/ accessed 14 May 2021	For assessment of fluvial and tidal flood risk

Data	Source	Purpose
Risk of Flooding from Surface Water (RoFSW) Mapping	https://flood-warning-information.service.gov.uk/long-term-flood-risk/map accessed 14 May 2021	For assessment of surface water flood risk
Flood Risk from Reservoirs Mapping	https://flood-warning-information.service.gov.uk/long-term-flood-risk/map accessed 14 May 2021	For assessing reservoir flood risk
Geological Mapping	British Geological Survey (BGS) Geology of Britain Viewer: https://mapapps.bgs.ac.uk/geologyofbritain/home.html BGS Onshore GeoIndex: http://mapapps2.bgs.ac.uk/geoindex/home.html BGS Hydrogeological mapping: 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 accessed 14 May 2021	To characterise the underlying geology and hydrogeology
Aquifer Designations	http://www.magic.gov.uk/ accessed 14 May 2021	To characterise the underlying aquifers and hydrogeology
Soils Mapping	http://www.landis.org.uk/soilscapes/ accessed 14 May 2021	To characterise the underling soil type
Environment Agency flood model data	Environment Agency supplied data on 14 May 2021 (see **Table 5-4** for more details)	For assessment of fluvial and tidal flood risks

1.4 Flood event probability and Flood Zone definitions

1.4.1 Throughout this report, 'Annual Exceedance Probability' (AEP) terminology is used to describe the magnitude and likelihood of a flood event. AEP expresses the probability of a flood occurring in a given year. For example, what is commonly referred to as a '1 in 50 year flood event', is a flood with a 1 in 50 or 2% probability of occurring in any given year.

1.4.2 Use of the AEP terminology makes it clearer that there is a probability of this magnitude of flooding occurring in any one year, not just once every 50 years. The relationship between AEP and Flood Zones are provided in **Table 1-2** below, together with the definitions for the Flood Zones, as specified in the NPPF. In addition, the 3.33% AEP event is included, owing to its common use in drainage design.

Table 1-2 Annual probability and Flood Zone definitions

Flood Zone	Flood Zone Definition	AEP	Annual probability
Flood Zone 1: Low probability	Land having less than a 1 in 1,000 annual probability of river or sea flooding.	<0.1%	<1 in 1000
Flood Zone 2: Medium probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.	0.1%	1 in 1,000
Flood Zone: 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.	1% (fluvial) 0.5% (tidal)	1 in 100 (fluvial) 1 in 200 (tidal)
Flood Zone: 3b Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency.	5%*	1 in 20*
N/A	A commonly used design standard for sewer design, as specified in Sewers for Adoption (WRc, 2012).	3.33%	1 in 30
N/A	Q_{BAR}, a commonly used design standard for drainage design.	2.33%	1 in 2

* The 5% AEP (or 1 in 20 annual probability) event is often used to help define Flood Zone 3b, the 'functional floodplain', but is not part of the definition.

1.5 Structure of this FRSA

1.5.1 The remainder of this FRSA is structured as follows:

- **Section 2** establishes the planning policy context for the assessment;
- **Section 3** provides an overview of the development site location and characteristics;

- **Section 4** provides a description of the onshore elements of the Proposed Development;
- **Section 5** comprises a screening assessment to consider the potential risk from all sources of flooding prevailing across the PEIR Assessment Boundary and the surrounding area and identifies those that may require detailed assessment;
- **Section 6** presents an initial assessment of flood risks associated with the Proposed Development. This includes the identification of potential flood risk receptors and consideration of risks to these receptors associated with all the potentially significant hazards identified in **Section 5**;
- **Section 7** specifies potential flood risk management measures that could be available to address the potential risks identified in Section 6 and considers residual risk. Note, the potential flood risk management measures have been embedded into the design of the Proposed Development and will be secured as part of the PEIR commitments (**Appendix 4.1: Commitments register, Volume 4**);
- **Section 8** sets out how the specific planning requirements have been / will be addressed in the final FRA, including the Sequential and Exception Tests;
- **Section 9** presents summary and concluding comments;
- **Section 10** provides a glossary of terms and abbreviations; and
- **Section 11** outlines references.

2. Planning context and requirements

2.1 Introduction

2.1.1 The purpose of this section is to identify the key policy documents that define the scope of this FRSA. This section concludes by summarising the flood risk requirements applicable to this FRSA. The section is structured in a hierarchical order, from national policy down to local guidance.

2.2 National policies

National Policy Statement (NPS) for Energy (EN-1)

2.2.1 The National Policy Statements (NPSs) set out Government planning policy for NSIPs in England and Wales. The Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change, 2011a) sets out national policy for energy infrastructure and provides a framework for decision-making by the Secretary of State for Energy and Climate Change on applications for energy developments that fall within the scope of the NPSs.

2.2.2 Sections of NPS EN-1 that are relevant to this assessment and the subsequent FRA are:

- Section 4.8 which discusses climate change adaptation; and
- Section 5.7 which discusses flood risk, setting out the minimum requirements of a FRA as well as information on the application of the Sequential and Exception tests.

2.2.3 The minimum requirements for all FRAs, irrespective of the development type, as taken from Planning Policy Statement 25: Development and Flood Risk (PPS25)[1], are set out in Paragraph 5.7.5 of NPS EN-1. These are set out in **Table 2-1** below, together with the location in which they are addressed in this assessment.

[1] Planning Policy Statement 25: Development and Flood Risk (PPS25). PPS25 has since been superseded by NPPF (Ministry of Housing, Communities & Local Government, 2019a) and its associated Planning Practice Guidance (Ministry of Housing, Communities & Local Government, 2019b).

Table 2-1 NPS EN-1 minimum FRA requirements

NPS EN-1 minimum FRA requirements (Paragraph. 5.7.5)		Section of FRSA
Scope of FRA	"*Be proportionate to the risk and appropriate to the scale, nature and location of the project*".	1.2, 7.5 & 8
Assessment	"*Consider the risk of flooding arising from the project in addition to the risk of flooding to the project*".	1.2, 5 & 6
Climate change	"*Take the impacts of climate change into account, clearly stating the development lifetime over which the assessment has been made*".	4.6, 5.2, 5.7, 6.3, 6.4 & 7.4
Approach	"*Be undertaken by competent people, as early as possible in the process of preparing the proposal*".	1.3
Flood risk management infrastructure	"*Consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure*".	5 & 6
Vulnerability and safe access	"*Consider the vulnerability of those using the site, including arrangements for safe access*".	4.7 & 7.2
Assessment	"*Consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made*".	5, 6 & 7
Assessment	"*Consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes*".	5 & 6
Residual risks	"*Include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular project*".	7.5
Surface water run-off	"*Consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems*".	5.3 & 6.3
Assessment	"*Consider if there is a need to be safe and remain operational during a worst case flood event over the development's lifetime*".	6.2

NPS EN-1 minimum FRA requirements (Paragraph. 5.7.5)		Section of FRSA
Baseline	"*Be supported by appropriate data and information, including historical information on previous events*".	1.3 & 5

2.2.4 NPS EN-1 also includes a number of additional requirements that are specific to Energy Infrastructure. Those that are of potential relevance to the assessment are set out in **Table 2-2** below, together with the location of this assessment in which they are addressed, or the other DCO Application document in which they are addressed, where appropriate.

Table 2-2 NPS EN-1 flood risk specific requirements

NPS EN-1 Requirements		Section of FRSA and explanatory comments
Policy	The development proposal should be in line with any relevant national and local flood risk management strategies (Paragraph 5.7.9).	2
Flood risk	Where necessary, the development should be appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed over the lifetime of the development (Paragraph 5.7.9).	6, 7.2 & 7.6
Operation of the site	The development should be designed to remain operational when floods occur (Paragraph 5.7.24).	5 & 6
Functional floodplain	The development should not result in a net loss of functional floodplain storage or impede water flows (within Flood Zone 3b) (Paragraph 5.7.24).	5.2, 6, & 8.4
Flood warning and evacuation plan	Flood warning and evacuation plans should be in place for those areas at an identified risk of flooding. The applicant should take advice from the emergency services when producing an evacuation plan for a manned energy project as part of the FRA. Any emergency planning documents, flood warning and evacuation procedures that are required should be identified in the FRA (Paragraph 5.7.25).	7.2

NPS EN-1 Requirements		Section of FRSA and explanatory comments
Climate change	The impacts of climate change should be considered when planning the location, design, build, operation and, where appropriate, decommissioning of the development (Paragraph 4.8.5).	4.6, 5.7, 6.3, 6.5 & 7.4
Climate change	PINS should be satisfied that applicants for new energy infrastructure have taken into account the potential impacts of climate change using the latest UK Climate Projections available at the time the ES was prepared to ensure they have identified appropriate mitigation or adaptation measures (Paragraph 4.8.6).	4.6, 5.7, 6.3, 6.5, 7.4 & 7.5
Climate change	As a minimum, the applicant should consider the emissions scenario that the Independent Committee on Climate Change suggests the world is currently most closely following – and the 10%, 50% and 90% estimate ranges. These results should be considered alongside relevant research which is based on the climate change projections (Paragraph 4.8.7).	4.6, 5.7, 6.3, 6.5, 7.4 & 7.5
Climate change	Where energy infrastructure has safety critical elements, the applicant should apply the high emissions scenario (high impact, low likelihood) to those elements (Paragraph 4.8.9).	4.6, 5.7, 6.3, 6.5, 7.4 & 7.5
Climate change	The applicant should demonstrate that that there are no critical features of the development which may be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections (Paragraph 4.8.8).	6.2 & 6.5
Climate change/adaptation	Adaptations to climate change to protect against flood risk may give rise to additional impacts, such as consequential impacts on coastal change (Paragraph 4.8.4).	6.2 & 6.5
Adaptation	The potential consequential impacts of adaptation measures, including those addressing flood risk, should be considered by PINS in relation to the application as a whole (Paragraph 4.8.10).	6.2, 6.5 & 7.4

NPS EN-1 Requirements		Section of FRSA and explanatory comments
Adaptation	Appropriate mitigation or adaptation measures to cover the estimated lifetime of the development should be identified (paragraph 4.8.6). Any adaptation measures should be based on the latest set of UK Climate Projections, the Government's latest UK Climate Change Risk Assessment, when available and in consultation with the Environment Agency (Paragraph 4.8.11).	6.2, 6.5 & 7.4
Drainage and SuDS	The applicant should give priority to the use of Sustainable Drainage Systems (SuDS) and make provision for their adoption and maintenance (Paragraphs 5.7.9 and 5.7.10).	6.2 & 7.4
Drainage and SuDS	For construction work which has drainage implications, approval for the project's drainage system will form part of the DCO issued by PINS. The proposed drainage system should comply with any National Standards published by Ministers under Paragraph 5(1) of Schedule 3 to the Flood and Water Management Act 2010 (Paragraph 5.7.10).	7.1
Drainage and SuDS	Site layout and surface water drainage systems should be designed to cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without any adverse impacts (Paragraph 5.7.20).	7.1
Drainage and SuDS	The volumes and peak flow rates of surface water leaving the site should be no greater than the rates prior to the proposed project, unless specific off-site arrangements are made and result in the same net effect (Paragraph 5.7.21).	7.1
Sequential Test	The PPS25 Sequential Test and sequential approach should be applied (Paragraphs 5.7.9, 5.7.12 and 5.7.13).	8.1 & 8.2
Exception Test	The PPS25 Exception Test, where necessary, should be applied (Paragraphs 5.7.14 to 5.7.17).	8.3

2.2.5

2.2.6 In addition to the requirements listed in **Table 2-2**, NPS EN-1 also details the following points:

- exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated, PINS may grant consent if it is satisfied that the increase in present and future flood risk can be mitigated to an acceptable level and taking account of the benefits of, including the need for, nationally significant energy infrastructure;
- where adaptation measures will have adverse effects, these could be implemented should the need arise, rather than at the outset of the development; and
- if any adaptation measures give rise to consequential impacts, PINS should consider the impact of the latter in relation to the (DCO) application as a whole and the impacts guidance set out in Part 5 of the NPS.

2.2.7 NPS EN-1 states that further guidance on flood risk can be found in PPS25. PPS25 has since been superseded by NPPF and the associated Planning Practice Guidance and consequently, where further detail for assessment of the flood risk is provided in NPPF and is of relevance to this FRSA, reference has been made to NPPF.

The Sequential Test

2.2.8 The Sequential Test is set out in NPS EN-1 as follows:

> "*Preference should be given to locating projects in Flood Zone 1 in England or Zone A in Wales. If there is no reasonably available site in Flood Zone 1 or Zone A, then projects can be located in Flood Zone 2 or Zone B. If there is no reasonably available site*[2] *in Flood Zones 1 or 2 or Zones A & B, then nationally significant energy infrastructure projects can be located in Flood Zone 3 or Zone C subject to the Exception Test*."

2.2.9 NPS EN-1 and the NPPF also require that a sequential approach should be applied to the layout and design when allocating land for development and land use types within development sites.

The Exception Test

2.2.10 NPS EN-1 states that:

> "*If, following application of the sequential test, it is not possible, consistent with wider sustainability objectives, for the project to be located in zones of lower probability of flooding than Flood Zone 3 or Zone C, the Exception Test can be applied. The test provides a method of managing flood risk while still allowing necessary development to occur.*"

[2] Footnote quotation provided in NPS EN-1: "*When making the application, the applicant should justify with evidence what area of search has been used in examining whether there are reasonably available sites. This will allow PINS to consider whether the Sequential Test has been met as part of site selection.*"

2.2.11 The Planning Practice Guidance for the NPPF provides further information on the circumstances under which the Exception Test should be applied. NPPF guidance states that:

"for the Exception Test to be passed it should be demonstrated that:

- *it must be demonstrated that the project provides wider sustainability benefits to the community[3] that outweigh flood risk; and*
- *a FRA must demonstrate that the project will be safe, without increasing flood risk elsewhere subject to the exception below and, where possible, will reduce flood risk overall."*

2.2.12 The 'exception below' mentioned in the second part of the Exception Test is set out in paragraph 5.7.17 of NPS EN-1:

"Exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated, the IPC may grant consent if it is satisfied that the increase in present and future flood risk can be mitigated to an acceptable level and taking account of the benefits of, including the need for, nationally significant energy infrastructure as set out in Part 3 above. In any such case the IPC should make clear how, in reaching its decision, it has weighed up the increased flood risk against the benefits of the project, taking account of the nature and degree of the risk, the future impacts on climate change, and advice provided by the EA and other relevant bodies."

National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3)

2.2.13 NPS EN-3 covers nationally significant renewable energy infrastructure including offshore generating stations in excess of 100 megawatts (MW), which applies to Rampion 2.

2.2.14 Sections 2.6.37 to 2.3.39 state that any potential effects of the cable connecting the wind farm to the onshore substation and the connection to the transmission network should be assessed as part of EIA.

2.2.15 Section 2.6.40 states that "*A proposed offshore electricity cable connecting the wind farm with the onshore electricity infrastructure and any offshore electricity substations that may be required, may constitute associated development, depending on their scale and nature in relation to the offshore wind farm.*" The Proposed Development is an associated development to Rampion 2.

2.2.16 Section 2.6.41 states that the onshore element of the grid connection (electric lines and substations) should be determined in accordance with the Electricity Networks Infrastructure NPS, EN-5.

[3] Footnote quotation provided in NPS EN-1: "*These would include the benefits (including need), for the infrastructure set out in Part 3*."

National Policy Statement (NPS) for Electricity Networks Infrastructure (EN-5)

2.2.17 The technology specific NPS EN-5 covers the electricity transmission and distribution network. Section 2.4 of NPS EN-5 provides further clarification on climate change adaptation but provides no additional guidance with respect to the assessment of flood risk.

2.2.18 With respect to climate change adaptation, Paragraph 2.4.1 of NPS EN-5 advises that as climate change is likely to increase risks to the resilience of electricity network infrastructure, applicants should set out to what extent the proposed development is expected to be vulnerable to extreme weather, including flooding, and, as appropriate, how it would be resilient, particularly for substations that are vital for the electricity transmission and distribution network.

National Planning Policy Framework

2.2.19 The NPPF (2019) acts as guidance for local planning authorities and decision-makers, both in drawing up plans and making decisions about planning applications. This is supported by online Planning Practice Guidance.

2.2.20 Although NPPF is not directly applicable to NSIP developments, they do provide additional relevant guidance on a range of issues, including the definition of flood zones, development vulnerability classifications, compatibility of development types and flood zones, and appropriate allowances for the effects of climate change.

2.3 Regional policies and guidance

Environment Agency

2.3.1 The Proposed Development is located within the Solent and South Downs Environment Agency region. The Environment Agency is the lead statutory body with responsibility for protection of the water environment. It is also responsible for flood defence and drainage for Main Rivers (Main River is a statutory designation which is usually applied to larger watercourses) and estuarine and coastal areas. The Environment Agency has produced several regional management plans and policies for the water environment that cover the onshore cable corridor:

- Rivers Arun to Adur flood and erosion management strategy 2010 - 2020;
- Arun to Pagham flood and coastal erosion risk management strategy;
- Lower Tidal River Arun Strategy;
- Arun and Western Streams Catchment Flood Management Plan; and
- River Adur Catchment Flood Management Plan.

Arun Internal Drainage Board

2.3.2 The Arun Internal Drainage Board (IDB) is responsible for managing land drainage, water levels and flood risk within the Arun Internal Drainage District

(IDD), that covers 3,304 hectares. The Arun IDD primarily lies within the administrative boundaries of Horsham District Council and Arun District Council.

2.3.3 Consultation with the Environment Agency has identified that the Environment Agency are in fact the IDB body, though have investigated dissolving the district on the basis that it serves no purpose with respect to flood risk (see meeting minutes included in **Annex A**). Byelaws exist for the district but the Environment Agency have advised that there are no specific maintained watercourses that the byelaws apply to. Any works within 5m of any watercourse bank top within the district require consent, irrespective of whether they are maintained or not. However, consents for the IDB District are not anticipated to be complex on the basis that the IDB is not providing a flood purpose, but rather for land drainage.

Lead Local Flood Authority

2.3.4 West Sussex County Council is the Lead Local Flood Authority (LLFA) (as defined by the Flood and Water Management Act, 2010) for the Proposed Development. As the LLFA, West Sussex County Council has a duty to take the lead in the coordination of flood risk management from local sources, specifically defined as flooding from surface water, groundwater and ordinary watercourses. West Sussex County Council is responsible for regulation and enforcement on ordinary watercourses and is a statutory consultee for drainage for major new developments.

2.3.5 **Table 2-3** below summarises the relevant documents produced by West Sussex County Council as LLFA and includes any policies pertinent to the development.

Table 2-3 Relevant West Sussex County Council (LLFA) flood and drainage documents

Relevant documents	Description	Pertinent policies
Preliminary Flood Risk Assessment (2011)	This provides a high-level overview of flood risk from local sources for provision to the Environment Agency, ultimately for reporting to the European Commission. The report was published in 2011 with an addendum published in 2017.	None applicable
Local Flood Risk Management Strategy (2014)	The strategy is used as a means by which the LLFA co-ordinates Flood Risk Management on a day-to-day basis. The Strategy also sets measures to manage local flood risk (i.e. flood risk from surface water, groundwater and Ordinary Watercourses.)	None applicable

Relevant documents	Description	Pertinent policies
Policy for the Management of Surface Water (2018)	Policy statement setting out the requirements of the LLFA for drainage strategies and surface water management provisions associated with applications for development.	SuDS Policies 1-10
Culvert Policy	Policy statement explaining the agreed West Sussex County Council policy regarding the culverting of ordinary watercourses, and providing a guide to good practice and design principles.	1.0 Local Authority Policy 4.0 Culvert Design Requirements 5.0 Environmental Considerations 6.0 Consent Procedure 7.0 Planning Application and Building Control Considerations
Guidance for the design of structures	Policy statement providing guidance to the requirements of highway structures and design approval process.	Design Approval Process

Culvert Policy

2.3.6 Consent from West Sussex County Council (the LLFA) will be required for works between top of bank of Ordinary Watercourses (no byelaw distance from top of bank applies is known of) outside of the IDB district (inside, consent would be required from the Environment Agency). The West Sussex County Council Culvert Policy is therefore of particular relevance to this assessment. Selected text from this policy document is reproduced below:

"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."

2.3.7 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."

2.3.8 It is worth noting that some leniency would be expected with respect to the suitability of any culverts 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 (with full removal and restoration undertaken to restore the watercourse to its previous state upon completion of construction works). This is provided efforts are taken to meet the 17 culvert design requirements set out in the Culvert Policy.

2.3.9 The policies of most pertinence to flooding in the Culvert Policy are provided below:

- a detailed design will need to be submitted with the formal application for consent. Hydraulic calculations are required and are to include an allowance for climate change over the lifetime of the activity or development;
- culvert length should be kept as short as possible and diameter as large as possible. Depending on local circumstances, a minimum culvert diameter of 450mm is required, or as agreed with the local authority;
- the design of the culvert should consider any impact on flood flow. They must not increase flood risk to property. Consideration should also be given to the alternative flow paths in the event of a culvert becoming obstructed;
- most culverts should be set so that the inlet/outlet is at the true bed level; and
- only in exceptional circumstances where site constraints prevent a single pipe or box culvert option being practical will multiple barrel culverts be considered.

2.3.10 As well as the 17 policies, further environmental considerations are set out in the Culvert Policy, which will be taken into consideration when determining the consent.

2.4 Local policies and guidance

2.4.1 The Proposed Development passes through four local authority areas:

- Arun District Council;
- Horsham District Council;
- Mid Sussex District Council; and
- South Downs National Park Authority.

2.4.2 Each of these local authority areas have their own flood risk and drainage policies within their Local Plans, supported by Strategic Flood Risk Assessments, and perhaps supplementary planning guidance. Relevant policy and guidance are identified below.

2.4.3 Adopted Local Plans will be the main source of local planning policy relating to flood risk to be considered for the Proposed Development. These will be supplemented by the supporting evidence base, and the emerging policy included in the local development documents associated with emerging Local Plans.

2.4.4 Many of the flood risk and drainage-related policies in Local Plans are directly sourced from the NPPF, its associated Planning Practice Guidance (and predecessors), or other national guidance, or are variations thereof. In such cases, to avoid repetition of well-established standard policy and / or that covered by the NPSs, these have not been replicated below. A summary of the sources of local policies relating to flood risk and drainage are set out in **Table 2-4** below.

Table 2-4 Relevant flood and drainage policies within local authorities Local Plan documents.

Local authority	Local Plan documents	Pertinent policies
Arun District Council	Adoption Arun Local Plan 2011-2031 (July 2018) Surface Water Drainage Proposal Checklist	Policy W DM2: Flood Risk Policy W DM3: Sustainable Urban Drainage Systems
Horsham District Council	Horsham District Planning Framework (2015 - 2031) Surface Water Drainage Statement	Policy 38: Flooding
Mid Sussex District Council	Mid Sussex District Plan (2014-2031) (Adopted March 2018)	DP41: Flood Risk and Drainage DP42: Water Infrastructure and the Water Environment
South Downs National Park Authority	South Downs Local Plan 2014-2033 (Adopted July 2019)	SD49: Flood Risk Management SD50: Sustainable Drainage Systems

3. Site characteristics

3.1 Study area and location

3.1.1 The onshore cable corridor runs from the landfall location at Climping in the south west, (National Grid Reference (NGR) TQ 0106500909), to the existing National Grid substation at Bolney in the north east (NGR TQ 2423121319). The PEIR Assessment Boundary is indicated in **Figure 27.2.1a-e, Annex B** and covers an area of 7.5km^2. Chainage distances measured in km from the landfall location are indicated in **Figure 27.2.1a-e, Annex B** to aid in describing locations being referred to in this FRSA.

3.2 Land use

3.2.1 The land uses present within and adjacent to the PEIR Assessment Boundary comprise predominantly rural land in agricultural use. The UK Centre for Ecology and Hydrology (UKCEH) Land Cover Map 2015 (Rowland et al., 2017) defined the dominant land-use as arable and improved grassland. The onshore cable corridor avoids interaction with urban areas; though the onshore part of the PEIR Assessment Boundary includes minor settlements Crossbush, Washington, and Buncton, the onshore cable corridor itself will be almost entirely on rural agricultural land and / or undeveloped open space.

3.3 Topography

3.3.1 The coastal cable landfall location and southwest portion of the PEIR Assessment Boundary are situated within the low-lying lower River Arun floodplain, with elevations varying between 1-5m Above Ordnance Datum (AOD) between Climping and Broomhurst Farm, Crossbush.

3.3.2 The central portion of the PEIR Assessment Boundary spans the South Downs, with elevations along the onshore cable corridor generally increasing in a northeast direction up to a peak elevation of 200m AOD at Sullington Hill.

3.3.3 As the onshore cable corridor crosses the watershed and into the River Adur catchment, elevations fall steadily along the route to a minimum of 5m AOD on the floodplain of the western branch of the Adur. The topography across the remainder of the onshore cable corridor to the northeast varies from 8-10m AOD associated with lower lying ground on the Cowfold Stream floodplain, and up to 35m AOD on higher ground at Snakes Harbour Farm.

3.4 Hydrological setting

3.4.1 The PEIR Assessment Boundary spans two hydrological catchments; the River Arun and River Adur, as indicated in **Figures 27.2.1** and **27.2.2, Annex B**. The cable landfall and southwest portion of the PEIR Assessment Boundary adjacent to Littlehampton lie within the lower River Arun catchment, whilst the northeast extent of the PEIR Assessment Boundary are situated within the River Adur

catchment. The central portion of the PEIR Assessment Boundary traverses the catchment watershed across the South Downs. No watercourses are present over this central section of the PEIR Assessment Boundary, associated with the highly permeable chalk outcrop of the South Downs.

River Arun catchment

3.4.2 The Arun catchment covers an area of approximately 1,500km^2, and includes the Main Rivers Arun and Rother. The headwaters of the Arun rise near Horsham, in the area of St Leonard's Forest in the Weald, from which point the river flows initially west, turning south at Bucks Green towards the river mouth at Littlehampton.

3.4.3 The River Arun is subject to a major tidal flow with a range of 16m, and is tidal for approximately 20km inland, up to the tidal limit at Pallingham Lock. There are two flow gauges within the Arun catchment, situated on the Arun at Pallingham, and Rother at Hardham.

3.4.4 The cable landfall and PEIR Assessment Boundary intersect and cross the Ryebank Rife sub-catchment of the lower Arun (See **Figure 27.2.1a-e, Annex B**, chainage 0.9km). The Ryebank Rife is an east-west orientated Main River which drains primarily agricultural land between Middleton-on-Sea and Yapton to the west. However, there is a gap in the Main River classification to the west of the PEIR Assessment Boundary (there is a section of 'ordinary watercourse' between the two sections of Main River classifications). Review of elevation data for this area indicates that this gap in the Main River Classification corresponds to a topographic catchment divide, with an artificial channel cut (the section of ordinary watercourse) into the landscape to connect the headwaters of two small (originally separate) watercourses. This seems to be reflective of it appearing to have at least two outfalls, one directly to the sea (to the west of the PEIR Assessment Boundary) and the other to the River Arun (to the east of the PEIR Assessment Boundary).

3.4.5 The Western Section of Ryebank Rife (which the PEIR Assessment Boundary does not interact with) drains the majority of the catchment, with the Main River turning sharply south towards the sea adjacent to 'Bairds Business Park Hobbs New Barn' located approximately 1.25km to the west of the PEIR Assessment Boundary (far south west corner in **Figure 27.2.2, Annex B**). This outfalls directly to the sea on the beach located at the eastern edge of the settlement of Elmer approximately 2km to the west of the cable landfall location. The 'second' section of Ryebank Rife Main River is the one which interacts with the PEIR Assessment Boundary. This is the smaller of the two topographic Ryebank Rife catchments mentioned in the paragraph above. The Ryebank Rife is reclassified as Main River from Climping Street (approximately 425m to the west of the PEIR Assessment Boundary) to another outfall at Littlehampton Marina (approximately 300m to the east of the PEIR Assessment Boundary). The location of the Ryebank Rife is indicated in **Figure 27.2.1a-e** and **Figure 27.2.2, Annex B**.

3.4.6 The PEIR Assessment Boundary crosses onto the eastern bank of the Arun approximately 900m upstream of the A259 crossing, and traverses across the lower portion of the Black Ditch sub-catchment as seen in **Figure 27.2.1a-e, Annex B**. The Black Ditch rises at Northdown Farm to the east, and drains west

along the northern edge of Littlehampton, joining the Arun adjacent to Brook Barn Farm.

3.4.7 Northeast of Warningcamp, the PEIR Assessment Boundary crosses the South Downs and intersect the headwaters of the River Stor sub-catchment as seen in **Figure 27.2.1a-e, Annex B**. The Stor rises from Chantry and Sullington Hill, and drains northwest towards its confluence with the Arun at Pulborough.

3.4.8 The assessment boundary crosses into the adjacent River Adur catchment east of Sullington Hill on the South Downs, at approximately 16km chainage.

River Adur catchment

Overview

3.4.9 The River Adur catchment covers an area of approximately 600km^2. The catchment has two distinct branches, and eastern and western branch, that join adjacent to Bines Green. The eastern branch rises near Ditchling Common, whilst the western branch rises near Slinfold.

3.4.10 The River Adur is tidal for some distance inland, with the tidal limit coinciding with the end of the Environment Agency flood defences on the western branch, and to the gauging station at Sakeham on the eastern branch. There is an additional gauge on the western branch at Hatterell Bridge, and Chess Stream at Chess Bridge.

Western branch

3.4.11 The western branch of the Adur flows southeast from its source towards Coolham and is classified as a Main River downstream of the Coolham Road bridge. The river is joined by the Honey Bridge Stream approximately 2.2km upstream from the confluence to the eastern branch.

3.4.12 The levels within the western branch are controlled by Merions penstock, approximately 100m upstream of the confluence. The Environment Agency has advised that the penstock boards are closed during summer to retain water in the upper catchment, whilst they remain open in the winter. The Environment Agency also advised that upstream of the penstock in winter, the floodplain is regularly inundated for long periods (two-three months).

3.4.13 The PEIR Assessment Boundary intersects the headwaters of the Honey Bridge Stream between 20-22km chainage at Wiston as seen in **Figure 27.2.1, Annex B**. The Honey Bridge Stream is classified as main river downstream of Honey Bridge and flows northeast towards its confluence with the Western Branch.

3.4.14 Northeast of Wiston, the PEIR Assessment Boundary crosses the Adur Western branch between 27-28km chainage, approximately 400m upstream from the confluence to the eastern branch as seen in **Figure 27.2.1a-e, Annex B**.

Eastern branch

3.4.15 The eastern branch initially flows north and meanders west around World's End from its source. The river is classified as a Main River downstream of Wintons

Fishery, Folders Lane. The river continues west from Burgess Hill golf centre, turning southwest at Rice Bridge on the A23. It is joined by Cowfold Stream at Shermanbury Place draining from Cowfold to the north, before continuing southwest towards the confluence to the western branch.

3.4.16 Levels within the eastern branch are controlled by Chates Weir, approximately 100m upstream from the confluence. Similarly to the western branch, penstock boards are closed in summer to retain water in the upper catchment, and open during winter. The eastern branch is subject to significantly more flow than the western branch due to higher rates of runoff from the contributing catchment which is more developed. Floodplains on the eastern branch are also subject to long periods of inundation during the winter months, similar to the western branch.

3.4.17 The PEIR Assessment Boundary crosses into the eastern branch catchment northeast of the 28km chainage point as seen in **Figure 27.2.1a-e, Annex B**. The PEIR Assessment Boundary includes several options beyond the 31km chainage point. There are two possible crossing points across the Cowfold Stream, at Pooks Farm to the south and Moatfield Farm to the north. These possible crossing points are associated with Bolney Road/Kent Street and Wineham Lane route options on sheet 5 of **Figure 27.2.1a-e, Annex B**.

3.4.18 The PEIR Assessment Boundary does not cross the eastern branch of the Adur, although the Wineham Lane North Route 1B & Wineham Lane South Route 1B route option does fall within its catchment in the vicinity of Frylands as seen in **Figure 27.2.1 a-e, Annex B**.

Lower river

3.4.19 Downstream from the confluence of the two branches at Bines Green, the lower river flows south through Upper Beeding to the mouth at Shoreham-by-Sea. The lower river is joined by several minor tributaries from the west, namely Northover Sewer, Wyckham Farm Stream, and Black Sewer.

3.4.20 The PEIR Assessment Boundary intersects the headwaters of each of these tributaries between 22-27km chainage points as seen in **Figure 27.2.1a-e, Annex B**. Each of these watercourses flow east and into the lower river downstream of the confluence at Bines Green.

3.5 Flood defence assets

Coastal defences at Climping

3.5.1 Coastal defences are indicated at the landfall location at Climping, consisting of a shingle embankment. The Environment Agency advised (**Annex A**) that the embankment was ‘over-washed’ in February 2020 during Storm Ciara, and that subsequent engineering works were required to re-work the washed material to reform the shingle flood defence.

3.5.2 The Environment Agency’s strategy for the management of the Climping shingle embankment defences are set out in the Arun to Pagham Flood and Coastal Erosion Risk Management Strategy (Environment Agency 2015). The strategy is ‘do minimum’, reflecting of the limited socio-economic benefits of the defence. It

was identified that minor repairs would keep the defences economically viable for between 15 and 35 years, though some of the works needed were / are anticipated to be unaffordable.

3.5.3 The Environment Agency elaborated that the short-term strategy post-Storm Ciara remains to patch and repair for as long as possible with the financially limited budget available. However, Storm Ciara caused significant damage and deterioration is occurring quicker than originally anticipated in the strategy. The Environment Agency's preferred approach for the long-term management of this defence is to allow the shingle embankment to naturally realign to a more naturally sustainable position, which is expected to result in a shift of the coastline landwards. The practicalities of allowing this to occur are currently being investigated by the Environment Agency.

River defences

3.5.4 Flood defences also exist inland from the coast. Although the Environment Agency's Flood Map for Planning (**Figure 27.2.2, Annex B**) does not indicate any Areas Benefitting from Defences (ABD) in the vicinity of the PEIR Assessment Boundary, a network of embankments exist along both the Arun and Adur rivers and their associated tributaries, as indicated in **Figure 27.2.2, Annex B**.

3.5.5 **Figure 27.2.2, Annex B** shows defences along the length of the lower Arun adjacent to Littlehampton. The Environment Agency's strategy is to sustain the existing defences along the River Arun between Arundel and Littlehampton (as set out in the Lower Tidal River Arun strategy report, Environment Agency 2012), whilst the strategy for the Black Ditch is to improve the flood risk management.

3.5.6 Defences are also shown along the River Adur western branch downstream of Pinlands Farm, along the length of the River Adur eastern branch and Cowfold Stream. According to the Environment Agency's Catchment Flood Management Plan for the River Adur (Environment Agency 2009a), the strategy for the Upper Adur (including both eastern and western branches), was to investigate removal of Environment Agency owned and maintained defence structures, with the aim of providing additional storage of water on the floodplain to reduce flood risk to downstream areas by restoring rivers and floodplains to a naturally functioning state.

3.6 Geology

Overview of geology

3.6.1 An overview of the geology along the route is presented in **Figure 27.4, Volume 3** (Solid geology) and **Figure 27.5, Volume 3** (Superficial geology) of **Chapter 27: Water environment, Volume 2** of the PEIR. These indicate that the south western section of the onshore cable corridor (between chainage 0km and 17km in **Figure 27.2.1a-e, Annex B**) is predominantly underlain by solid geology comprising Chalk. The northeast section of the route (between chainage 22km and 32km, and including the remaining onshore cable corridor bifurcations to the onshore substation search areas) is largely underlain by the clays of the Wealden Group, with no superficial overlying deposits. Between these two main solid

geological features, and in distinct locations overlying them, are further solid and superficial geological features, as discussed further below.

Detailed geological description

3.6.2 From landfall to chainage 5km, the chalk is overlain by the superficial deposits of the River Arun valley, as indicated in **Figure 27.5, Volume 3** of **Chapter 27, Volume 2**. These largely comprise Alluvium (clay, silt and sand), but also include River Terrace sand and gravel deposits extending to Arundel (to chainage 8km). Some brickearth superficial deposits are present at the fringes of the PEIR Assessment Boundary in these first few km.

3.6.3 Just south of Arundel (between chainage 5km and 7km), a narrow east-west orientated band of Thames Group (London Clay Formation) and Lambeth Group strata overlies the Chalk, as indicated in **Figure 27.4, Volume 3** of **Chapter 27, Volume 2**. The Thames Group is composed of clay, silt and sands. The Lambeth Group comprises a complex of vertically and laterally varying gravels, sands, silts and clays.

3.6.4 The central portion of the PEIR Assessment Boundary (chainage 7km to 17km) is predominantly underlain by the Chalk outcrop forming the higher elevated topography of the South Downs between Arundel and Washington, West Sussex. Superficial deposits in this area are largely absent, with 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. A chalk escarpment exists at Sullington Hill (chainage 16km), where the Chalk of the South Downs gives way to the 'Grey Chalk sub-group' which outcrops between chainage 16km and 17km.

3.6.5 At the northeast end of the PEIR Assessment Boundary, the solid geology predominantly comprises the 'Weald Clay' of the Wealden Group (Chainage 23km to the onshore substation search areas), with superficial deposits are also largely absent. The Gault Formation (chainage 17km to 19km), the Lower Greensand Formation (chainage 19km to 23km) and the sandstone and siltstone members of the Wealden Group (around 32km chainage) are also present at the surface for short stretches. The occasional superficial deposits comprise patches of clay, silt, sand and gravel Head deposits and Alluvium clay, silt, sand and peat and River Terrace sand and gravel deposits. The Alluvium deposits follow the route of the River Adur floodplain and its associated tributaries.

3.7 Hydrogeology

3.7.1 The aquifer status of the geology along the onshore cable corridor has been sourced from the Department for Environment, Food and Rural Affairs (Defra) MAGIC website (BGS 2021a; Environment Agency, 2017). An overview of the aquifer status along the PEIR Assessment Boundary is provided in **Table 3-1** below.

Table 3-1 Aquifer designations

Bedrock Geology	Chainage (km)	Aquifer Status	Vulnerability
Chalk	0-5 8-17	Principal	High
Lambeth Group	5-8	Secondary A	Medium - High
Thames Group	5-8	Unproductive Strata	Low
Gault and Upper Greensand Formation	17-19	Principal	High
Lower Greensand Group	19-23 26-27	Principal	High
Wealden Group	23-26 27-32[1]	Unproductive Strata	Low
Superficial Geology	**Chainage (km)**	**Aquifer Status**	**Vulnerability**
Brickearth	0-1	Secondary A	Medium - High
Alluvium	0-8 27-28	Secondary A	Medium - High

[1]The Wealden Group extends beyond chainage point 32km, and underlays the remainder of the PEIR Assessment Boundary.

3.7.2 The 1:625,000 scale Hydrogeological map of England and Wales (BGS 2021b) indicates that groundwater level fluctuation is common within the top 80m of the Chalk from landfall to chainage point 17km. The map indicates groundwater levels as being typically around 0m AOD within the Chalk along the coastal area trending to between 30 and 60m AOD on the South Downs (over 100 metres below ground level (mbgl) at higher elevations). The 1:100,000 scale Hydrogeological map (BGS 1978) shows that groundwater levels within the Chalk Formation within the vicinity of Burpham and Warningcamp (chainage 6km to 10km) typically range between 3m AOD and 20m AOD (approximately 30m to 35m below ground level respectively) with groundwater flow to the south and south west towards the River Arun.

3.7.3 The Chalk of the South Downs 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.

3.7.4 The 1:100,000 scale Hydrogeological map of the South Downs (BGS 1978) indicates groundwater flow lines 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.

3.7.5 The 1:100,000 scale map indicates a clear divide in groundwater flow at the Chalk escarpment at Sullington Hill (chainage 16km). To the north and east of Sullington Hill groundwater levels within the Lower Greensand Formation fall from greater than 60m AOD near Green Farm to below 0m AOD near Buncton and Wiston (approximately between 100 to 20mbgl respectively), between chainage points 21-22km.

3.7.6 The online BGS GeoIndex Viewer (BGS, 2021c) describes the Weald Clay Formation 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. The clays of the Wealden Group retards infiltration and are 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.

4. Description of the onshore elements of the Proposed Development

4.1 Overview

4.1.1 A full overview of the Proposed Development is provided in **Chapter 4**: **The Proposed Development, Volume 2** and its accompanying Figures (**Figures 4.1** to **4.8, Volume 3**). For the purpose of this assessment, the below sub-sections provide a summary of the onshore elements of the Proposed Development pertinent from a flood risk perspective.

4.1.2 The key onshore elements of the Proposed Development consist of:

- a single landfall site (for the offshore cable to come ashore) using HDD installation techniques;
- buried onshore cables in a single corridor approximately 36km in length; and
- a new onshore substation which will connect to the existing National Grid substation at Bolney, Mid Sussex.

4.1.3 At this stage, the description of the Proposed Development is indicative and a 'design envelope' approach has been adopted.

4.1.4 Options are intentionally included in the PEIR Assessment Boundary to allow for further refinement taking into account engineering, environmental and consultation feedback. The ultimate intention is to refine the onshore cable corridor options to a single onshore cable corridor and to reduce the onshore substation search areas to a single onshore substation taken forward for assessment in the ES to accompany the DCO application. The subsequent final FRA accompanying the ES will consider the final onshore cable corridor and onshore substation design assumptions.

4.2 Programme of development and lifetime

4.2.1 An indicative construction programme for the Proposed Development is presented in **Chapter 4, Volume 2**. The construction programme illustrates the anticipated duration of the major construction / installation elements. The anticipated maximum total construction duration is approximately four years. In summary:

- year 1 – earliest construction work commences (anticipated to be 2025 to 2026); and
- year 5 – fully operational and connected to the National Grid (anticipated to be 2028 to 2029).

4.2.2 The predicted lifetime of the completed Proposed Development is around 30 years. At the end of their life, the wind turbines generators (WTGs) will be removed from the seabed, and if wind power is still an essential requirement for our energy mix, they may be repowered with the latest technology of the day, but that will be subject to a new consent application at that time. At the

decommissioning phase, it is anticipated that the onshore landfall transition joint bay and onshore cable circuits will be left buried in-situ with circuit ends being cut and sealed. 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 renewable energy generation projects (which would be subject to a separate planning application). The decommissioning duration of the onshore infrastructure may take the same amount of time as construction of the Proposed Development, up to four years, although this indicative timing may reduce.

4.3 Description of the permanent onshore infrastructure

Onshore cable corridor

4.3.1 The PEIR Assessment Boundary runs from the landfall at Climping through to the proposed new substation, and then onto the existing National Grid substation at Bolney.

4.3.2 Design refinement of the onshore elements of the Proposed Development has been undertaken to refine the Scoping Boundary that was presented at Scoping (July 2020) to provide a PEIR Assessment Boundary. This has involved a detailed review of land ownership, local environmental sensitivities (including flood risk) and technical construction challenges, through consultation and analysing data collected from surveys and site visits.

4.3.3 The process as described in **Chapter 3: Alternatives, Volume 2** has resulted in the consideration of numerous onshore cable corridor options to avoid as many environmental sensitivities as possible. This has ensured that a sequential approach to locating the Proposed Development has been followed, with flood risk one of the multiple constraints and opportunities considered when deciding upon the various onshore cable corridor options taken forward at PEIR stage.

4.3.4 The onshore cable corridor options, together with temporary infrastructure (temporary construction access roads and temporary construction compounds) are included within the PEIR Assessment Boundary. The onshore elements of the Proposed Development will be further refined during ongoing design refinement and the detailed design phase which will be informed by the EIA process.

Onshore cable design

4.3.5 A maximum of 20 buried cables (3 No. power cables and 2 No. fibre optic cables per circuit) will run along the length of the onshore cable corridor from the landfall at Climping through to the new onshore substation. These will be provided in four cable circuits laid in separate trenches (i.e. four parallel trenches).

4.3.6 400kV buried cables will subsequently run from the new onshore substation to tie into the existing National Grid substation at Bolney. The 400kV cable system will comprise two cable circuits in separate trenches (i.e. 2 parallel trenches).

4.3.7 At regular intervals along the onshore cable corridor, joint bays will be constructed to enable onshore cable installation and connection. The joint bays are subsurface structures with an associated subsurface link box. These link boxes enable electrical checks and testing to be carried out on the cable system during

operation (making use of Fibre Optic Cables which will be installed alongside the transmission cables for communication and monitoring purposes). It is understood that the joint bays will not have solid surfaces, and will be backfilled with sand and soil. Joint bays will be finished level with the ground surface (i.e. no raised structure). Joint bays (and the onshore cable itself) are resilient to submergence once constructed (i.e. resilient to flooding). The landfall transition joint bay will be also be resilient to flooding once constructed.

4.3.8 The locations of the joint bays will be determined during the detailed design phase. Typically, they are located every 750 to 950m however the location depends on factors such as crossing and bends.

4.3.9 A permanent easement of 15m to 25m is anticipated for the constructed onshore cable (this may be wider at trenchless crossing points and joint bays).

Onshore substation

4.3.10 Recognising existing constraints and sensitivities around the existing National Grid Bolney substation, two potential new onshore substation search areas are under consideration. These two sites are within a radius of 5km of the existing National Grid Bolney substation and lie within the PEIR Assessment Boundary and are shown in **Figure 27.2.1a-e, Annex B**.

4.3.11 Design refinement of the onshore substation has been undertaken since the Scoping stage. This has involved a detailed review of land ownership, environmental and engineering challenges (including flood risk), through consultation and analysis of data collected through surveys and site visits.

4.3.12 The two onshore substation search areas (**Figure 27.2.1a-e, Annex B**) are under consideration are as follows:

- Bolney Road / Kent Street; and
- Wineham Lane North.

4.3.13 Of the two substation options under consideration, only one will be taken forward and assessed in the ES accompanying the DCO application. Two onshore substation search area options are being assessed at PEIR stage to ensure that consideration is given to the likely significant effects and relevant consultation feedback before a final location is selected.

4.3.14 The overall built site footprint for the proposed onshore substation is anticipated to be up to 5.9 hectares (ha) within a larger onshore substation search area (between approximately 15ha and 21ha). The additional land could be used to provide associated necessary development, such as permanent drainage infrastructure, if such features cannot be delivered within the 5.9 ha footprint anticipated for the permanent onshore substation itself. The additional space will also be used to facilitate construction activities at the onshore substation, as well as enable further design and siting refinement of the permanent infrastructure to be undertaken subsequent to the PEIR to ensure that the most suitable location within the wider onshore substation search area is selected for the permanent development.

4.3.15 The onshore substation will comprise electrical components and equipment necessary to connect the electricity generated by the Proposed Development to the existing network, including:

- transformers and associated equipment;
- switch room;
- control building; and
- welfare facilities.

4.3.16 Some equipment will be placed outdoors and other equipment will be housed in buildings or enclosures.

4.4 Construction phase

Landfall

4.4.1 The location where the offshore cables come ashore is known as the 'landfall'. The offshore cables will make 'landfall' at Climping beach, just to the west of Littlehampton Harbour. To avoid interaction with the sea defence, trenchless crossing technologies (discussed further below in **paragraph 4.4.10**) will be used to cross under the beach and the shingle embankment coastal defence to the agricultural land beyond. Behind the landfall location (in the agricultural land), the offshore cables will be joined to the onshore cables, usually forming the first joint bay of the onshore cable corridor. The landfall works are anticipated to take around six months.

Onshore substation installation

4.4.2 Construction activities for the onshore substation will include enabling works and construction works. Enabling works will prepare the onshore substation site ahead of construction and include vegetation clearance, stripping and storage of topsoil, installation of drainage systems, installation of a temporary construction compound, delivery of materials, plant, machinery and fuel, and any earthworks necessary for the installation of the substation foundations.

4.4.3 Construction works will involve:

- landscaping and installation of perimeter fencing;
- installation of underground services and onshore substation foundations;
- Installation, commissioning and testing of electrical plant and equipment;
- construction of the control and switchgear buildings and plant buildings;
- construction of onshore cable trenches, construction of ducts and pits; and
- provision of utility supplies.

4.4.4 Once all construction activities have been carried out, the onshore substation site will be secured, and the temporary construction area returned to its original use and condition.

Onshore cable construction

4.4.5 At the PEIR stage, the PEIR Assessment Boundary is generally approximately 100m in width. This was initially determined by providing a 50m width on either side of an anticipated onshore cable centreline. It is not anticipated that the whole 100m width will be required for construction, for the most part it is anticipated that construction works will be limited to a 50m wide corridor. The remaining 25m on either side allows for space for deviation of the onshore cable within the overall boundary, to avoid constraints for example, and space to undertake construction works and associated mitigation. The PEIR Assessment Boundary also allows for temporary construction compounds, temporary stockpile storage, trenchless crossing compounds and the likely temporary access requirements, which widen the boundary in such locations. In other locations, where constraints exist, the boundary has been narrowed. Sufficient space to provide temporary and permanent (at the onshore substation search areas) drainage infrastructure has also been included in the PEIR Assessment Boundary.

4.4.6 The standard onshore temporary construction corridor will be 50m wide and consist of the trenches (in which the cables will be laid), excavated material (i.e. stockpiles) and a haul road (often known as a running track). The onshore temporary construction corridor may require widening beyond the standard width in predetermined locations to allow enough space for temporary construction access and / or equipment at crossings and avoidance of obstacles. The PEIR Assessment Boundary has been defined considering this enlargement at potential locations.

4.4.7 The haul road (discussed further below in **paragraph 4.4.15**) will enable the transportation of machinery used for topsoil stripping and subsoil excavation. This soil will be stored in bunds / stockpiles within the onshore temporary construction corridor. Typically, the topsoil stockpiles will be up to 8m wide and 4m high to avoid compaction from the weight of the soil. It is anticipated that a mechanical excavator will be used for these activities.

4.4.8 Trenches will be backfilled with the originally excavated material or cement bound sand (CBS) to the layer of the protective tiles / tape (use of CBS is dependent on soil thermal resistivity). Where required, a layer of stabilised backfill (likely sandy material) will be deposited for the purposes of protection under the cable ducts. Protective cover tiles / tape will be placed on top of the material to prevent the cable from being damaged. Any surplus material from excavation will be spread across the onshore cable corridor area. The topsoil material will be reinstated, and the land returned to its original use.

Permanent onshore cable crossings

4.4.9 The permanent onshore cable will need to cross a number of features along the route, such as road, rail, water, footpaths and third party services. Each crossing will be individually reviewed / surveyed during detailed design (which will occur subsequent to gaining planning consent) to confirm the crossing methodology employed. Open cut crossing methodology will predominantly be used. This involves the preparation of the crossing (damming / fluming / pumping in the case of watercourses) to allow the trenches to be excavated and ducts installed. The crossing area will be reinstated to the original form.

4.4.10 For larger crossings, including Main Rivers, railways and roads that form part of the Strategic Highways Network, trenchless methodologies (such as HDD) will be used). Trenchless methodologies are less intrusive from a crossing interaction and environmental aspect however the equipment used is louder and therefore proximity to noise receptors must be considered.

4.4.11 HDD involves drilling a borehole from one location to another under feature being crossed. Following completion of the borehole, the ducts lengths are strung out and connected in a line of equal length to the crossing and pulled through. Each circuit will have separate HDDs.

4.4.12 The configuration and design assumptions of the trenchless crossings will be determined during the detailed design phase and informed by the EIA process. It is worth noting at this stage however that all watercourse crossings will be designed to be at suitable depth for the size and depth of the watercourse, and will avoid interaction with flood defences as well (trenchless methods likely to be employed where formal flood defences exist).

4.4.13 Watercourse crossings will be subject to either Flood Risk Activity Permits (FRAP) from the Environment Agency (for Main Rivers), Ordinary Watercourse / Land Drainage consents from the LLFA (ordinary watercourses outside of the IDB district) or the Environment Agency (ordinary watercourses inside the IDB district).

4.4.14 A crossing matrix is provided as part of the PEIR (see the draft version presented in **Appendix 4.2: Crossing schedule, Volume 4)**.

Temporary construction access and haul road

4.4.15 Temporary construction access points are required along the PEIR Assessment Boundary to allow the transportation of materials, equipment and personnel to and from the construction sites. These temporary construction access points will allow access to the onshore temporary construction corridor which will have a temporary haul road running along the length of the onshore cable corridor (often referred to as a running track), except for locations where there are trenchless or road crossings (e.g. Main Rivers). The use of temporary culverts or bridges may be required where obstacles are encountered along the haul road, such as ordinary watercourses. At Main Rivers (and perhaps some larger ordinary watercourses too), no temporary crossing for the haul road will be provided; access will be gained from either side.

4.4.16 The haul road will comprise crushed aggregates and a geotextile membrane where the existing ground is not considered stable enough. Such ‘stone’ roads usually involve excavation and stockpiling of near surface soils nearby available for reinstatement once construction is complete. The stone road itself is then built up so it is raised above the surrounding ground level to facilitate drainage (and minimise the volume of soil needing excavation before the required depth of stone can be provided). In areas where it is anticipated that the raised stone haul road and associated stockpiles may cause an obstruction to flood water (e.g. on the floodplain), then road mats (also often referred to as ‘trackway’) placed on the existing ground surface will be used instead (thus avoiding both the raised stone road and the associated stockpiles). The haul road will be approximately 5m in width, occasionally increasing to 10m for passing places. The haul road will be

used during installation works and construction activities and be removed prior to final reinstatement.

4.4.17 Potential temporary construction access points proposed along the onshore cable corridor will be based on suitability for the Proposed Development requirements, reduced environmental / social effects and connection to key road infrastructure. Existing access points and tracks have been utilised where possible. The selected number and location of these temporary construction access points will be confirmed at a later stage and agreed with the relevant local authorities, highways authorities and landowners.

Temporary construction compounds

4.4.18 Temporary construction compounds are required for:

- landfall works;
- trenchless crossings; and
- logistics compounds; storage of materials and equipment, also includes welfare facilities and office space as appropriate.

4.4.19 All temporary construction compounds are located within the PEIR Assessment Boundary and are indicated in **Figure 27.2.1a-e, Annex B**.

4.4.20 Temporary construction compounds for trenchless crossings should fit within the standard 50m wide onshore temporary construction corridor, typically being 50m x 75m. At PEIR stage, additional area is included within the PEIR Assessment Boundary to allow for any small changes to the trenchless crossing location during the ongoing design refinement. Temporary construction compounds for trenchless crossings are identifiable in **Figure 27.2.1a-e, Annex B** by their comparatively small footprint and location along the onshore cable corridor itself.

4.4.21 Along the onshore temporary construction corridor, seven sites have been identified for potential temporary construction logistics compounds, of which four are anticipated to be required. The potential temporary construction logistics compounds identified for PEIR stage are identifiable in **Figure 27.2.1a-e, Annex B** by their comparatively larger footprint (approximately 4ha each, compared to the trenchless (HDD) crossing compounds of 0.4ha) and location away from the onshore cable corridor. These are at the following chainage locations in **Figure 27.2.1a-e, Annex B**:

- one option near to the landfall (between chainage 1km to 2km);
- one option near Warningcamp (between chainage 5km and 6km);
- three options close to Washington, West Sussex (between chainage 19km and 20km); and
- two options near Bolney Road / Kent Street (at and adjacent to the proposed onshore substation search area).

4.4.22 The location and number of these temporary construction compounds will be selected at a later stage, in agreement with the appointed principal contractor.

Land drainage

4.4.23 Extensive areas of the PEIR Assessment Boundary are served by land drainage (underground pipes to assist drainage of land prone to waterlogging). Construction works will be undertaken in fields where land drains are known to exist (by way of land drainage plans and landowners knowledge) and in areas where, although no plans are available, they are considered likely to exist. Works will be undertaken to retain the integrity of the existing land drainage systems.

4.4.24 Land drainage will also provide one of the environmental measures employed to manage surface water run-off arising from the construction works themselves, with the details to be determined subsequent to gaining planning consent, at the detailed design stage, based on a number of local variables including topography, existing land drainage and the location of an appropriate outfall point.

4.5 Operation and maintenance phase

4.5.1 The operational lifetime of the Proposed Development is expected to be around 30 years. The operation and maintenance phase activities can be divided into three main categories:

- scheduled maintenance;
- operation and unscheduled maintenance; and
- special maintenance in the event of major equipment breakdown and repairs.

4.5.2 Maintenance of the onshore cable is expected to be minimal. During the operation and maintenance phase, periodic testing of the onshore cable is likely to be required (every two to five years). This will require access to the joint bays and link boxes along the onshore cable corridor. This will involve attendance by up to three light vehicles, such as vans, in a day at any one location. The vehicles will gain access using existing field accesses and side accesses as agreed with landowners to reach the relevant sections of the onshore cable.

4.5.3 Monitoring of the onshore substation will be done remotely using CCTV technology. Unscheduled maintenance or emergency repair visits will typically involve a very small number of vehicles, typically light vans. Infrequently, equipment may be required to be replaced, then the use of an occasional heavy goods vehicle (HGV) may be utilised, depending on the nature of the repair. Inspection and minor servicing may be required for the electrical plant, but it is anticipated that the onshore substation will require minimal scheduled maintenance and operation and maintenance activities.

4.6 Decommissioning phase

4.6.1 At the end of the operational lifetime of the Proposed Development, it is anticipated that the onshore electrical cables will be left in-situ with ends cuts, sealed and buried to minimise environmental effects associated with removal.

4.6.2 The onshore substation may be used as a substation site after decommissioning of the Proposed Development or it may be upgraded for use by another offshore wind project. This will be subject to a separate planning application.

4.6.3 Should the onshore substation need to be decommissioned fully, however, the decommissioning works are likely to be undertaken in reverse to the sequence of construction works and involve similar levels of equipment. All relevant sites will be restored to their original states or made suitable for an alternative use. Further detail will be provided in the decommissioning plan.

4.6.4 The duration of the decommissioning phase may take the same amount of time as construction of the onshore infrastructure, up to four years, although this indicative timing may reduce.

4.7 Vulnerability classification

4.7.1 In accordance with NPS EN-1, a FRA should consider the vulnerability of those using the site, including arrangements for safe access. The Planning Practice Guidance (Ministry of Housing, Communities & Local Government, 2019b) provides further guidance classifying vulnerability according to the type of development and vulnerability of its users (e.g. children or the elderly). Five vulnerability classes are identified in the Planning Practice Guidance, ranging from essential infrastructure, through highly, more and less vulnerable, to water compatible. The compatibility of these vulnerability classes with respect to each Flood Zone are set out in Table 3 of the Planning Practice Guidance, which is reproduced in **Table 4-1** and the accompanying table notes below.

Table 4-1 Flood risk vulnerability and flood zone compatibility (Table 3 of the Planning Practice Guidance)

Flood Zones	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
1	✓	✓	✓	✓	✓
2	✓	Exception Test required	✓	✓	✓
3a †	Exception Test required †	✗	Exception Test required	✓	✓
3b *	Exception Test required *	✗	✗	✗	✓*

Key:
✓ Development is appropriate
✗ Development should not be permitted
Notes to table 3:
This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea.
The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site.

Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.
† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.
* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

4.7.2 The development vulnerability classifications for the onshore cable corridor and onshore substation site permanent infrastructure are 'Essential Infrastructure'. Construction and enabling works are considered to be classified as 'Essential Infrastructure', whilst temporary logistics compounds are considered to be 'Less Vulnerable' **Table 4-2**).

4.7.3 NPS EN-1 only states that development should be steered to areas of lower flood risk, however Table 3 in the Planning Practice Guidance provides an assessment criterion for development appropriateness in the context of flood risk. The application of the development appropriateness matrix to the Proposed Development is summarised in **Table 4-2** and the accompanying table notes, along with the development vulnerability as set out in the Planning Practice Guidance.

Table 4-2 Application of the flood risk vulnerability and flood zone compatibility matrix to the Proposed Development

Development type	Flood risk vulnerability classification	Flood Zone(s)[1] in which this 'development' will occur	Flood risk vulnerability and flood zone 'compatibility'
Construction and Operation and maintenance phase			
Onshore cable corridor	Essential Infrastructure[4]	1 & 2	✓
		3a & 3b	Exception Test required
Onshore substation search areas	Essential Infrastructure4	1	✓

Development type	Flood risk vulnerability classification	Flood Zone(s)[1] in which this 'development' will occur	Flood risk vulnerability and flood zone 'compatibility'
Temporary logistics compounds (storage of materials and equipment, also includes welfare facilities and office space as appropriate)	Essential Infrastructure	1 & 2	✓
Construction (and enabling) works (temporary construction access routes and onshore cable corridor working areas)	Essential Infrastructure[2]	1 & 2	✓
		3a & 3b	Exception Test required[3]
Watercourse crossings	Water compatible	1, 2, 3a and 3b	✓

Key:
✓ Development is appropriate
✗ Development should not be permitted
Table notes:
[1] Definition of flood zones is provided in Table 13A.1-2.
[2] The Planning Practice Guidance does not explicitly categorise the vulnerability of access routes and working areas to be used for construction purposes, therefore, given that these are for electricity transmission infrastructure it is considered that Essential Infrastructure is the most appropriate classification.
[3] See relevant notes to Table 4.1.
[4] The Planning Practice Guidance does not explicitly categorise the vulnerability of electricity transmission infrastructure, however it is considered that Essential Infrastructure is the most appropriate classification.

4.7.4 As shown in **Table 4-2**, the Proposed Development are appropriate for the Flood Zones, with the exception of the construction and enabling works, and the onshore cable itself. Elements of these are to be located in Flood Zones 3a and 3b, for which the Exception Test must be passed for such 'development' to be considered appropriate. The requirements of the Exception Test are set out in **Section 2.2**. Demonstration that the Proposed Development pass the Exception Test is provided in **Section 8.3**.

4.7.5 It is worth noting that, in this case, the proposed construction works (not usually considered to be development in themselves) in Flood Zones 3a and 3b are considered to be appropriate in this case, for a number of reasons. These include the limited amount of construction infrastructure proposed in Flood Zones 3a and 3b (temporary haul road and trenchless crossing compounds), its short-term presence, the infrastructure itself (such as temporary haul roads) will be flood

resilient, and flood risk management measures will be incorporated to ensure that flood risk is not increased elsewhere. Similarly, the onshore cable itself (once constructed) will be buried and entirely flood resilient, with no potential to increase flood risk elsewhere, and thus is also considered appropriate in this case. In addition, the temporary construction logistics compounds (storage of materials and equipment, also includes welfare facilities and office space as appropriate), will be sited in accordance with a sequential approach to avoid areas of high risk of flooding.

5. Flood sources

5.1 Screening of potential sources of flooding

5.1.1 All potential sources of flooding in and around the PEIR Assessment Boundary have been considered. **Table 5-1** provides an initial screening of the potential sources of flood risk. Sources of flooding may combine (e.g. a high tide coinciding with a river flood). These 'in-combination' events are also considered as part of this assessment (**Section 5.2**).

Table 5-1 Initial screening of potential sources of flood risk

Flooding source	Comments	Source present
Tidal	There is a potential risk of flooding from tidal sources to portions of the PEIR Assessment Boundary associated with the open coast at Climping (the landfall location) and within the lower River Arun catchment. The River Adur is also tidal where the PEIR Assessment Boundary crosses the western Branch at Bines Green. Tidal flood sources are discussed further in **Section 5.2** of this document.	✓
Fluvial	There is a potential flood risk from fluvial sources to parts of the PEIR Assessment Boundary from the River Arun and River Adur, and their associated tributaries. Fluvial flood sources are discussed further in **Section 5.2** of this document.	✓
Surface water	The Environment Agency's Risk of Flooding from Surface Water (RoFSW) mapping (Environment Agency, 2021c) indicates regions of surface water flood risk to sections of the site, particularly in the northeast section of the PEIR Assessment Boundary. Surface water flood sources are discussed further in **Section 5.3** of this document.	✓
Sewer	Sewer networks are limited within the PEIR Assessment Boundary due to the rural location of the majority of the Proposed Development. As a result, sewers are unlikely to constitute a significant source of flooding in their own right which can be distinguished from surface water flooding. This screening out of sewer flood sources is explained further in **Section 5.4** of this FRSA. Urban flood risk in general is considered in the sub-section on surface water flood risk.	×

Flooding source	Comments	Source present
Groundwater	The British Geological Survey Aquifer Designation dataset (BGS, 2021a) indicates that much of the PEIR Assessment Boundary is underlain by principal aquifers (Chalk, Gault and Greensand). These are rocks that harbour significant volumes of groundwater, and therefore there is the potential for groundwater emergence. Groundwater flood sources are discussed further in **Section 5.5** of this document.	✓
Artificial sources*	The Environment Agency's Risk of Flooding from Reservoirs mapping (Environment Agency, 2021d) indicates that areas of the PEIR Assessment Boundary are at potential risk of flooding from reservoirs in the event of a failure. There are no canals within the vicinity of the PEIR Assessment Boundary that are envisaged to pose a flood risk in the event of a failure. Artificial flood sources are discussed further in **Section 5.6** of this document.	✓

* Flooding associated with water supplies (such as burst water mains) are not required to be assessed in FRAs.

5.2 Tidal and fluvial sources

Overview

5.2.1 The Environment Agency's Flood Zone map (**Figure 27.2.2, Annex B**) provides an indication of the likelihood of flooding from fluvial and tidal sources, with Flood Zones 1, 2, and 3 indicating a low, medium and high annual probability of flooding, respectively (any area not highlighted on these maps is Flood Zone 1). The most significant areas of Flood Zones 2 and 3 are located in the lower tidal reaches of the River Arun at the southwest limit of the PEIR Assessment Boundary, and on the River Adur and the Cowfold Stream on the northeast end of the PEIR Assessment Boundary. The central portion of the onshore cable corridor between Warningcamp and Ashurst sits within Flood Zone 1. An overview of the interaction with flood zones is provided in **Table 5-2**.

Table 5-2 The PEIR Assessment Boundary interaction with Environment Agency flood zones

Flood Zone	Area of the PEIR Assessment Boundary (ha)	Proportion of PEIR Assessment Boundary Area (%)
1	533	71.4
2	107	14.6
3	104	14.0

5.2.2 A data request was made to the Environment Agency for existing model data available for the PEIR Assessment Boundary. Model results files and model reports from multiple studies were provided by the Environment Agency to inform this assessment, as listed in **Table 5-3**.

Table 5-3 Environment Agency flood models

Environment Agency flood model	Coverage
Atkins (2010) Lower Arun	Lower Tidal Arun (fluvial and tidal).
JBA Consulting (2012) Arun to Adur Coastal Model	Adur and Arun catchments.
Hyder Consulting (2011) Adur Eastern Branch	Adur Eastern Branch.
JBA Consulting (2017) Adur Eastern Branch	Adur Eastern Branch.
JBA Consulting (2008) JFLOW Improvements for Solent and South Downs Area	Adur and Arun catchments.
Atkins (2005) Adur Flood Mapping	Adur catchment.

5.2.3 The fluvial, tidal and coastal modelling results shared by the Environment Agency for the PEIR Assessment Boundary are summarised below in **Table 5-4**.

Table 5-4 Model data summary

Modelling study	Location	Date	Source	Runs (% AEP)	Model outputs			Comments
					Extent	Depth	Hazard	
Lower Arun	Pallingham Weir - Sea	2010	Fluvial & Tidal	Fluvial: 20%, 5%, 1.33%, 1%, 1% + 20%, 0.1% Tidal: 50%, 20%, 10%, 1.33%, 0.5%, 0.1%, 50% (2110), 20% (2110), 5% (2110), 1% (2110), 0.5% (2110)	✓	✓	✓	1D/2D linked model. Model runs include both defended and undefended scenarios (no breach scenarios). It is understood that the combined fluvial and tidal model outputs constitute the Environment Agency flood zones on the Lower Arun.
Arun to Adur Coastal Model	Littlehampton – South Lancing	2012	Coastal	20%, 5%, 1.33%, 1%, 0.5%, 0.1%, 0.5% (2070), 0.5% (2115), 0.1% (2115)	✓	✓	✓	2D model. Model runs include both defended (overtopping) and undefended scenarios (no breach scenarios). The model extent extends to Priory Farm on the Lower Arun floodplain just south of Arundel.
Adur Eastern Branch	Ditchling Common – Bines Green	2011	Fluvial	20%, 2%, 1.33%, 1%, 1% + 20%, 0.4%, 0.1%	✓	✗	✗	1D only model. Model runs are all classified as 'undefended' since there are no

Modelling study	Location	Date	Source	Runs (% AEP)	Model outputs			Comments
					Extent	Depth	Hazard	
		2017	Fluvial	1% + 35%, 1%, + 45%, 1% + 105%	✓	✓	✗	formal raised defences along the Upper Adur. It is understood that the model outputs represent Environment Agency flood zones 2 and 3 for the majority of the Adur eastern branch and its tributaries.
JFLOW Improvements for Solent and South Downs area	Sussex Rifes, River Arun and River Adur	2009	Fluvial	1%, 0.1%	✓	✓	✗	2D model. The model outputs consist of 1% AEP and 0.1% AEP depth results only, and it is understood these constitute the Environment Agency flood zones on the Adur western branch. These results have been superseded by modelling studies discussed above elsewhere within the Adur and Arun catchments, and provide no advancement on the Environment Agency flood zones. Consequently, it is proposed that these results will only be utilised where no other model results are available (i.e. on the Adur western branch).

Modelling study	Location	Date	Source	Runs (% AEP)	Model outputs			Comments
					Extent	Depth	Hazard	
Adur Flood Mapping	Ditchling Common / Coolham – Sea (Adur catchment wide)	2005	Fluvial & Tidal	Fluvial: 50%, 20%, 10%, 4%, 2%, 1.33%, 1%, 1% + 20% Tidal: 1.33%, 0.5%, 0.5% + CC	✓	✗	✗	1D only model. Model outputs include fluvial only, tidal and combined model outputs. It is understood that only the tidal modelling outputs have been used to determine the Environment Agency flood zones on the Lower Adur. The fluvial modelling outputs have since been superseded by all modelling studies discussed above. The PEIR Assessment Boundary does not interact with the section of the Lower Adur for which the tidal results would apply and consequently, it is proposed that these results will not be utilised for the subsequent FRA or for this screening assessment.

Tidal sources

Landfall

5.2.4 At the landfall location (Climping Beach), the primary source of flood risk will be directly from the sea. For this location, peak sea water levels have been sourced from the Environment Agency's Coastal Design Sea Levels database (Environment Agency, 2021a) and presented in **Table 5-5** below. Flood risk hazard rating will be sourced from the Arun Coastal model. The flood risk hazard rating from the 0.5% AEP present day defended scenario is shown in **Figure 27.2.3, Annex B** and with respect to the Environment Agency Flood Zones. The outputs indicate 'Very High' (Danger for all) hazard rating at the landfall location (on the seaward side). The hazard rating on the landward side of the landfall location varies between Moderate (Danger for some) to Very High, and is associated with overtopping of the Arun defences on the western bank (right-hand bank[4]), adjacent to Littlehampton.

5.2.5 Peak extreme sea levels for extreme tidal events at Littlehampton Estuary (slightly higher than the offshore values opposite Climping Beach) for a 2017 base year are presented in **Table 5-5** below. The potential impacts of climate change are set out in **Section 5.7** below.

Table 5-5 Extreme sea level values at Littlehampton Estuary

Extreme sea level event (% AEP)	Peak sea level for a base year of 2017 (m AOD)
0.5	3.97
0.1	4.17

Notes: Littlehampton Estuary (4572_1) as a conservative estimate as it is slightly higher than the offshore value opposite Climping Beach.

Arun catchment

5.2.6 The PEIR Assessment Boundary between chainage points 0-5km (**Figure 27.2.2, Annex B**) is situated within the lower Arun floodplain and is at risk from combined tidal and fluvial flood risk (Flood Zones 2 and 3). This section of the Lower Arun floodplain is tidally dominant, as demonstrated through sensitivity testing carried out within the lower Arun modelling study (Atkins, 2010) which concluded that tidal flooding is dominant between the sea and Burpham (north of Arundel and Warningcamp). Therefore, the entire region of the Arun floodplain over which the Proposed Development interacts with is tidally dominant. The tidal outputs from the lower Arun model (Atkins, 2010) have since been superseded by the Arun

[4] In hydrology, the banks of a watercourse are referred to as left or right-hand bank based on facing downstream (i.e. towards the sea).

coastal model (JBA Consulting, 2012), and therefore tidal flood risk outputs have been sourced from the more recent coastal modelling study.

5.2.7 The 0.5% AEP present day tidal hazard rating from the coastal modelling study is presented in **Figure 27.2.3, Annex B**, overlying the Flood Zones to enable comparison with the undefended scenario. The results indicate that the western bank (right-hand bank) of the Arun floodplain is the section at greatest risk from tidal flooding, with the hazard rated primarily at 'danger for all' (red in **Figure 27.2.3, Annex B**) between the landfall location and the crossing point on the Arun at 2.1km chainage.

5.2.8 Between chainage points 2.1km to 3km (**Figure 27.2.2, Annex B**), the PEIR Assessment Boundary passes through a region of Flood Zone 3 on the eastern bank (left-hand bank) of the Arun. The 0.5% AEP tidal hazard rating in this section is notably less, varying between 'null' (clear in **Figure 27.2.3, Annex B**, low hazard (green) and danger for some (yellow), with some isolated regions as 'danger for most' (orange) associated with deeper water within the drainage ditches. For this stretch of the Arun, the hazard rating continues to be higher on the western bank (right-hand bank), with minimal overtopping occurring on the eastern bank (left-hand bank), thus sparing this section of the PEIR Assessment Boundary from the higher hazard ratings seen elsewhere.

5.2.9 From chainage points 3.1km to 5km (**Figure 27.2.3, Annex B**), the associated 0.5% AEP tidal hazard rating is predominantly 'danger for some' (yellow) and 'danger for most' (orange). The railway embankments near to the 3.1km chainage appear to be influencing the hazard rating, providing floodplain compartmentalisation separating the eastern floodplain between 2.1 and 3km (lower hazard) from the higher hazard between 3 and 5km.

5.2.10 The PEIR Assessment Boundary intersects the edge of Flood Zone 2 at chainage point 8.5km (**Figure 27.2.3, Annex B**). This region is situated outside of the Arun coastal model extent, and consequently it is proposed tidal model outputs from the lower Arun model will be used to assess tidal risk at this location.

Adur catchment

5.2.11 Whilst the tidal limit of the Adur extends to beyond the crossing location on the western branch (chainage 27km to 28km, **Figure 27.2.1a-e, Annex B**), the dominant source of flooding at this location is fluvial. Consequently, tidal flood risk has not been assessed on the Adur catchment.

Fluvial sources

Arun catchment

Overview

5.2.12 As discussed in **paragraph 5.2.6**, between the landfall location and chainage point 5km is at risk of combined fluvial and tidal flood risk within the Arun floodplain. The risk of fluvial flooding from the Arun for this section (chainage 0km to 5km) will be sourced from the Lower Arun modelling study. Fluvial-only flood extents are shown in **Figure 27.2.4, Annex B** for the 5% AEP, 1% AEP and 1% AEP climate change

(20% increase in peak fluvial flows) scenarios. The 5% AEP extent largely reflects the functional floodplain as indicated in the Arun District Council SFRA (JBA Consulting, 2016, Appendix C) (the exception being downstream (to the south) of the A259 road, for which no flooding is indicated in the 5% AEP Lower Arun modelling results (discussed further below), but some flooding in the vicinity of Ferry Road is indicated in the SFRA flood map). The PEIR Assessment Boundary between chainage 0km and 5km is discussed further below, from the landfall (0km) inland (to 5km) and shown in **Figure 27.2.4, Annex B**.

Ryebank Rife

5.2.13 The edge of the fluvial flood extent for the scenarios identified in **paragraph 5.2.12** and shown in **Figure 27.2.4, Annex B** coincides with A259 road bridge, with no fluvial flooding from the River Arun indicated to the south of the road. The Lower Arun modelling (Atkins, 2010) indicates that there is no risk of fluvial flooding (from the River Arun) from the landfall location (0km) to the A259 (chainage 1km). However, this region of the PEIR Assessment Boundary (which is situated within the Arun tidal floodplain) intersects the Ryebank Rife watercourse. So rather than this indicating that the Ryebank Rife does not pose a fluvial flood risk in its own right, this could reflect a lack of modelling undertaken specifically for this watercourse (perhaps due to the lack of receptors in the immediate vicinity to warrant watercourse-specific modelling).

5.2.14 On this basis, a precautionary / conservative approach of the potential fluvial flood extent will be taken for this FRSA at PEIR stage, until this can be confirmed through further discussions with the Environment Agency. The conservative approach will assume that the fluvial extent extends to the edge of the tidal floodplain until such time as a smaller flood extent can be demonstrated otherwise. It is worth noting however, that the PEIR Assessment Boundary interacts with the second, shorter section of Ryebank Rife Main River classification (as discussed in **Section 3.4**) and therefore it is possible that only the fluvial risk (from this watercourse) at this location is minimal (i.e. significantly less than the tidal extent).

River Arun

5.2.15 North of the A259 (chainage 1km) and extending to the crossing of the River Arun (chainage 2.1km) on the Arun western bank (right-hand bank), the onshore temporary construction corridor element of the PEIR Assessment Boundary is situated predominantly outside of the present day 1% AEP fluvial extent (**Figure 27.2.4, Annex B**). However, the Lower Arun modelling (Atkins, 2010) indicates that this section of the PEIR Assessment Boundary will be at risk of fluvial flooding via overtopping of the flood defences once an allowance for climate change (20% increase in fluvial flows) is considered. Portions of the wider PEIR Assessment Boundary to the west (included to provide access to the onshore cable corridor) intersect the 5% AEP fluvial extent, defined as Flood Zone 3b within the Arun District Council SFRA (JBA Consulting, 2016, Appendix C). Areas of the PEIR Assessment Boundary in this area is located in Flood Zone 1, and are predicted to remain outside of the 1% AEP plus climate change (20%) extent. These include the temporary construction compound (as indicated in **Figure 27.2.1a-e, Annex B** near to the 1km chainage) and dedicated areas for stockpile storage located outside of the fluvial floodplain.

5.2.16 On the eastern bank (left-hand bank) of the Arun (chainage 2.1km to 3km), the PEIR Assessment Boundary is also at risk of fluvial flooding. This section is situated primarily within the 1% AEP present day and 5% AEP fluvial flood extents (**Figure 27.2.4, Annex B**).

5.2.17 From 3km to 3.1km (the eastbound railway line to Brighton), the PEIR Assessment Boundary is predicted to remain dry during the various fluvial scenarios, including the 1% AEP plus climate change event (**Figure 27.2.4, Annex B**).

Black Ditch (and River Arun)

5.2.18 From chainage 3.1km to 4.8km (**Figure 27.2.4, Annex B**), the PEIR Assessment Boundary is situated primarily within a region of fluvial flood risk partially associated with the Black Ditch. This section of the PEIR Assessment Boundary is situated almost entirely within the 1% AEP present day extent (entirely within the climate change extent), and partially within the 5% AEP extent (between chainage 3.1km to 4km and at several additional isolated locations).

River Arun

5.2.19 Beyond chainage 4.8km, the PEIR Assessment Boundary emerges out of the River Arun floodplain, the exception being a very short section at chainage 8km where the ground elevations dip to cross the valley associated with the 'Monarch's Way' footpath. At this point, a very short section on the edge of the PEIR Assessment Boundary is indicated as being within the 1% AEP plus climate change fluvial flood extent (**Figure 27.2.4, Annex B**).

South Downs

5.2.20 The central portion of the PEIR Assessment Boundary from chainage points 8km to 27km is situated entirely within Flood Zone 1 (**Figure 27.2.2, Annex B**), and subsequently not considered at risk from fluvial or tidal sources.

Adur catchment

5.2.21 Sections of the northeast portion of the PEIR Assessment Boundary are at risk primarily of fluvial flooding associated with the River Adur and Cowfold Stream. The PEIR Assessment Boundary intersects Flood Zone 3 associated with the Adur western branch between chainage points 27-28km adjacent to Bines Green, before crossing into the eastern Adur catchment (**Figure 27.2.2, Annex B**). The PEIR Assessment Boundary further intersects Flood Zone 3 between chainage points 28-28.5km (the eastern edge of the PEIR Assessment Boundary only) and 29-30km on the Adur eastern branch (the entire width of the PEIR Assessment Boundary). Finally, the PEIR Assessment Boundary for both the Bolney Road / Kent Street and Wineham Lane onshore cable corridor options to reach the onshore substation search areas both interact with Flood Zone 3 associated with the Cowfold Stream at potential crossing locations at Pook's Farm (Wineham Lane onshore cable corridor option) and Moatfield Farm (Bolney Road / Kent Street onshore cable corridor option).

5.2.22 As outlined in **Table 5-3** and **Table 5-4**, the Environment Agency hold three fluvial and tidal flood models for the area of interest; one covering the Adur eastern

branch completed in 2011, a JFLOW model covering the wider catchment completed in 2009 and a catchment wide model completed in 2005. If flood model results are needed to support the FRA accompanying the ES, these will be sourced from the JFLOW model for the section of the PEIR Assessment Boundary that crosses the Adur western branch at chainage points 27-28km (no other results available) and from the Adur Eastern Branch model elsewhere (where available), on the basis that this was a more-recent and more-detailed study.

5.2.23 The 5% AEP fluvial results available from the Adur eastern branch model have been used to provide an indication of functional floodplain (Flood Zone 3b) on the eastern branch. This is rather than using the functional floodplain extent as set out in the Horsham District Council SFRA (AECOM, 2020, Appendix 1 Figure 8D), which defined Flood Zone 3b using the 4% AEP results from the Adur Flood Mapping Study (2005). This is because the 4% AEP results indicates a functional floodplain extent which exceeds Flood Zone 2 determined in the more recent Hyder Consulting, 2011 study for the majority of the eastern Adur. The results of the more-recent study are deemed to be more reliable on the basis of modelling advancements and the use of 2D modelling in the 2011 study allowing for higher resolution flood outputs. Portions of the PEIR Assessment Boundary intersect Flood Zone 3b (as defined by the Hyder Consulting, 2011 study) at Bines Farm and Homelands Farm, and at crossing locations on the Cowfold Stream at Pooks Farm and Moatfield Farm.

Model results summary

5.2.24 An overview of the relevant fluvial and tidal modelling along the PEIR Assessment Boundary is provided in **Table 5-6** below. Note, allowances for climate change are discussed further in **Section 5.7**.

Table 5-6 Model results summary

		Tidal		Fluvial	
Chainage (km)	**Location**	**Model**	**Flood risk overview / present day hazard rating**	**Model**	**Flood risk overview**
0	Landfall (seaward)	Arun Coastal	Open coast Danger for all	N/A	N/A
0 - 1.2	Landfall to A259	Arun Coastal	FZ1, 2 & 3 Hazard: null, danger for some/most/all	Lower Arun	To be confirmed (Ryebank Rife)

		Tidal		Fluvial	
Chainage (km)	**Location**	**Model**	**Flood risk overview / present day hazard rating**	**Model**	**Flood risk overview**
1 – 2.1	A259 to Arun crossing	Arun Coastal	FZ1, 2 & 3 Hazard: null, danger for some/most/all	Lower Arun	Predominantly outside present-day 1% AEP extent, but in Climate Change (CC) extent. Some (access routes) in 5% AEP extent. Some in Flood Zone (FZ) 1.
2.1 – 2.7	Arun crossing to fields	Arun Coastal	FZ1, 2 & 3 Hazard: Null to danger for some/most	Lower Arun	Within 1% and 5% AEP extent (functional floodplain)
2.7 – 3.2	Fields to Brook Barn Farm	Arun Coastal	FZ1	Lower Arun	FZ1
3.2 – 5	Brook Barn Farm to Broomhurst Farm	Arun Coastal	FZ3 Hazard: Danger for some/most	Lower Arun	Predominantly within 1% AEP extent, some interaction with 5% AEP extent (functional floodplain)

		Tidal		Fluvial	
Chainage (km)	**Location**	**Model**	**Flood risk overview / present day hazard rating**	**Model**	**Flood risk overview**
5 – 8	Broomhurst Farm to Warningcamp Hill	Lower Arun	Predominantly in FZ1. Fringing FZ2 & 3.	Lower Arun	Predominantly in FZ1. Minor interactions with 1% AEP and 5% AEP extent and 1% AEP +CC at 8km
8 – 27	South Downs	N/A	FZ1	N/A	FZ1
27 – 28	Adur western branch crossing	N/A	N/A	JFLOW	FZ3
28 – 28.5	Bines Green	N/A	N/A	Adur Eastern Branch	FZ3
29 – 30	Homelands Farm	N/A	N/A	Adur Eastern Branch	FZ3 – a side floodplain of the River Adur associated with some minor tributaries
Bolney Road/Kent Street onshore cable corridor option	Pooks Farm crossing	N/A	N/A	Adur Eastern Branch	FZ3

		Tidal		Fluvial	
Chainage (km)	**Location**	**Model**	**Flood risk overview / present day hazard rating**	**Model**	**Flood risk overview**
Wineham Lane onshore cable corridor option	Moatfield Farm crossing	N/A	N/A	Adur Eastern Branch	FZ3

5.3 Surface water

5.3.1 Areas at risk of surface water flooding are defined by the Environment Agency's Risk of Flooding from Surface Water (RoFSW) map (Environment Agency 2021c), which is reproduced in **Figure 27.2.5a-e, Annex B** (covering the PEIR Assessment Boundary) and **Figure 27.2.6a-b, Annex B** (the onshore substation option search areas only). The RoFSW map defines flood risk from surface water for the:

- 3.33% AEP (high risk) rainfall event;
- Between the 3.33% AEP and 1% AEP (medium risk) rainfall events;
- Between the 1% AEP and 0.1% AEP (low risk) rainfall event; and,
- Less than the 0.1% AEP (very low risk) rainfall event.

5.3.2 The RoFSW can be used to give an indication of the broad areas likely to be at risk of surface water flooding, as well as an estimation of the fluvial flood risk from minor tributaries of the Arun and Adur catchments not covered by the Environment Agency flood zones or the modelling discussed in **Section 5.2** above.

5.3.3 The interaction between the PEIR Assessment Boundary and the RoFSW zones is shown in **Table 5-7**, which shows that the majority of the PEIR Assessment Boundary (approximately 96%) is at low or very low risk of surface water flooding.

Table 5-7 Project interaction with RoFSW Zones

RoFSW Zone (AEP)	Risk	Area in each zone (ha)	Proportion of PEIR Assessment Boundary (%)
3.33% (1 in 30)	High	11.4	1.5
3.33% - 1%	Medium	17.9	2.4

RoFSW Zone (AEP)	Risk	Area in each zone (ha)	Proportion of PEIR Assessment Boundary (%)
(1 in 30 – 100)			
1% - 0.1% (1 in 100 – 1000)	Low	52.4	7.0
<0.1% (> 1 in 1000)	Very Low	664.4	89.1

5.3.4 The mapping in **Figure 27.2.5, Annex B** indicates that the risk of surface water flooding is generally low to very low for the south western and central portions of the PEIR Assessment Boundary. This correlates to where the underlying geology is dominated by chalk (irrespective of whether there are overlying deposits) and the Gault and Upper and Lower Greensand Formations. The exceptions to this (in the south west portion of the onshore cable corridor) are associated with occasional watercourse crossings / valleys where the Chalk is overlain by the Thames Group (clay), such as close to the 5km chainage to the north of Lyminster and close to the 7km chainage point near Warningcamp (chainages indicated in **Figure 27.2.1a-e, Annex B**).

5.3.5 The mapping (**Figure 27.2.5a-e, Annex B**) indicates regions at high risk in the northeast portion of the PEIR Assessment Boundary, where the underlying geology is dominated by the Weald Clay (from chainage 23km onwards, as discussed in **Section 3.6**). The majority of surface water flood risk intersecting the PEIR Assessment Boundary is associated with crossings of minor watercourses and tributaries of the River Adur and Cowfold Stream. Away from these watercourses, the risk is generally low.

5.3.6 In addition, the risk of surface water flooding is also generally low at the onshore substation search areas (over 90% of the onshore substation search areas are at low risk of flooding), but equally, both have regions at medium or high risk, and further areas of high risk often running along the boundaries, which could potentially impact site access. The interaction of the onshore substation search areas with the RoFSW zones are presented in **Table 5-8** below.

Table 5-8 Onshore substation search area percentage overlap with RoFSW Z ones

Onshore substation search area	3.33% (1 in 30)	3.33% - 1% (1 in 30 – 100)	1% - 0.1% (1 in 100 – 1000)	<0.1% (>1 in 1000)
Bolney Road / Kent Street	3.5%	6.5%	17.9%	72.1%
Wineham Lane North	0.9%	1.6%	11.1%	86.4%

5.3.7 The existing surface water flood risks at the two potential onshore substation search areas are discussed further in the run-on section (**paragraph 5.3.8**) below, along with any other locations along the PEIR Assessment Boundary considered to be at potential risk from this source.

Run-on

Overview

5.3.8 Surface water run-on is run-off that originates from outside of a site that runs onto a site (i.e. run-on). This may then pond onsite, or could take the form of a flow pathway which passes through the site. Run-on can be seen in the RoFSW mapping by flood extents that originate offsite which cross the PEIR Assessment Boundary.

5.3.9 As described above, the RoFSW mapping presented in **Figure 27.2.5a-e, Annex B** indicates a number of locations at risk of surface water run-on along the PEIR Assessment Boundary, particularly in the north eastern section. For example, **Figure 27.2.5a-e, Annex B** suggests some minor interaction between the temporary construction compound locations and regions of high risk at Washington, West Sussex (chainage point 20km) and Oakendene (to the west of the Bolney Road / Kent Street substation search area). The risk at these locations will need to be considered further as part of the final FRA prepared at ES stage and subsequent drainage design.

5.3.10 Regions of high risk are shown to intersect each of the two onshore substation search area options. A detailed overview of each of the onshore substation search areas with respect to the RoFSW mapping is shown in **Figure 27.2.6a-b, Annex B**.

Onshore substation search areas

5.3.11 The Bolney Road / Kent Street onshore substation search area shows greatest interaction with RoFSW flood extents, with approximately 3.5% of the onshore substation search area at high risk of surface water flooding, as presented in **Table 5-8** above. The onshore substation search area is intersected by two main surface water flowpaths evident in the 3.33% AEP extents, that drain south across the search area and into an Ordinary Watercourse (a small unnamed tributary of the Cowfold Stream) running along the southern boundary of the search area. In events of 1% AEP and greater, the southern boundary of the onshore substation search area is anticipated to be impacted by flooding from this unnamed tributary.

5.3.12 The Wineham Lane North onshore substation search area's interaction with RoFSW extents can be mainly attributed to ordinary watercourse flooding associated with an unnamed tributary of the River Adur that drains eastwards along the northern search area boundary. Surface water flowpaths across the onshore substation search area are only anticipated in the 0.1% AEP event, flowing northeastwards across the western and central portions of the search area.

Run-off

5.3.13 The development of permanent hardstanding at the onshore substation search areas[5] and temporary surfaces at temporary construction compounds and the haul road / temporary construction accesses has the potential to increase the overall extent of lower permeability surfaces within the PEIR Assessment Boundary. In the absence of effective surface water management measures, this could lead to an increase in peak runoff rates (and volumes) and a consequent increase in flood risk for downstream receptors. This is discussed further in the context of specific aspects of the Proposed Development in **Sections 6.3** and **6.4**.

5.3.14 As discussed in **Section 7.1**, appropriate flood risk management measures will be put in place, supported by suitable drainage strategies, to manage surface water for both the construction phase and for the permanent onshore substation, covering both surface water run-off and surface water run-on (note that attenuation of run-on flows is not necessarily required). The provision of appropriate drainage infrastructure will ensure be no increase in surface water flood risk as a consequence of the Proposed Development.

5.4 Sewer flooding

5.4.1 Sewer flooding occurs when intense rainfall overloads the sewer system capacity (surface water, foul or combined), and / or when sewers cannot discharge properly to watercourses due to high water levels. Sewer flooding can also be caused when problems such as blockages, collapses or equipment (such as pumps) failure occur in the sewerage system. Risk of flooding from sewers is likely to be limited to regions where extensive sewer systems exist (i.e. only where the PEIR Assessment Boundary intersects urbanised areas).

5.4.2 Spatial records of historical sewer flooding incidents were requested from Southern Water, however, it was advised that they were unable to provide such details from their DG5 register citing Regulation 12(3) (personal data) of the Environmental Information Regulations (2004). As a result, consideration of specific locations at risk of sewer flooding along the PEIR Assessment Boundary is limited to that information provided on a postcode basis in the Arun District Council SFRA (JBA Consulting, 2016) and Horsham District Council SFRA (AECOM, 2020) discussed below.

5.4.3 Highest incidents of sewer flooding within the Arun District are typically recorded along the coastal front in Bognor Regis (west of the proposed landfall). The number of recorded incidents within the BN17 5 postcode, which includes the landfall location, is relatively high with 22 recorded incidents. However, the postcode also includes urban regions of Littlehampton, Horsemere Green and Atherington; to which these incidents are likely attributed to. The number of recorded incidents along the remainder of the PEIR Assessment Boundary within

[5] Permanent infrastructure considered to have the potential to affect surface runoff rates is limited to the onshore substation search area(s) only. The joint bays associated with the onshore cable corridor are anticipated to be covered by natural material, and therefore no net impact to runoff rates is anticipated.

the district is low, with seven and eight incidents recorded within the BN17 7 and BN18 9 postcodes, respectively.

5.4.4 Within Horsham District Council, historical incidence along the PEIR Assessment Boundary from Harrow Hill to Bolney is typically low since the region is predominantly rural. A relatively high number of incidents (26) are recorded at Ashington, situated to the north of the PEIR Assessment Boundary that passes through Washington, West Sussex, but this is outside of the PEIR Assessment Boundary.

5.4.5 No spatial indication of historical flooding incidents is provided within the Mid Sussex District Council SFRA (2015). However, given the predominantly rural location of the PEIR Assessment Boundary that span into the Mid Sussex District, sewer flooding is not anticipated to be prevalent or pose a significant risk to the Proposed Development.

5.4.6 On this basis and given the predominantly rural location of the PEIR Assessment Boundary, sewer flooding is not anticipated to pose a significant risk to the Proposed Development. Therefore, it is proposed flood risk from sewer sources is scoped out of further consideration in **Sections 6** and **7** of this FRSA. Urban flooding in general is covered in **Section 5.3** above.

5.5 Groundwater

5.5.1 Shallow groundwater is likely to be encountered along sections of the onshore cable corridor. The southwest portion of the onshore cable corridor is underlain by chalk bedrock, classified as a primary aquifer harbouring large volumes of groundwater. The Horsham (AECOM, 2020), South Downs (Amec Foster Wheeler, 2017) and Arun District Council (JBA Consulting, 2016) SFRA's all indicate the potential for groundwater flooding within the districts.

5.5.2 The Arun District Council SFRA (JBA Consulting 2016) covers the southwest portion of the onshore part of the PEIR Assessment Boundary from the landfall location to close to Sullington Hill (chainage 15km in **Figure 27.2.1a-e, Annex B**). The report indicates several historical incidents of groundwater flooding within the district. Although all of these were recorded outside of the PEIR Assessment Boundary, it is also worth noting that, given the sites rural location, any groundwater flooding onsite may not have been reported and / or recorded given the lack of receptors that will have been impacted. The Environment Agency's Areas Susceptible to Groundwater Flooding (AStGWF) map, as included in Appendix F of Arun District Council's SFRA (JBA Consulting, 2016), indicates High (>= 75%) susceptibility across the majority of the district and within the PEIR Assessment Boundary.

5.5.3 Horsham District Council covers the majority of the PEIR Assessment Boundary, from near Sullington Hill (chainage 15km) to the northeast limit at the existing National Grid Bolney substation that cross into the Mid Sussex District. The SFRA completed in 2020 (AECOM, 2020) indicates that there are no historic incidents of groundwater flooding recorded within the district. The AStGWF dataset is included within Appendix F and indicates that areas susceptible to risk of groundwater emergence within the PEIR Assessment Boundary varies between 25% - 75%,

with regions of higher susceptibility outside of the PEIR Assessment Boundary to the south at Steyning, and further west at Pulborough and Amberley.

5.5.4 GeoSmart groundwater flood risk data is mapped in Figure 3B of the Horsham District Council SFRA (AECOM, 2020), providing a higher resolution indication of groundwater potential flood risk based on a 5m Digital Terrain Model (compared to the coarser AStGWF dataset). The dataset indicates a negligible risk across the majority of the District and PEIR Assessment Boundary, though regions of Low and Moderate risk coincident with the Adur Valley are indicated. Several regions of High risk are mapped within the vicinity of the PEIR Assessment Boundary at Washington, West Sussex. One of these appears to correlate with a Sand Pit quarry which the PEIR Assessment Boundary passes round to the south (i.e. avoiding the area of highest risk).

5.5.5 However, Figure 3B of the Horsham District SFRA (AECOM, 2020) indicates that the PEIR Assessment Boundary intersects with regions of high risk at the foot of Sullington Hill and Barnsfarm Hill at chainage points 16 to 17km. This location is at the foot of the chalk escarpment of the South Downs and in a dry valley (i.e. no watercourse at the ground surface) flanked by the two chalk escarpments on either side. The contours on the Ordnance Survey (OS) mapping (**Figure 27.2.1a-e, Annex B**) indicate a steady fall in ground levels along this valley to the north, along the PEIR Assessment Boundary corridor, indicating that any emergent groundwater will likely drain away to the north, potentially along the onshore cable corridor itself, until it reached the small watercourse close to the 18km chainage point (**Figure 27.2.1a-e, Annex B**) (if it had not reinfiltrated before then). Further consideration of this risk will be necessary in the final FRA which will accompany the ES.

5.5.6 The section of the PEIR Assessment Boundary that spans into Mid Sussex District Council is a region of negligible risk (of groundwater flooding) indicated by the GeoSmart data, with some overlap with regions of <25% susceptibility mapped in the AStGWF dataset.

5.5.7 Based on the above information, groundwater emergence or interception of shallow groundwater along the onshore cable corridor is most likely to occur at the following locations:

- within the Arun valley adjacent to Littlehampton and Lyminster. This coincides with areas at tidal and fluvial flood risk from landfall to chainage point 5km;
- where the onshore cable corridor passes through low ground / the dry valley at the foot of Sullington and Barnsfarm Hill (chalk escarpments), adjacent to Washington, West Sussex between chainage points 16 to 17km; and
- within the fluvial floodplain of the Adur Valley adjacent to Bines Green, Partridge Green, Pooks Farm and Moatfield Farm, between chainage points 27-28km and at the two proposed crossing locations on the Cowfold Stream. These locations coincide with areas at fluvial flood risk.

5.6 Artificial sources

5.6.1 The Environment Agency's Risk of Flooding from Reservoirs mapping (Environment Agency, 2021d) indicates that sections of the northeast portion of

the PEIR Assessment Boundary will be at risk of flooding in the event of reservoir embankment failures. Anticipated flood extents from Knepmill pond, situated on the western Adur branch, and New Pond and Furnace Pool on the eastern branch intersect the onshore cable corridor at crossing locations on the Adur western branch between 27-28km chainage points, and the Bolney Road / Kent Street and Wineham Lane onshore cable corridor options crossing the Cowfold Stream at Moatfield Farm and Pook's Farm respectively (sheet 5 (e) of **Figure 27.2.1a-e, Annex B**). These 'reservoir' flood extents are entirely confined to the fluvial floodplains of those watercourses in the vicinity of the PEIR Assessment Boundary.

5.6.2 The likelihood of such a dam failure event occurring is considered to be extremely low, given that arrangements are in place under the Reservoirs Act 1975 and the Flood and Water Management Act 2010 to ensure that regular inspection and essential safety work is carried out. That said, breaches at these locations, whilst not exceeding Flood Zone 3 extents, could generate significant water depths and velocities in affected areas without warning in a very short time. Therefore, it is essential that this risk is factored into emergency planning procedures for the construction and decommissioning phases, as discussed further in **Section 7.2**.

5.6.3 Review of OS mapping at 1:25000 scale suggests no additional impounded or raised waterbodies (any excluded from the Environment Agency reservoirs flooding extents) within the vicinity of the PEIR Assessment Boundary that will be anticipated to pose a flood risk in the event of a failure of artificial sources.

5.7 Climate change

5.7.1 As detailed in **Section 2.2**, NPS EN-1, NPS EN-3 and NPS EN-5 specify the requirement for schemes to take into account the potential impacts of climate change over the lifetime of the development. Given the activities proposed and the resulting risk, the approaches set out below are considered suitable and proportionate for the purposes of the FRSA.

5.7.2 The programme of the Proposed Development and its proposed lifetime were set out in **Section 4.2**. In summary, construction is anticipated to take up to 4 years, with an operational lifetime of around 30 years and up to a further 4 years for decommissioning. Construction is currently anticipated to commence around 2025, so for simplicity, timeframes of up to 2030 for construction, 2060 for operation and 2065 for decommissioning have been assumed. This provides a degree of contingency in the climate change horizons to allow for any minor delays in programme between now and commissioning of the Proposed Development.

5.7.3 The Environment Agency provides guidance on climate change allowances to be applied in flood risk assessments (Environment Agency, 2021b), covering peak fluvial flows, peak rainfall intensity, sea level rise and offshore windspeed and wave height. Allowances for other flood sources are not provided or considered.

Fluvial climate change allowances

5.7.4 The Environment Agency's peak river flow climate change allowances for the south east river basin district (Environment Agency, 2021b) are reproduced in

Table 5-9 below, together with the flood zone development vulnerability combination for which each applies.

Table 5-9 Peak river flow climate change allowances for the south east river basin district

Allowance	2015 to 2039 (construction to 2030)	2040 to 2069 (operation to 2060)	Relevant Flood Zone and development vulnerability combination guidance
H++	30% - N/A	60% - N/A	Some NSIPs are required to consider a credible maximum climate change scenario. Where necessary, this is set out in the relevant NPS. No such requirement is set out in NPS EN-01, NPS EN-3 or NPS EN-5 and so this 'sensitivity test' is not required for this assessment.
Upper end	25%	50%	Essential infrastructure in Flood Zones 2, 3a and 3b If development is appropriate even though it will not follow flood zone vulnerability categories, use the upper end allowance. Floodplain storage compensation – when the catchment is particularly sensitive to small changes in volume, which could cause significant increases in flood depth or hazard, or affected area contains essential infrastructure or vulnerable uses, such as primary schools, caravans, bungalows or basement dwellings.
Higher central	15%	30% - N/A	Less vulnerable development in Flood Zones 2 and 3a - for designing safe access, escape routes and places of refuge (less vulnerable development is not permitted in Flood Zone 3b). Floodplain storage compensation – in most cases use the higher central allowance.
Central	10%	20% - N/A	Less vulnerable in Flood Zones 2 and 3a – use the central and higher central allowances to assess a range of allowances. Water compatible in Flood **Zones 2 and 3a and 3b.** Floodplain storage compensation – when you can demonstrate that the affected area contains only low vulnerability uses, such as water compatible development.

5.7.5 The potential impacts of climate change were assessed as part of the Lower tidal River Arun (20%) (Atkins, 2010) and Adur eastern branch (35% and 45%) (JBA Consulting, 2017) modelling studies. Climate change allowances applied in each modelling study were presumably appropriate for the purpose of each study and at the time. Where results are needed for assessment at ES, but are only available from the J-Flow model, the 0.1% AEP extents (i.e. Flood Zone 2) could be used as a proxy for the 1% AEP plus climate change scenarios, if upon review the results are deemed appropriate / the best available. Where no fluvial modelling exists (smaller watercourses) the 0.1% AEP RoFSW extents have been used (and will be for the FRA to support the ES) as a proxy for the fluvial risk during the 1% AEP plus climate change event. The fluvial model climate change allowances we are proposing to apply to the various elements of the Proposed Development are presented in **Table 5-10** below, along with the current NPPF guidance for reference.

Table 5-10 Available climate change model outputs and current NPPF guidance

Phase	Years	Development element	Flood risk vulnerability classification	Recommended climate change allowance	Model outputs available
Construction	2025 to 2030	Temporary construction logistics compounds Construction (and enabling) works	Essential Infrastructure	25%	Lower Arun 1% AEP 20% Adur Eastern Branch 1% AEP 35% Adur JFLOW 0.1% AEP Minor watercourses 0.1% AEP extent from the RoFSW
		Watercourse crossings	Water compatible	10%	
Operation and maintenance	2030 to 2060	Onshore cable corridor	Essential Infrastructure	50%	N/A – development element will be resilient to flooding
		Onshore substation search areas	Essential Infrastructure	50%	Minor watercourses 0.1% AEP extent from the RoFSW

Phase	Years	Development element	Flood risk vulnerability classification	Recommended climate change allowance	Model outputs available
Decommissioning	2060 to 2064	Onshore cable corridor	Essential Infrastructure	50%	Lower Arun 0.1% AEP Adur Eastern Branch 1% AEP 45% Adur JFLOW 0.1% AEP Minor watercourses 0.1% AEP extent from the RoFSW
		Onshore substation search area	Essential Infrastructure	50%	Minor watercourses 0.1% AEP extent from the RoFSW

5.7.6 For assessment of fluvial flood risk during the construction phase, the 20% uplift results in the River Arun floodplain are considered to be an acceptable estimate of the potential impacts of climate change given the anticipated timeframe of construction works between approximately 2025 and 2028/2029. This is considered a suitable and proportionate approach given the activities proposed. For the Adur eastern branch fluvial model, the uplift of 35% exceeds the recommended allowance of 25% for the construction phase and will therefore ensure a conservative approach. In addition, an approach of avoiding construction works in Flood Zone 2 (0.1% AEP) wherever possible has been applied in the River Adur catchment, which is assumed to exceed the fluvial 1% AEP plus 25% extent.

5.7.7 For the assessment of fluvial risk during the operation and maintenance phase, the only location for which a climate change allowance is considered necessary will be at the permanent onshore substation on the basis that the onshore cable will be resilient to flooding (being entirely buried). There are no watercourses of significant scale in the vicinity of the onshore substation search areas to warrant modelling to be undertaken specifically for this FRSA, and an approach of avoidance of the 0.1% AEP RoFSW flood extent is considered suitably precautionary as a proxy for the 1% AEP plus 50% flood extent from the minor watercourses involved.

Tidal climate change allowances

5.7.8 **Table 5-11** below outlines the recommended annual sea level rise allowances for the south east river basin district, and the anticipated total sea level rise for the construction, operation and maintenance, and decommissioning phases of the Proposed Development timeline. Current guidance from the Environment Agency recommends using both the higher central and upper end allowances to understand the range of potential impact. As outlined in **Table 5-11** above, no requirement is set out in NPS EN-1, NPS EN-3 or NPS EN-5 to consider the credible maximum climate change scenario, and hence, the H++ scenario is not considered necessary in this case.

Table 5-11 Sea level climate change allowances for the south east river basin district (mm per year)

Allowance	Annual sea level rise (mm/year)		Total sea level rise (mm)		
	2000 to 2035 (mm)	2036 to 2065 (mm)	2030 (construction)	2060 (operation and maintenance)	2065 (decommissioning)
Upper end	6.9	11.3	89.7	406.7	463.2
Higher central	5.7	8.7	74.1	320.1	363.6

Note: Values calculated using a base year of 2017, to facilitate addition to the extreme peak sea level estimates provided in **Table 5-12** below.

5.7.9 For context, the sea level allowances presented in **Table 5-11** have been applied to the extreme peak sea level values presented previously for Littlehampton Estuary, to provide an indication of potential extreme water levels at the coast in the future. These are presented in **Table 5-12** below.

Table 5-12 Extreme peak sea level values at Littlehampton Estuary, including climate change

Extreme sea level event (% AEP)	Peak sea level (m AOD)						
	2017	2030		2060		2065	
		Higher central	Upper end	Higher central	Upper end	Higher central	Upper end
0.5	3.97	4.04	4.06	4.29	4.38	4.33	4.43
0.1	4.17	4.24	4.26	4.49	4.58	4.61	4.72

Notes: Base values from Littlehampton Estuary (4572_1) have been used as a conservative estimate as it is slightly higher than the offshore value opposite Climping Beach.

5.7.10 It is worth noting that application of the uplifts should not be directly applied to water levels experienced in the floodplains further upriver, as it would overestimate the risk. Instead, model results should be used.

5.7.11 The potential impacts of climate change were assessed as part of the Lower tidal River Arun (Atkins, 2010) and Arun Coastal modelling (JBA Consulting, 2012) studies. The Arun coastal model includes 2070 and 2115 uplift scenarios applied to the 0.5% AEP event. These correspond to uplifts of +0.49m and +1.12m respectively. The 2070 uplift of 0.49m therefore exceeds the recommended allowance for the end of the Proposed Development's lifetime (operation and maintenance phase) to 2060 (an increase in water level of 406.7mm (0.4m) using the upper end allowance, resulting in a peak sea water level of 4.4m AOD). The tidal model outputs from the Lower tidal River Arun model apply a 2110 future sea level estimate to assess the potential impact of climate change to the 0.5% AEP event. However, no detail is provided as to the level this equates to.

5.7.12 On the basis that the onshore cable infrastructure will be flood resilient once constructed (entirely buried), tidal flooding will not pose a risk during the operation and maintenance phase at Climping or in the floodplain of the River Arun (i.e. consideration of the 2060 climate change allowance is not necessary). Provided the coastline remains seaward of the transition joint bay (where the sea-based cables transition to land based cables), no consideration of the 50% climate

change allowance is necessary. Therefore, only flood risks during the construction phase (approximately 2025 to 2029) will require assessment.

5.7.13 For the assessment of tidal flood risk during the construction phase (for which an increase in peak water level of 0.14m would apply if using a base year of 2010, reflective of the date of the Lower Arun modelling), it is proposed that the present day flood hazard map for the River Arun tidal floodplain provides a more appropriate indication of the potential tidal flood risks than the 2070 or 2110 model results (for which uplifts of 0.49m and greater were applied). This approach is considered to be appropriate provided a precautionary approach is taken in the subsequent assessment to ensure sufficient consideration is given for the potential for higher risks and hazard that could occur in 2030 than is indicated in the 'present day' results.

5.7.14 An example of a precautionary approach in the subsequent assessment is as follows: the onshore cable corridor already passes through an area indicated as 'danger to all' in the present day flood hazard map. As such, appropriate flood risk management measures will already be necessary to safeguard works through areas at risk from the highest hazard rating (danger for all). A precautionary approach could involve applying similar measures to all locations in the tidal floodplain (even those currently indicated to be at lower risk in the present day mapping). Given the infrequency of tidal flood events, the implications of such a precautionary approach may be minimal in practice (flood response in the event of receiving a flood warning for example), and therefore acceptable to the developer / contractor. Another approach (where the above was overly precautionary) could be to apply a hazard rating one greater than indicated in the present day model results (other than in areas of 'null' hazard which would be assumed to remain the same). Where necessary for the assessment to support the FRA, an appropriate precautionary approach will be used for the consideration of flood hazard.

5.7.15 To account for the potential increase in flood extent during the 0.5% AEP plus climate change scenario, the 0.1% AEP tidal flood extent (Flood Zone 2) will be used as a proxy for the 0.5% AEP plus climate change tidal flood extent. Under this approach the avoidance of works in Flood Zone 2 (where possible, such as temporary construction logistics sites) will provide a suitably precautionary approach, thus avoiding the need to rerun the Environment Agency's flood models. It is suggested that this will be a suitable and proportionate approach given the temporary nature of the risks and activities proposed in the Lower Arun tidal floodplain, and is therefore proposed to be taken forward.

5.7.16 For the decommissioning phase (up to 2065), the Arun coastal model 0.5% AEP defended event with 2070 climate change uplift scenario (an uplift of +0.49m) is considered suitable. The flood extent associated with such an event is largely comparable to the present day 0.1% AEP undefended event, i.e. Flood Zone 2, but covering a slightly larger extent in a few areas, including near the landfall (chainage 0km) and the temporary logistics construction compound near to the 1km chainage.

Pluvial sources

5.7.17 The RoFSW dataset has been used as a primary means of assessing surface water flood risk. The dataset does not include a specific scenario to determine the impact of climate change on surface water flood risk. However, it is possible to use the 0.1% AEP mapped outputs as a proxy as to the potential impacts of climate change associated with the 1% AEP plus climate change event, which is deemed sufficient to inform the assessment of flood risk for the construction, operation and maintenance and decommissioning phases of the Proposed Development.

Groundwater sources

5.7.18 No specific guidance is provided for the effects of climate change on groundwater levels. However, it is anticipated that sea level rise associated with climate change in the future will lead to a rise in average groundwater levels in adjacent coastal aquifer systems (Environment Agency, 2018).

5.7.19 Drier and warmer summers associated with climate change may lead to a shortening of the groundwater recharge season, though this may be compensated in part by an increase in winter rainfall (UK Groundwater Forum, 2019). The impacts of climate change on groundwater in the UK therefore may include:

- long-term decline in groundwater storage;
- increased frequency and severity of groundwater droughts;
- increased frequency and severity of groundwater related floods; and
- saline intrusion in coastal aquifers due to sea level rise and resource reduction.

5.7.20 Further variability in groundwater levels in the future could result from changes in abstraction (for example associated with water supply and / or irrigation), particularly in aquifers that support high yield (and thus could present the greatest groundwater flood risk).

5.7.21 If seasonally high groundwater levels are encountered as a result of increased winter rainfall, groundwater intrusion may impact onshore cable corridor construction. However, no allowance for climate change has been considered for the construction phase given the short timeframe to completion.

5.7.22 The onshore cable itself is considered resilient to flooding and the onshore substation search areas are underlain by clay. As a result, no allowance for climate change is required with respect to this permanent onshore infrastructure.

6. Assessment of flood risk

6.1 Introduction

6.1.1 The potential flood sources are set out in **Section 5** and this section identifies the potential receptors that could be at risk (both to and from the Proposed Development) and provides the general approach to the assessment that is proposed for the final FRA to accompany the ES.

6.2 Receptors scoped out

6.2.1 Flood risk associated with the operation and maintenance phase (permanent onshore infrastructure) is limited to the onshore substation search areas. The onshore cable and associated joint bays are scoped out of the assessment. This applies to any risk to the infrastructure itself, as well as any risks arising from the presence of the infrastructure. This scoping out is on the basis that the onshore cable and associated joint bays will be flood resilient, finished level with the ground surface in areas at risk of flooding and covered with natural material (see Flood Risk Management Measures in **Section 7** below). These embedded environmental measures will ensure that the infrastructure will not be liable to physical or structural damage from flood water or from debris carried by floodwater, will not pose an obstruction to water flow nor loss of floodplain storage and / or conveyance; and cause no net impact on runoff rates or volumes.

6.3 Receptors scoped in

6.3.1 Four broad groups of receptors have been identified for consideration, as summarised in **Table 6-1**. The first three (ID1, ID2 and ID3) are related to the Proposed Development itself, and the fourth group (ID4) comprises third party property and infrastructure within the vicinity of the PEIR Assessment Boundary. Third party receptors identified through initial analysis of locations of potential impact are displayed in **Figures 27.2.4** and **27.2.5, Annex B**.

Table 6-1 Potential flood receptors

ID	Title	Description	Vulnerability	Duration	Comments
ID1	Construction and enabling works and temporary infrastructure	Personnel, plant and temporary infrastructure associated with construction works	Essential Infrastructure	Construction phase and decommissioning phase	Some receptors located within FZ2 and FZ3, potential risks from fluvial, tidal, surface water, groundwater and artificial flooding.

ID	Title	Description	Vulnerability	Duration	Comments
ID2	Permanent onshore infrastructure	Onshore substation electrical and civil infrastructure	Essential Infrastructure	Operation and maintenance phase	All substation options search areas are situated within Flood Zone 1. Potential risks from surface water, groundwater and ordinary watercourses remain.
ID3	Operation and maintenance phase maintenance activities and temporary infra-structure	Personnel, plant and temporary infrastructure associated with regular inspection and periodic maintenance activities	Essential Infrastructure	Short periods throughout operation and maintenance phase	Some receptors located within FZ2 and FZ3, potential risks from fluvial, tidal, surface water, groundwater and artificial sources.
ID4	Offsite third party receptors	Third-party property and infrastructure in and around the PEIR Assessment Boundary	Variable	Construction and operation and maintenance and decommissioning phase	Eight potential off-site receptors with varying vulnerability have been identified as being at potential increased risk of fluvial and tidal flooding as a result of the Proposed Development, if appropriate measures to address such risks were not incorporated into the design. Four potential receptors with varying vulnerability have been identified

ID	Title	Description	Vulnerability	Duration	Comments
					potential increased risk due to changes in surface water.

Table notes: Essential Infrastructure includes temporary construction access routes and working areas.

6.4 Risks during the construction phase

6.4.1 The majority of potential flood risks associated with the Proposed Development will occur during the construction phase. Potential risks associated with tidal and fluvial, pluvial, groundwater and artificial flood sources have been discussed in the separate sub-sections (**paragraphs 6.4.3** to **6.4.39**) below.

6.4.2 It is worth noting that construction works will be phased according to programme requirements and therefore only sections of the PEIR Assessment Boundary will be subject to construction works at any one time as a consequence. Reinstatement will be undertaken as soon as works are complete, meaning that the duration of any temporary risks and impacts identified below are likely to be shorter than the overall construction programme of approximately four years in total.

Combined tidal and fluvial flood risk

6.4.3 During the construction phase there is the potential for:

- temporary loss of floodplain storage;
- compartmentalisation of the floodplain; and / or
- changes to watercourse flow conveyance as a consequence of the development of temporary infrastructure in and around watercourses and in floodplain areas.

6.4.4 The potential impacts of the Proposed Development on fluvial and tidal flood mechanisms are first discussed, before this section concludes with an assessment of the consequences of these impacts on flood risk receptors.

Loss of floodplain storage

6.4.5 The creation of temporary raised structures in the fluvial floodplain during construction works, such as stockpiles of soil arising from the onshore cable trenches and raised stone haul road and associated stockpiles of topsoil, could lead to a loss of floodplain storage and thus an increase in water levels elsewhere. The potential for such impacts in the tidal floodplain is considered to be negligible, due to the extreme volume of water associated with the sea far exceeding the potential for lost floodplain storage.

6.4.6 The general approach will be to keep raised structures (stockpiles and raised stone haul road) to a minimum in the fluvial floodplain, and to avoid them entirely

in those areas where potential third-party receptors have been identified that could be impacted. This will be achieved by temporary stockpiling excavated soil to outside of the fluvial floodplain, and / or using trackway or similar for the haul road, to avoid the need for soil excavation to create a stone road and avoid the raised stone road itself. The need to avoid the creation of raised structures in the fluvial floodplain will primarily apply to the IDB area, through which trenchless approaches cannot avoid the fluvial floodplain entirely.

6.4.7 If necessary, further assessment will be undertaken at the identified receptors (and any additional receptors that are identified following the PEIR stage) in the final FRA to accompany the ES.

Compartmentalisation of the floodplain

6.4.8 The presence of the proposed construction phase infrastructure within the floodplain has the potential to compartmentalise the floodplain, or in other words affect the conveyance or movement of flood waters across the floodplain and thus affect flood extent and depths at the local scale. This effect will only occur where the flood depths are equal to or less than raised features (such as temporary construction access tracks and soil stockpiles). The provision of regular gaps in stockpiles will minimise the risk of such compartmentalisation occurring.

6.4.9 The specification of appropriately sized culverts at watercourse crossing points will ensure that the conveyance capacity of the ditch network is maintained, or indeed may be improved where culverts of insufficient capacity are upgraded.

Watercourse flow conveyance

6.4.10 If not appropriately designed, the new and upgraded watercourse crossings that are required for temporary construction access have the potential to adversely affect flow conveyance within the affected watercourses and therefore to influence flood depths.

6.4.11 Temporary watercourse crossings required for the temporary construction haul road will employ a mixture of clear span bridges and culverts based on crossing specific requirements (size of watercourse, capacity of nearby culverts up and downstream, and flood risk) to ensure flow conveyance is maintained. No temporary watercourse crossings are proposed for locations to be crossed using trenchless techniques (for the cable), i.e. no temporary crossings of Main Rivers are proposed.

6.4.12 Theoretically, direct disturbance of watercourses and / or deposition of sediment arising from temporary construction activities in watercourses could also reduce flow conveyance and potentially increase flood risk. A range of construction phase measures will be implemented to control silt-laden runoff from working areas and minimise direct channel disturbance. These will be set out in **Chapter 27: Water environment, Volume 2**.

6.4.13 Given the requirement to obtain permits and consents for all watercourse crossings and the proposed implementation of measures to minimise impacts on watercourses during the construction phase, it is concluded that the Proposed Development is unlikely to increase flood risk through impacts on watercourse conveyance.

Risk to construction activities and temporary infrastructure (ID1)

6.4.14 The construction activities that will be carried out in the working areas located within the floodplain areas throughout the PEIR Assessment Boundary are considered to be at risk of combined fluvial and / or tidal flooding. This particularly involves the presence of construction personnel and plant in these areas. The preparation of an appropriate emergency response plan for flood events will ensure that these risks are avoided or minimised to an acceptable level. The flood response and evacuation plan will include the following elements:

- areas at risk of flooding should be clearly marked on site access plans, including details of Environment Agency Flood Warning Areas;
- evacuation routes from flood risk areas should be clearly defined;
- the circumstances under which evacuation of flood risk areas will take place should be specified. It is suggested that appropriate triggers for evacuation might be receipt of a Met Office Severe Weather Warning for heavy rain or an Environment Agency Flood Warning for the area (construction works may be suspended in such weather in any case, reducing the likelihood of occupation at such times of elevated flood risk); and
- those items of plant and equipment that could be left in-situ without risk of damage or causing pollution should be identified, together with those items that should be evacuated, provided sufficient notice is provided and it is safe to do so.

Risk to third-party receptors (ID4)

6.4.15 Eight potential off-site third party receptor locations (each location may have multiple receptors associated with it) have been identified that could potentially be at increased risk of tidal and / or fluvial flooding as a result of the Proposed Development in the absence of appropriate measures (appropriate measures have been set out in **Section 7** below). These are shown in **Figure 27.2.7, Annex B**. All of those identified are located in or on the edge of the Arun IDB District. No potential receptors were identified within the Adur catchment on the basis that the proposed approach is to avoid construction works in the floodplains by undertaking trenchless approaches where possible (and a lack of receptors nearby where not possible). If necessary, further assessment of the potential risks to the various receptors will be undertaken for the final FRA to accompany the ES, however, an approach has been sought which aims to avoid impacts to any of the receptors through incorporation of appropriate embedded environmental measures into the design.

6.4.16 Receptors identified are shown in **Figure 27.2.7, Annex B** and include:

- residential properties within Atherington;
- The Mill, Climping;
- Climping Park;
- Brookside Caravan Park;
- residential and mixed-use properties on Church Lane, Lyminster;

- Priory Farm;
- Old Waterworks Farm; and
- Arundel Station.

6.4.17 Additional mitigation may be required in the vicinity of these receptors, in the form of avoiding any raised structures (e.g. stockpiles and raised temporary construction haul road) within the fluvial floodplain as discussed in **Table 7-1**.

6.4.18 On the basis of this additional mitigation, together with the embedded environmental measures proposed throughout the PEIR Assessment Boundary to address floodplain storage, compartmentalisation and watercourse conveyance, it is anticipated that the final FRA to accompany the ES will be able to conclude that there will be negligible change in the risk of fluvial or tidal flooding to third party receptors as a result of construction activities associated with the Proposed Development.

Surface water flood risk

Risk to construction activities and temporary infrastructure (ID1)

6.4.19 As shown in **Figure 27.2.5a-e, Annex B**, some aspects of the PEIR Assessment Boundary intersect existing surface runoff flow routes. Such flow routes could pose a risk to construction activities, particularly given the nature of surface water flooding that is often driven by intense, short duration high intensity rainfall with limited warning time.

6.4.20 In general, the surface water flood extents appear to be coincident with the channel networks along the onshore cable corridor, indicating a general low risk of surface water flooding. However, regions of high-risk areas are more prevalent in the north east section of the PEIR Assessment Boundary. Mapping indicates that the north east section of the PEIR Assessment Boundary is traversed by a number of a surface runoff pathways and minor watercourses draining into the River Arun and Cowfold Stream. Regions of high risk are also mapped intersecting the temporary construction compounds at Washington and Oakendene.

6.4.21 Appropriate flood risk management measures (see **Table 7-1**) should avoid any significant issues associated with surface water runoff pathways, minor watercourses and regions of high risk identified above. For example, appropriate sizing of haul road culverts and bridges based on crossing specific requirements will ensure existing conveyance capacity is maintained. In any case, even if surface water flooding were to occur in these areas of the temporary construction site, this will be of short duration and limited extent, and temporary construction activities, plant and infrastructure could be expected to be resilient to this type of flooding.

6.4.22 It is concluded that the surface water flood risk to construction workers is minor and deemed to be of lower significance than the combined flood risk arising from fluvial and tidal sources. Therefore, provided the generic embedded environmental measures recommended to address drainage and flood risk requirements are implemented as set out in **Section 7**, no further location-specific measures to address surface water flood risk anticipated to be required.

Risk to third-party receptors (ID4)

6.4.23 Four third party receptors have been identified that could potentially be at increased risk of surface water flooding as a result of the Proposed Development and in the absence of appropriate flood risk management measures. These third-party receptors are displayed in **Figure 27.2.8a-b, Annex B** and include:

- mixed-use properties on Sandhill Lane, Washington;
- Rock Business Park, Washington;
- Yokenclose Barn, Bines Green; and
- Springlands, Wineham.

6.4.24 The development of temporary construction haul roads and areas of hardstanding (required to progress construction works) will result in a reduction in permeability in the PEIR Assessment Boundary. However, as outlined in **Section 4**, the temporary construction haul road and temporary construction / logistics compounds will be developed with aggregate surfaces that will still allow infiltration of incident rainfall.

6.4.25 In addition, many of the proposed temporary construction access routes (to reach the onshore temporary construction corridor) will either comprise or follow the route of existing access tracks. Where existing access routes or tracks are already of sufficient structural capability, these will be utilised without modification. Otherwise, they will be upgraded. Where completely new temporary construction access tracks are required, these will be in place only for as long as required to provide temporary construction access, after which the ground will be reinstated to its pre-development condition, meaning that any localised change to the existing surface run-off regime will be short-lived.

6.4.26 Furthermore, the new access track surfaces will be widely dispersed, meaning that infiltration of incident rainfall will be locally displaced, rather than leading to an overall increase in runoff rates. Where there is considered to be an elevated risk of surface runoff occurring, for instance where tracks traverse sloping ground, shallow infiltration trenches will be installed to allow any runoff to be captured and to promote infiltration to ground. It is therefore considered that any localised increases in surface runoff generated from new temporary construction access tracks and hardstanding can be adequately controlled by standard construction best practice.

6.4.27 The embedded environmental measures noted in **Table 7-1** to mitigate the risk of floodplain compartmentalisation, ensuring that there are regular gaps in temporary soil stockpile embankments, combined with cross-drainage beneath raised sections of access tracks, will ensure that existing surface runoff pathways are not significantly disrupted by temporary construction access infrastructure. Gaps and cross drainage will be sited with due consideration for the surface water flow pathways indicated in **Figure 27.2.5a-e, Annex B**.

6.4.28 As discussed in **Section 4**, dewatering of excavations may be required. In order to ensure such works do not result in an increase in flood risk downstream water from excavations will preferably be discharged to ground and allowed to infiltrate. Where this is not possible, and direct discharge to a watercourse is necessary, this could conceivably increase downstream water levels and flows. Dewatering will

therefore be suspended if there are any fluvial flood alerts or warnings in place in those watercourses downstream. Such events would coincide with heavy rainfall, during which works may cease in any case.

6.4.29 To support construction works, it is anticipated that approximately four temporary construction logistics compounds will be required for the duration of the onshore cable corridor construction phase. There will also be temporary construction compounds in the vicinity of the landfall and new onshore substation locations. Any new areas of temporary hardstanding will be constructed using semi-permeable compacted aggregate to maintain permeability and run-off rates. Existing drainage infrastructure will be utilised wherever possible, where this exists, with upgrades as necessary. Temporary drainage arrangements, in accordance with sustainable drainage system (SuDS) principles, will be provided where existing drainage infrastructure is not available or unsuitable.

6.4.30 Drainage strategies will need to be prepared for each compound, including specification of appropriate runoff rates and SuDS measures. It is envisaged that simple storage measures, such as a perimeter drain, will be sufficient to control run-off from the additional semi-permeable areas without any additional flow control measures being necessary. As the LLFA and statutory consultee for drainage, these drainage strategies will be prepared in liaison with West Sussex County Council and finalised prior to establishment of the temporary construction compounds.

6.4.31 Provided that the measures described above to control runoff and to ensure that existing surface runoff pathways are not disrupted are in place during construction activities, it is considered that there will be no increase in surface water flood risk to third party receptors.

6.4.32 Once construction activities are complete, all temporary construction haul roads, compounds, access tracks and hardstanding will be removed and the ground re-instated to its pre-development condition.

Groundwater flood risk

Risk to construction activities and temporary infrastructure (ID1)

6.4.33 Initial investigations undertaken thus far indicates that portions of the PEIR Assessment Boundary could be liable to groundwater flooding at the surface, particularly where there are significant drops in elevation, such as at the edge of the South Downs (e.g. the Chalk escarpment at the base of Sullington Hill). This will be investigated further for the final FRA to accompany the ES.

6.4.34 There is also potential for shallow groundwater to be encountered during excavations for the onshore cable corridor construction, particularly in valley floor locations in the Adur and Arun catchments. These excavations may require dewatering to facilitate construction. There is a potential risk to construction personnel and equipment working in excavations at or below the water table level. This will be controlled by pumping under normal circumstances. Where extreme groundwater flooding is encountered (i.e. groundwater flooding at the surface for several weeks) no works within the affected areas will take place and works could be timed to undertake works in areas at highest risk during the summer.

6.4.35 The risk of groundwater flooding to construction activities will be considered further for the final FRA to accompany the ES and appropriate environmental measures will be proposed (in addition to normal construction best practice) where necessary.

Risk to third-party receptors (ID4)

6.4.36 No third-party groundwater flood risk receptors have been identified on the grounds that there is no potential pathway for the development to change groundwater flood risk at these receptors.

Artificial flood risk

Risk to construction activities and temporary infrastructure (ID1)

6.4.37 There could be a potential risk to life to construction workers working in any of the areas at risk in the event of a reservoir failure, given that there is likely to be limited warning. However, the overall risk to the Proposed Development has been assessed as low because of the very low likelihood of occurrence due to the inspection and maintenance works required of such structures and the general approach of employing trenchless crossing techniques (avoiding the floodplain entirely) wherever possible. The risk of reservoir failure should be factored into the emergency response plan for flood events to minimise risks further.

6.4.38 Environmental measures embedded into the design of the Proposed Development to address risks from the fluvial flooding will also serve a dual purpose of managing risks associated with reservoir failures too, provided appropriate emergency response (in response to warning of reservoir failure) is also accounted for.

Risk to third-party receptors (ID4)

6.4.39 The Proposed Development are unlikely to affect the severity of a reservoir failure to other parties given the volumes of water involved in an uncontrolled release, and given that mapped regions of risk intersect the PEIR Assessment Boundary only at main river crossings where trenchless crossing method (e.g. HDD) is anticipated to be used.

6.5 Risks during the operation and maintenance phase

Overview

6.5.1 As discussed in **Section 6.2**, the only aspects of the permanent onshore infrastructure that sit above ground and considered vulnerable to flooding are the onshore substation search areas. The onshore cable itself (including joint bays) will be entirely underground and resilient to flooding.

Risk to permanent infrastructure (ID2)

6.5.2 Both potential onshore substation search areas are situated within Flood Zone 1. Minor watercourses pass along the boundaries of some of the onshore substation

search areas, and thus provide a minor risk of fluvial flooding which should be accounted for when determining the layout and means of access to the search area. A sequential approach to the layout of the onshore substation search area should be undertaken, whereby the most vulnerable elements of the search area are located in the areas at lowest risk, and any permanent access to the search area which requires crossing of the watercourse should be subject to suitable design to ensure flow capacities are maintained.

6.5.3 Regions of high risk of surface water flooding are mapped across all potential onshore substation search areas. In the absence of appropriate mitigation, aspects of the onshore substation search areas and associated infrastructure may be at risk of flooding from both surface water run-on and run-off. Site specific drainage strategies should incorporate mitigation measures to address existing surface water flood risk and may incorporate measures such as swales to capture flowpaths at the onshore substation search area boundary or raising of flood sensitive infrastructure to an appropriate level. An overview of potential mitigation measures for permanent infrastructure is provided in **Section 7.3**.

6.5.4 The risk of groundwater flooding at the onshore substation search areas is considered very low. All onshore substation search areas are situated within an area mapped as negligible risk in the Horsham District Council SFRA (AECOM, 2020). In addition, there are no flood sensitive elements of the onshore substation search areas envisaged to be at or below ground level.

6.5.5 All onshore substation search areas are situated outside of mapped regions of reservoir flood risk, and no other raised waterbodies have been identified within the vicinity of the search areas. Consequently, the onshore substation search areas are not considered at risk of flooding from artificial sources.

Risk to operation and maintenance phase maintenance activities and temporary infrastructure (ID3)

6.5.6 Once construction of the onshore cable corridor is completed, inspections to sections of the onshore cable may be required by vehicle or on foot. Personnel carrying out inspections could be at risk of flooding in areas where a fluvial, tidal, surface water, groundwater or artificial risk has been identified. It is recommended that a flood response and evacuation plan similar to that proposed for the construction work in **Section 6.3** be incorporated into inspection procedures to mitigate this risk.

Risk to third party receptors (ID4)

6.5.7 The onshore substation search area will include areas of hardstanding with the potential to increase runoff rates (albeit sites may be developed with aggregate surfaces that will still allow infiltration of incident rainfall). A drainage strategy will be prepared in accordance with SuDS principles, with the flood risk requirement to retain runoff discharges to predevelopment rates and volumes (or appropriate control to achieve the same effect).

6.5.8 No additional risk to third party receptors has been considered from fluvial, tidal, groundwater or artificial sources, on the basis that there are no aspects of the

permanent development considered to have the potential to impact the existing risk.

6.6 Risks during the decommissioning phase

6.6.1 Risks during the decommissioning phase will be similar to those encountered during the construction phase. Indeed, in many locations the risks will be less because of the reduced level of works associated with decommissioning compared to construction. For example, it is proposed that the onshore cable will remain in situ, with just the end caps sealed off. This presumably will therefore result in reduced excavation and thus stockpiling of soils, thus reducing the need for movement and storage of soils outside of the floodplain. Reduced works in the floodplains will therefore reduce the opportunities for workers to physically be present in areas of flood risk, as well as reduced potential for impacts on third party receptors. The flood risk information which is available to inform this assessment (e.g. tidal flood modelling for the Arun for 2070, as discussed in **Section 5.7**) indicates that flood extents will not be significantly larger than the present day Flood Zone 2 extents, such that sufficient land outside of the flood extent to provide mitigation will still be available to implement similar measures as proposed for the construction phase. On this basis, it is anticipated that there will not be any flood risk obstacles during the decommissioning phase that could not be overcome with similar mitigation / environmental measures (for the most part at a reduced scale and / or frequency) as will be implemented during the construction phase.

6.6.2 It is however, recommended that re-assessment of flood risk is undertaken prior to decommissioning works commencing, to ensure that the best available flood risk information is considered at the time, to thus inform appropriately scaled measures. For example, if climate change occurs as anticipated, the flood hazard baseline will be altered compared to that which will apply during the construction phase – flood events may have occurred in the intervening years which could provide additional insight on the likelihood and consequence of flood events. Any identification of higher level of risk could be addressed through more stringent mitigation, such as a more precautious emergency flood plan for example For other measures, those that require physical intervention on the ground (such as surface water management) it is important that sufficient space is provided in the DCO application boundary to allow for such flexibility of implementing potentially larger intervention measures in the future, to account for greater rainfall intensity for example arising from a changing climate.

6.6.3 It is therefore concluded that, provided sufficient space is provided in the DCO assessment boundary to mitigate effects during the construction phase (with some contingency for uncertainty and the potential impacts of climate change), there will not be any flood risk obstacles during the decommissioning phase that could not be overcome.

7. Flood risk management

7.1 Delivery of embedded environmental measures

7.1.1 A number of embedded environmental measures relating to flood risk management have been identified in **Table 7-1** below. These measures address all potential flood risks to all potential receptors identified at this stage (assessment at PEIR stage). The embedded environmental measures have been secured in the PEIR commitments register (**Appendix 4.1: Commitments register, Volume 4**) and a register ID is provided in **Table 7-1.** These commitments will form the basis for identifying the embedded environmental measures for the final FRA to accompany the ES, subject to changes in design and further assessment at ES stage to ensure they are suitable, fit for purpose and necessary, reflective of the final DCO application.

7.1.2 It is anticipated that the flood risk management measures will be secured via DCO Requirement(s), such as (for the construction phase) the Outline Code of Construction Practice (COCP), which will be included as part of the ES. The Outline COCP will set out the environmental management and construction principles that will be implemented as part of the Proposed Development, including embedded environmental measures relating to flood risk management. It is worth noting that some of the measures in **Table 7-1** serve environmental management as well as flood risk, for example the commitment to providing SuDS (No. 2, C-73) will address water quality as well as water quantity matters.

Table 7-1 Embedded environmental measures relating to flood risk management

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
1	All works	Construction and permanent development in floodplains 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.	To ensure a sequential approach to development is taken and the Exception Test is passed where necessary.	C-75

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
2	All works	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.	To retain predevelopment runoff rates (and water quality control).	C-73
3	Construction works near watercourses	Any works within 5m of any watercourse in the Internal Drainage Board (IDB) district will be subject to consent from the Environment Agency. 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) will require consent from the Lead Local Flood Authority (LLFA).	To minimise the risk of any impacts to watercourses, including impacting flood flow conveyance.	C-182

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
4	Construction works near watercourses	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.	To minimise the risk of any impacts to watercourses, including impacting flood flow conveyance.	C-135
5	Soil stockpiles	During construction, no soil 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.	To minimise any impacts on flood flow conveyance, and to maintain access for watercourse maintenance.	C-130
6	Soil stockpiles	Where potential flood risk receptors could be impacted by a loss of floodplain storage and/or impacts on floodplain conveyance, soil stockpiles (associated 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.	To prevent any increase in water levels as a result of loss of floodplain storage volume in the vicinity of identified receptors.	C-131
7	Soil stockpiles	Soil stockpiles in the tidal floodplain will have regular gaps to prevent floodplain compartmentalisation. The maximum continuous length	To prevent floodplain compartmentalis ation.	C-132

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
		of embankment/bunds is to be determined in the Flood Risk Assessment (FRA).		
8	Soil stockpiles	Stockpile gaps will be located at topographic low points to preserve existing flow paths.	To maintain existing surface water flow paths.	C-179
9	Soil stockpiles	Where stockpiles are placed on both sides of the access routes/haul road the gaps should coincide.	To maintain connectivity of flow paths.	C-180
10	Soil stockpiles	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.	To prevent sedimentation of watercourses. To prevent loss of topsoil in a major flood event, thereby reducing the availability of material for reinstatement.	C-133
11	Temporary construction haul road and access routes	In the fluvial floodplain, temporary trackway (rather than raised stone roads) will be utilised for the temporary haul road and access routes wherever practicable.	To minimise the loss of floodplain storage associated with raised stone temporary construction haul road/access routes and associated temporary soil stockpiles.	C-119
12	Temporary construction haul road, access routes	Where use of trackway is not possible and potential flood risk receptors could be impacted (to be identified in	To minimise loss of floodplain storage.	C-175

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
	(and working areas)	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).	To avoid disrupting flow paths and compartmentalising the floodplain. To retain natural surface water flow routes.	
13	Temporary construction haul road (and working areas)	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.	To retain the existing infiltration characteristics and runoff rate (to avoid the need for attenuation throughout the route of the running track.	C-120
14	Temporary construction haul road (and working areas)	Run-off from access routes/haul road and working areas to be allowed to infiltrate wherever possible.	To retain the existing runoff rate.	C-121
15	Temporary construction haul road and access routes	Access roads will have cross drainage provided where necessary at topographic low points.	To retain natural surface water flow paths.	C-181
16	Temporary construction haul road and working areas	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 for the Sustainable Use of Soils on Construction Sites PB13298	To return the temporary construction haul road, access routes and working areas to a natural condition, in terms of their rainfall	C-7

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
			infiltration and runoff generation characteristics.	
17	Temporary construction working areas	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 impacts on flood flow conveyance and to maintain access for watercourse maintenance.	To prevent any increase in flood risk downstream.	C-134
18	Temporary construction compounds	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, and 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.	To retain predevelopment runoff rates in previously undeveloped areas (and pollution control).	C-129
19	Landfall	The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques.	To maintain the structural integrity of the flood defence and avoid additional engineering works.	C-43

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
20	Watercourse crossings (permanent for onshore cable)	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.	Maintain existing conveyance capacity and minimise risk of blockage.	C-122
21	Watercourse crossings (permanent for onshore cable)	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).	Maintain existing conveyance capacity and minimise risk of blockage.	C-5
22	Watercourse crossings (permanent for onshore cable)	Where the cable route crosses an Environment Agency flood defence, trenchless methodologies will be used.	To maintain the structural integrity of the flood defence and avoid additional engineering works.	C-125
23	Watercourse crossings (permanent for onshore cable)	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 pit further away from watercourses).	Minimise the potential flood risk to trenchless crossing activities during construction.	C-123

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
24	Watercourse crossings (permanent for onshore cable)	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.	Minimise the potential flood risk to trenchless crossing activities during construction.	C-124
25	Watercourse crossings (permanent for onshore cable)	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 river bed and watercourse is undisturbed by construction activities. Specific construction method statements will be prepared.	Maintain existing conveyance capacity and minimise risk of blockage.	C-138
26	Watercourse crossings (permanent for onshore cable)	Where trenchless techniques are not required or are not practical, 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 Environment Agency (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).	Maintain existing conveyance capacity and minimise risk of blockage.	C-17

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
27	Watercourse crossings (permanent for onshore cable and temporary for construction haul road)	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.	To avoid interaction with known flooding periods and to facilitate efficient construction.	C-139
28	Watercourse crossings (temporary for construction haul road)	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 (LLFA).	Maintain existing conveyance capacity and minimise risk of blockage.	C-126
29	Watercourse crossings (temporary for construction haul road)	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.	Maintain existing conveyance capacity and minimise risk of blockage.	C-127
30	Temporary watercourse crossings (for temporary construction haul road)	Any temporary crossings will be in place for the minimal time possible.	Maintain existing conveyance capacity and minimise risk of blockage.	C-128

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
31	Temporary watercourse crossings (for temporary construction haul road)	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.	To minimise the loss of channel capacity (and to prevent in channel or bankside disturbance where there are ecological requirements to do so).	C-145
32	Temporary watercourse crossings (for temporary construction haul road)	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.	Maintain existing conveyance capacity.	C-176
33	Temporary watercourse crossings (for temporary construction haul road)	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).	Maintain existing conveyance capacity and minimise the risk of blockage.	C-177
34	Temporary watercourse crossings (for temporary construction haul road)	Circular culverts for temporary watercourse crossings to have concrete bedding in locations where ground conditions suggest that settlement could occur, e.g. Internal Drainage Board (IDB) district.	To prevent settling of the culvert and resultant loss of flow capacity.	C-178
35	All works and temporary construction access routes in Flood Zones 2 and 3	Emergency Response Plans (ERPs) for flood events will be prepared for all construction activities, working areas, access and egress routes in floodplain	To minimise the risk to construction staff who may be working within the	C-118

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
		areas (tidal and fluvial). These plans will be provided for both construction and operation / maintenance phases.	floodplain, or may need to cross it to access / egress the part of the PEIR Assessment Boundary they are working in. To minimise the risk of contamination of flood water. To minimise the loss of non-flood resistant plant and materials.	
36	Programme of construction works in the floodplain	Works in the floodplain will be programmed to occur in late summer / early autumn if possible, to avoid interaction with known flooding periods to minimise the potential for displacement of floodwater.	To avoid interaction with known flooding periods and to facilitate efficient construction.	C-117
37	Permanent onshore cable	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).	To minimise loss of floodplain storage. To avoid disrupting flow paths and compartmentalising the floodplain. To retain natural surface water flow routes.	C-154
38	Permanent joint bays	Joint bays will be completely buried, with the land above reinstated to pre-	To minimise loss of	C-9

No.	Development element	Embedded environmental measure (PEIR commitment)	Reason	PEIR Commitments Register ID
		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.	floodplain storage. To avoid disrupting flow paths and compartmentalising the floodplain. To retain natural surface water flow routes.	
39	Permanent onshore cable and joint bays	All sub-surface infrastructure will be designed to retain sub-surface flow pathways to avoid any localised increases in groundwater flooding.	To retain natural sub-surface water flow paths and thus avoid impacting groundwater flood risk.	C-74
40	Permanent onshore substation	Measures (if any) required to address risks at the permanent onshore substation will be identified as part of the Flood Risk Assessment (FRA).	To ensure safe development and prevent any increase in flood risk downstream.	C-136

7.1.3 Additional measures relating to temporary watercourse crossing for the temporary construction haul road (relating to ecology rather than flood risk) are included in the PEIR commitments register (**Appendix 4.1: Commitments register, Volume 4**) but not included here as the primary purpose does not directly relate to flood risk, notably commitment C-64, which includes continuation of bed material through the culvert and 'isolation works' (to facilitate construction of the temporary culvert) being kept to as short a duration as possible (for the benefit of ecology).

7.1.4 Similarly, a number of additional measures relating to drainage, primarily standard practice to protect the water environment are included in the PEIR commitments register (**Appendix 4.1: Commitments register, Volume 4**), for example commitment C-140, which includes temporary cut off drains, where necessary, to capture run-off originating from upgradient areas before it reaches the construction works.

7.1.5 Further detail and discussion on specific flood risk management measures and how those identified relate to the phases of development are provided in **Section 7.2** to **7.7** below.

7.2 Emergency response plan for flood events

7.2.1 Emergency Response Plan(s) for Flood Events will be prepared for all working areas located in Flood Zones 2 and 3. This / these will also cover those working areas that are accessed via Flood Zones 2 and / or 3, to / from which access / egress could be compromised during a flood event.

7.2.2 Details of emergency responses for different parts of the Proposed Development will be developed by the contractor prior to commencement of construction in that area. The plan will detail the procedure to be followed if flooding of the construction site is expected:

- **personnel to evacuate the working areas at risk of flooding** – this is the primary safety consideration, and is the highest priority in the unlikely event that there is insufficient time to undertake the following activities;
- **making the site safe prior to evacuation** – this will include appropriate storage of equipment and materials, securing items to prevent them being mobilised in, or causing pollution of flood water; and
- **removal of critical plant and equipment from at risk areas** – this may be removal of critical plant and equipment from the temporary construction haul roads or working areas and could include raising critical items above the design flood level or removing them from the floodplain completely to one of the temporary construction compounds.

7.2.3 To expedite response upon receiving an alert / warning, the following elements should be specified in the Emergency Response Plan:

- areas at risk of flooding should be clearly marked on site access plans, including details of Environment Agency Flood Warning Areas;
- evacuation routes from flood risk areas should be clearly defined;
- the circumstances under which different responses will be implemented should be specified, with an escalation of response associated with increasing levels of danger. For example, a ‘be prepared’ alert may be raised upon receipt of an Environment Agency Flood Alert or a Met Office Severe Weather Warning for heavy rain, followed by an ‘evacuate’ order upon receipt of an Environment Agency Flood Warning, or at the discretion of the site Health, Safety, Security and Environment (HSSE) Manager, based upon an appraisal of local conditions; and
- those items of plant and equipment that could be left in-situ without risk of damage or causing pollution should be identified, together with those items that should be evacuated, provided sufficient notice is provided and it is safe to do so.

7.2.4 In addition, as discussed in **Table 7-1**, dewatering activities to a watercourse should be ceased when a Flood Alert or Flood Warning is received for an area downstream.

7.2.5 For any given area of construction, the flood response and evacuation plan(s) for that area should be finalised before commencement of works onsite. All personnel should be briefed on the contents of the plan as part of the site induction process.

The Emergency Response Plan for Flood Events will be secured through a DCO Requirement (likely via the COCP).

7.3 Construction phase

7.3.1 As outlined in **Section 6**, the majority of potential flood risks identified will occur during the construction phase. Measures to manage flood risks for this phase were set out in **Table 7-1**. A summary of key measures to address the sources, pathways and receptors identified thus far in this assessment are set out in **Table 7-2**.

Table 7-2 Summary of selected key flood risk management measures to address specific mechanisms during the construction phase

Flood mechanism	Summary of selected key flood risk management measures
Tidal, fluvial and artificial sources	• Emergency Response Plan for Flood Events (evacuation). • The statutory authorities' permitting and consenting regimes will be adhered to.
Fluvial	• No in-channel crossings for the permanent onshore cable (all crossings beneath the bed of watercourses). • Trenchless techniques for permanent Main River crossings (and under flood defences). • No temporary crossings for Main Rivers. • Clear span bridges to be used for temporary crossings too wide or deep to be crossing using for temporary culverts. • Temporary culverts to be sized to maintain existing flow conveyance. • Stand-off distances from watercourses (other than crossings).
Fluvial – Arun	• Temporary stockpiles to be stored outside of the fluvial floodplain (where potential receptors could be impacted). • Avoidance of raised stone roads where possible (use trackway or road level as close to the ground surface as possible).
Fluvial – Adur	• Trenchless techniques to avoid interaction with the floodplain, where possible (currently anticipated that trenchless techniques can span under the floodplains of the Adur (and Main River tributaries), thus minimising construction works in Flood Zone 2 or Flood Zone 3.

Flood mechanism	Summary of selected key flood risk management measures
Tidal – Arun	• Gaps in stockpiles to prevent floodplain compartmentalisation.
Surface water run-on and run-off	• SuDS for all elements of the temporary and permanent development. • Gaps in temporary soil stockpiles and cross drainage at topographic low points. • Use of semi-permeable material for temporary construction haul road and working areas to minimise run-off rates and volumes. • Infiltration as the preferred means of discharge. • Reinstatement post-construction.
Groundwater	• Sub-surface onshore infrastructure to be designed to retain sub-surface flow pathways. • Construction to be programmed to occur in late summer / early autumn if possible.

Notes: Not an exhaustive list, summary of key measures only for ease of reference – see **Table 7-1** for full list of flood risk management measures and full wording of PEIR commitments.

7.4 Operation and maintenance phase

7.4.1 As outlined in **Section 6.5**, flood risks associated with the operational development are limited to the onshore substation and surface water flood risk. The length of the onshore cable and associated joint bays are considered to be entirely flood resilient and will have no impact of floodplain storage or flow conveyance, provided the specific mitigation measures proposed in relation to the onshore cable corridor and associated infrastructure are enacted (commitments C-9, C-74 and C-154).

7.4.2 Surface water flood risk to the onshore substation may be addressed through appropriate drainage measures outlined in the preparation of a detailed drainage strategy (commitment C-73). Any additional risks (if any are identified) will be addressed through commitment C-136. Options for mitigation may include:

- raising of any flood sensitive components of new infrastructure sufficiently above existing ground levels such that if flooding does occur operation of the onshore substation remains unaffected;
- profiling of ground levels within the onshore substation site to divert overland flow away from flood sensitive infrastructure and into the drainage infrastructure

- micro-siting of any flood sensitive infrastructure away from areas of greatest risk; and
- ensuring suitable SuDS are provided as part of the onshore substation design, including managing surface water run-on / areas at risk of surface water flooding.

7.5 Maintenance works

7.5.1 Some of the measures included in the Outline COCP could be required for infrequent maintenance activities during the operation and maintenance phase of the development and for eventual decommissioning, such as the inclusion of an Emergency Response Plan for Flood Events within the method statements for maintenance / refurbishment works. Specific flood risk mitigation requirements for maintenance works will be specified when the details of such works are known.

7.6 Decommissioning phase

7.6.1 With respect to the decommissioning phase, similar measures as employed during the construction phase will be required, albeit likely at a reduced scale owing to the proposed approach of leaving the cables in the ground and only sealing the end caps. As a result, the space needed for measures such as stockpile storage will be reduced compared to the construction phase, which will offset the minor (and occasional) predicted increase in flood extent (due to the effects of climate change) at the proposed soil storage locations in Flood Zone 1. The substation sites are located in Flood Zone 1 and are likely to remain at low risk (other than from surface water, which will be managed through appropriately sized drainage design) throughout their lifetime, including the decommissioning phase. Construction drainage measures similar to those employed during construction will be employed during decommissioning works.

7.6.2 Specification of future measures will need to take account of the changes in the flood hazard baseline relating to climate change, land use change and the planning and regulatory requirements prevailing at the time, as well as being reflective of the works to be undertaken (and the methodology), once these are known. If necessary, more stringent mitigation could be implemented to address the risks associated with such future works, to be identified through an appropriate assessment to be undertaken at the time; it is not anticipated that there will be any insurmountable flood risk obstacles to decommissioning that could not be overcome.

7.7 Residual risk

7.7.1 Residual risk is that which remains after the flood risk management measures set out above in **Table 7-1** have been taken into account. As already identified, construction staff undertaking construction works in the floodplain (or accessing /egressing other areas of the PEIR Assessment Boundary via the floodplain) will be at residual risk in the event of a flood that either overtopped the banks / raised defences, or the embankments failed (a breach).

7.7.2 The Emergency Response Plan for Flood Events will address this residual risk, and therefore upon implementation of the flood risk management measures set out in **Table 7-1**, the residual risk to all potential receptors is considered to be low. The implementation of the Emergency Response Plan for Flood Events will ensure that the risk to them is as low as is reasonably practicable, and appropriate for their vulnerability (Essential Infrastructure, as detailed in **Section 4.7**). Such an approach is considered to be proportionate to the risk and appropriate to the scale, nature and location of the Proposed Development.

8. Planning requirements

8.1 Sequential Test

The need for development at this location

8.1.1 It is proposed that the need case for the development will be outlined in the FRA to accompany the ES submission. In the meantime, information is provided in PEIR **Chapter 3: Alternatives, Volume 2**.

Onshore cable corridor and onshore substation selection process

8.1.2 The proposed route for the onshore cable and siting of the onshore substation have been determined following detailed design options appraisal undertaken in a number of stages. The onshore cable corridor route and onshore substation selection and refinement process is detailed PEIR **Chapter 3: Alternatives, Volume 2**.

8.1.3 At each stage, a wide range of technical, environmental, landowner and financial factors had been considered so that the most appropriate onshore cable corridor and onshore substation could be determined. The optioneering work has had to balance a range of constraints, such as avoiding urban areas.

8.1.4 As set out in **Section 6.5**, once constructed, the operational development will not cause significant effects on the water environment (be it flood risk or other water effects) and therefore flood risk was not a primary differentiator between options. Therefore, the design of the onshore elements of the Proposed Development, has been primarily selected based upon other environmental constraints, such as avoiding urban areas.

8.1.5 That said, the siting of the onshore cable corridor and onshore substation search areas has been very carefully considered in relation to flood risk, and a sequential approach has been taken in determining the route where possible, thus ensuring that the onshore cable corridor has been sited in the lowest flood risk areas possible. This is demonstrated through the alternatives that were considered and subsequently discounted as preferred options, as set out in **Chapter 3: Alternatives, Volume 2**.

8.1.6 The Proposed Development have been determined minimising the interaction with flood zones associated with the Arun and Adur catchments wherever possible. Other environmental and technical constraints have dictated that alternative routes to further minimise interaction have not always been possible.

8.1.7 The landfall location at Climping and southwest portion of the onshore cable corridor is sited unavoidably within Flood Zones 2 and 3 associated with the River Arun. The landfall location is bounded by regions of developed areas to the east and west, and therefore is the only feasible location for the offshore cable to make landfall.

8.1.8 In addition, preferred onshore substation search area options have been refined following a sequential approach and a potential onshore substation search area at

Star Road, Partridge Green situated within Flood Zone 3 has been omitted due to flood risk considerations. The remaining onshore substation search areas at Bolney Road / Kent Street and Wineham Lane North are situated within Flood Zone 1, therefore passing the Sequential Test.

8.1.9 It is concluded that the Sequential Test is considered passed due to:

- the flood resilient nature of the onshore elements of the Proposed Development, with respect to **Section 6.2**; and
- where possible, the Proposed Development and associated temporary infrastructure will be sited in areas of lower flood risk.

8.2 Sequential approach

8.2.1 As set out above, a sequential approach has been taken within the PEIR Assessment Boundary itself, with the Proposed Development and associated temporary construction infrastructure sited in areas of lower flood risk where possible. Those elements of the Proposed Development considered to be at greatest vulnerability to flood risk (and /or capable of providing a location to store sensitive equipment in the event of the flood warning), namely the temporary construction logistics compounds (Less Vulnerable as set out in **Section 4.7**), being situated in the areas of lowest risk, Flood Zone 1.

Route options included in the PEIR

8.2.2 The PEIR Assessment Boundary includes a number of route options at specific locations, including at Warningcamp (chainage 5.5 to 6.5km) and for the final stretch to the two substation options (beyond chainage 32km), as indicated in **Figure 27.2.1a-e, Annex B**. From the information available at this stage, there is little to choose from for the various options that remain part of the proposals, in terms of a sequential approach to flood risk.

8.2.3 Both Warningcamp options (Warningcamp B and C in **Figure 27.2.1a-e, Annex B**) are in areas at low risk of flooding from any source.

8.2.4 The various onshore cable corridor options for connecting to the substations (Bolney Road / Kent Street 1C and 1D and Wineham Lane North and South 1A and 1B in **Figure 27.2.1a-e, Annex B**) all require crossing of the Cowfold Stream and a number of smaller / ordinary watercourses. Given that Cowfold Stream is a Main River, the permanent cable crossing is proposed to be achieved using a trenchless approach, with the associated construction compound micro-sited outside of the floodplain (**Figure 27.2.5a-e, Annex B**). In conjunction with the PEIR commitment to avoid creating temporary crossings for the haul road over Main Rivers (Flood risk management measure 29 (PEIR commitment C-127 in **Table 7-1**), this effectively removes the Cowfold Stream from consideration in terms of the sequential approach.

8.2.5 In terms of the smaller / ordinary watercourses, a sequential approach to flood risk will only slightly favour the Wineham Lane North and South Route options, on the basis that the ordinary watercourses to be crossed are of a smaller scale than the

Bolney Road / Kent Street Route option, but this preference is marginal given the total number of crossings appears to be comparable.

8.2.6 The sequential approach also fed into refinement of the options as they stand, such that the onshore cable corridor route options were developed with due consideration of flood risk constraints to minimise the number of crossings and interactions with floodplains, as discussed further in **Chapter 3: Alternatives, Volume 2**.

Onshore substation options

8.2.7 Of the two potential onshore substation search areas, the Wineham Lane North onshore substation search area will be marginally preferable from a flood risk sequential approach perspective on the basis of approximately 97% of the onshore search area being at low or very low risk of surface water flooding (as set out in **Table 5-8**) compared to 90% for the Bolney Road / Kent Street onshore substation search area. In addition, the surface water flow pathway at the Wineham Lane North onshore substation search area primarily runs along the northern edge of the land parcel, whereas a pathway crosses through the centre of the Bolney Road / Kent Street onshore substation search area.

8.2.8 It should be noted that both onshore substation search areas are located in Flood Zone 1 and are not at risk from any other flood source. It will also be possible to capture and convey surface water flow pathways in formal surface water management structures such that the risk at both sites will be comparable, provided appropriate mitigation is implemented to achieve this. Indeed, there is the potential for betterment to be provided in the surrounding area for the Bolney Road/Kent Street substation option by providing formal conveyance structures within the site. Such structures could assist in reducing the surface water flood risk in Kent Street public highway which is indicated in **Figure 27.2.1a-e, Annex B** as being at high flood risk to the south east of the site due to the flow pathway which passes through the site.

8.2.9 On this basis, the preference in terms of flood risk sequential approach for the two substations is considered to be marginal. It is therefore anticipated that other considerations will be the primary drivers for which onshore substation option is taken forward for the DCO application.

8.3 Application of the Exception Test

8.3.1 The Exception Test is described in **Section 2.2**. This section sets out the evidence to demonstrate that the Exception Test will be passed.

Wider sustainability benefits

8.3.2 Part 1 of the Exception Test requires the Proposed Development to provide wider sustainability benefits to the community that outweigh flood risk. As stated in NPS EN-1, this will include the benefits (including need), for the Proposed Development.

8.3.3 As discussed above in **paragraph 8.1.1**, the need case for the Proposed Development is to be outlined in the final FRA to accompany the ES.

Flood risk

8.3.4 Part 2 of the Exception Test requires that the FRA must demonstrate that the Proposed Development will be safe, without increasing flood risk elsewhere subject to the exception below and, where possible, will reduce flood risk overall. This has been covered in this assessment and discussed further below in **paragraphs 8.3.5** to **8.3.9**.

8.3.5 As set out in **Table 4-2**, construction (and enabling) works and the onshore cable itself are considered to be Essential Infrastructure, and thus are appropriate in Flood Zones 1 and 2, but require the Exception Test to be passed in order to be considered 'appropriate' development in Flood Zones 3a and 3b.

8.3.6 The onshore cable corridor intersects Flood Zone 3 in numerous locations as shown in **Figure 27.2.2, Annex B**. However, as described in **Section 6.2**, the onshore cable infrastructure is resilient to flooding, will not pose a safety risk, and will not cause an increase in flood risk elsewhere. It is concluded that the location of the cable in Flood Zones 3a and 3b is consistent with Exception Test requirements.

8.3.7 With respect to the construction and enabling works that will occur in Flood Zones 3a and 3b, both the works themselves, and the temporary construction infrastructure (temporary construction access tracks and working areas) should be considered. The safety of the construction workers will be ensured through effective implementation of the Emergency Response Plan for Flood Events (**Section 7.2**), together with the standard approach to works programming, which requires that certain works are not undertaken during inclement weather and programmed to occur during summer / autumn where possible.

8.3.8 In terms of the temporary construction infrastructure, this will itself be resilient to occasional flooding. Furthermore, the construction phase infrastructure to be located Flood Zone 3 will only be in place for only a limited period owing to the owing to the limited construction period of four years, which will reduce the likelihood of the temporary construction structures being present at the time of a flood. With respect to flood risk elsewhere, the location specific measures proposed in **Section 7.1** will ensure that the flood risk to third party receptors will not be increased.

8.3.9 It is concluded that the placement of temporary construction phase infrastructure in Flood Zone 3a and 3b is consistent with Exception Test requirements, and that the Exception Test will be able to be passed for the ES.

8.4 Functional floodplain

8.4.1 As set out in **Section 6.2**, such effects on floodplain storage and flows have been scoped out of the assessment on the basis that the onshore cable corridor infrastructure in areas of flood risk will be designed and reinstated to have negligible effect on the risk or displacement of water since there will be no permanent above ground features that may pose a material change to water flow.

9. Summary and conclusions

9.1 Summary

9.1.1 This FRSA provides an overview of the potential flood risks to the onshore elements of the Proposed Development, including its construction, and its potential impact elsewhere. Both flood risks 'to' and flood risks 'from' the Proposed Development are considered.

9.1.2 This assessment has been prepared in accordance with the *NPS EN-1* (Department of Energy and Climate Change, 2011a) which sets out planning policy with regard to NSIPs in the energy sector, and NPS *EN-3* (Department of Energy and Climate Change, 2011b) and NPS *EN-5* (Department of Energy and Climate Change, 2011c) which cover renewable energy infrastructure and electricity transmission and distribution, respectively. Reference has also been made to the NPPF (Ministry of Housing, Communities, and Local Government, 2019a) and associated Planning Practice Guidance (Ministry of Housing, Communities, and Local Government, 2019b) where relevant for additional guidance regarding flood risk and development, as appropriate. Consultation with key stakeholders, including the Environment Agency, and West Sussex County Council (the LLFA) has also informed the development of this FRSA.

9.1.3 This FRSA accompanies the Section 42 formal consultation (PEIR) and as such will be revised to support the subsequent ES which will accompany the DCO application. This FRSA seeks to present preliminary flood risk information (consistent with the purpose of the PEIR), namely the flood risk baseline, the relevant elements of the Proposed Development, and the potential environmental measures that could be embedded within the final design (and / or enacted / implemented during the construction phase) to facilitate comment from stakeholders on the emerging proposals and thus influence the final FRA that will accompany the ES and DCO application.

9.1.4 With due consideration of the temporary nature of many of the Proposed Development, which is only required during construction of the onshore cable corridor, the approach taken in this FRSA is considered to be proportionate to the risk and appropriate to the scale, nature and location of the Proposed Development.

9.1.5 All flood risks associated with the construction, and operation and maintenance of the onshore cable corridor and onshore substation have all been considered. Sections of the onshore cable corridor traverse the low-lying lower River Arun floodplain, and the River Adur catchment.

9.1.6 In terms of the permanent onshore development, the onshore substation is the only aspect of the permanent infrastructure that sits above ground, and both onshore substation search area options considered at PEIR stage are situated in Flood Zone 1. Surface water run-on and run-off (as well as the potential for flooding from minor nearby ordinary watercourses) will be considered when designing the onshore substation, and reflected in the final FRA which will accompany the ES. All permanent infrastructure associated with the onshore cable will be buried and flood resilient. In combination with the appropriate

environmental measures set out in **Section 7** (to avoid any permanent raised structures associated with the buried onshore cable), the operational elements of the Proposed Development are anticipated to have a negligible impact on flood risk.

9.1.7 For the construction phase, flood risk receptors include the construction activities themselves (including workers), plus third-party receptors for which flood risk could (in the absence of appropriate measures) be increased as a result of the works. Flood risks associated with fluvial, tidal, surface water, groundwater and artificial sources have been identified as being potentially significant during the construction phase of the development. Similar risks will also apply during periodic operation and maintenance periods.

9.1.8 A number of flood risk management measures are proposed (detailed in **Table 7-1**) in order to mitigate the potential flood risks associated with the construction phase of the Proposed Development. These are summarised below.

- SuDS will be employed to manage surface water, for all elements of the temporary and permanent development, areas of temporary hardstanding, such as temporary construction access tracks, working areas and compounds will be constructed with semi-permeable aggregate surfaces, and infiltration will be encouraged where appropriate.
- Permanent onshore cable crossings to minimise impacts on watercourses, such as no in-channel crossings (all crossings beneath the bed of watercourses), use of trenchless techniques for crossing Main Rivers (and under flood defences) and spanning floodplains where possible (for example in the River Adur catchment).
- Temporary crossings to minimise impacts on watercourses, such as no temporary crossings for Main Rivers, clear span bridges to be used for temporary crossings too wide or deep to be crossed using temporary culverts, and where temporary culverts are to be used these will be appropriately sized to maintain existing flow conveyance and be in place for the minimal time possible.
- Wherever possible, the creation of raised structures, such as stone haul / temporary construction access roads and stockpiles, will be avoided in the fluvial floodplain. Trackway will be used or the road level will be kept as close to the ground surface as possible and soil stockpiles will be located outside of the fluvial floodplain (where potential receptors could be impacted).
- Measures will be taken to mitigate against any potential effects of temporary soil stockpiles on flood risk, such as provision of gaps in topographic low points and at regular intervals to allow water to flow.
- Reinstatement post-construction with the land above reinstated to pre-construction ground level (in the fluvial floodplain in particular).
- Temporary construction logistics compounds will be located in Flood Zone 1 and runoff rates from these areas will be limited to pre-development rates using appropriate sustainable drainage measures, delivered through site-specific drainage strategies incorporating SuDS principles.

- Stand-off distances from watercourses (both temporary construction works in general and for stockpiling of topsoil) other than for watercourse crossings.
- Preparation of an Emergency Response Plans for Flood Event for all construction and maintenance activities located in floodplain areas, and those areas outside of the floodplain that require access / egress through it.

9.1.9 During the operation and maintenance phase, there will also be a minor flood risk to site operatives during any maintenance activities. This could be addressed through implementation of a flood emergency response plan into operation and maintenance procedures, taking into account the effects of future climate change on flood risk throughout the life of the Proposed Development. These operation and maintenance procedures will be updated throughout the operational lifetime of the Proposed Development, reflective of the flood risk understanding and warning arrangements at the time of the works.

9.2 Conclusions

9.2.1 It is concluded that the Proposed Development, with the flood risk management measures described above in place, will not be subject to an unacceptable level of flood risk, nor will it increase flood risk elsewhere. It will not result in a net loss of functional floodplain storage or impede water flows.

9.2.2 Sufficient evidence to demonstrate that the Sequential Test has been passed has been / will be provided, and that a sequential approach has been applied within the PEIR Assessment Boundary such that the vulnerable land uses will be located in Flood Zone 1 (and taking account of other sources of flooding too). In accordance with the guidance in the NPPF, the development proposals are appropriate for the flood zone classification and where necessary the Exception Test is considered to be passed.

9.2.3 Suitable flood risk management measures have been identified to address the risks identified, including residual risks, including the preparation of Emergency Response Plan for Flood Events to address residual risks, the use of SuDS to manage surface water and a range of measures to ensure risks and impacts during the construction phase are managed appropriately. The operational development will be resilient to the most extreme climate change allowances that are considered feasible over the development's lifetime, and therefore the identification of future adaptation measures considered unlikely to be necessary. This will be reconsidered for the final FRA that will accompany the ES.

9.2.4 With due consideration of the temporary nature of many of the onshore elements of the Proposed Development, which is only required during construction of the onshore cable corridor and onshore substation, the approach undertaken in this FRSA is considered to be proportionate to the risk and appropriate to the scale, nature and location of the Proposed Development.

9.2.5 In conclusion, this assessment demonstrates that the requirements of NPS EN-1, NPS EN-3 and NPS EN-5 and the NPPF and its associated Planning Practice Guidance with respect to flood risk have been met. The flood risk management measures identified have been secured as PEIR commitments (**Appendix 4.1: Commitments register, Volume 4**) at this stage and could be secured through DCO Requirements.

10. Glossary of terms and abbreviations

Term (Acronym)	Definition
ABD	Areas Benefitting from Defences
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
AStGWF	Areas Susceptible to Groundwater Flooding
BGS	British Geological Survey
CBS	Cement bound sand
COCP	Code of Construction Practice
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
FRA	Flood Risk Assessment
FRAP	Flood Risk Activity Permits

Term (Acronym)	Definition
FRSA	Flood Risk Screening Assessment
FZ	Flood Zone
HDD	Horizontal Directional Drill
HGV	Heavy Goods Vehicle
IDB	Internal Drainage Board
IDD	Internal Drainage District
km	kilometre
LLFA	Lead Local Flood Authority
mgbl	metres below ground level
MHWS	Mean High Water Springs
N/A	Not applicable
NGR	National Grid Reference
NPPF	National Planning Policy Framework
NPS(s)	National Policy Statement(s)
NSIP	Nationally Significant Infrastructure Project
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
RBMP	River Basin Management Plan
RoFSW	Risk of Flooding from Surface Water
SFRA	Strategic Flood Risk Assessment

Term (Acronym)	Definition
SuDS	Sustainable Drainage System
UK	United Kingdom
UKCEH	United Kingdom Centre for Ecology and Hydrology
WTGs	Wind Turbine Generators

11. References

AECOM (2020). *Horsham Strategic Flood Risk Assessment*. [online]. Available at: https://www.horsham.gov.uk/planning/local-plan/local-plan-review-evidence-base [Accessed 02 July 2021].

Amec Foster Wheeler, (2017). *South Downs National Park Authority – Level 1 Update and Level 2 Update Strategic Flood Risk Assessment*. [online]. Available at: https://www.southdowns.gov.uk/wp-content/uploads/2017/02/Level-1-Update-and-Level-2-Strategic-Flood-Risk-Assessment.pdf [Accessed 02 July 2021].

Atkins, (2005). *River Adur Flood Mapping Study. National Strategic Flood Risk Management Framework Agreement (5013005/71/DG/069)*. [online]. Available at: https://www.gov.uk/guidance/flood-risk-and-coastal-change [Accessed 02 July 2021].

Atkins, (2010). *LTRAS Model Development. (DG_081_LTRAS_DRAFT_Modelling_Report)*

British Geological Survey (BGS), (2021a). *Aquifer Designation Dataset for England and Wales*. [online]. Available at: https://magic.defra.gov.uk/MagicMap.aspx [Accessed 02 July 2021].

British Geological Survey (BGS), (2021b). *Hydrogeology 625k digital hydrogeological map of the UK*. [online]. Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html?layer=BGSHydroMap&_ga=2.8727024.450271776.1621345958-17698986.1599042271 [Accessed 02 July 2021].

British Geological Survey (BGS), (2021c). Geoindex Viewer [online]. Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed 02 July 2021].

British Geological Survey (BGS), (1978). *Hydrogeological Map of the South Downs and Adjacent Parts of the Weald*. [online]. Available at: http://www.largeimages.bgs.ac.uk/iip/hydromaps.html?id=south-downs.jp2 [Accessed 02 July 2021].

Department of Energy and Climate Change (DECC), (2011a). *Overarching National Policy Statement for Energy (EN-1)*. The Stationary Office. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed 02 July 2021].]

Department of Energy and Climate Change (DECC), (2011b). National Policy Statement for Renewable Energy Infrastructure (EN-3). The Stationary Office. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf [Accessed 02 July 2021].

Department of Energy and Climate Change (DECC), (2011c). *National Policy Statement for Electricity Networks Infrastructure (EN-5)*. The Stationary Office. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47858/1942-national-policy-statement-electricity-networks.pdf [Accessed 02 July 2021].

Environment Agency, (2009a). *River Adur Catchment Flood Management Plan*. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/293867/Adur_Catchment_Flood_Management_Plan.pdf [Accessed 02 July 2021].

Environment Agency, (2009b). *Arun and Western Streams Catchment Flood Management Plan*. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/293864/Arun_and_Western_Streams_Catchment_Flood_Management_Plan.pdf [Accessed 02 July 2021].

Environment Agency, (2011). *Rivers Arun to Adur flood and erosion management strategy 2010 – 2020*. [online]. Available at: https://ww3.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/Flood%20&%20Erosion%20Mngmnt%20Strtgy%20Rivers%20Arun%20&%20Adur%202010_2020.pdf [Accessed 02 July 2021].

Environment Agency, (2012). *Lower Ridal River Arun Strategy Environmental Report*. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/307894/Lower_Tidal_River_Arun_final_strategy_report.pdf [Accessed 02 July 2021].

Environment Agency, (2015). *River Arun to Pagham Flood and Coastal Erosion Risk Management Strategy*. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/469503/F1516_0552_A2P_Strategy_Appraisal_Report_v3.0.pdf [Accessed 02 July 2021].

Environment Agency, (2017). *Groundwater Vulnerability Maps*. [online]. Available at: https://magic.defra.gov.uk/MagicMap.aspx [Accessed 02 July 2021].

Environment Agency, (2018). *Climate Change Impacts and Adaptation*. [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/758983/Climate_change_impacts_and_adaptation.pdf [Accessed 02 July 2021].

Environment Agency, (2021a). *Coastal Design Sea Levels - Coastal Flood Boundary Extreme Sea Levels Estuary* (2018). [online]. Available at: https://data.gov.uk/dataset/5b9a5a99-e996-431b-b001-f364d53736f0/coastal-design-sea-levels-coastal-flood-boundary-extreme-sea-levels-estuary-2018 [Accessed 02 July 2021].

Environment Agency (2021b). *Flood risk assessments: climate change allowances.* [online]. Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances [Accessed 02 July 2021].

Environment Agency, (2021c). *Risk of Flooding from Surface Water*. [online]. Available at: https://environment.data.gov.uk/DefraDataDownload/?Mode=rofsw [Accessed 02 July 2021].

Environment Agency, (2021d). *Risk of Flooding from Reservoirs*. [online]. Available at: https://data.gov.uk/dataset/44b9df6e-c1d4-40e9-98eb-bb3698ecb076/risk-of-flooding-from-reservoirs-maximum-flood-extent-web-mapping-service [Accessed 02 July 2021].

Flood and Water Management Act 2010, C29. [online]. Available at: https://www.legislation.gov.uk/ukpga/2010/29/contents [Accessed 02 July 2021].

Hyder Consulting, (2011). *Upper Adur Model Maintenance. (5001-UA002575-GDR-02-Upper Adur Report_F_incl_apps)*.

JBA Consulting, (2008). *JFLOW Improvements for Solent and South Downs Area. (2008s3503 Flood Zone Improvement Work for Solent & South Downs Final Report).*

JBA Consulting, (2012). Arun to Adur Flood Modelling. (2010s4031_Arun to Adur_Final_Report_v2.0).

JBA Consulting, (2016). *Arun District Council Level 1 and Level 2 Strategic Flood Risk Assessment*. [online]. Available at: https://www.arun.gov.uk/flood-risk-planning-policy/ [Accessed 02 July 2021].

JBA Consulting, (2017). *Adur Eastern Branch Climate Change Technical Note. (2016s3840 - Adur* Eastern Branch climate change technical note (v1 November 2017)).

Mid Sussex District Council, (2015). *Strategic Flood Risk Assessment – Level 1*. [online]. Available at: https://www.midsussex.gov.uk/media/2609/strategic-flood-risk-assessment.pdf [Accessed 02 July 2021].

Ministry of Housing, Communities & Local Government, (2019a). *National Planning Policy Framework*. [online]. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 [Accessed 02 July 2021].

Ministry of Housing, Communities & Local Government, (2019b). *Planning Practice Guidance*. [online]. Available at: https://www.gov.uk/guidance/flood-risk-and-coastal-change [Accessed 02 July 2021].

Reservoirs Act 1975, C23. [online]. Available at: https://www.legislation.gov.uk/ukpga/1975/23 [Accessed 02 July 2021].

Rowland, C.S.; Morton, R.D.; Carrasco, L.; McShane, G.; O'Neil, A.W.; Wood, C.M., (2017). Land Cover Map 2015 (1km dominant aggregate class, GB). NERC Environmental Information Data Centre.

The Environmental Information Regulations 2004 (SI 2003/2901). [online]. Available at: https://www.legislation.gov.uk/uksi/2004/3391/contents [Accessed 02 July 2021].

UK Groundwater Forum, (2019). *Groundwater Resources and Climate Change*. [online]. Available at: http://www.groundwateruk.org/Groundwater_resources_climate_change.aspx [Accessed 02 July 2021].

West Sussex County Council, (2021). *West Sussex LLFA Culvert Policy*. [online]. Available at: https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent/ [Accessed 02 July 2021].

WRc, (2012). *Sewers for Adoption 7th Edition - A Design & Construction Guide for Developer.*

Annex A
Meeting minutes

Meeting Minutes

Date: 09/11/2020 – 14:00 **Meeting at:** Teams

Subject / purpose:

Consultation meeting on Climping Sea Flood Defences, Internal Drainage Board and general flood risk matters

Attendees:

[redacted] (SB) (Environment Agency) - Planning Officer for Rampion 2
[redacted] (AJ) (Environment Agency) - Partnership and Strategic Overview (flood risk)
[redacted] (RF) (Environment Agency) - Catchment engineer (flood risk assets) - South Downs area - Operations and Maintenance
[redacted] (RC) (Wood) – Flood Risk Assessment

Apologies:

[redacted] (GD) (Wood) – Water Environment Assessment technical lead

Meeting Minutes:

1 **Introduction**
SB confirmed that she is the Environment Agency's planning contact for the Rampion 2 project.
RF advised that his role includes the management of the Climping Sea defences.
AJ advised that he will be reviewing the flood risk elements of the project. He has experience from working on Rampion 1. His role also includes the River Arun Internal Drainage Board (IDB) consents.
RC advised that he is a flood risk assessment and sustainable drainage specialist working on the Rampion 2 project.
GD apologies. RC will defer to GD for matters relating to the wider Water Environment assessment beyond flood risk and drainage.

2 **Selection of landfall location at Climping**
AJ and RF agreed in principle with the selection of Climping for the landfall location. This is on the basis that there are no other reasonably available locations along that stretch of coast to make landfall that are not already developed (other options would involve trying to thread the cable through or under areas of existing built development. RC welcomed this support for the selected landfall location, which will be of relevance for the Sequential Test as the location of the cable route through the floodplain behind the sea defence is necessary if the landfall is to be located there.

3 **Climping Sea Defences and Strategy**

RF provided a background to the sea defences in the vicinity of the proposed landfall location for the cable (the section between the Climping Beach Site of Special Scientific Interest (SSSI) in the east and the beach fronting car park in the west).

4 Overview of the defence: This section of sea defence at the proposed landfall and to the west (the straight section) is formed by a shingle beach, which has been formed into a non-natural shingle embankment (which is actively managed to provide a 1 in 200 year standard of protection at present). This section of defence is considered to be 'very vulnerable', not just to overtopping, but also erosion and natural coastal realignment - the coast wants to be further inland. For further context, the road to the west of the proposed landfall location which now leads out to sea used to lead to further properties which have been lost to the sea over the years. The lowest point of this vulnerable defence corresponds with the preferred location for the proposed landfall. To the immediate east of the proposed landfall (including the SSSI) the defence is formed by a natural shingle bank. This is considered to be the most sustainable type of defence in the area. It is expected to be present for the long term.

5 Long term Strategy for the defence: Flood and Coastal Risk Management Strategy completed in 2015 for Climping (the rest of the strategy was completed in 2012). The landfall is in the Arun to Pagham section (Climping flood cell). The Climping frontage posed a particular challenge, with particular interest from the community, which includes properties at risk of tidal flooding. The long term strategy is to allow natural processes to reform the non-natural section into a natural embankment (including at the landfall) similar to that already present immediately to the east. This would result in a shift of the coastline landwards (natural realignment). The Environment Agency has estimates for where the new shoreline frontage will be. A geomorphological report (2019/2020) for informing the community as to how the frontage will look once the Environment Agency stop maintaining the defence has been prepared. RF believes that this has been released to the public and thus could be released to the Rampion 2 project, albeit the Environment Agency would likely request that this is treated as confidential if provided. **Action 1: SB/RF to investigate sharing the geomorphological report for the future Climping shoreline with the Rampion 2 project.** **SB/RF**

6 Short term Strategy for the defence: In the meantime, the 2015 strategy was to maintain (patch and repair) that stretch of vulnerable coastal defence for as long as possible with the financially limited budget available. The budget is limited as the justification for large expenditure is not there – the social and economic benefits of the sea defence are limited. Analysis was undertaken at the time to justify this approach. **Action 2: SB/RF to send information on the 2015 strategy (covering both the long and short term strategy for the Climping shingle defences).** **SB/RF**

7 Storm Keira: The approach of patch and repair was expected to extend the life of the existing defence in its present location to between 15 and 30 years depending on the weather, but with the acknowledgement that one big storm could do irreparable damage to the defences. Unfortunately, this occurred in February 2020 when Storm Keira resulted in the shingle defence being 'overwashed' (not a breach).

8 Post-Storm Kiera: Works to reform the defence were undertaken following Storm Keira. This involved pushing the shingle to reform the embankment. Further shingle 'recycling' has occurred to improve the defence in the last month (and the car park to the west too). Shingle beach now provides a Standard of Protection similar to before Storm Keira. The defence is more- landward than it was before Storm Kier, which is considered to be a more sustainable position. RF advised that they have LiDAR for the recently completed works to the defence. **Action 3: SB to investigate sharing the LiDAR information on the shingle defence with the Rampion 2 project.** **SB**

9 The shingle defence is not impermeable. Recent high tides led to water seeping through and ponding behind – this then drains away to the north to the Ryebank Rife (an Environment Agency Main River).

10 **Micro-siting of landfall location**
In light of the vulnerability of the defence at the preferred landfall location, RC enquired about the value in shifting the landfall slightly further to the east, so the landfall passed beneath the existing natural shingle embankment. RF advised that this is a stable defence but of the same type (shingle). No major concerns were raised against such an approach, but no preference for this either. Only that it would not require such a setback distance as the defence is more 'stable'/less liable for realignment further inland. RF and AJ acknowledged the presence of the SSSI further to the east, to be avoided. RC noted that the interface with/standoff distance from the SSSI would be a question for Natural England, addressed by the Terrestrial ecology team. AJ also mentioned the potential for archaeology on the beach (metal detectorists).

11 **Location of the Transition Joint Bay with respect to the Climping Defence**
RC described how a transition joint bay (TJB) will be required behind the defence to join the offshore cables to the onshore cables (different type of cables). SB enquired how far behind the coast would the TJB would be and whether these would be at risk if the defence moved inland via the natural realignment discussed previously. RF and AJ advised that siting the TJB set back by 50m to 100m might be sufficient. RC advised that the TJB is likely to be resilient to flooding, so provided the coastal realignment matter can be resolved, the flood risk to the TJB itself should not be a significant concern.

12 **Flood cell behind the Climping defences – including Rope Walk community**
As discussed previously, in the medium to longer term, there is a high likelihood that Environment Agency will cease maintenance of the existing coastal frontage where the landfall is proposed. The defence will continue to deteriorate over time, including the standard of protection provided by the defence to the land behind (less than 1 in 200 standard of protection in the future). This will result in an increase in flood risk in the Climping flood cell through which the proposed cable route will need to pass. The flood cell covers the land between the A259 (Ferry Road) and the River Arun (South of the west bank) and includes some houses, some permanent static caravans and the Rope Walk community

13 RF advised that the strategy identified that defences are needed on both sides, to protect the community against flooding propagating from both the river and the sea frontage. Unfortunately, such an approach is uneconomic according to the existing Government funding mechanism. The Environment Agency continue to investigate options, with the Environment Agency and the **SB/RF**

community currently looking for other ways to protect the area. The community would welcome a contribution from the Rampion 2 project to help fund flood defence improvements. **Action 4: SB/RF to send information on the strategy for the Rope Walk community/Climping Flood Cell**.

14 **Existing property adjacent to the SSSI and the Golf Course**
RF advised that another community issue associated with the Environment Agency's long term strategy for natural realignment is that posed by the private access road along the existing sea defence frontage. The residential property to the east of the landfall (next to the Golf course) is accessed via the track along the existing sea defence. This currently requires a four-wheel drive to access. The owner would be interested in any options that facilitated a new permanent access. RC advised that a number of potential options to gain construction access to the landfall location are being investigated, but could not confirm whether these were temporary or permanent. One potential route could be alongside the cable route itself from Ferry Road. RF highlighted that the Environment Agency would be supportive of any approach that facilitated an alternative access for this property that avoided access along the shingle sea defence.

15 **Flood Risk Assessment in the tidal and fluvial floodplains**
It was agreed that loss of floodplain storage due to any temporary raised structures would not require compensation in the tidal floodplain. However, any loss of floodplain volume in the fluvial floodplain would require assessment and potentially compensation if any receptors were identified at increased flood risk as a result. AJ suggested that the fluvial extents in the tidal floodplain between Littlehampton and Climping are likely to be less extensive than the tidal extents, thus reducing the potential for flood risk impacts.
AJ advised that Ryebank Rife discharges via the marina and is thus is subject to tidelocking – it can only discharge when the Arun is at low tide.

16 **Other flood defences**
RC queried whether there are any other flood defences present along the route, defences that might not be to the 100 or 200 year standard of protection necessary for inclusion in the online Flood Map for Planning. AJ advised that they are not aware of any additional inland defences. Reference was also made to the Lower Tidal River Arun Flood Risk Strategy, which is publicly available.

17 **Watercourse crossings**
AJ advised that, alongside flood risk, ecological considerations may also apply with respect to the crossing type. For example, below bed (trenchless) crossings would likely be preferred where there is a particularly valuable (ecologically) stream.

18 **Permits and consents**
AJ advised that the Environment Agency would issue Flood Risk Activity Permits (FRAPs) for the Main Rivers and Land Drainage/Flood Defence Consents for the watercourses in the Arun IDB District (discussed further below). It is the Environment Agency's preference for permits/consents to be grouped (multiple crossings in one application) for efficiency. For example, one permit for 4-5 watercourses with the same crossing type. RC advised that this will likely be welcomed by the contractor, once the project reaches that stage, likely post-gaining planning consent.

19 **Internal Drainage Board**

A discussion was held on the Arun IDB District. AJ advised that the Environment Agency are the IDB body, but have been in the process of trying to dissolve the District.

20 RC queried the existence of byelaws and whether these apply to 'maintained' drains in the district. AJ confirmed the existence of the West Sussex Internal Drainage Board Byelaws, but that these are 50 to 60 years old and are not referred to often.

AJ advised that there are not specific 'maintained' watercourses that the byelaws apply to. Any works within 5m of any watercourse bank top within the district require consent, i.e. the need for consent applies to all the drains, whether they are maintained or not. The consents for the IDB area are not anticipated to be complex on the basis that the IDB is not providing a flood purpose here - it is for land drainage. **AJ**

AJ advised that some ditches are quite deep and quite wide (lowland drainage). Historically work was undertaken on the main drains, but works can be undertaken on any drain. AJ pointed out that irrespective of the presence of the IDB, the ultimate responsibility for maintaining watercourses rests with the riparian owner.

AJ has paper copies of maps with named watercourses and drains. **Action 5: AJ to provide copies of the IDB maps (which name the watercourses and drains)**.

21 **Tidal limit of River Arun**

The River Arun is a tidal river for some distance inland. It has a major tidal flow with a range of 16m. The tidal limit is at Pallingham Lock (20km inland, beyond Pulborough).

22 **River Adur**

The River Adur is also a tidal river for some distance inland. This extends upstream beyond the confluence of the east and west branches of the River Adur. South (downstream) of the confluence the river is known as the River Adur Tidal, but the tidal extent extends upsteam.

The West Branch of the River Adur is tidal to beyond Bines Green. The tidal limit coincides with the end of the Environment Agency flood defences shown in the Flood Map for Planning. Just upsteam of the confluence is Merions Penstock on the West Branch. Upstream of this the floodplain is regularly inundated during winter for a long duration (2-3 months). The penstock boards are closed in summer to retain water in the upper catchment. The gates are open in winter. Pinlands Farm

The East Branch of the River Adur is tidal to the gauging Station near St Giles Church at Shermanbury, but only that far during the largest tides. Water is not saline that far upstream. Just upstream of the confluence is Chates Weir on East Branch. As per the West Branch, upstream of this the floodplain is regularly inundated during winter for a long duration (2-3 months). The penstock boards are closed in summer to retain water in the upper catchment. The gates are open in winter. The East Branch is subject to significantly more flow than the west branch due to higher rates of run-off from the contributing catchment which is more developed.

23 RC queried the long term flood risk strategy for the River Adur. AJ advised that this would likely involve maintenance of defences, but that the Environment Agency are also looking into managed realignment at selected locations. RC requested further information on this where such managed realignment could coincide with the proposed cable route. AJ advised that a **AJ and/or SB**

strategy report is not available. **Action 6: AJ and/or SB to provide information on any known plans for managed realignment (discussion was focussing on the River Adur catchment) where this might coincide with the proposed cable route.**

24 **Timing of cable construction works**

AJ provided advice on timing of cable construction works. AJ recommended that works in the floodplains is undertaken in late summer/autumn because the watercourses regularly flood in winter for durations of months at a time. The largest of floods are equally likely to occur in the summer, but the duration of summer floods are short (days) rather than months. RC enquired whether this advice applied to the smaller watercourses as well. AJ advised that there is less certainty for the smaller watercourses as these are visited less often.

25 AJ also noted that late summer/early autumn timing for works in and around watercourses/floodplains would avoid bird nesting and fish spawning seasons. Also potential water vole habitat. An example of where this timing recommendation would apply would be where the cable route passes Merions.

26 **AOB**

SB and AJ queried whether there is a way to join up with the existing Rampion 1 route up near Bolney. RC advised that this is a matter the designers have likely considered (when considering route options and alternatives) and not something he can advise on.

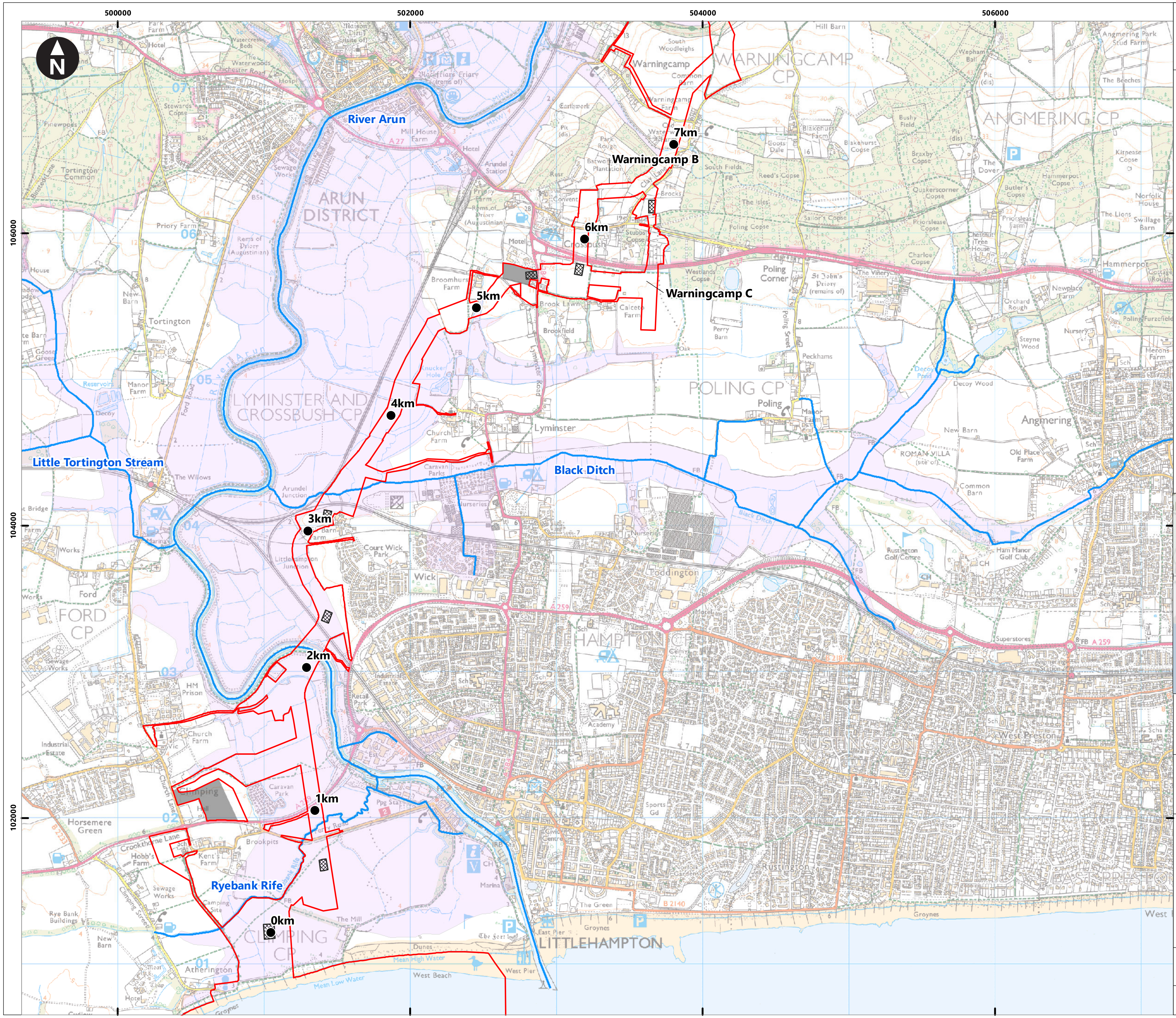
27 SB welcomes opportunity to discuss groundwater Source Protection Zones SPZs. RC advised that this would be a matter for the Water Environment technical lead for the project, i.e. GD.

28 SB also advised that funding is in place for future flood risk consultation to occur as necessary on the Rampion 2 project. RC welcomed the opportunity for further consultation if the project team has any further questions, but otherwise the next consultation would likely be on the content of the flood risk screening report (rather than a full risk assessment) to accompany the PEIR, to provide the Environment Agency with an idea of what to expect.

Actions Summary

1. SB/RF to investigate sharing the geomorphological report for the future Climping shoreline with the Rampion 2 project.
2. SB/RF to send information on the strategy (covering both the long and short term strategy for the Climping shingle defences).
3. SB to investigate sharing the LiDAR information on the shingle defence with the Rampion 2 project.
4. SB/RF to send information on the strategy for the Rope Walk community/Climping Flood Cell.
5. AJ to provide copies of the IDB maps (which name the watercourses and drains)
6. AJ and/or SB to provide information on any known plans for managed realignment (discussion was focussing on the River Adur catchment) where this might coincide with the proposed cable route.

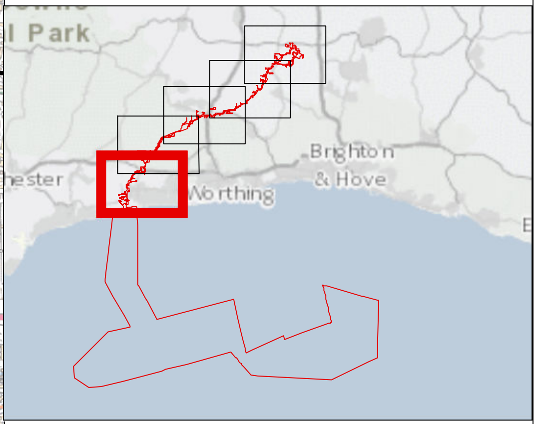
Annex B
Figures



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

- ☐ PEIR Assessment Boundary
- ▨ Onshore substation search areas
- ▩ HDD compounds
- ■ Temporary construction compounds
- — Main rivers
- ▢ Arun Internal Drainage District
- ● Chainage



Kilometres
0 0.125 0.25 0.5 0.75 1

1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

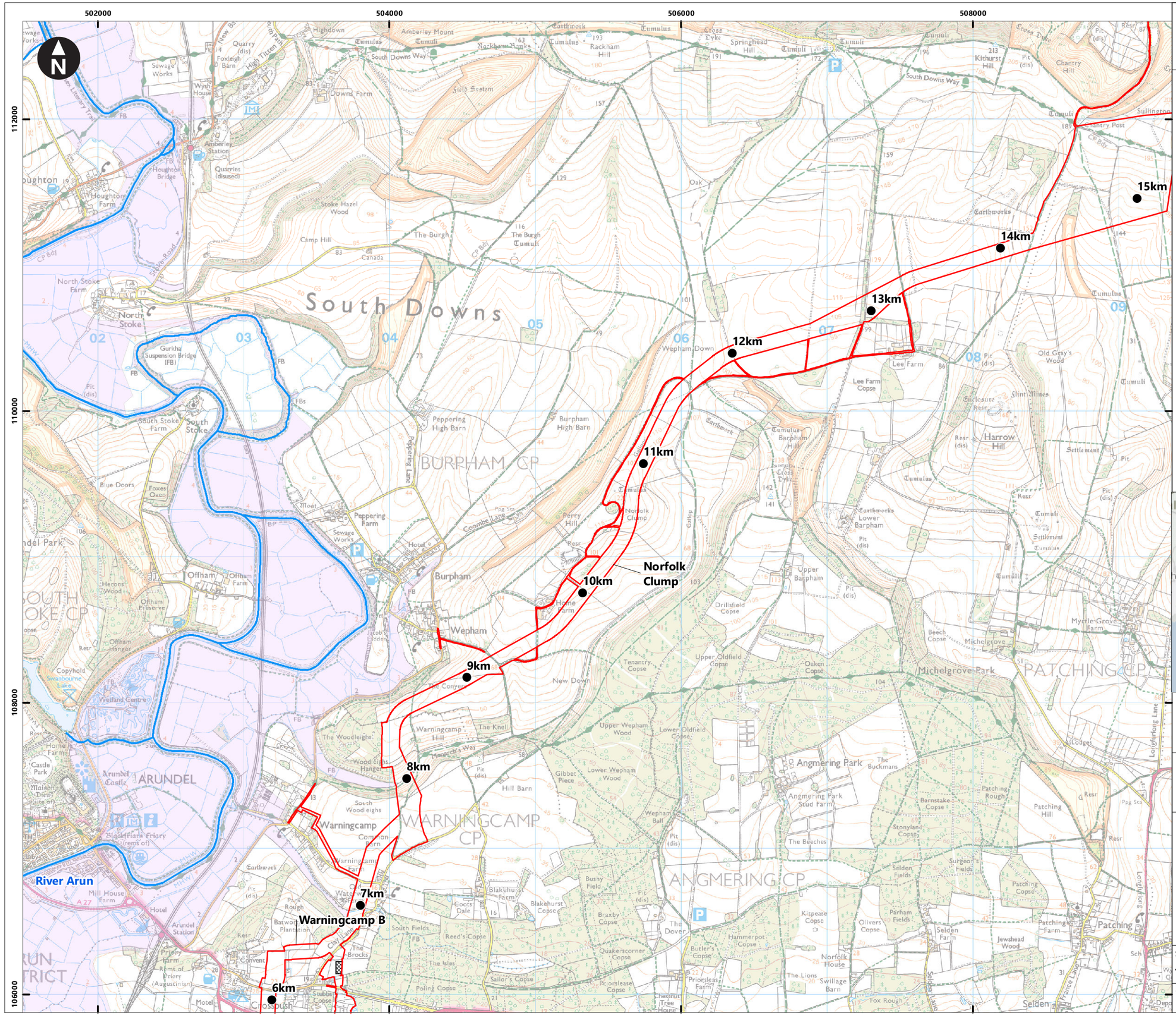
Rampion 2 Offshore Wind Farm

Figure 27.2.1a Water Environment

Preliminary Environmental Information Report

1 of 5

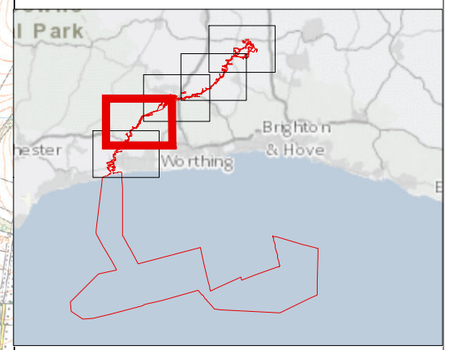
System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-7242				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Main rivers
- Arun Internal Drainage District
- Chainage



Kilometres
0 0.125 0.25 0.5 0.75 1
1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

Rampion 2 Offshore Wind Farm

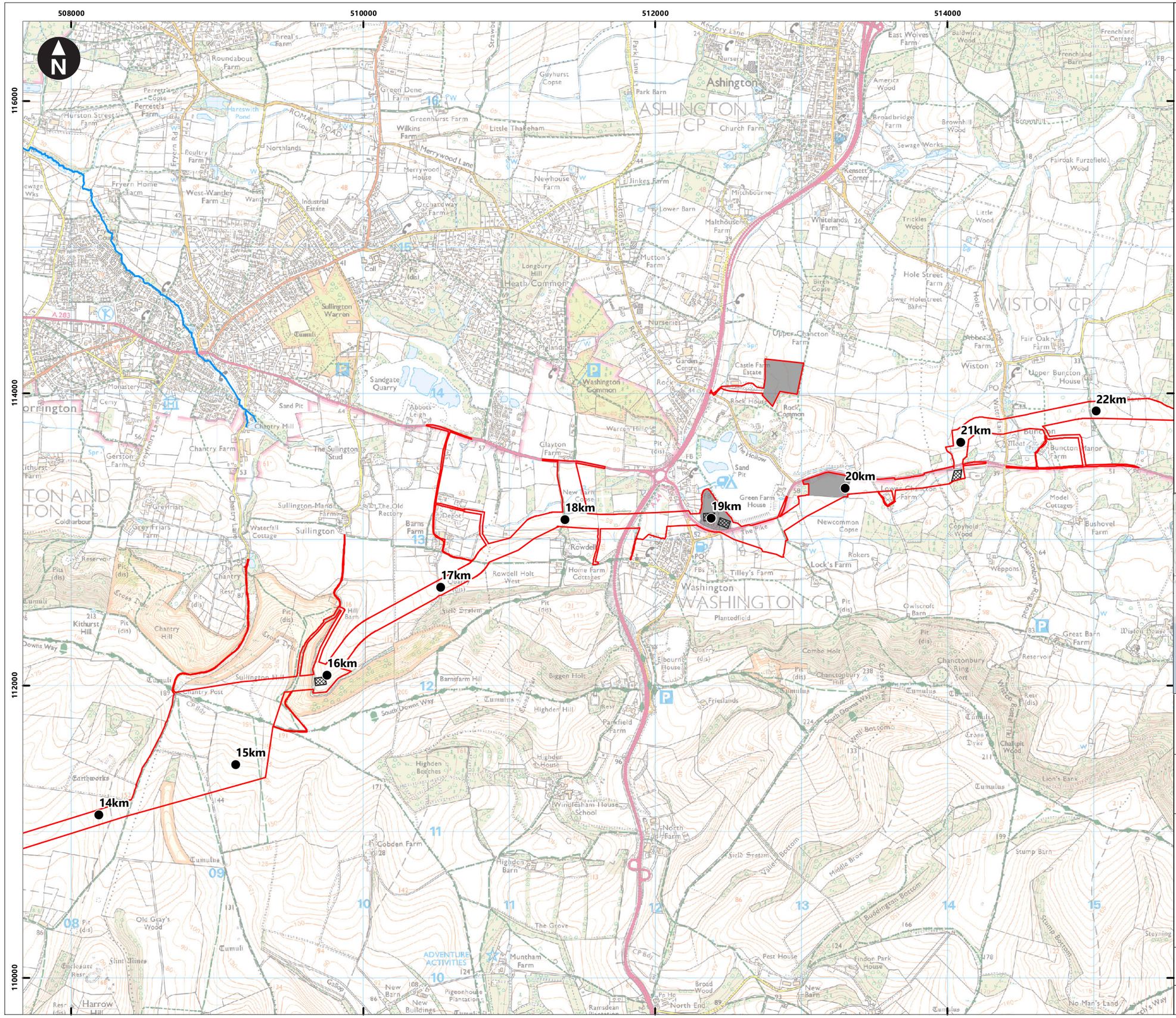
Figure 27.2.1b Water Environment

Preliminary Environmental Information Report

2 of 5

System Identifier:	Version:
42285-WOOD-PE-ON-FG-OY-7242	1.0

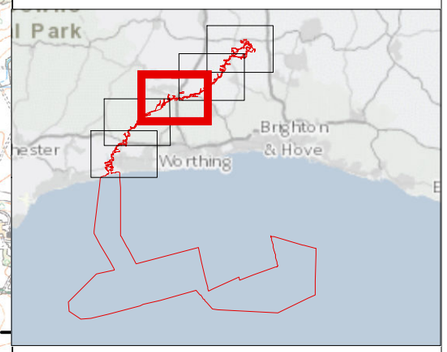
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
Wood	BUTLS	CARTR	02/07/2021	Final



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Main rivers
- Arun Internal Drainage District
- Chainage



Kilometres
0 0.125 0.25 0.5 0.75 1
1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

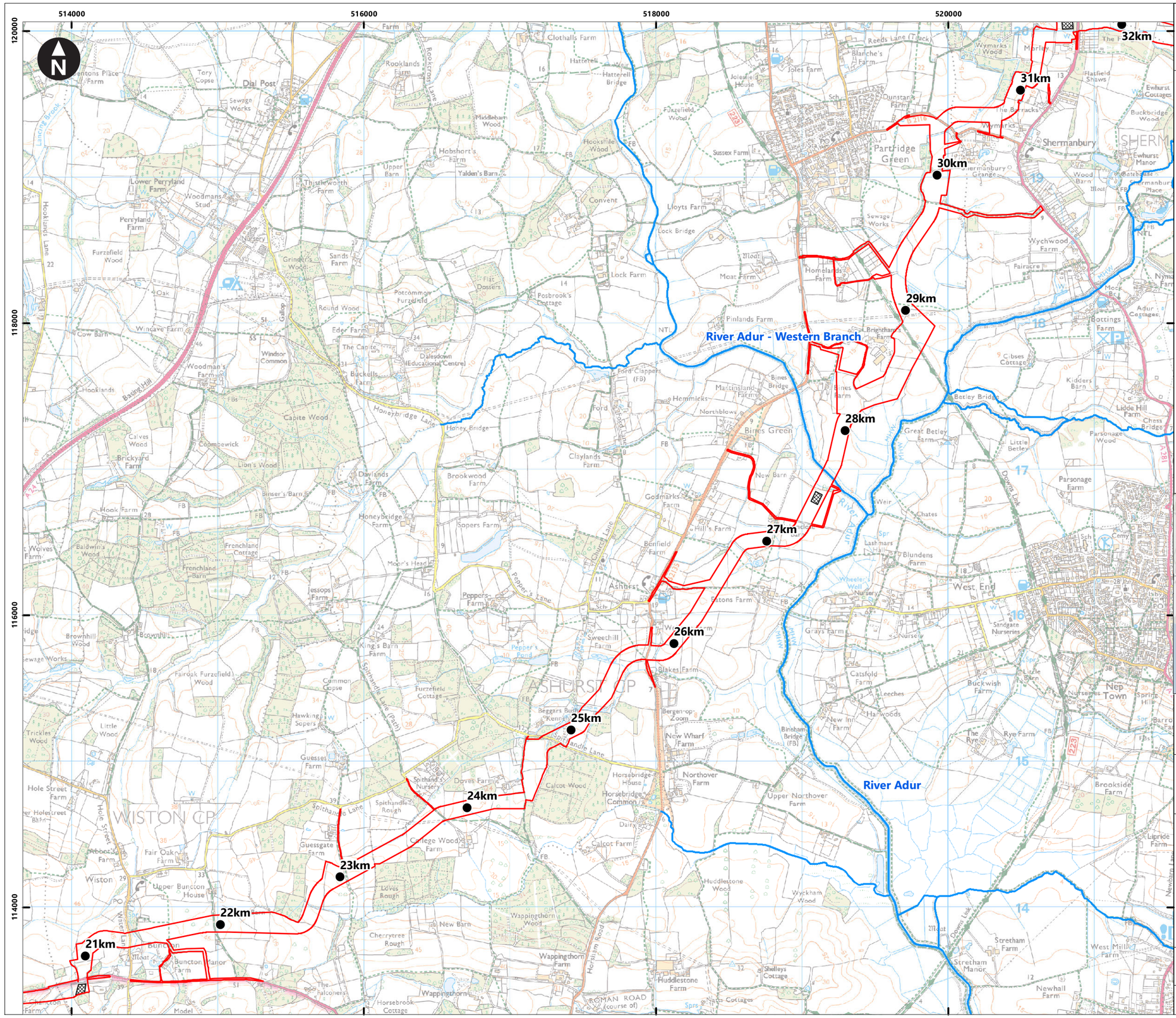
Rampion 2 Offshore Wind Farm

Figure 27.2.1c Water Environment

Preliminary Environmental Information Report

3 of 5

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-7242				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Main rivers
- Arun Internal Drainage District
- Chainage

Kilometres
0 0.125 0.25 0.5 0.75 1
1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

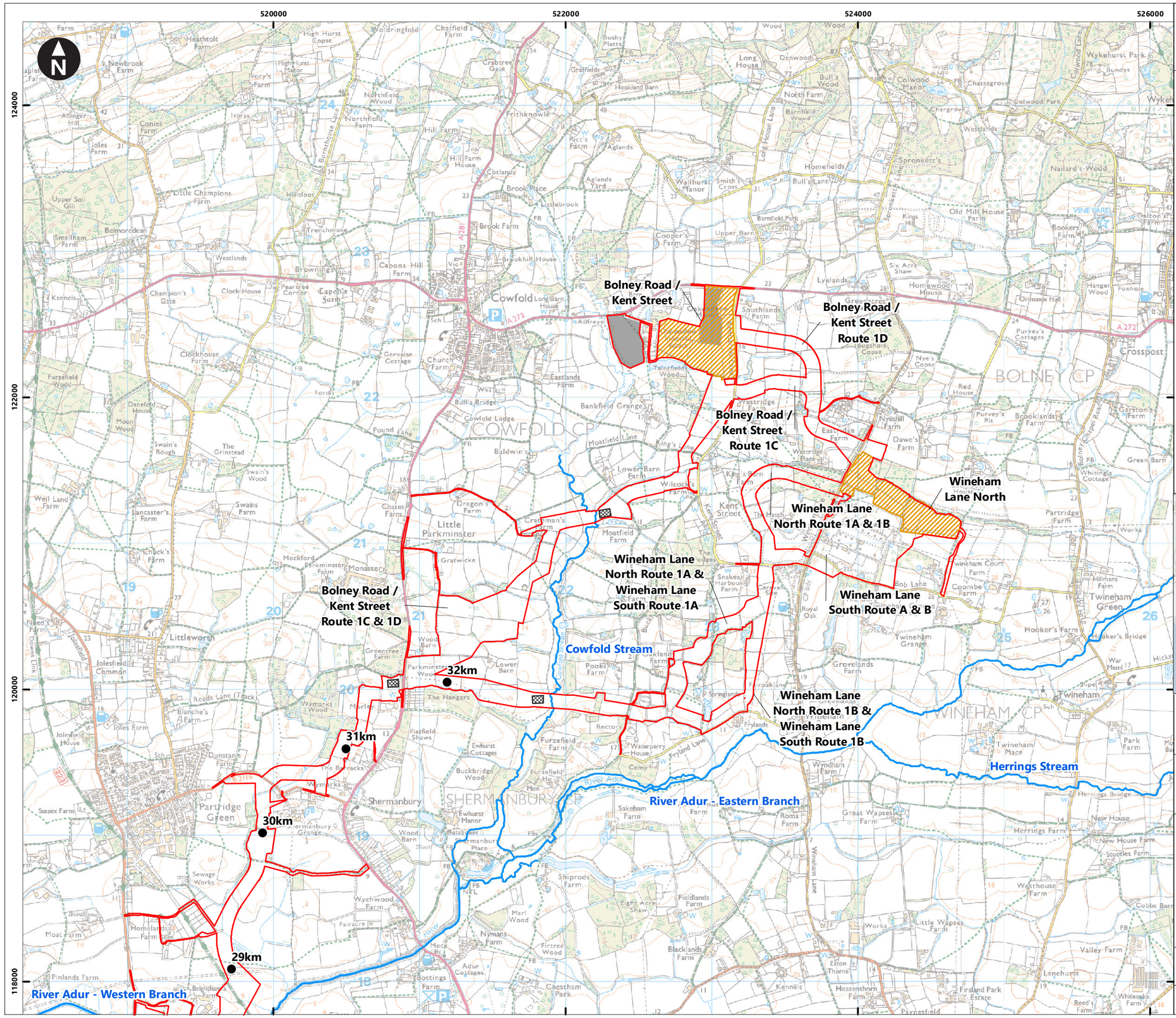
Rampion 2 Offshore Wind Farm

Figure 27.2.1d Water Environment

Preliminary Environmental Information Report

4 of 5

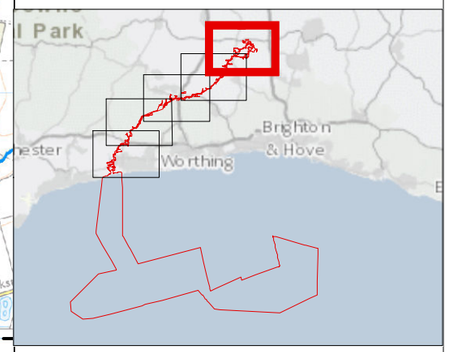
System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-7242				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Main rivers
- Arun Internal Drainage District
- Chainage



Kilometres
0 0.125 0.25 0.5 0.75 1

1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

Rampion 2 Offshore Wind Farm

Figure 27.2.1e Water Environment

Preliminary Environmental Information Report

5 of 5

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-7242				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final

Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Main rivers
- Flood Zone 3
- Flood Zone 2
- Flood Zone 1
- Areas Benefiting from Flood Defences
- Flood Storage Areas
- Spatial Flood Defences

Kilometres
0 0.5 1 2 3 4
1:85,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

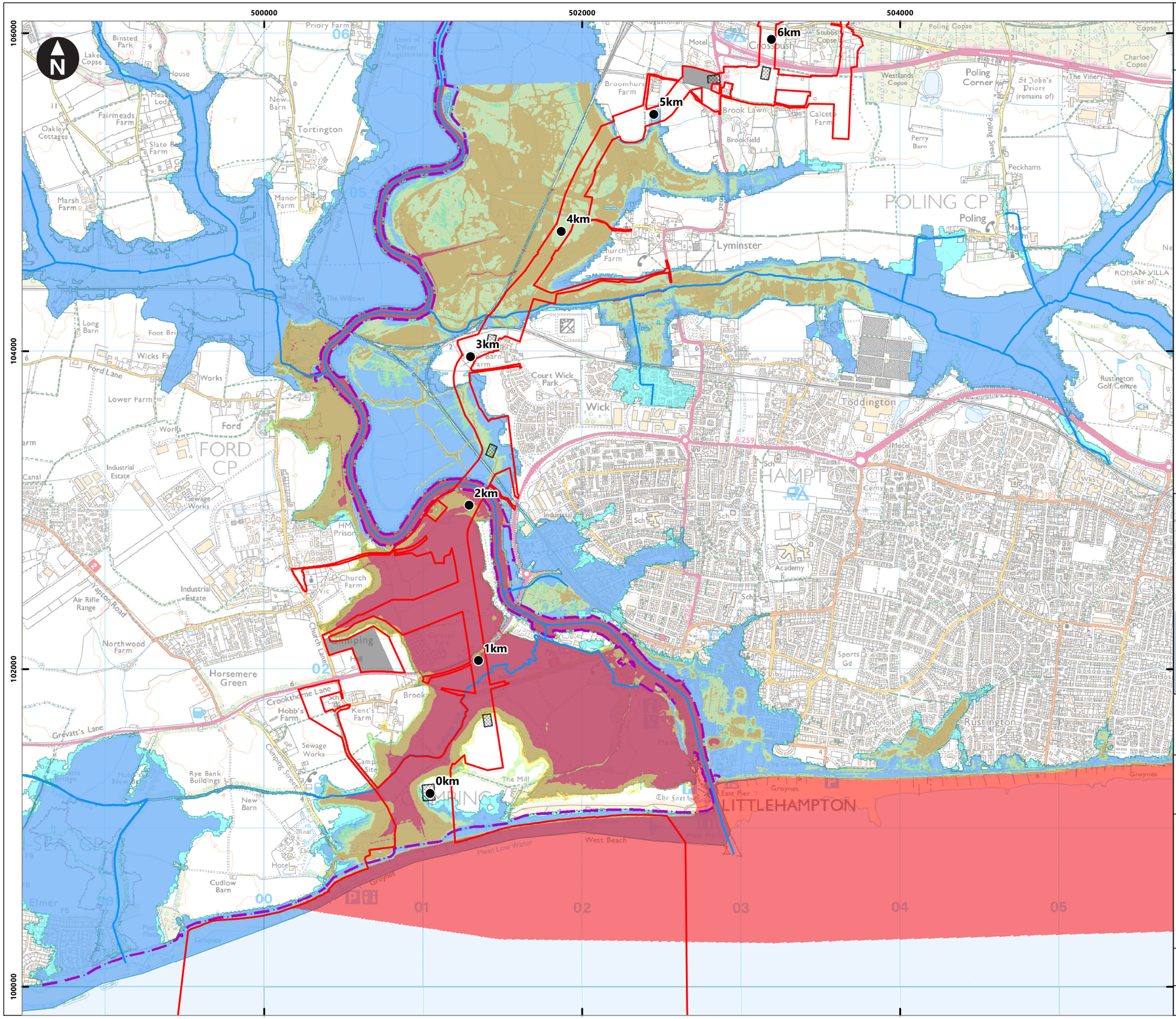
Rampion 2 Offshore Wind Farm

Figure 27.2.2 Flood map for planning overview

Preliminary Environmental Information Report

System Identifier:	Version:
42285-WOOD-PE-ON-FG-OY-7074	1.0

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BUTLS	CARTR	21/06/2021	FINAL



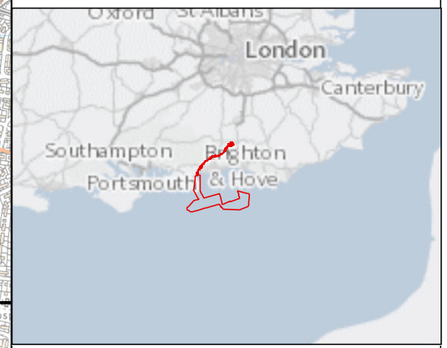
Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

- PEIR Assessment Boundary
- HDD compounds
- Temporary construction compounds
- Main rivers
- Flood Storage Areas
- Spatial Flood Defences
- Areas Benefiting from Flood Defences
- Flood Zone 3
- Flood Zone 2
- Chainage

0.5% AEP tidal max hazard

- Null
- Low hazard
- Danger for some
- Danger for most
- Danger for all



Kilometres
0 0.125 0.25 0.5 0.75 1
1:23,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

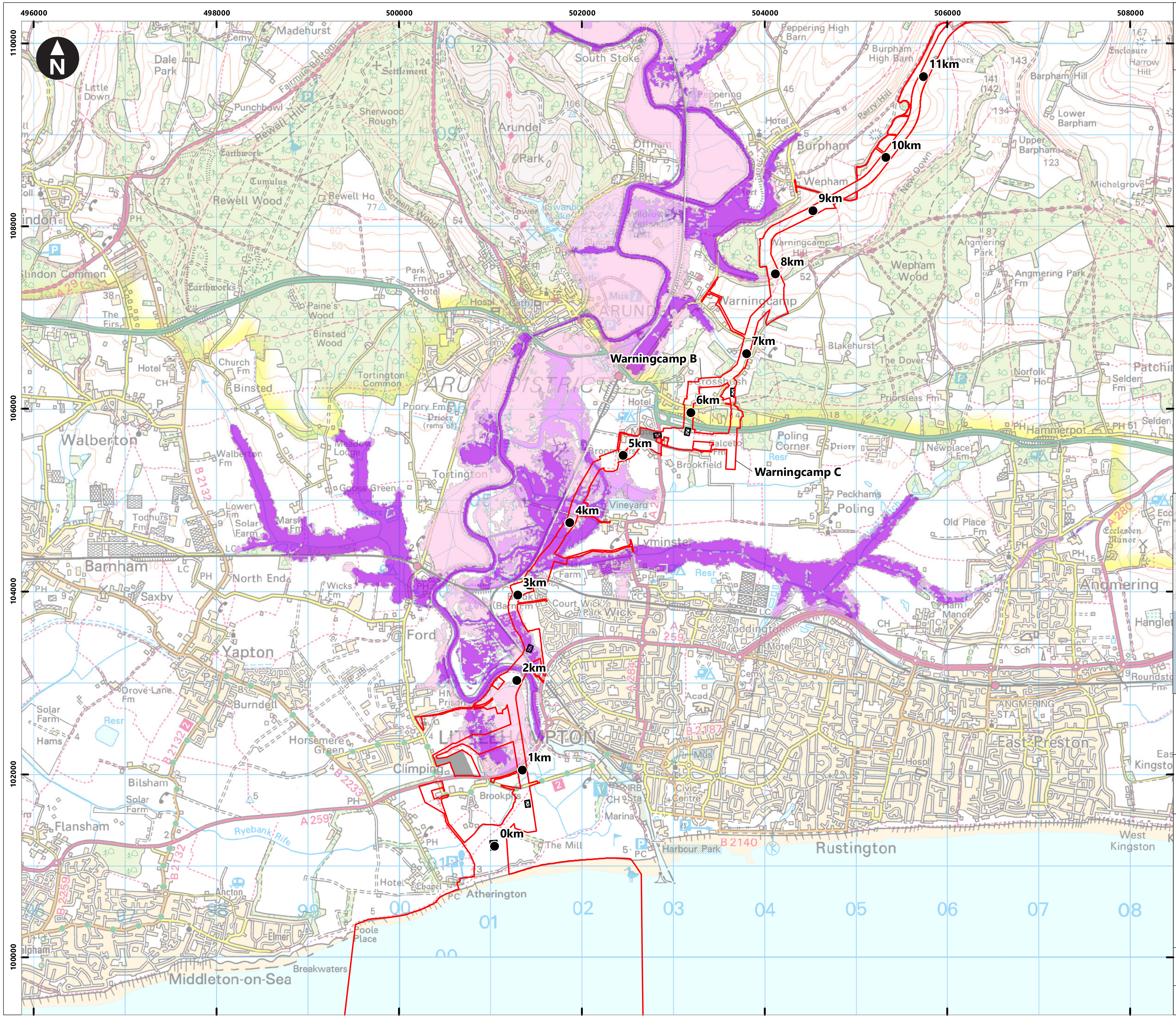
Rampion 2 Offshore Wind Farm

Figure 27.2.3 Tidal flood risk: Littlehampton

Preliminary Environmental Information Report

System Identifier:	Version:
42285-WOOD-PE-ON-FG-OY-7236	1.0

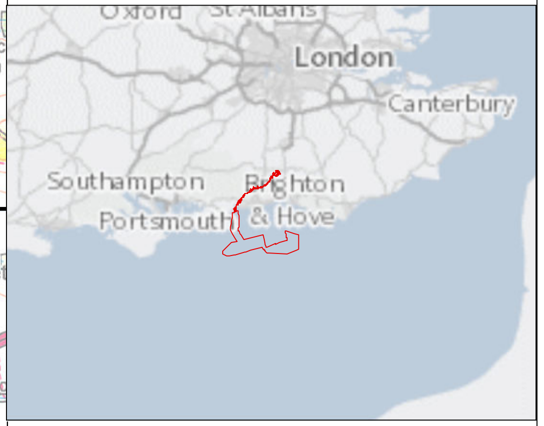
Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BUTLS	CARTR	21/06/2021	FINAL



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

☐	PEIR Assessment Boundary
▨	HDD compounds
■	Temporary construction compounds
■	5% AEP fluvial flood extent (defended)
■	1% AEP fluvial flood extent (defended)
■	1% AEP climate change fluvial flood extent (defended)
●	Chainage



Kilometres
0 0.225 0.45 0.9 1.35 1.8

1:40,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

Rampion 2 Offshore Wind Farm

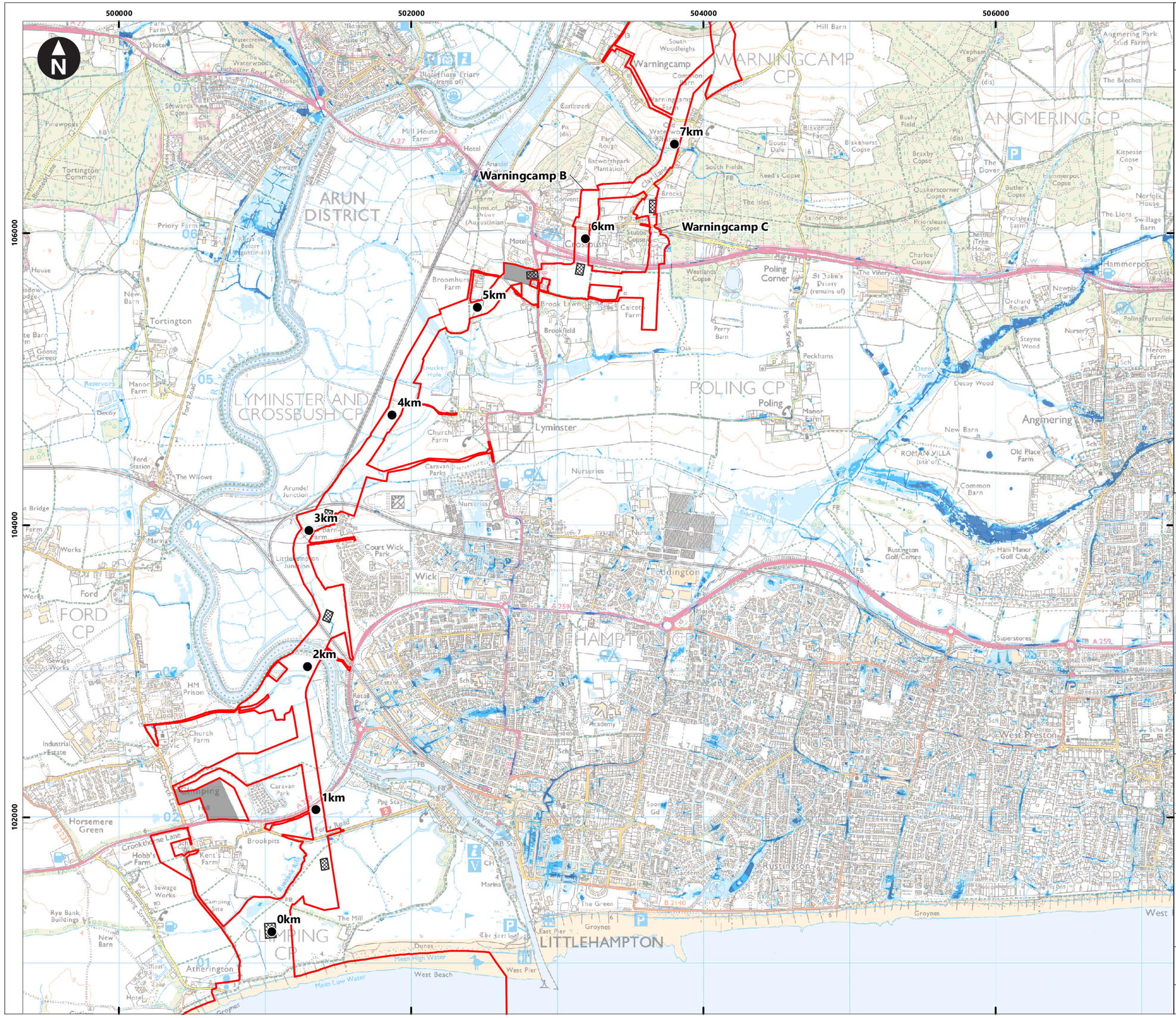
Figure 27.2.4 Fluvial flood extents: Littlehampton

Preliminary Environmental Information Report

System Identifier:	Version:
42285-WOOD-PE-ON-FG-OY-9870	1.0

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
WOOD	BUTLS	CARTR	18/05/2021	FINAL

ISO A3 Landscape



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Chainage

Risk of Flooding from Surface Water flood extent

- > 3.33% AEP - High risk of surface water flooding
- 1%- 3.3% AEP - Medium risk of surface water flooding
- 0.1 - 1% AEP - Low risk of surface water flooding

Kilometres
0 0.125 0.25 0.5 0.75 1
1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

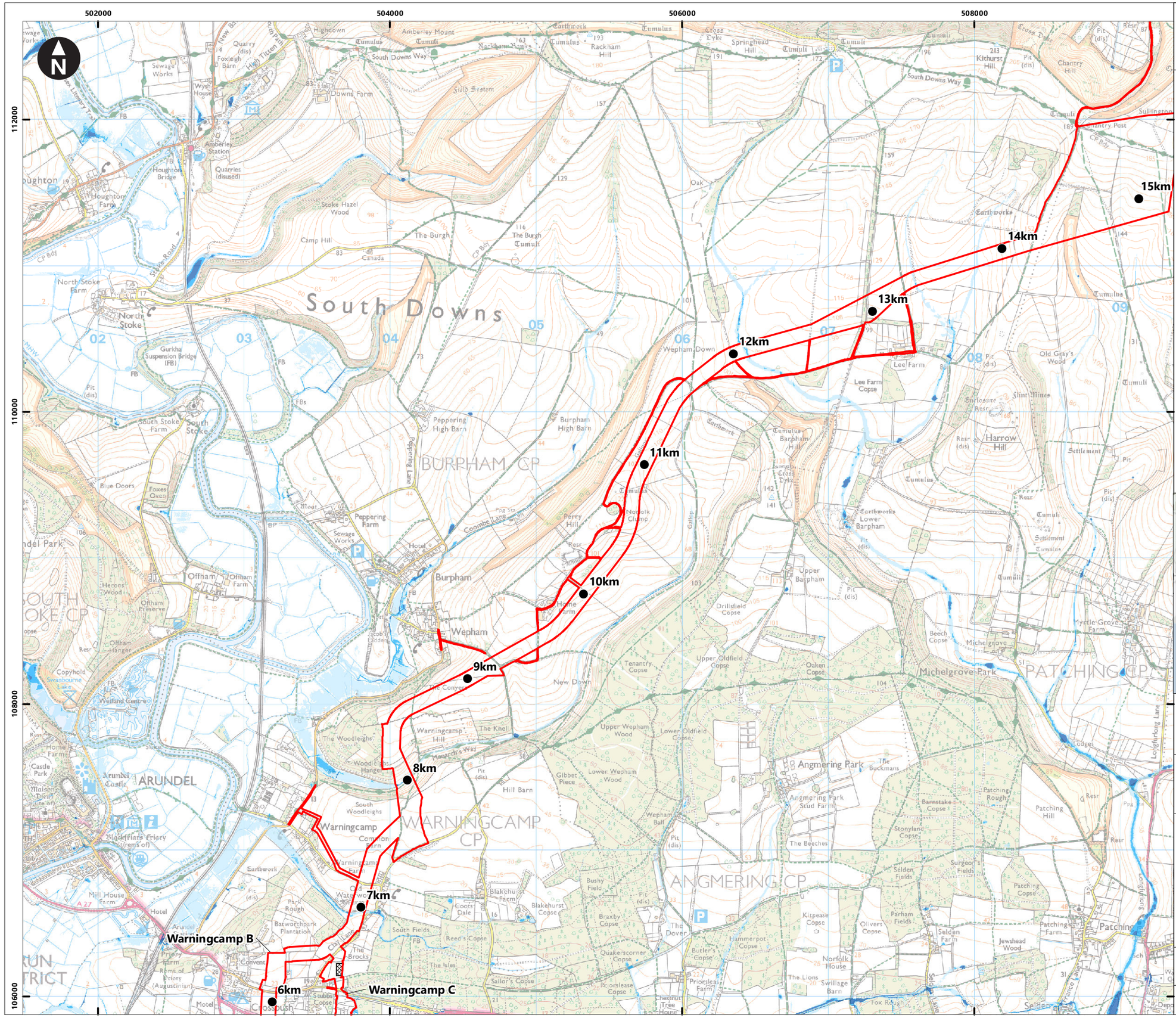
Rampion 2 Offshore Wind Farm

Figure 27.2.5a Risk of flooding from surface water extents: Overview

Preliminary Environmental Information Report

1 of 5

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-6374				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final

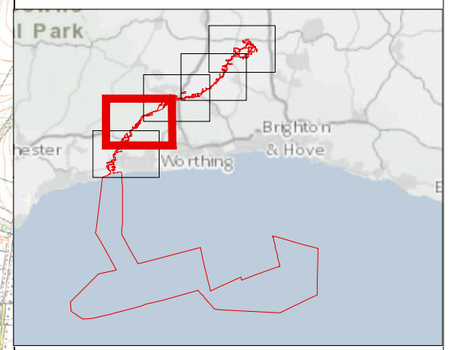


Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Chainage

Risk of Flooding from Surface Water flood extent

- > 3.33% AEP - High risk of surface water flooding
- 1%- 3.3% AEP - Medium risk of surface water flooding
- 0.1 - 1% AEP - Low risk of surface water flooding



Kilometres
0 0.125 0.25 0.5 0.75 1
1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

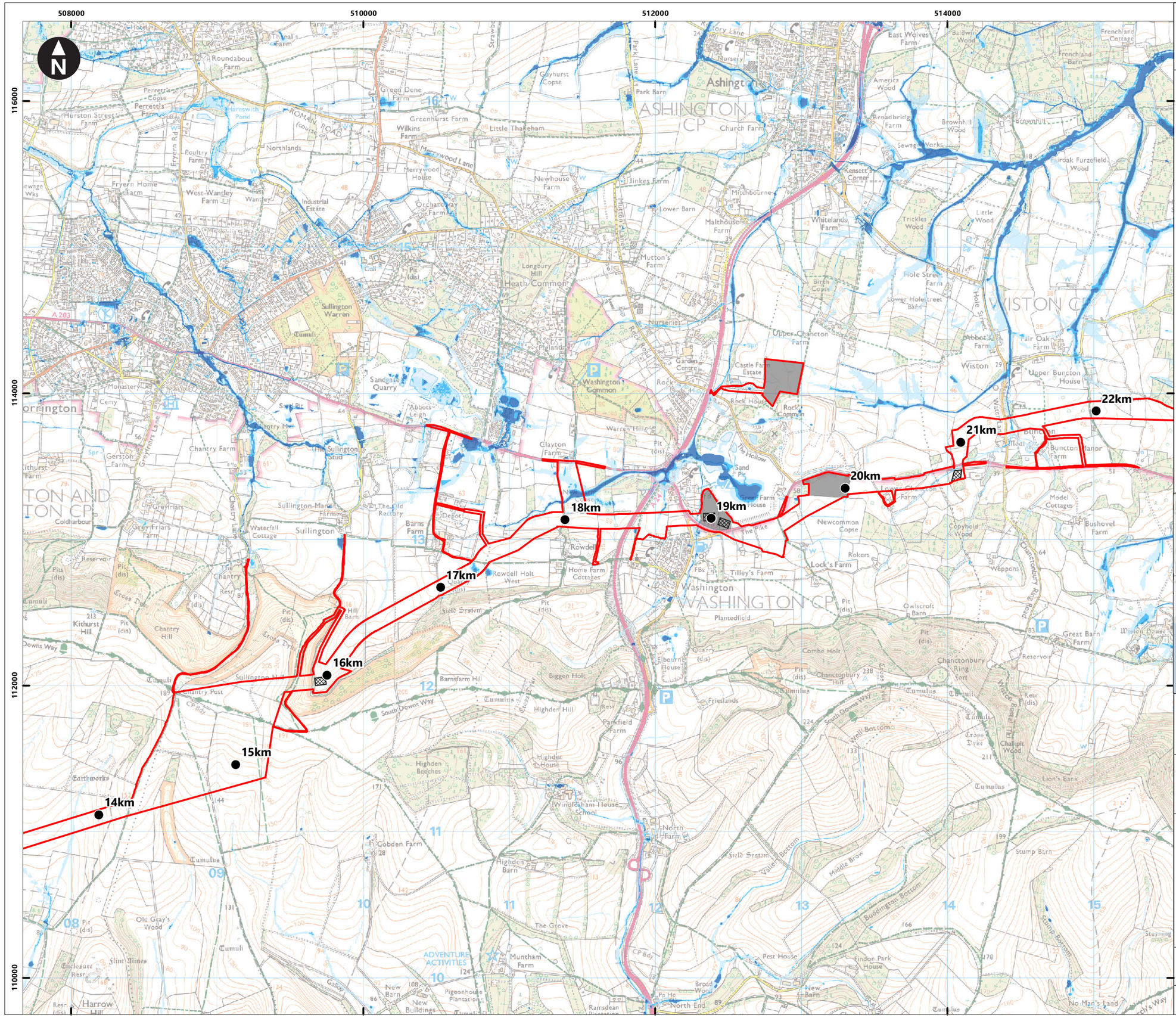
Rampion 2 Offshore Wind Farm

Figure 27.2.5b Risk of flooding from surface water extents: Overview

Preliminary Environmental Information Report

2 of 5

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-6374				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final



Service Layer Credits: Contains OS data © Crown Copyright and database right 2020 © Environment Agency copyright and/or database right 2018. All rights reserved.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673.

Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Chainage

Risk of Flooding from Surface Water flood extent

- > 3.33% AEP - High risk of surface water flooding
- 1%- 3.3% AEP - Medium risk of surface water flooding
- 0.1 - 1% AEP - Low risk of surface water flooding

Kilometres
0 0.125 0.25 0.5 0.75 1
1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

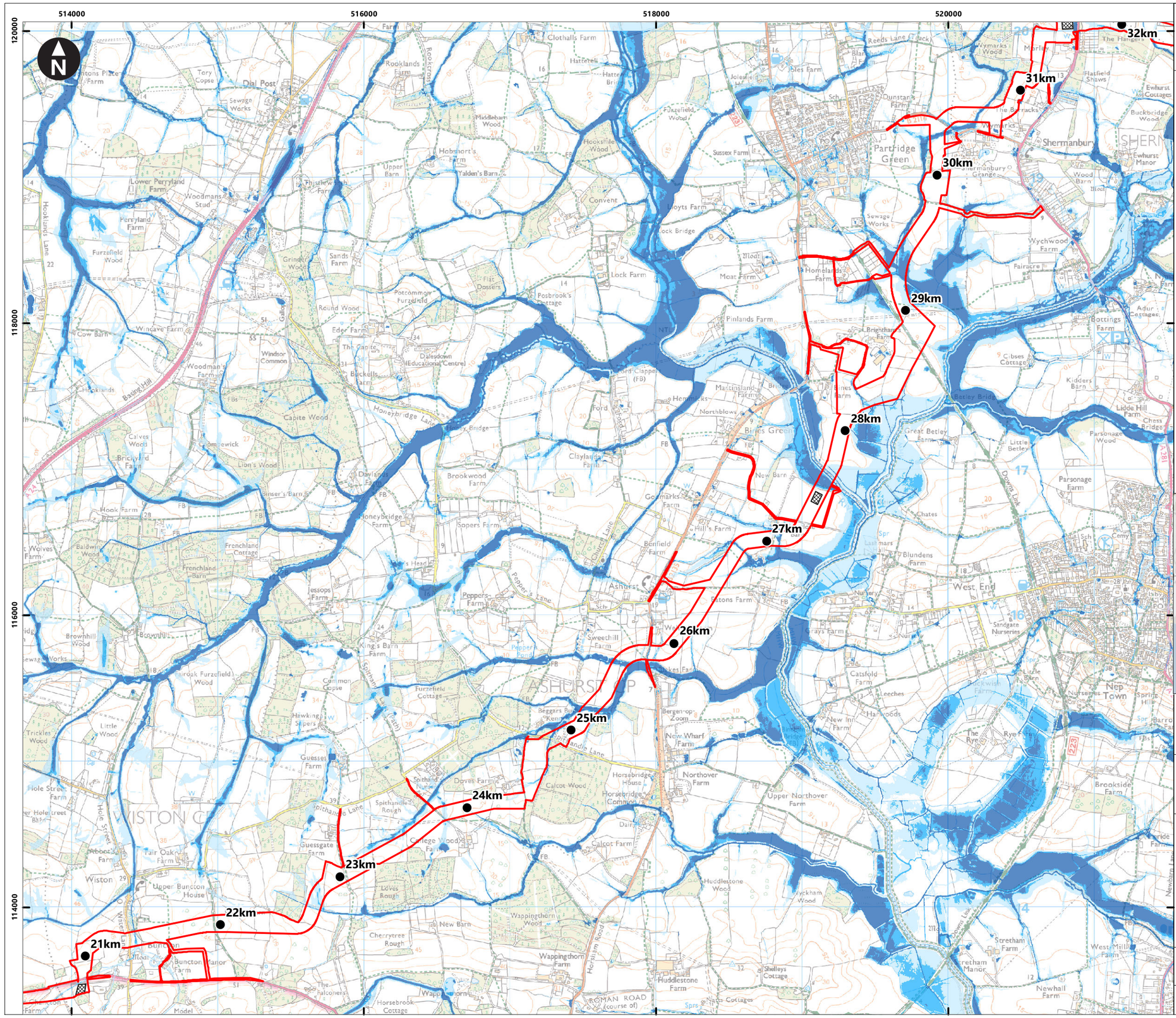
Rampion 2 Offshore Wind Farm

Figure 27.2.5c Risk of flooding from surface water extents: Overview

Preliminary Environmental Information Report

3 of 5

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-6374				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final

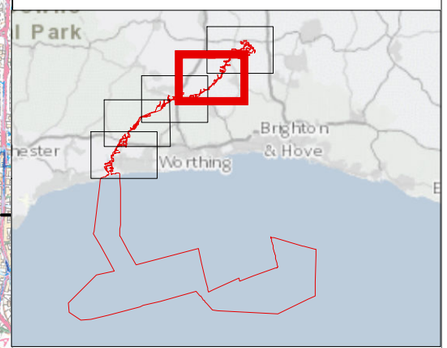


Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Chainage

Risk of Flooding from Surface Water flood extent

- > 3.33% AEP - High risk of surface water flooding
- 1%- 3.3% AEP - Medium risk of surface water flooding
- 0.1 - 1% AEP - Low risk of surface water flooding



Kilometres
0 0.125 0.25 0.5 0.75 1
1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

Rampion 2 Offshore Wind Farm

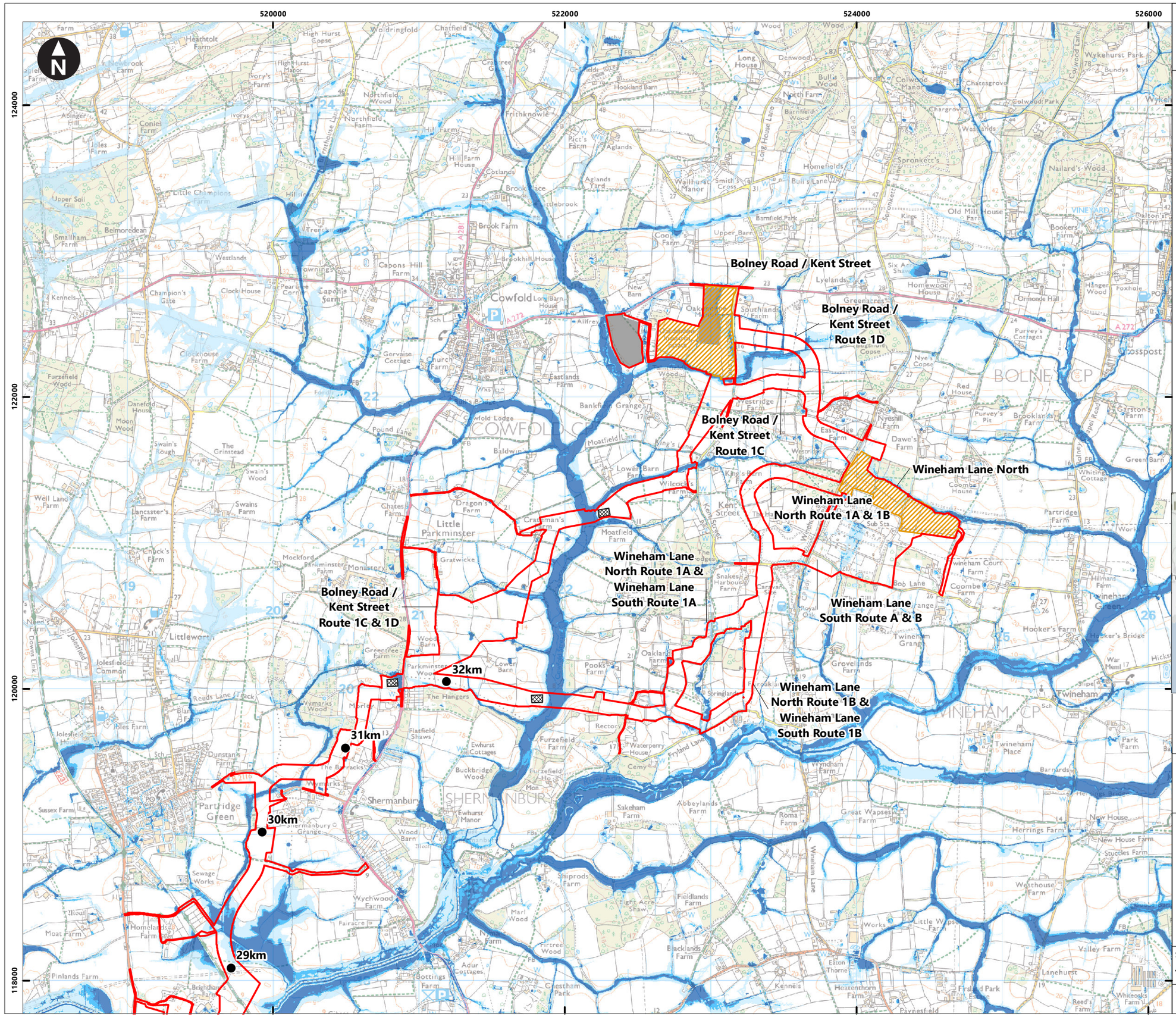
Figure 27.2.5d Risk of flooding from surface water extents: Overview

Preliminary Environmental Information Report

4 of 5

System Identifier:	Version:
42285-WOOD-PE-ON-FG-OY-6374	1.0

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
Wood	BUTLS	CARTR	02/07/2021	Final

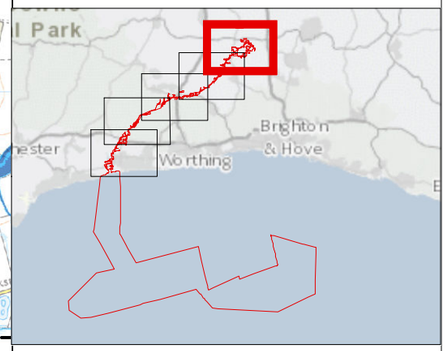


Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Chainage

Risk of Flooding from Surface Water flood extent

- > 3.33% AEP - High risk of surface water flooding
- 1%- 3.3% AEP - Medium risk of surface water flooding
- 0.1 - 1% AEP - Low risk of surface water flooding



Kilometres
0 0.125 0.25 0.5 0.75 1

1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

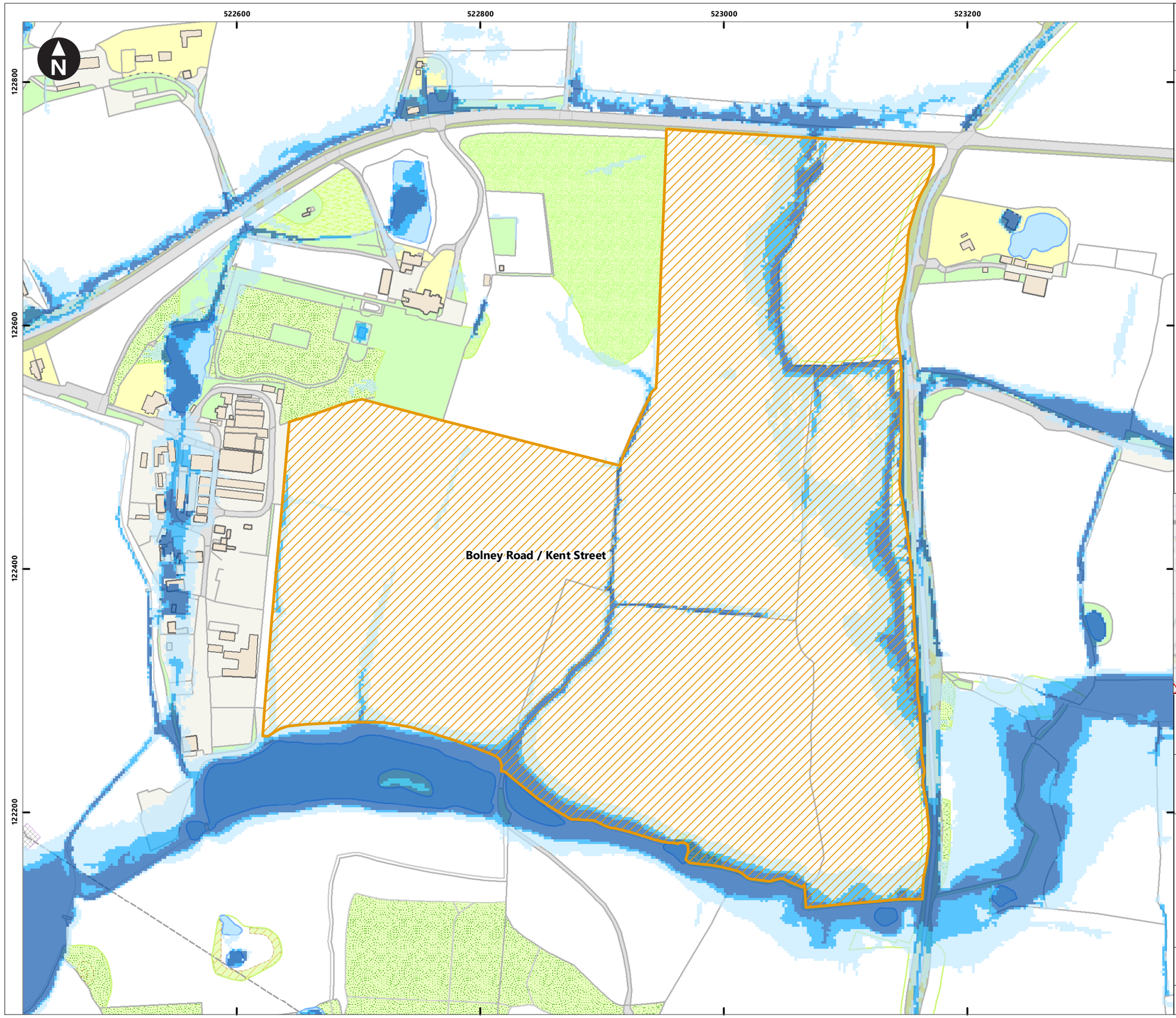
Rampion 2 Offshore Wind Farm

Figure 27.2.5e Risk of flooding from surface water extents: Overview

Preliminary Environmental Information Report

5 of 5

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-6374				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final



Key

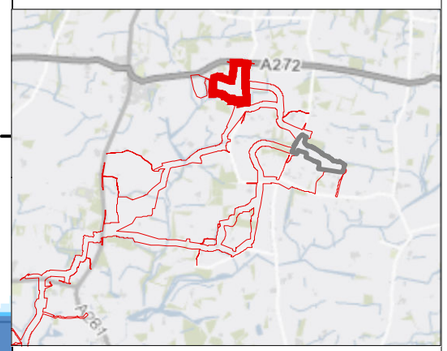
Onshore substation search areas

Risk of Flooding from Surface Water flood extent

> 3.33% AEP - High risk of surface water flooding

1%- 3.3% AEP - Medium risk of surface water flooding

0.1 - 1% AEP - Low risk of surface water flooding



Kilometres
0 0.015 0.03 0.06 0.09 0.12

1:3,000

British National Grid Transverse Mercator

Rampion Extension Development

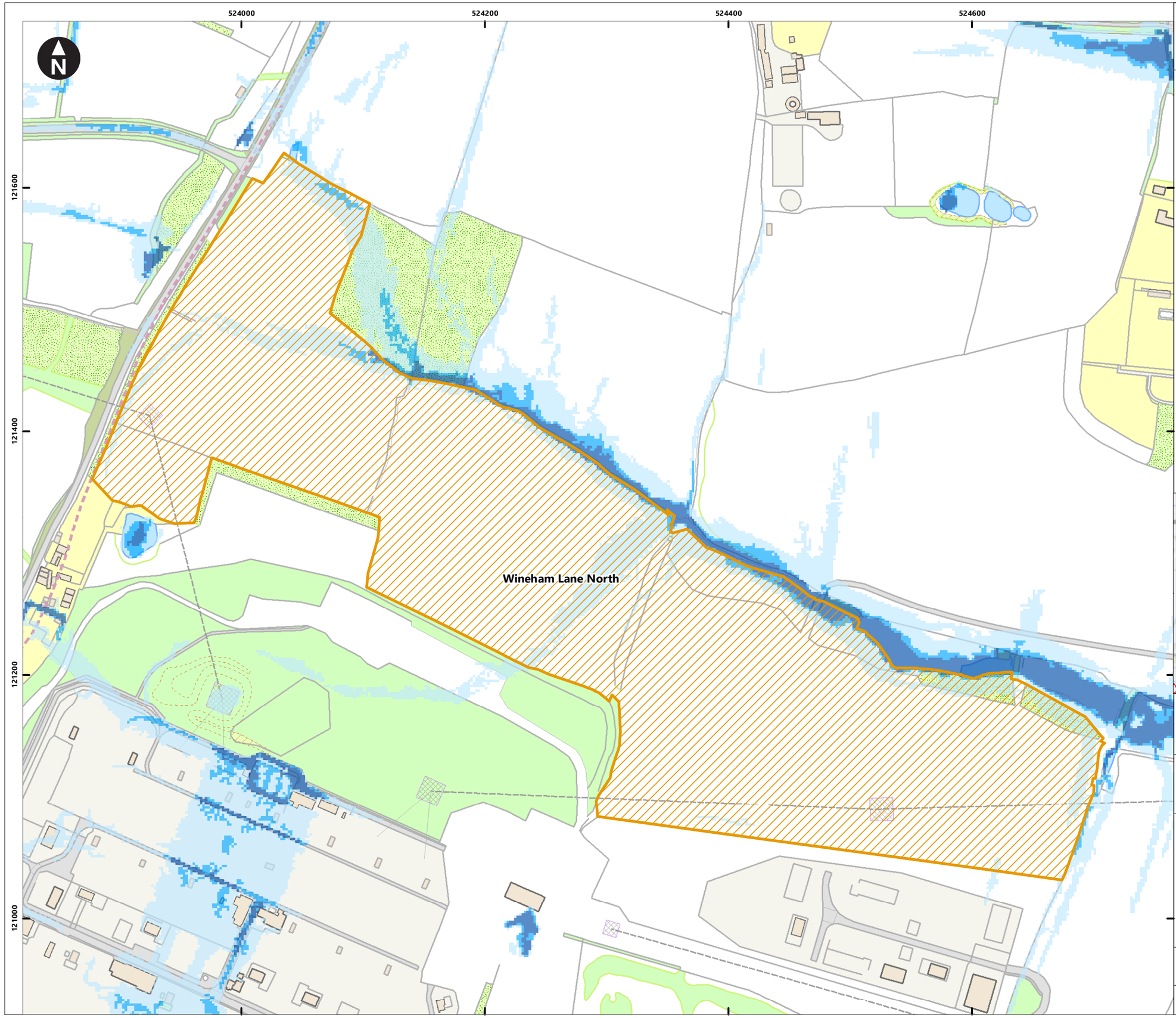
Rampion 2 WIND FARM

Rampion 2 Offshore Wind Farm

Figure 27.2.6a Risk of flooding from surface water extents: Onshore substation search areas

Preliminary Environmental Information Report

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-3426				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final



Key

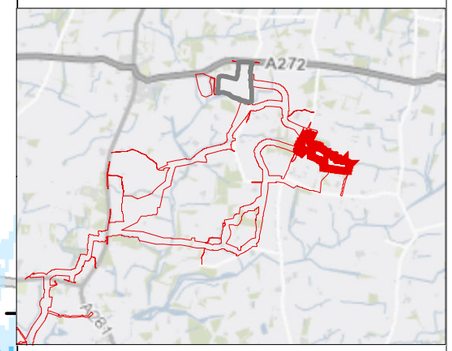
Onshore substation search areas

Risk of Flooding from Surface Water flood extent

> 3.33% AEP - High risk of surface water flooding

1%- 3.3% AEP - Medium risk of surface water flooding

0.1 - 1% AEP - Low risk of surface water flooding



Kilometres

0 0.015 0.03 0.06 0.09 0.12

1:3,000

British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

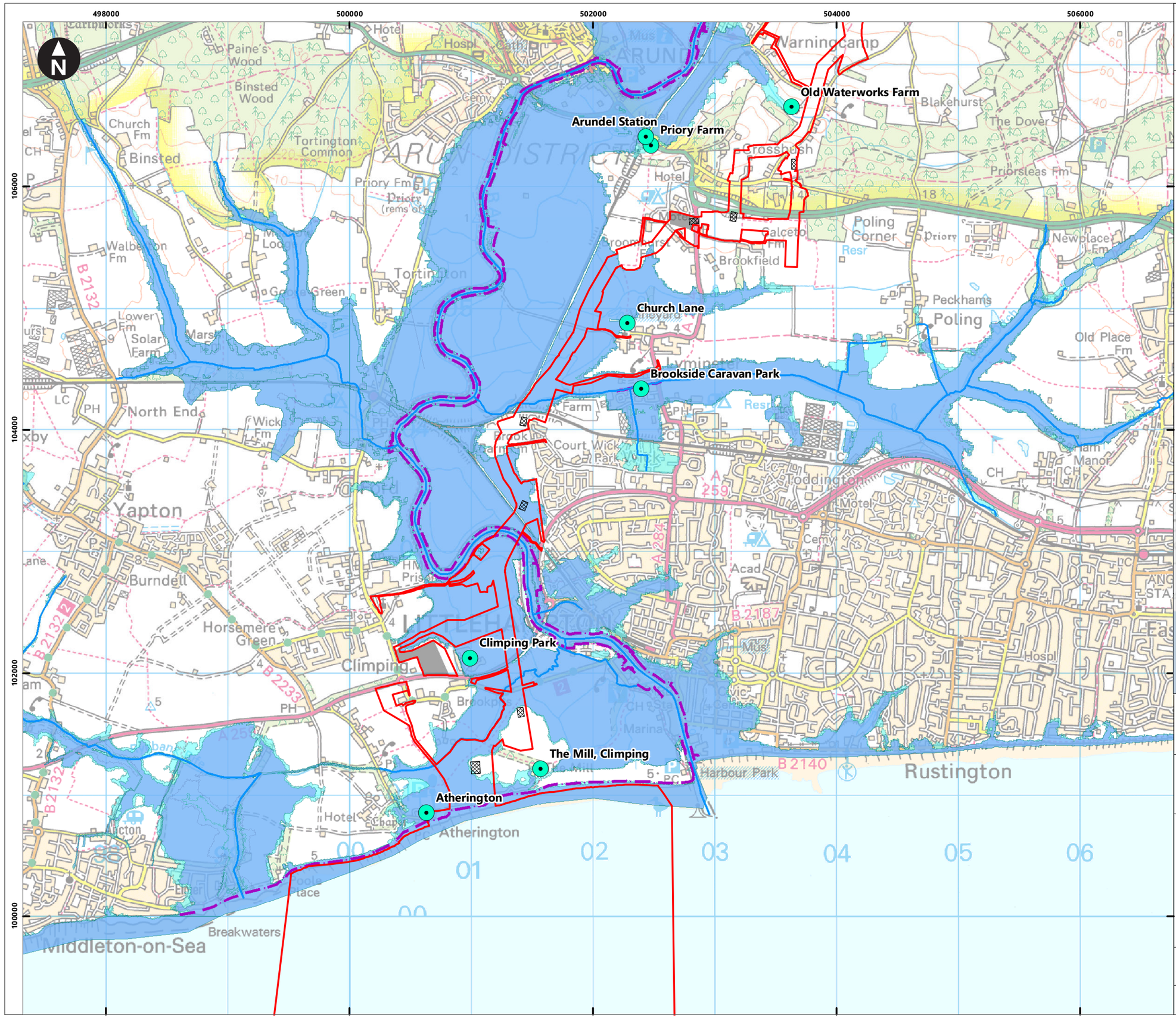
Rampion 2 Offshore Wind Farm

Figure 27.2.6b Risk of flooding from surface water extents: Onshore substation search areas

Preliminary Environmental Information Report

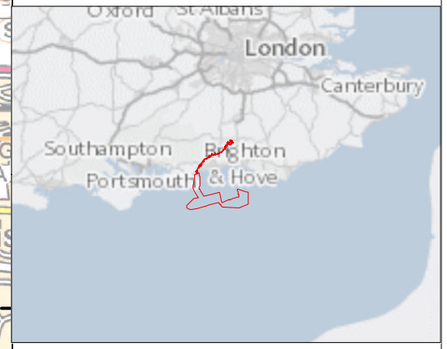
System Identifier:	Version:
42285-WOOD-PE-ON-FG-OY-3426	1.0

Company:	Drawn By:	Chk/Aprvd:	Drawn Date:	Status:
Wood	BUTLS	CARTR	02/07/2021	Final



Key

- PEIR Assessment Boundary
- HDD compounds
- Temporary construction compounds
- Main rivers
- Flood Storage Areas
- Spatial Flood Defences
- Areas Benefiting from Flood Defences
- Flood Zone 3
- Flood Zone 2
- Fluvial & Tidal Receptors



Kilometres
0 0.15 0.3 0.6 0.9 1.2

1:30,000

British National Grid Transverse Mercator

Rampion Extension Development

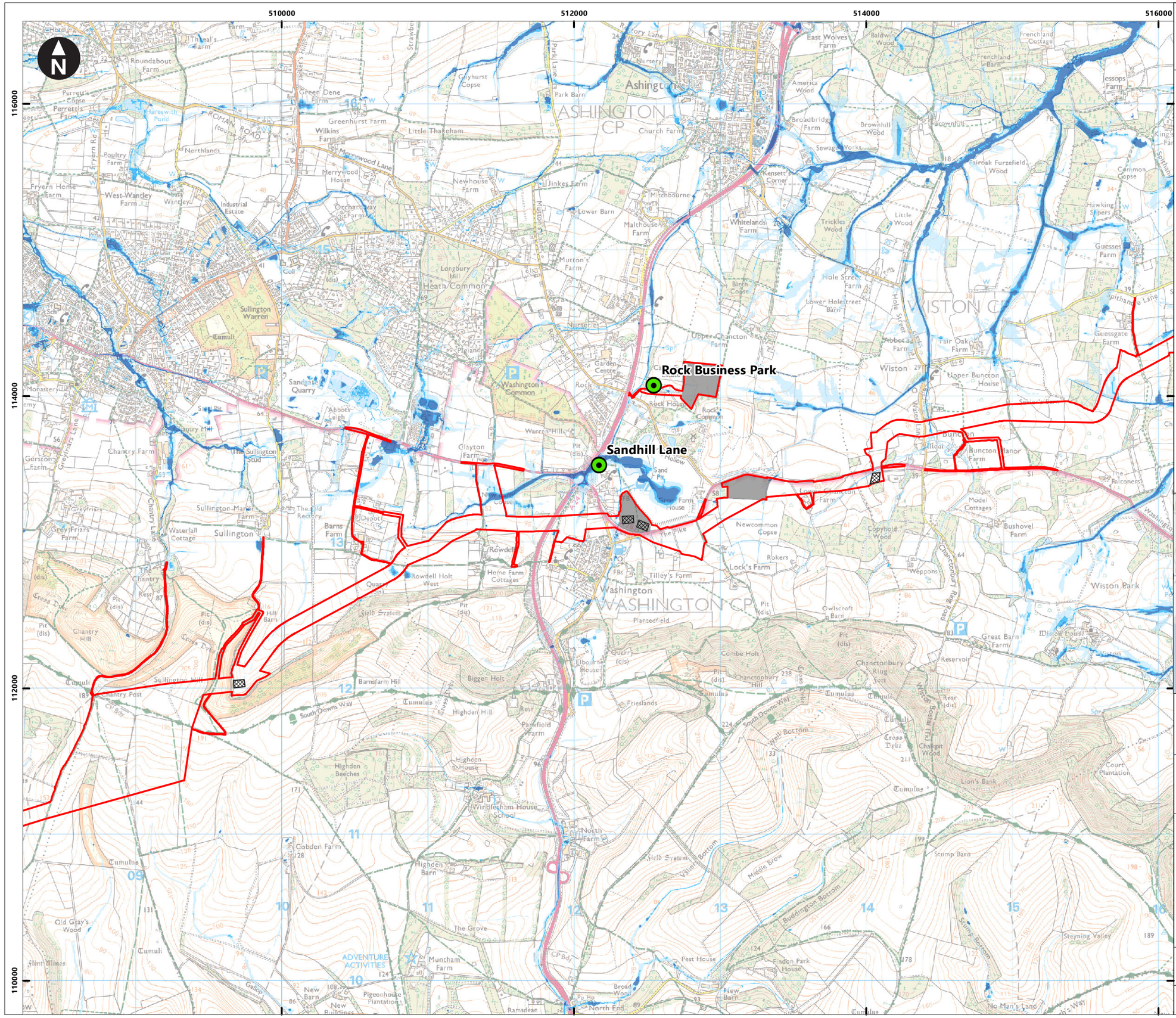
Rampion 2 WIND FARM

Rampion 2 Offshore Wind Farm

Figure 27.2.7 Fluvial and tidal flood risk receptors

Preliminary Environmental Information Report

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-4789				1.0
Company: WOOD	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 18/05/2021	Status: FINAL



Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Surface water receptors

Risk of Flooding from Surface Water flood extent

- > 3.33% AEP - High risk of surface water flooding
- 1%- 3.3% AEP - Medium risk of surface water flooding
- 0.1 - 1% AEP - Low risk of surface water flooding

Kilometres
0 0.125 0.25 0.5 0.75 1

1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

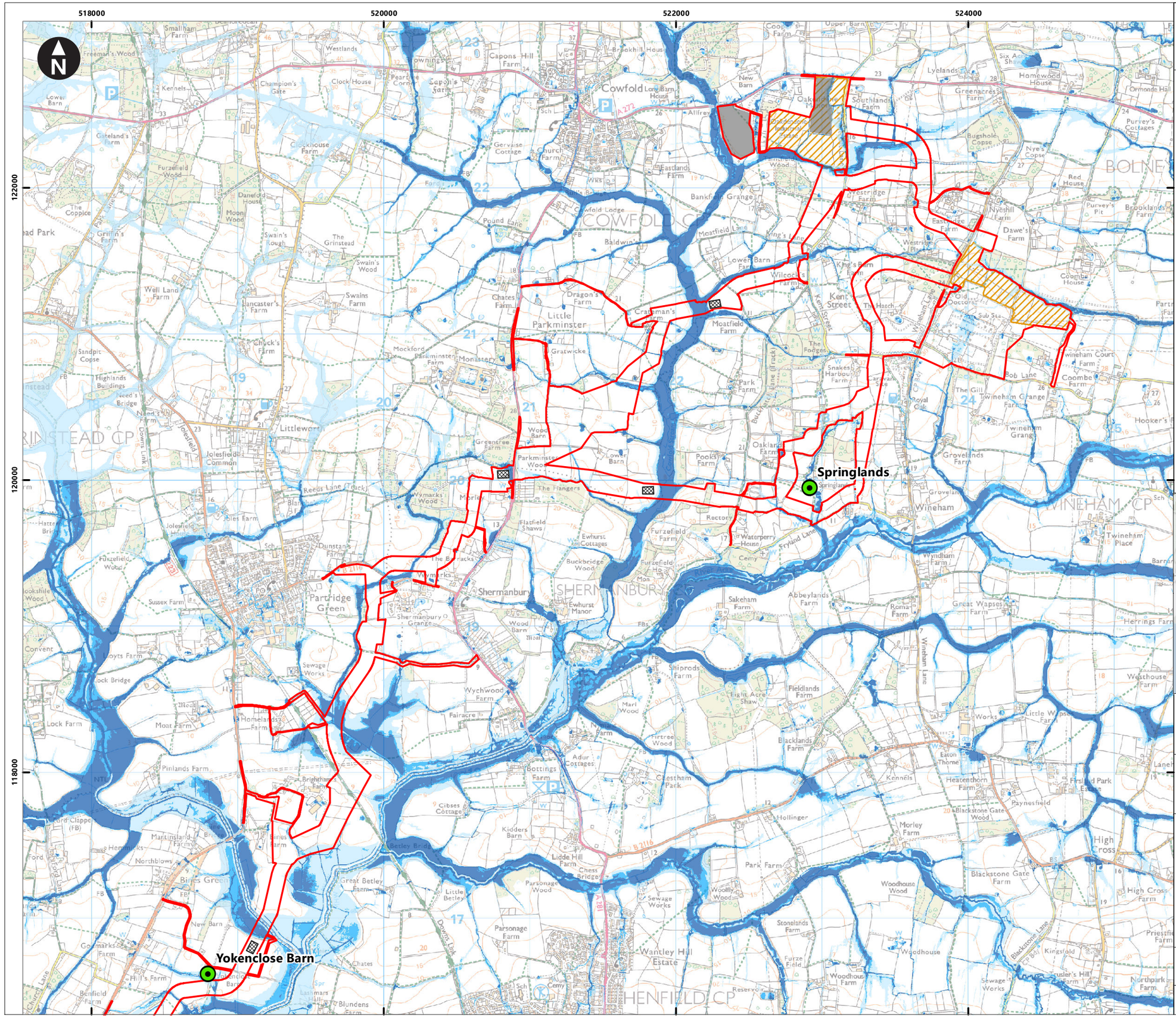
Rampion 2 Offshore Wind Farm

Figure 27.2.8a Surface water flood risk receptors

Preliminary Environmental Information Report

1 of 2

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-3108				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final



Key

- PEIR Assessment Boundary
- Onshore substation search areas
- HDD compounds
- Temporary construction compounds
- Surface water receptors

Risk of Flooding from Surface Water flood extent

- > 3.33% AEP - High risk of surface water flooding
- 1%- 3.3% AEP - Medium risk of surface water flooding
- 0.1 - 1% AEP - Low risk of surface water flooding

Kilometres
0 0.125 0.25 0.5 0.75 1
1:25,000
British National Grid Transverse Mercator

Rampion Extension Development

Rampion 2 WIND FARM

Rampion 2 Offshore Wind Farm

Figure 27.2.8b Surface water flood risk receptors

Preliminary Environmental Information Report

2 of 2

System Identifier:				Version:
42285-WOOD-PE-ON-FG-OY-3108				1.0
Company: Wood	Drawn By: BUTLS	Chk/Aprvd: CARTR	Drawn Date: 02/07/2021	Status: Final

wood.

4.27.3

Rampion 2 WIND FARM

Volume 4, Appendix 27.3

Preliminary Water Framework Directive Assessment

GoBe wood.

Contents

1.	**Introduction**	**5**
1.1	Background to this appendix	5
1.2	Structure of this report	6
	Design of the Proposed Development to facilitate WFD compliance	6
1.3	The legislative context – The Water Framework Directive	6
	Overview	6
	Surface waters	7
	Groundwater	9
	Bathing Waters Directive	10
2.	**Consultation**	**12**
3.	**WFD assessment methodology**	**18**
3.1	Structure of this assessment	18
3.2	Available guidance	18
3.3	Assessment Process	19
	Screening and Scoping	19
	Further Assessment	20
	Identification and evaluation of measures	20
	Article 4.7 consideration	21
4.	**Screening and Scoping assessment**	**22**
4.2	River water bodies	31
4.3	Transitional (Estuarine) and Coastal	38
	Onshore activities	38
	Offshore activities	42
4.4	Lake water bodies	55
4.5	Groundwater bodies	56
4.6	Protected Areas	60
5.	**Preliminary further assessment results**	**62**
5.1	Structure of further assessment	62
5.2	Surface water bodies	67
	Introduction	67
	Coastal Sussex GB640704540003	67
	Lower Arun Transitional GB540704105000	69
	Ryebank Rife GB107041006620	70
	Black Ditch (West Sussex) GB107041012890	71

Honeybridge Stream GB107041012120 72
Adur Transitional GB540704116000 73
Adur (Lockbridge) GB107041012200 74
Adur East (Sakeham) GB107041012900 75
Cowfold Stream GB107041012260 76
Adur East GB107041012180 78

5.3 Groundwater bodies 79
Introduction 79
Littlehampton Anticline West GB40701G504900 79
Littlehampton Anticline East GB40701G503400 80
Sussex Lambeth Group GB40701G505100 81
Worthing Chalk GB40701G505300 81
Lower Greensand Adur and Ouse GB40701G502400 82

6. Preliminary conclusions on WFD compliance 84

6.1 Overview 84
6.2 Will the Proposed Development lead to deterioration in WFD status of any WFD water body in the Study Area? 84
6.3 Will the Proposed Development compromise the achievement of Good Status in any WFD water body in the Study Area? 84
6.4 Will the Proposed Development compromise the achievement of Protected Area objectives? 84
6.5 Statement of WFD compliance 84

7. Glossary of terms and abbreviations 85

8. References 89

Table 1-1 WFD classification elements for rivers, transitional and coastal WFD water bodies 8
Table 1-2 rBWD classifications. 11
Table 2-1 Consultation responses relating to WFD Assessment 12
Table 4-1 Proposed Development activities and the WFD 25
Table 4-2 Screening of onshore activities / infrastructure for river WFD water bodies 33
Table 4-3 Screening of onshore activities / Infrastructure for Transitional (TraC) and Coastal WFD water bodies 39
Table 4-4 Scoping of activities associated with the offshore infrastructure 43
Table 5-1 Summary of embedded environmental measures and their relevance regarding potential affects 63
Table 5-2 Summary of the further assessment results, from onshore activities, for the Coastal Sussex water body 67
Table 5-3 Summary of the further assessment results, from offshore activities, for the Coastal Sussex water body 68

Table 5-4 Summary of the further assessment results, from onshore activities, for the Lower Arun TrAC water body 69
Table 5-5 Summary of the further assessment results, from offshore activities, for the Lower Arun TrAC water body 69
Table 5-6 Summary of the further assessment results, from onshore activities, for the Ryebank Rife river water body 70
Table 5-7 Summary of the further assessment results, from onshore activities, for the Black Ditch (West Sussex) river water body 72
Table 5-8 Summary of the further assessment results, from onshore activities, for the Honeybridge Stream river water body 73
Table 5-9 Summary of the further assessment results, from onshore activities, for the Adur TrAC water body 74
Table 5-10 Summary of the further assessment results, from onshore activities, for the Adur (Lockbridge) river water body 75
Table 5-11 Summary of the further assessment results, from onshore activities, for the Adur East (Sakeham) river water body 76
Table 5-12 Summary of the further assessment results, from onshore activities, for the Cowfold Stream river water body 77
Table 5-13 Summary of the further assessment results, from onshore activities, for the Adur East river water body 78
Table 5-14 Summary of the further assessment results, from onshore activities, for the Littlehampton Anticline West groundwater water body 79
Table 5-15 Summary of the further assessment results, from onshore activities, for the Littlehampton Anticline East groundwater water body 80
Table 5-16 Summary of the further assessment results, from onshore activities, for the Sussex Lambeth Group groundwater water body 81
Table 5-17 Summary of the further assessment results, from onshore activities, for the Worthing Chalk groundwater water body 82
Table 5-18 Summary of the further assessment results, from onshore activities, for the Lower Greensand Adur and Ouse groundwater water body 83

Graphic 1-1 Overview of the groundwater classification elements (UKTAG, 2012) 10

Annex A Baseline WFD Data
Annex B Screening and Scoping Assessment
Annex C Preliminary Further Assessment

1. Introduction

1.1 Background to this appendix

1.1.1 This appendix has been produced to demonstrate how the assessment of the effects from Rampion 2 (the 'Proposed Development') complies with the requirements of domestic law under the Water Framework Directive (WFD) (England and Wales) Regulations 2017[1].

1.1.2 A single preliminary document to cover all aspects of WFD compliance is presented, as it has the benefit of being able to draw conclusions on WFD compliance based on the outputs of several chapters of the Preliminary Environmental Information Report (PEIR) including **Chapter 6: Coastal processes, Volume 2, Chapter: 8 Fish and shellfish ecology, Volume 2, Chapter 9: Benthic subtidal and intertidal ecology, Volume 2, Chapter 14: Nature conservation, Volume 2 Chapter 23: Terrestrial ecology and nature conservation, Volume 2, Draft Report to Inform Appropriate Assessment, Volume 2, Chapter 25: Ground conditions, Volume 2,** and **Chapter 27: Water environment, Volume 2**.

1.1.3 The Proposed Development is a Nationally Significant Infrastructure Project (NSIP), which will be authorised by a Development Consent Order (DCO). The decision will be made by the Secretary of State for Energy and Industrial Strategy, as advised by the Planning Inspectorate (PINS). Further to this, the Environment Agency is the relevant permitting authority in relation to its role in issuing Environmental Permits under the Environmental Permitting (England and Wales) Regulations 2016.

1.1.4 In England, whilst the responsibility for ensuring that the WFD is implemented lies with Environment Agency, public bodies have a duty to 'have regard' to the objectives of the WFD in exercising their functions. In the case of the Proposed Development this includes West Sussex County Council (WSCC) – which is the Lead Local Flood Authority (LLFA) which is responsible for consenting works in Ordinary Watercourses. In addition, Natural England (NE) has responsibility for ensuring compliance with the Objectives and Measures associated with Natura 2000 sites, designated as Protected Areas under the WFD (see **Section 4.6**).As noted in the PINS advice note 18 (PINS, 2017) the 2017 WFD (England and Wales) Regulations place these duties on each public body to exercise their functions to secure compliance with the WFD and in particular with regard to relevant River Basin Management Plans[2].

---

[1] The fundamental requirements of the EU Water Framework Directive (2000/60/EC) were enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

[2] PINS advice note 18 (PINS, 2017) acknowledges that the 2017 regulations places a general duty on the Secretary of State, the Environment Agency to exercise their 'relevant functions' so as to secure compliance with the WFD. It also notes that their functions under the Planning Act 2008 are not deemed 'relevant functions' for this purpose.

1.2 Structure of this report

1.2.1 This preliminary WFD Assessment is structured as follows:

- **Section 1: Introduction** outlines the legislative requirements and context of the WFD in respect of the Proposed Development;
- **Section 2: Consultation** provides dialogue between Rampion Extension Development Limited (RED) and the regulatory bodies that have a responsibility of the WFD;
- **Section 3: WFD assessment methodology** provides an overview of the methodology that has been adopted in order to undertake the preliminary draft WFD assessment;
- **Section 4: Screening and Scoping assessment** sets out the process that has been followed to gain a better understanding of Proposed Development activities that are low risk and do not require further consideration ('scoped out') and those that require detailed assessment ('scoped in');
- **Section 5: Preliminary further assessment results** sets out the process that has been followed and outcomes of a further, detailed assessment on those relatively high-risk activities that were scoped in as part of the work presented in **Section 5**. These findings will be developed and refined at the ES stage of the DCO Application;
- **Section 6: Preliminary conclusions on WFD compliance** takes the outputs from **Sections 4** and **5**, and provides a statement of compliance with the objectives of the WFD;
- **Section 7: Glossary of terms and abbreviations**; and
- **Section 8: References**.

Design of the Proposed Development to facilitate WFD compliance

1.2.2 As a general principle, the Proposed Development has been designed to minimise the impact to water bodies and WFD objectives; first by minimising direct contact between construction, operation and maintenance activities and surface water bodies, and second by incorporating appropriate embedded environmental measures where infrastructure has to pass over, under or through water bodies. In this way, the ultimate impact to WFD water bodies from the Proposed Development has been managed to an acceptably low level, and the Proposed Development will not therefore compromise WFD objectives. This appendix provides the initial evidence to demonstrate how this preliminary draft conclusion has been reached.

1.3 The legislative context – The Water Framework Directive

Overview

1.3.1 The WFD came into force in 2000 and was transposed into UK law in 2003. The principal aims of the WFD are to protect and improve the water environment and

promote the sustainable use of water. Environmental Quality Standards (EQSs; 2008/105/EC) for priority substances were set by the daughter directive to the WFD (the EQS Directive and subsequent amendments (EQSD; 2013/39/EU) and the Groundwater Directive (2006/118/EC). The environmental objectives of the WFD and its daughter directives are to:

- prevent deterioration of aquatic ecosystems;
- protect, enhance and restore water bodies to Good status; which is based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface water, and water quantity and chemical status for groundwater;
- comply with water related standards and objectives for environmentally protected areas established under other European Union (EU) legislation;
- progressively reduce pollution from priority substances and cease or phase out discharges of priority hazardous substances; and
- prevent or limit the input of pollutants into groundwater and reverse any significant or sustained upward trends in the concentration of any groundwater pollutant.

1.3.2 The WFD sets a default objective for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve Good status by 2027 at the latest. Where it is not possible to achieve Good status by 2027, alternative water body objectives can be set. The current (baseline) status, and the measures required to achieve the 2027 status objective are set out, for each water body, in the relevant River Basin Management Plans (RBMPs), as prepared by the Environment Agency every six years (Environment Agency, 2015). The first RBMPs were published in 2009, and the current Cycle 2 RBMPs were published in December 2015. The plans provide the baseline condition of the water environment at the time of publication, and indicate the measures needed and timescales required to attain their target status.

Surface waters

1.3.3 For surface water bodies (rivers, estuaries and coastal waters[3]), overall water body status has an ecological and a chemical component. Ecological status is measured on the scale of high, good, moderate, poor and bad. Chemical status is measured as good or fail, based on the presence or absence of priority substances which present a risk to the environment. Good ecological status (GES) is defined as a slight variation from undisturbed natural conditions, with minimal distortion arising from human activity. The ecological status of water bodies is determined by examining biological elements (e.g. fish, invertebrates, plants) and a number of supporting elements and conditions, including physico-chemical (e.g. metals and organic compounds), and hydromorphological (e.g. depth, width, flow, and ‘structure’) factors. These elements are summarised in **Table 1-1.**

[3] There are no lake WFD waterbodies situated within the study area described in **Chapter 27: Water environment, Volume 2** therefore these have not been considered within the assessment.

Table 1-1 WFD classification elements for rivers, transitional and coastal WFD water bodies

Waterbody Type	Biological	Physio-chemical and chemical	Hydromorphological
Rivers	Macrophytes Phytobenthos Benthic invertebrates Fish	Thermal conditions Dissolved oxygen Acidification Nutrients Salinity Organic pollutants Pollution by substances being discharged e.g. chemicals, metals, pesticides.	Hydrological regime: - quantity and dynamics of water flow - connection to groundwater bodies. River continuity morphological conditions: - river depth and width variation - structure and substrate of the river bed - structure of the riparian zone.
Transitional Waters	Phytoplankton Other aquatic flora Benthic invertebrates Fish	Transparency Thermal conditions Dissolved oxygen Nutrients Salinity Pollution by substances being discharged e.g. chemicals, metals, pesticides.	Tidal regime: - freshwater flow - wave exposure Morphological conditions: - depth variation - quantity, structure and substrate of the bed - structure of the intertidal zone
Coastal waters	Phytoplankton Other aquatic flora Benthic invertebrates	Transparency Thermal conditions Dissolved oxygen Nutrients Salinity Pollution by substances being discharged e.g. chemicals, metals, pesticides.	Tidal regime: - freshwater flow - wave exposure Morphological conditions: - depth variation - quantity, structure and substrate of the bed - structure of the intertidal zone

1.3.4 Whilst GES is defined as a slight variation from undisturbed conditions in ‘natural’ water bodies, surface water bodies can also be designated as artificial or heavily modified water bodies (AWBs or HMWBs). These designations apply where there

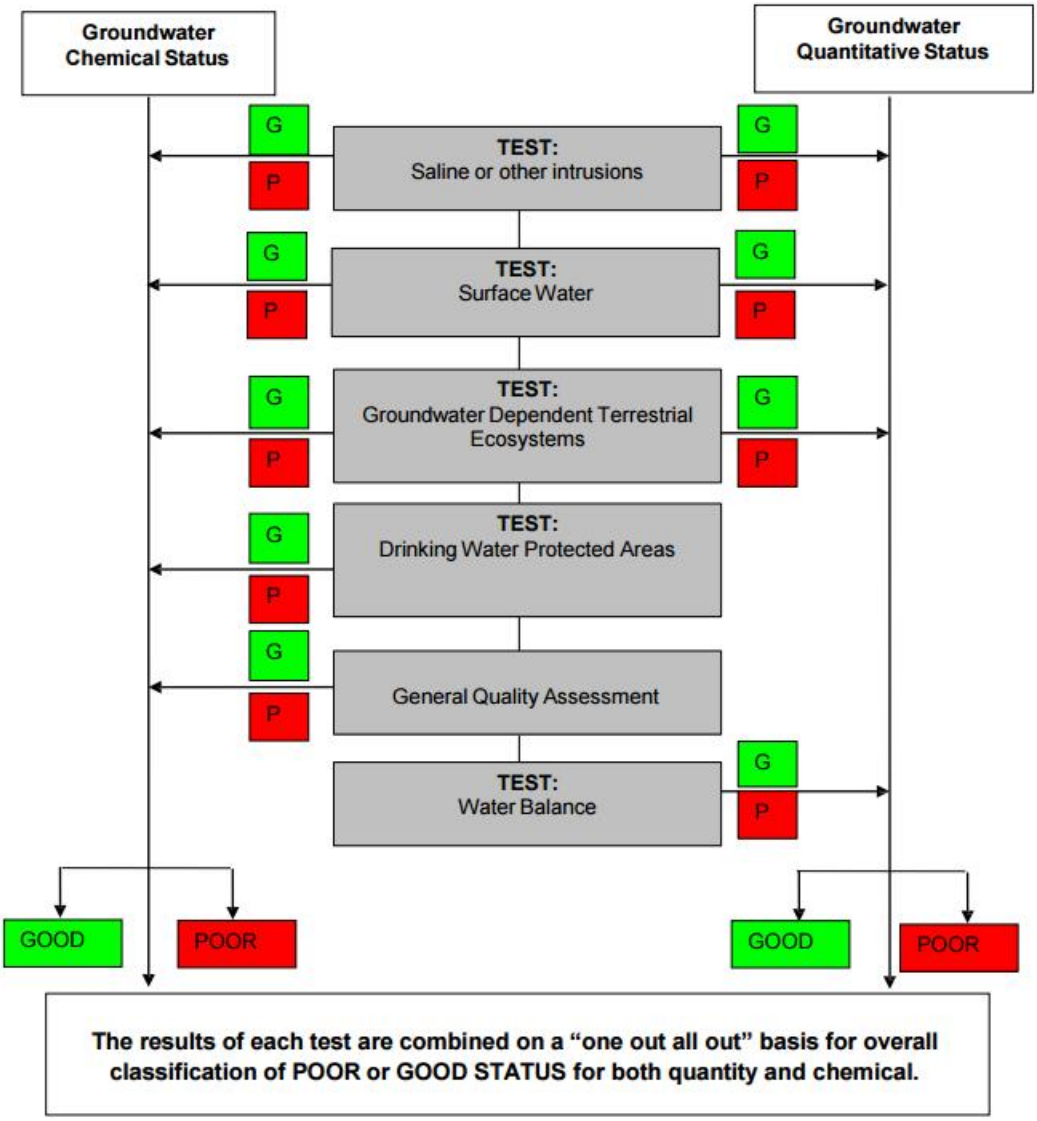
has been significant human influence on the nature of the water body such that they are considered to be unable to achieve the standards required to attain GES. Instead, AWBs and HMWBs have a target to achieve good ecological potential (GEP), which recognises their essential human use/s (e.g. flood protection, navigation, water resources abstraction), whilst making sure ecology is protected and enhanced as far as possible. The ecological potential for AWBs and HMWBs is also measured on the scale high, good, moderate, poor and bad. For those ecological elements that are sensitive to the human use of the water body, status is measured based on the successful implementation of a list of mitigation measures. These measures are set in order for the sensitive ecological elements to achieve the best aquatic health that is possible without compromising the human use of the water body. Ecological elements that are not sensitive to the human use of the water body are measured in the same way and with the same standards as for natural water bodies. Similarly, the chemical status of AWBs and HMWBs is also measured and classified in the same way as for natural water bodies.

1.3.5 In order for a surface water body to attain good 'overall' status, it must meet the requirements of GES or GEP, and achieve good chemical status. The achievement of good overall status by 2027 or earlier is the default WFD objective for almost all water bodies in the UK.

Groundwater

1.3.6 For groundwater bodies, Good status has quantitative and chemical components that are assessed via a series of 'tests', as shown in **Graphic 1-1** below. Together, these provide a single final classification: good or poor status. Quantitative status is evaluated on the basis of overall aquifer water balance, impacts of abstraction on dependent surface waters or wetlands and potential for saline intrusion. Chemical status is evaluated on the basis of evidence for impacts of poor water quality on dependent surface waters or wetlands or deterioration of the quality of groundwater used for potable supply.

Graphic 1-1 Overview of the groundwater classification elements (UKTAG, 2012)



1.3.7 Both the WFD and the GWD also require the prevention of any input of priority substances and limiting (or control) of the input of all other substances to groundwater to prevent the deterioration of groundwater body status.

Bathing Waters Directive

1.3.8 The EU's revised Bathing Water Directive (rBWD) came into force in March 2006 and replaced the 'current Bathing Water Directive (cBWD)' (76/1160/EEC). The rBWD provides more stringent standards than the cBWD and places an emphasis on providing information to the public. The Bathing Water Directive is transposed into domestic law in England under The Bathing Water (Amendment) (England) Regulations 2018.

1.3.9 The rBWD has four different classifications of performance, these are:

- Excellent – the highest, cleanest class;

- Good – generally good water quality;
- Sufficient – the water meets minimum standards; and
- Poor – the water has not met the minimum required standards.

1.3.10 The Environment Agency measures, monitors and reports the number of certain types of bacteria which may indicate the presence of pollution, mainly from sewage or animal faeces, these are *Escherchia coli* (*E. coli*) and intestinal *enterococci* (IE). An increase in the concentrations of these bacteria indicates a decrease in water quality. **Table 1-2** presents the microbiological standards for the different types of bacteria under the rBWD.

Table 1-2 rBWD classifications.

Classification	E. Coli		IE	
	No. per 100 ml	Percentile*	No. per 100 ml	Percentile*
Excellent	250	95	100	95
Good	500	95	200	95
Sufficient	500	90	185	90
Poor	>500	90	>185	90

1.3.11 The Environment Agency collects approximately 20 samples from each Bathing Water (BW) each year during the bathing season (15 May to 30 September in England). An overall classification for the BW is then determined by creating a distribution from the monitoring data for the last four years (4 years x 20 samples = distribution of 80 samples). A separate distribution is calculated for both *E. coli* and IE. The 95th and 90th percentile values[4] from each distribution are calculated. This then enables the determination of the classification for each bacterium for the BW. Therefore, activities from Rampion 2 have the potential to affect the BW classifications for up to four bathing seasons after the proposed activities commence.

1.3.12 If the classification for both types of bacteria is different, then the overall compliance of the BW is the lowest classification achieved by either type. For example, if *E. coli* were performing at 'Good' but IE was performing at 'Sufficient', then the BW would be classified as performing at 'Sufficient'.

1.3.13 The status of the BWs within 2km of the offshore cable corridor part of the PEIR Assessment Boundary are presented in **Annex A** of this appendix.

[4] A percentile is a measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall.

2. Consultation

2.1.1 This Section briefly sets out the consultation and engagement comments received in relation to the draft preliminary WFD Assessment. The methodology described in **Section 3**, below, has addressed, where necessary, the issues raised, and the preliminary findings of this appendix will be developed at the subsequent ES stage as further information in terms of the outline design becomes available. **Table 2-1** sets out the comments received in Section 5 of the PINS Scoping Opinion (PINS, 2020) 'Aspect based scoping tables – Onshore' and how these have been addressed in this appendix. A full list of the PINS Scoping Opinion comments and responses is provided in **Volume 4, Appendix 5.1: Response to the Scoping Opinion**. **Table 2-1** also provides the other relevant stakeholder comments that were received in relation to the Scoping Report. Note that no other relevant comments were returned by stakeholders in relation to WFD assessment during the informal consultation process or via the Evidence Plan Process (EPP) Expert Topic Group (ETG) meetings.

Table 2-1 Consultation responses relating to WFD Assessment

Comment Source	Comment	How this is addressed in this appendix
PINS (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*	This assessment has drawn on the information provided in the PEIR (such as **Chapter 6: Coastal processes, Volume 2, Chapter 8 Fish and shellfish ecology, Volume 2, Chapter 9 Benthic subtidal and intertidal ecology, Volume 2** and **Chapter 27: Water environment, Volume 2**) which covers numerous elements of the WFD relevant to the proposed activities, including marine water quality. This appendix presents a preliminary standalone WFD assessment of all potentially impacted WFD water bodies including river, transitional and coastal water bodies; which incorporates the findings and provides cross referencing to these other documents where appropriate. At the ES stage this appendix will be updated and refined based on the final outline design.

Comment Source	Comment	How this is addressed in this appendix
	the proposed nature conservation aspect chapter."	
Environment Agency response in the scoping opinion	A WFD Assessment will be required for this development. The EA recommends including this as a standalone chapter in the report.	This appendix presents a preliminary standalone WFD assessment. This incorporates findings and provides cross referencing to other PEIR documents where appropriate. At the ES stage this appendix will be updated and refined based on the final outline design.
Environment Agency response in the scoping opinion	*"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 we* (the Environment Agency) *acknowledge 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."*	A full assessment on the potential for mobilisation of sediments (and sediment bound bacteria) to affect compliance criteria for Middleton-on-Sea and Littlehampton Bathing Waters is provided in **Table C-4** of **Annex C**. A consideration of the potential for the release of contaminants in the marine environment as a result of activities associated with the Proposed Development is provided in **Table 4-4**. The results of the sediment contaminant survey that has been undertaken across Rampion 2 were not available for inclusion within this assessment at the PEIR stage but will be fully reported within the final ES. The conclusion of whether the activity has the potential to disturb seabed sediments containing levels of contamination above Centre for Environment, Fisheries and Aquaculture Science (Cefas) Action Level 1 will be provided in the DCO Application and assessed accordingly.
Environment Agency response in the scoping opinion	The Environment Agency advises that "*the applicant should assess even short-term effects as part of the WFD Assessment. This will be particularly relevant in the context*	This appendix considers the potential for both short-term and long-term impacts on WFD water bodies which have a connection to the Proposed Development.

Comment Source	Comment	How this is addressed in this appendix
	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."	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 **Table C-4 of Annex C**. This assessment provides quantified evidence to provide assurance that there will be no likely impact on coastal and transitional water bodies.
Environment Agency response in the scoping opinion	*"The WFD Assessment should follow the 'Clearing the Waters for All' guidance, which has been published on https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters"*	This preliminary assessment in this appendix follows this guidance as acknowledged in **Section 3.2** along with other appropriate guidance documents.
Environment Agency response in the scoping opinion	*"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."*	A scoping impact assessment has been completed in spreadsheet format within **Annex B** and the findings are summarised in **Section 4** of this appendix. **Annex B** provides rationale for why elements have been scoped out. The activities and water bodies scoped / screened in are taken forward for further preliminary assessment in **Section 5** of this document. **Section 4** presents the scoping of the offshore activities which have been used to scope the WFD elements. **Table 4-4** provides a detailed explanation of which WFD elements have been scoped in (and those scoped out) for further impact assessment from the proposed activities associated with the Proposed Development.
Environment Agency response in the scoping opinion	The Environment Agency 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*	The preliminary assessment for WFD water bodies conducted at the PEIR stage is commensurate with the risks posed by the potential works, and

Comment Source	Comment	How this is addressed in this appendix
	demonstrate that they have assessed the risks and provided mitigation where necessary."	mitigation signposted in **Annex C** and **Section 5** of this appendix. This approach has been carried out at the PEIR stage to demonstrate WFD compliance on the basis of the embedded environmental measures.
Environment Agency response in the scoping opinion	*"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."*	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 **Table C-4** of **Annex C**. No designed Shellfish Waters have been identified within 2km of the PEIR Assessment Boundary. Sediment sampling has been undertaken by RED to determine the levels of potential contamination within the offshore cable corridor. Details of the embedded environmental measures of relevance to this WFD assessment are provided in **Annex C**.
Environment Agency in the scoping opinion	The Environment Agency 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."*	**Table C-4** of **Annex C** provides an assessment of the potential impacts of increased suspended sediment concentrations on bathing waters. The assessment considers the worst case potential impacts in terms of methodologies and volumes of sediment which may be disturbed. The assessment concludes that no additional mitigation is required as no deterioration in status is anticipated.

Comment Source	Comment	How this is addressed in this appendix
Environment Agency response in the scoping opinion	*"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."*	This is noted by RED. The potential for dilution and dispersion of sediment suspended from activities within the receiving water body has been quantified in **Chapter 6: Coastal processes, Volume 2** with the findings used to inform this assessment. The worst-case tidal state, in terms of the plumes entering an estuarine environment would be on a flood tide. However, as no work which will disturb seabed sediments are proposed in an estuarine environment when the plumes reach the mouth of the estuary they will have been subjected to vertical and lateral dispersion and so will be notable more dilute that at the location of the works. RED has undertaken a site specific survey to determine the levels of contamination which are present and may be disturbed. The results of the sediment contaminant survey that has been undertaken across Rampion 2 were not available for inclusion within this assessment at the PEIR stage but will be fully reported within the final ES. The conclusion of whether the proposed activities may pose a risk to chemical water quality will be provided in the DCO application and assessed accordingly.
Environment Agency response in the scoping opinion	The Environment Agency 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."*	This preliminary WFD assessment has considered each of the WFD water bodies which have a potential hydrological connection to the onshore elements of the Proposed Development. In **Section 4** and **Annex B,** a scoping assessment identified the relevant onshore construction and operation and maintenance activities which could

Comment Source	Comment	How this is addressed in this appendix
		potentially impact these WFD water bodies objectives. A further assessment is carried out in **Annex C** and the findings summarised in **Section 5.** Within each sub-section preliminary conclusions are provided on whether embedded environmental measures will help address potential effects on WFD water bodies, in order to achieve compliance with respective WFD body objectives.

3. WFD assessment methodology

3.1 Structure of this assessment

3.1.1 All aspects of construction, operation and maintenance, and decommissioning of the Proposed Development have been considered in the assessment in order to determine whether each will have an effect on WFD water bodies. Accordingly, the WFD assessment considers the following key questions:

- At the water body scale, on a non-temporary basis, will the Proposed Development result in deterioration of any of the WFD classification elements from one status class to the next, (e.g. from good to moderate) irrespective of whether or not it results in the lowering of overall status?
- Will the Proposed Development prevent any water bodies from achieving good overall status or, where relevant, an alternate objective?
- Will the Proposed Development contribute towards a cumulative deterioration of WFD status (in combination with other projects) or prevent the cumulative enhancement of status (up to 2027)?
- Will the Proposed Development compromise the achievement of the WFD objectives in multiple water bodies that are hydrologically linked?
- Can the Proposed Development assist in the delivery of any measures, as published in the RBMP, required to achieve water body objectives?

3.2 Available guidance

3.2.1 The principal source of relevant guidance on WFD Compliance Assessment in England is the Environment Agency. At present the only publicly available guidance is Environment Agency (2017) *Clearing the Waters for All*, which relates specifically to activities in estuarine and coastal water bodies up to one nautical mile out to sea. This guidance interprets the 'no deterioration criterion' as applying to each supporting WFD element as well as the overall status classification of the water body. This is supported by the Bund Case[5] which ruled (at a European level) that this was true for all WFD waterbodies. So, for example, a deterioration in the quality of macrophytes in a river water body from good to moderate status would be classed as deterioration irrespective of whether this caused the overall water body status to be lowered.

3.2.2 Furthermore, the Cycle 2 RBMPs indicate that within class deterioration of any constituent element (e.g. a lowering of the quality of macrophytes in a river water body that does not result in a lowering of the status of macrophytes e.g. from good to moderate) is permissible, but should be limited as far as practicable. There are two exceptions to this: first, where the water body is at the lowest possible class (bad ecological status/potential) where no within class deterioration is allowed and,

[5]Available at: https://academic.oup.com/jel/article-abstract/28/1/151/1748461 [online]. [Accessed: 02 July 2021].

second, elements that are at high status (with the exception of morphology), which may be allowed to deteriorate to good status provided a number of additional conditions are met.

3.2.3 From an overall WFD compliance perspective, the principles set out in *Clearing the Waters for All* (Environment Agency, 2017) are unlikely to change and are used as a basis for assessment of effects in the marine environment. The Environment Agency have also made available their position statement on WFD assessment of new physical works in rivers (position 488_10) (Environment Agency, 2015), which has been used, as appropriate, to assess effects on river water bodies.

3.2.4 The Environment Agency have not published any guidance on WFD compliance assessments of lake or groundwater bodies.

3.2.5 This WFD assessment has also been undertaken in line the guidance within PINS Advice Note 18 (PINS, 2017).

3.3 Assessment Process

3.3.1 The WFD assessment considers the potential for both short-term and long-term impacts on WFD water bodies which have a connection to the Proposed Development.

3.3.2 The WFD assessment comprises the following stages:

- Stage 1: Screening;
- Stage 2: Scoping;
- Stage 3: Further assessment; followed by, if required;
- Stage 4: Identification and evaluation of measures; and
- Stage 5: Article 4.7 considerations.

Screening and Scoping

3.3.3 Certain types of proposals do not require specific applications for permission but can be undertaken under existing general powers and provisions, such as developments authorised through the General Permitted Development Order. Such proposals can be identified at the screening stage as not requiring a WFD assessment. Furthermore, certain types of maintenance activity do not require assessment. All such activities would not require a WFD assessment.

3.3.4 However, the Proposed Development has the potential to have effects on the water environment and it requires a DCO which must be supported by environmental information. Moreover, it is not a continuation of a previously permitted activity. Therefore, there is no doubt that a WFD compliance assessment is required to support applications for a DCO, Environmental Permits and potentially other permissions.

3.3.5 The focus of the screening and scoping stages is to identify component activities of the Proposed Development that have the potential to cause an impact to the

WFD quality elements. Given that there are strong links between the screening and scoping parts of the assessment process they have accordingly been considered together in **Section 4** and **Annex B**.

3.3.6 Each water body potentially affected directly or indirectly by the Proposed Development is considered. Water bodies will be screened out at this stage if it can be robustly demonstrated that there will be no impacts.

3.3.7 The screening stage includes identifying risks from the Proposed Development's activities to receptors based on the relevant (screened in) water bodies and their water quality elements. In terms of screening new physical works, the EA 488_10 guidance provides a protocol for rapid screening of development proposals based upon the type and scale of activities that are being undertaken. A similar process is set out for scoping activities against water quality elements, based on the likelihood of potential risks posed towards WFD objectives.

3.3.8 The scoping process is based on the type and extent of activities, providing a traffic light screening and scoping outcome depending on the level of potential risk against different elements. Proposed Development activities / infrastructure types that are considered unlikely to cause any risk to the delivery of WFD objectives are given a green traffic light (screened/scoped out). Proposed Development activities / infrastructure types that are considered likely to carry a significant risk to the delivery of WFD objectives are given a red traffic light (screened/scoped in for further assessment). Proposed Development activities / infrastructure types that carry a possible risk to the delivery of WFD objectives are given an amber traffic light (screened/scoped in on precaution for further assessment). The traffic light system is consistent with the cell colouring provided with the screening/scoping outcomes in **Annex B**. The screening and scoping does not consider the implementation of design principles and environmental measures.

Further Assessment

3.3.9 For the activities / infrastructure types that are 'Screened / 'Scoped in' a further assessment is required. The aim of this is to provide a proportionate view on (i) the likelihood of a new development causing non-temporary water body-scale deterioration in WFD status and (ii) whether the development may preclude the ability of the water body to achieve its target status. Those activities / infrastructure types that are eliminated at the screening and scoping stage are not carried forward to the further assessment stage.

3.3.10 The further assessment process involves the examination of sources of potential effect, pathways by which water bodies could be affected, and consideration of effects on each WFD quality element for each WFD water body type (river, coastal, estuarine, or groundwater), taking into account embedded environmental measures.

Identification and evaluation of measures

3.3.11 Where the assessment identifies an activity which would cause a risk of non-compliance with the WFD but which may become compliant with some form of bespoke mitigation (i.e. above and beyond the embedded design principles and environmental measures that are considered during the further assessment

stage), the mitigation required is described. Where mitigation cannot be identified that would result in WFD compliance and no suitable alternatives can be identified, the provisions of Article 4.7 of the WFD would apply (below).

Article 4.7 consideration

3.3.12 The provisions of Article 4.7 would only apply where:

- failure to meet good groundwater status, Good Ecological Status or Good Ecological Potential or to prevent deterioration in status arises from new modifications to the physical characteristics of the water body or alteration of groundwater levels; or
- failure to prevent deterioration from high to good overall status of a surface water body is the result of new sustainable human development activities.

3.3.13 If the further assessment concludes that the Proposed Development is not compliant with WFD requirements, documentation would be prepared to justify permitting of the development under the provisions of Article 4.7 of the WFD. This would need to demonstrate that the following conditions are met:

- all practicable mitigation has been incorporated;
- there are no significantly better environmental options;
- the Proposed Development is of overriding public interest and/or the benefits of the Proposed Development outweigh the benefits of WFD compliance; and
- the reasons for the modifications to the water body are flagged to the Environment Agency for reporting in the next RBMP.

3.3.14 PINS and the Environment Agency would be responsible to deciding whether the Article 4.7 conditions have been met, should this be necessary.

4. Screening and Scoping assessment

4.1.1 **Annex A** in this appendix provides baseline information for each of the WFD water bodies (surface, groundwater and protected areas), with a summary of their status and future objectives.

4.1.2 A brief overview of the development is provided here to describe the Proposed Development activities. Further details are provided in **Chapter 4: The Proposed Development, Volume 2**. An overview of the PEIR Assessment Boundary is shown in **Figure 1.1, Volume 3**.

4.1.3 The offshore elements of the Proposed Development are situated within an Area of Search adjacent to the south east and west of the existing Rampion 1 project site (as shown on **Figure 4.1, Volume 3**), comprising seabed areas extending between 13km and 25km offshore. The offshore part of the PEIR Assessment Boundary comprises the following:

- a wind farm array Area of Search of approximately 270km^2 to include the wind turbine generators (WTGs), WTG foundations, offshore substations and associated foundations, and inter-array cables and export cables to connect wind farm area to landfall;
- a marine cable link area to adjoin the south east area and the west area wind farm array zones, which is located at the south west corner of the Rampion 1 site. This marine cable link area has been included in the Area of Search to enable cabling requirements across the full area. For clarity, no WTG or substations will be located in the marine cable link area; and
- the offshore export cable Area of Search which will connect the offshore wind farm area to the shore of approximately 59km^2. The nearest coastal ports are Littlehampton, Worthing, Shoreham-by-Sea, Brighton, and Newhaven.

4.1.4 However, the array Area of Search will be sufficiently distanced from the areas protected by the under the WFD (1 nautical mile (nm) for ecological status and 12nm for chemical status) and therefore these activities are not considered in this assessment.

4.1.5 The onshore elements of the Proposed Development comprises an onshore cable corridor, approximately 36km in length, from the proposed landfall at Climping to a new onshore substation, and from the new onshore substation to the existing National Grid Bolney substation.

4.1.6 The following permanent infrastructure, for both the offshore and onshore elements, is proposed:

- main export cables (up to 4 cables x 19km cable length) which will connect the offshore substations to the shore. They are likely to be armoured and have three core cables with copper or aluminium conductors and XLPE insulation, at a voltage up to 275kV. It is anticipated the cables will be laid in separate trenches at different times and installed via either ploughing, jetting, trenching, or post-lay burial techniques;
- export cables, with up to 61,000m^2 (38,000 m^3) of rock protection;

- buried offshore export cable which will come ashore in ducts and will interface and join with buried onshore cables at a subsurface Transition Joint Bay (TJB);
- buried onshore cables along the length of the onshore cable corridor through to the new onshore substation;
- buried onshore cables from the new onshore substation to tie into the existing National Grid Bolney substation;
- other onshore buried joint bay structures with associated subsurface link boxes typically located every 750m to 950m along the onshore cable corridor;
- onshore cable watercourse crossings comprising of trenchless (e.g. horizontal directional drilling (HDD) or microtunnelling) and trenched (open cut) types; and
- localised permanent access roads for operational access to the new onshore substation.

4.1.7 Temporary construction works will include the following works:

- up to 1,900,000m^2 of the seabed within the export cable corridor will be prepared through the use of a pre-lay plough and / or subsea grab to remove boulders and other obstructions on the seabed. No sandwaves are anticipated in the offshore export cable corridor;
- burial of export cables below the seabed wherever possible with a maximum total seabed disturbance area of 1,900,000m^2. It is anticipated that the offshore cables will be installed via either ploughing, jetting, trenching, mass flow excavation or post-lay burial techniques, depending on ground conditions along the specific cable route;
- installation of export cable ducts beneath Climping beach using HDD between the exit pits and landfall TJB;
  - up to 4 offshore HDD exit pits below the low water mark, excavated by a shallow barge;
  - the HDD will exit up to approximately 1km below the mean low water spring tide (MHWS) mark; and
  - release of up to 450m^3 of drilling mud (bentonite drilling fluid) into the marine environment.
- landfall construction including excavation of a TJB pit, HDD of the export cables and jointing with the onshore cable corridor;
- temporary construction compounds at the landfall, trenchless crossings, elsewhere along the onshore cable corridor for logistics and at the new onshore substation (**Figure 4.11 a-c, Volume 3**);
- temporary construction access and points and haul road along the onshore temporary construction corridor (**Figure 4.10 a-c, Volume 3**), and associated temporary watercourse crossings comprising a mixture of culverts and bridges. Crossings will not be required where there are trenchless crossings or existing road crossings;

- onshore cable corridor watercourse crossings, which will be constructed by either trenchless (e.g. HDD) and open cut methods depending on the nature of the watercourse;
- excavation of four trenches and associated earthworks for installation of cabling, and excavation of joint bay pits;
- construction of the new onshore substation area including vegetation clearance, earthworks and installation of a subsurface foundations and underground services; and
- drainage areas related to the onshore cable corridor and substation construction that will include localised pumping, treatment and attenuation as necessary.

4.1.8 The construction of onshore elements of the Proposed Development is anticipated to be approximately four years. The HDD drilling will take place in the first 2 years of the programme and landfall tie in and TJB construction will take place in year 3. The other construction, commissioning and reinstatement works will take place between years 1 to 4, with works carried out sections. The Proposed Development is expected to be operational for around 30 years. Maintenance of the onshore cable is expected to be minimal.

4.1.9 During the operation and maintenance phase of onshore elements of the Proposed Development, periodic testing of the cable is likely to be required every two to five years, with access to the link boxes. Monitoring of the onshore substation will be done remotely using CCTV. Unscheduled maintenance will typically involve small number of vehicles to infrequently replace equipment.

4.1.10 Full details of the proposed maintenance works associated with the offshore elements of the Proposed Development are provided in **Chapter 4: Proposed Development, Volume 2**. To summarise, export cables infrequently develop faults in service which are detected by the wind farm protection systems. The worst-case repair will be a de-burial of a section of cable for repair on a vessel then subsequent re-burial. Where rock protection has been applied to cables during the construction phase, this may require replenishing due to natural processes. Up to 25% of original protection will be replenished over its lifetime.

4.1.11 The decommissioning sequence will generally be the reverse of the construction sequence and involve similar types and numbers of vessels and equipment. The decommissioning duration of the offshore infrastructure may take the same amount of time as construction of the Proposed Development, approximately four years, although this indicative timing may reduce. The details of the proposed decommissioning process, for export cables and associated protection, will be included within the Decommissioning Programme which will be developed and updated throughout the lifetime of the Proposed Development to account for changing best practice. It is likely that equipment similar to that which is used to install the cables could be used to reverse the burial process and expose them.

4.1.12 It is anticipated that the onshore electrical cables will be left *in situ* with their cable ends, cut sealed and left buried. 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 renewable energy generation projects. Should the

onshore substation need to be decommissioned fully, the decommissioning works are likely to be undertaken in reverse to the sequence of construction works (over less than four years) and involve similar levels of equipment.

4.1.13 A detailed description of the construction, and maintenance activities and what they will entail is provided in **Chapter 4: The Proposed Development, Volume 2.** In this assessment, the operation and maintenance phase is taken to include any refurbishment and maintenance activities for all permanent infrastructure. A summary of the Proposed Development activities / infrastructure and the elements of their construction and maintenance that are of interest to the WFD assessment is provided in **Table 4-1**. These elements include structural changes to water bodies through the construction of infrastructure within or adjacent to watercourse crossings. There is also the potential for changes to water quality and quantity through excavation of soil, changing surface infiltration and the creation of preferential flow paths both adjacent to water bodies and within their wider catchments. In relation to the onshore elements of the Proposed Development, and in particular during the construction phase, there is a requirement for heavy plant for the installation and maintenance of infrastructure. There is a risk of hydrocarbon leakages from heavy plant, however, the risk of leakages will be minimised through regular maintenance and appropriate pollution prevention measures, including interceptors and oil separators (in line with the appropriate environmental measures which are detailed in **Annex C** and the **Outline Code of Construction Practice.** Note, the term 'appropriate' used throughout for environmental measures is defined to be 'proportionate sufficient to ensure no significant effects on receptors).

Table 4-1 Proposed Development activities and the WFD

Activity / Infrastructure	Element of construction / maintenance of interest to the WFD
Offshore works	The minimum distance between the array and the coastline is 13km (approximately 24nm). Therefore, the components and activities relevant to this WFD Assessment are limited to the offshore export cables which will transfer power from the offshore substations to shore. The array will be sufficiently distanced from the areas protected by the under the WFD (1nm for ecological status and 12nm for chemical status) and therefore these activities are not considered in this assessment. The installation of the export cables is likely to involve the burial of the cables below the seabed using ploughing, trenching, jetting, or mass flow excavation techniques. It is anticipated that a combination of these four methods may be used depending on seabed conditions. The maximum footprint of the installation of export cables within the relevant coastal waterbody (see **Section 5.2**) is approximately 13.3ha (133,344m^2) based on the assumption of 1,852m (1nm) (length) x 4

Activity / Infrastructure	Element of construction / maintenance of interest to the WFD
	cables x 12m (width of plough) x 1.5 multiplier (as required in the Clearing the Waters for All guidance (Environment Agency, 2017)). No sandwave clearance is proposed for the installation of the export cables. There is no intention to knowingly release any chemicals listed in the EQSD into the environment during construction, operation or decommissioning of the Proposed Development.
Landfall works	Up to four offshore HDD exit pits below the low water mark, excavated by a shallow barge. The HDD will start from the landfall construction compound for approximately 1km to exit below the mean low water springs (MLWS) (into these exit pits). Ducts will then be installed. The offshore export cables will then be pulled ashore through pre-installed HDD ducts between a sea barge in shallow water sections towards the TJB at the landfall at Climping. The offshore export cables will be jointed to the onshore cable using HDD within the TJB. The TJB will comprise of four pits which will be excavated into the ground, lined with concrete and then once jointing is completed, backfilled and reinstated. A temporary construction compound (approximately 100m X 75m) will be located at the landfall, used for the activities, cable pulling and construction of the TJBs. It will be set up with required storage for materials and equipment, facilities for personnel, and area for construction activities.
Onshore cable circuits	(Landfall to new onshore substation) Buried onshore cables will run along the length of the onshore cable corridor from the landfall at Climping through to the new onshore substation. The 275kV cable system along the onshore cable corridor will comprise four cable circuits in separate trenches. (New onshore substation to existing National Grid Bolney substation) Buried onshore cables will subsequently run from the new onshore substation to tie into the existing National Grid Bolney substation. The 400kV cable system will comprise two cable circuits in separate trenches. Trenches will typically be 0.9m wide at the base, and 2m – 4m at the surface depending on the strength of soil. They will have a standard burial depth of 1.2m to the top of the duct. For the majority of the

Activity / Infrastructure	Element of construction / maintenance of interest to the WFD
	onshore cable corridor, available borehole information indicates that the ground water table is recorded well below this depth, as noted in the hydrogeology baseline section of **Chapter 27: Water environment, Volume 2**. Most of the logs recorded levels well below 3m, especially along the central section of the onshore cable corridor associated with well drained chalk along the South Downs. The logs indicate that there are limited sections of the onshore cable corridor where the resting water level may be closer but still below the standard burial depth, within the Alluvium / River Terrace deposits within the valleys of the Arun (1.8 metres below ground level (mbgl)) and Adur (1.82mbgl). The onshore cable corridor will be constructed and backfilled with the reinstatement commenced in as short a time as practicable to limit dewatering requirements. Dewatering of excavations will be carried out in line with good practice where shallow localised groundwater is encountered (see **Annex C** for further details on measures). Trenches will be backfilled with the originally excavated material or cement bound sand (CBS). These works will be located along with construction haul road works (which is described in a row below within this table) within a temporary construction corridor swathe which will typically be approximately 50m wide, or less (e.g. in areas with particular constraints or to minimise impacts to sensitive sites).
Onshore cable corridor watercourse crossings – Trenchless (e.g. HDD)	Trenchless methods such as HDD will be used for main watercourses, railways and roads that form part of the Strategic Highways Network, although if necessary other trenchless methodologies will be considered. Other trenchless methodologies to be considered could include auger boring and micro-tunnelling. Where the onshore cable corridor crosses an Environment Agency flood defence, trenchless methodologies will be used. The Crossings Schedule details the crossings for the onshore cable corridor and can be found in **Appendix 4.2: Crossings schedule, Volume 4**. HDD will involve drilling a bore from one location to another under the crossing. Following completion of the bore the ducts lengths are strung out and connected in a line of equal length to the crossing and pulled through. Each of the four circuits will have separate HDDs. Where groundwater is intercepted appropriate, management and treatment of dewatering arisings will be carried out prior to discharge. During the construction phase, the process of undertaking a trenchless crossing will take approximately 4 to 5 months. The excavated material

Activity / Infrastructure	Element of construction / maintenance of interest to the WFD
	will consist of a mixture of the natural substrate, bentonite or clay and water (slurry). Start or exit pits for HDD and other trenchless technologies will be microsited outside of the floodplain where possible (see **Annex C** for further details on measures). The configuration and design parameters of the trenchless crossings will be determined during the detailed design phase and informed by the EIA process.
Onshore cable corridor watercourse crossings – Open cut	Open cut crossing methodology will predominantly be used for ordinary watercourses. This will involve the preparation of the crossing (damming / fluming / pumping in the case of water courses) to allow the trenches to be excavated and ducts installed. For dry open cut watercourses and ditch crossings a suitably sized flume pipe will be installed over the point of the proposed crossing ensuring that it extends on each side of the trenchline crossing point for a suitable distance. The flume pipe will then be bedded and packed or surrounded with soil filled sandbags to create a dam across the watercourse, so that the flume pipes take all the flow. For pumping the watercourse will be dammed with soil filled sandbags used to create a dam across the watercourse material and pumps will be placed up-stream of the dam. The discharge location for the hoses will be, downstream of the crossing point. The discharge hose(s) will be directed through a filtering medium to limit silt carry over or bed disturbance, before the pumped water is returned to the watercourse. Each in case the crossing area will be reinstated to the original form. A section of duct will be lowered into the trench at a suitable depth beneath the bottom of the watercourse. During this period, which is likely to be less than several days in duration, there will be a temporary change in both the quantity and dynamics of flow over a distance. The upstream damming will be likely to locally increase water quantity and reduce flow / velocity variability due to the impounding of flow. The extent to which these effects will propagate upstream of the dam will depend on the amount of flow within and gradient of the watercourse.

Activity / Infrastructure	Element of construction / maintenance of interest to the WFD
	The trench will be backfilled in layers and will be compacted with cement bound sand, followed by the previously excavated subsoil free of large rocks. The riverbed and banks will be reinstalled and restored to the condition they had been prior to the installation of the duct. The flume or pumps and soil bags are removed once the bed materials and bank profile has been restored to allow the watercourse to flow again. For the bank profile to be restored, geotextiles may be used in conjunction with seeding of an appropriate grass mix. Solutions such as the importation of locally sourced large stones or rocks may also be used. Any bank protection, where it is required, will be adequately keyed into both the bed and banks. Materials and methods employed will be in keeping with the surrounding environment.
Temporary construction haul road	The temporary construction haul road will enable the transportation of machinery used for topsoil stripping and subsoil excavation. This soil will be stored in bunds within a temporary construction corridor. It is anticipated that a mechanical excavator will be used for these activities. The haul road will typically be 5m wide, and up to 10m in places (e.g. at passing places), with an average depth of 0.33m. This will either be crushed stone laid on a geotextile, or formed of interlocking panels, depending on ground conditions and the duration and type of use. It will be used during installation works and construction activities and be removed prior to final reinstatement. Existing access points and tracks have been utilised where possible. The selected number and location of these access points will be confirmed at a later stage and agreed with the relevant local authorities and landowners.
Temporary construction haul road watercourse crossings – culverts	Culverts will only be used for haul road crossings of small ordinary watercourses and ditches. The size of a culvert will vary per crossing depending on the dimensions of the crossing, sensitivity and importance of the watercourse. The construction of culverted access track watercourse crossings will generally be achieved by localised damming of the flow upstream of the proposed crossing location, with over-pumping of water to leave a dry area in which to install the culvert. The bottom of the watercourse will be excavated to the size of the proposed foundation and lined with a geotextile separation membrane prior to pouring the concrete. The culvert will then fit prior to the concrete being fully cured. A geotextile separation membrane will be

Activity / Infrastructure	Element of construction / maintenance of interest to the WFD
	placed on top of the ditch banks allowing backfilling to commence. This process will naturally lead to a period of localised flow regime alteration. During this period, which is likely to be less than several days in duration, there will be a temporary change in both the quantity and dynamics of flow over a limited distance downstream of each crossing. The upstream damming will be likely to locally increase water quantity and reduce flow / velocity variability due to the impounding of flow. The extent to which these effects will propagate upstream of the dam will depend on the amount of flow within and gradient of the watercourse however effects are expected to be localised.
Temporary construction haul road watercourse crossings – bridges	Where culverts are not suitable for a particular crossing due to either the sensitivity of the watercourse or engineering requirements a temporary bridge will be installed. Most bridge crossings will be of a short span and flat deck construction; however Bailey style bridges may also be used. All bridges will be clear span and the foundations will be offset back from the banks of the watercourse. The installation of each bridge will take several days.
Temporary construction compounds	Temporary construction compounds are required for landfall works (as noted in this table against the landfall works row above), trenchless crossings, logistics (including storage of temporary construction materials, equipment and welfare facilities) along the onshore cable corridor, and at the new onshore substation. Along the onshore cable corridor four sites have been identified as potential temporary construction or logistic compounds. The location and number of these temporary construction compounds will be selected at a later stage in agreement with the Contractor. Temporary construction compounds will typically be approximately 4 hectares (ha) in size, with dimensions varying subject to the site selection. The temporary construction compounds will be constructed with topsoil excavated and replaced temporarily with a base layer of crushed stone. They will take between 3 to 4 months to prepare and will be in place for up to 3.5 years. Following completion of construction works, the temporary construction compound facilities will be removed, and each temporary construction compound site will be returned to its original state.
Onshore substation	Two onshore substation search areas are under consideration at the PEIR stage which are as follows:

Activity / Infrastructure	Element of construction / maintenance of interest to the WFD
	• Bolney Road / Kent Street; and • Wineham Lane North. The overall permanent site footprint for the proposed onshore substation infrastructure is anticipated to be up to up to 5.9 ha. A temporary construction works area will be up to 2.5ha in area. Enabling works will prepare the onshore substation site ahead of construction and include vegetation clearance, access road construction, installation of drainage systems, installation of a temporary construction compound, delivery of materials, plant, machinery and fuel, and any earthworks necessary for the installation of the onshore substation foundations, trenches ducts and pits. Other relevant works include installation of underground services and onshore substation foundations, the control and switchgear buildings and plant buildings, construction of the oil containment bund; and provision of utility supplies. Construction works for the onshore substation will be carried out over a period of up to three years. The onshore substation site will then be secured and operated, whilst the temporary construction area returned to its original use and condition.

4.2 River water bodies

4.2.1 A total of seven river water bodies have been identified for consideration in **Chapter 27: Water environment, Volume 2,** and they are shown in relation to the Proposed Development on **Figures 27.1** and **27.2, Volume 3**. The screened in river water bodies include Ryebank Rife, Black Ditch (West Sussex), Honeybridge Stream, Adur (Lockbridge), Adur East (Sakeham), Cowfold Stream and Adur (East).

4.2.2 The screening assessment (**Annex B**) identified that there were no activities within scoping limits within the catchments of the Burpham tributary, the River Stor and Bolney sewer. On this basis these water bodies have been screened out from further assessment in **Section 4.6**.

4.2.3 A summary of the screening conclusions for each of the identified onshore activities / infrastructure types is provided below in **Table 4-2**. **Table 4-2** provides a description of the screening criteria that has been applied to screen in activities which require further assessment. The approach taken considers activities that will take place within either Flood Zone 3 or within 25m of any watercourse, should be scoped in for further assessment. Those activities that do not fit these criteria are to be compliant with the WFD, and no further assessment is necessary. **Annex B** provides details on which activities have been screened in for each of the seven river water bodies under consideration. A more detailed breakdown of the scoping

of individual WFD elements is also presented in **Annex B**. The activities and elements that are screened and scoped in are considered for further assessment in **Annex C** and **Section 5**.

Table 4-2 Screening of onshore activities / infrastructure for river WFD water bodies

Activity / Infrastructure	Scoping criteria	Phase and scoping result	Explanation
Landfall works	Within Flood Zone 3 or <25m of any watercourse / drainage channel	Construction and decommissioning: **In**	Potential for pollutants and sediments to reach watercourses via runoff, particularly during flood conditions
		Operation and maintenance: **Out**	No permanent effects identified as temporary construction working areas including temporary construction compounds and access tracks will be removed and reinstated to their original condition after construction complete. Maintenance anticipated to be minimal for the TJB and joint bays therefore limited opportunity for effects on watercourses.
	Wider WFD water body catchment	Construction, operation and maintenance and decommissioning: **Out**	No direct pathway for construction or operation and maintenance effects to reach watercourse.
Onshore cable circuits	Within Flood Zone 3 or <25m of any watercourse / drainage channel	Construction and decommissioning: **In**	Potential for pollutant release and ground disturbance during construction of onshore cable circuits, including discharge of dewatered groundwater pumped from trenched excavations.
		Operation and maintenance: **Out**	No effects on WFD water bodies during operation of onshore cable circuits given that land will be reinstated to its original

Activity / Infrastructure	Scoping criteria	Phase and scoping result	Explanation
			condition and there are minimal maintenance requirements.
	Wider WFD water body catchment	Construction, operation and maintenance, and decommissioning: **Out**	No direct pathway for construction effects to reach watercourse.
Onshore cable corridor watercourse crossings – Trenchless methods (e.g. HDD)	All trenchless onshore cable corridor watercourse crossings	Construction and decommissioning: **In**	Dewatering and ground disturbance from excavations have potential for pollutants, including slurry and sediment-laden runoff to enter watercourses. Also, a potential for alterations to flow regime in receiving watercourse(s) if dewatered groundwater is discharged to the watercourse network.
	All trenchless onshore cable corridor watercourse crossings	Operation and maintenance: **Out**	No effects anticipated on water bodies as all associated temporary construction working areas will be reinstated to their original condition, and the pre-installed ducts will be sufficiently buried beneath watercourses to avoid scour.
Onshore cable corridor watercourse crossings – Open cut methods	All open cut onshore cable corridor watercourse crossings	Construction and decommissioning: **In**	Ground disturbance from trenching and fluming / pumping will result in the potential for sediment-laden runoff and pollutants to transfer downstream along watercourses. Alteration to watercourse morphology associated with trenched underground

Activity / Infrastructure	Scoping criteria	Phase and scoping result	Explanation
			onshore cable corridor watercourse crossings.
		Operation and maintenance: **Out**	The pre-installed ducts will be sufficiently buried beneath watercourses to avoid scour. Maintenance anticipated to be minimal for both trenched crossings therefore limited opportunity for source of effects on watercourses.
Temporary construction haul road	Within Flood Zone 3 or <25m of any watercourse / drainage channel	Construction and decommissioning: **In**	Potential for pollutant release and sediments to reach watercourses during construction of temporary construction haul road, particularly during flood conditions.
		Operation and maintenance: **Out**	No effects identified during operation and maintenance as a result of onshore elements of the Proposed Development element as temporary construction haul roads will be removed after construction complete.
	Wider WFD water body catchment	Construction, operation and maintenance, and decommissioning: **Out**	No direct pathway for construction effects to reach watercourse. No effects identified during operation as a result of the onshore elements of the Proposed Development element as temporary construction haul roads will be removed after construction complete.

Activity / Infrastructure	Scoping criteria	Phase and scoping result	Explanation
Temporary construction haul road watercourse crossings (culverts and bridges)	All watercourse crossings	Construction and decommissioning: **In**	Potential for pollutants and sediments to reach watercourses directly from in channel and river bank changes for watercourse crossings. Alteration to watercourse morphology (from culverted haul road crossings).
		Operation and maintenance: **Out**	No effects identified during operation and maintenance as result of the onshore elements of the Proposed Development as all temporary construction haul road crossings will be removed after construction is complete.
Temporary construction compounds	Within Flood Zone 3 or <25 m of any watercourse / drainage channel	Construction and decommissioning: **In**	Potential for pollutants and sediments to reach watercourses.
		Operation and maintenance: **Out**	No effects identified as temporary construction compounds will be removed after construction.
	Wider WFD catchment	Construction, operation and maintenance, and decommissioning: **Out**	No direct pathway for construction / operation and maintenance / decommissioning effects to reach watercourses.

Activity / Infrastructure	Scoping criteria	Phase and scoping result	Explanation
Onshore substation	Within Flood Zone 3 or <25 m of any watercourse / drainage channel	Construction and decommissioning: **In**	Dewatering and ground disturbance from excavations have potential for pollutants and sediment-laden runoff to enter watercourses.
		Operation and maintenance: **Out**	No effects anticipated on water bodies as any hardstanding surface drainage effects or pollutants are not likely to result in any measurable change to receiving watercourse flow regime and water quality.
	Wider WFD water body catchment	Construction, operation and maintenance, and decommissioning: **Out**	No direct pathway for construction / operation and maintenance / decommissioning effects to reach watercourses.

4.3 Transitional (Estuarine) and Coastal

Onshore activities

4.3.1 Two transitional WFD water bodies, the Arun Lower and Adur and one Coastal WFD water body, the Sussex have been identified for consideration in this assessment in **Chapter 27: Water environment, Volume 2**. These transitional WFD water bodies are presented in relation to the Proposed Development along within the chapter on **Figures 27.1 and 27.2, Volume 3**. The identified water bodies either:

- have inflowing water bodies impacted by the onshore elements of the Proposed Development (for instance unnamed Arun Internal Drainage Board (IDB) ditches and two unnamed, unreportable Adur watercourse channels); or
- have onshore elements of the Proposed Development activities / infrastructure types located within / below them.

4.3.2 The majority of activities are screened in due to their proximity to unnamed ditches or watercourse crossings, and the only activities in close proximity to the transitional and coastal WFD waterbody boundaries are landfall works nearby the Sussex Coastal water body, and the proposed trenchless crossing of the Lower Adur water body. The onshore substation works and temporary construction compound infrastructure types have been screened out given that are not within 25 m of transitional or coastal water body boundaries or their associated ditches or unnamed watercourse channels.

4.3.3 A summary of activities screened in for detailed assessment in transitional and coastal WFD is provided in **Table 4-3**. **Annex B** provides details on which activities have been screened in for each of the transitional water bodies and coastal water body under consideration. A more detailed breakdown of the scoping of individual WFD elements is also presented in **Annex B**. The activities and elements that are screened and scoped in are considered for further assessment in **Annex C** and **Section 5**.

Table 4-3 Screening of onshore activities / Infrastructure for Transitional (TraC) and Coastal WFD water bodies

Activity / Infrastructure	Scoping criteria	Phase and scoping result	Explanation
Landfall works	Within 25m of TraC / Coastal waterbody Boundary and unnamed channels in TrAC catchment	Construction and decommissioning: **In**	Potential for pollutants and sediments to reach watercourses via runoff, particularly during flood conditions
		Operation and maintenance: **Out**	No permanent effects identified as temporary construction working areas including temporary construction compounds and access tracks will be removed and reinstated to their original condition after construction complete. Maintenance anticipated to be minimal for the TJB therefore limited opportunity for effects on TrAC / Coastal waterbodies.
Onshore cable circuits	Within 25m of TraC / Coastal waterbody Boundary and unnamed channels in TrAC catchment	Construction and decommissioning: **In**	Potential for pollutant release and ground disturbance during construction of onshore cable circuits, including discharge of dewatered groundwater pumped from trenched excavations.
		Operation and maintenance: **Out**	No effects on WFD water bodies during operation of onshore cable circuits given that land will be reinstated to its original condition and there are minimal maintenance requirements.

Activity / Infrastructure	Scoping criteria	Phase and scoping result	Explanation
Onshore cable corridor watercourse crossings – Trenchless methods (e.g. HDD)	Crossings, of TrAC waterbody and unnamed tributary watercourse / drainage channels within TrAC catchment	Construction and decommissioning: **In**	Dewatering and ground disturbance from excavations have potential for pollutants, including slurry and sediment-laden runoff to enter watercourses. Also, a potential for alterations to flow regime in receiving watercourse(s) if dewatered groundwater is discharged to the TrAC waterbody network.
	Crossings, of TrAC waterbody and unnamed tributary watercourse / drainage channels within TrAC catchment	Operation and maintenance: **Out**	No effects anticipated on water bodies as all associated working areas will be reinstated to their original condition, and the pre-installed ducts will be sufficiently buried beneath watercourses to avoid scour.
Onshore cable corridor watercourse crossings – Open cut methods	Crossings, of TrAC waterbody and unnamed tributary watercourse/drainage channels within TrAC catchment	Construction and decommissioning: **In**	Ground disturbance from trenching and fluming / pumping will result in the potential for sediment-laden runoff and pollutants to transfer downstream to TrAC waterbodies. Alteration to watercourse morphology associated with trenched underground onshore cable corridor watercourse crossings.
		Operation and maintenance: **Out**	The pre-installed ducts will be sufficiently buried beneath watercourses to avoid scour. Maintenance anticipated to be minimal for both trenched crossings therefore limited

Activity / Infrastructure	Scoping criteria	Phase and scoping result	Explanation
			opportunity for source of effects on TraC waterbodies.
Temporary construction haul road	Within 25m of TraC / Coastal waterbody Boundary and unnamed channels in TrAC catchment	Construction and decommissioning: **In**	Potential for pollutant release and sediments to reach watercourses during construction of temporary construction haul roads, particularly during flood conditions.
		Operation and maintenance: **Out**	No effects identified during operation and maintenance as result of the onshore elements of the Proposed Development element as temporary construction haul roads will be removed after construction complete.
Temporary construction haul road watercourse crossings (culverts and bridges)	Crossings, of TrAC waterbody and unnamed tributary watercourse / drainage channels within TrAC catchment	Construction and decommissioning: **In**	Potential for pollutants and sediments to reach watercourses directly from in channel and river bank changes for watercourse crossings. Alteration to watercourse morphology (from culverted temporary construction haul road crossings).
		Operation and maintenance: **Out**	No effects identified during operation and maintenance as result of the onshore elements of the Proposed Development element as all temporary construction haul road crossings will be removed after construction complete.

Offshore activities

Relevant waterbodies and Protected Areas

4.3.4 As required under the Environment Agency (2017) guidance, coastal and transitional waterbodies were identified based on whether there are any coastal or transitional WFD waterbody within 2km of the offshore PEIR Assessment Boundary. The PEIR Assessment Boundary overlaps with the Sussex waterbody (GB640704540003) and the Arun waterbody (GB540704105000) (**Graphics A-1** and **A-3** of **Annex A**). The current status of these waterbodies is presented in **Table A-2** of **Annex A.** The Adur transitional water body is beyond the 2km from the offshore PEIR Assessment Boundary and therefore has not been considered further for potential impacts from the proposed offshore activities.

4.3.5 As required under the Environment Agency (2017) guidance, the following WFD protected areas have been considered:

- Special Areas of Conservation (SACs);
- Special Protection Areas (SPAs);
- BWs;
- Shellfish waters; and
- Nutrient Sensitive Waters (NSWs).

4.3.6 The following sites described below are within 2km of the PEIR offshore cable corridor and are therefore included in this assessment:

- Solent and Dorset Coast SPA; and
- Bathing Waters:
  - Littlehampton; and
  - Middleton-on-sea.

4.3.7 There are no SACs, shellfish waters or NSWs within 2km of the PEIR offshore cable corridor [6]. The current status of all of the screened-in BWs is presented in **Table A-3** of **Annex A**. The Solent and Dorset Coast SPA is considered further in the **Report to Inform Appropriate Assessment** including its current conditions and conservation status are provided. Further details of the protected areas are provided in **Section 4.6.**

Biological habitats

4.3.8 There are three higher sensitivity habitats present (**Graphic A-1** of **Annex A**) within the Sussex waterbody as a whole. These higher sensitivity habitats are "Chalk reef", “Mussel beds” and "Subtidal kelp beds" (**Table A-5** of **Annex A**). Analysis of the area using the MAGIC mapping tool (DEFRA, 2021) has indicated

[6] Based on the data available from here: https://data.gov.uk/dataset/0f20d4e2-6811-48c7-b876-ad1287f08dcb/sensitive-areas-eutrophic-coastal [Accessed: 02 July 2021].

that all three of these habitat types are present within 500m of the PEIR Offshore cable corridor (**Graphic A-1** and **Table A-5** of **Annex A**). As such, further consideration of these habitats is screened in (**Table A-5** of **Annex A**). **Graphic A-2 and Table A-6** of **Annex A** presents the Lower Sensitivity habitats in the Sussex waterbody within the vicinity of the PEIR Offshore cable corridor; principally "Cobbles, gravels and shingle", Intertidal soft sediment", "Rocky shore", "Subtidal soft sediments" and "Subtidal rocky reef".

4.3.9 As part of the proposed marine activities, no offshore export cables installation or seabed preparation works are proposed to occur with Arun transitional waterbody. As such, no direct interaction with any lower sensitivity habitats is expected to occur (**Graphic A-4** and **Table A-8** of **Annex A**). There are two higher sensitivity habitats present (**Graphic A-3** of **Annex A**) within the Arun waterbody as a whole. These higher sensitivity habitats are "Saltmarsh" and "Subtidal kelp beds" (**Table A-7** of **Annex A**). Analysis of the area using the MAGIC mapping tool has indicated that habitat types are present within 500m of the PEIR Offshore cable corridor (**Graphic A-3** and **Table A-7** of **Annex A**).

Scoping considerations

4.3.10 The Proposed Development does not have a discharge pipe or outfall, nor does the Proposed Development intend to release substances on the EQSD list. Therefore, the Proposed Development will not have a defined mixing zone for these chemicals. **Table 4-4** presents the detailed scoping considerations for the screened in marine activities. **Table 4-5** provides a summary of the results of the marine scoping for consideration in the detailed impact assessment.

4.3.11 The following protected areas, as within 2km of the PEIR offshore cable corridor, have been scoped in for further consideration in the detailed impact assessment:

- Solent and Dorset Coast SPA;
- Littlehampton Bathing Water; and
- Middleton-on-sea Bathing Water.

Table 4-4 Scoping of activities associated with the offshore infrastructure

Activity	Phase and associated activities	Explanation	Scoped in?
Hydromorphology			
Could impact on the hydromorphology (for example morphology or tidal patterns) of a waterbody at high status?	All phases – the installation and operation of infrastructure	The proposed activities associated with the offshore infrastructure of the Proposed Development will not affect a waterbody of high status.	No – Impact assessment is not required

Activity	Phase and associated activities	Explanation	Scoped in?
		The Sussex and Arun are classed as moderate status (**Table A-2 of Annex A**).	
Could significantly impact the hydromorphology of any waterbody?	Construction – no activities have been identified which could impact the hydromorphology of the water bodies. Operation and maintenance – the presence of cables and cable protection. Decommissioning – no activities have been identified which could impact the hydromorphology of the water bodies.	There will be no physical barrier placed within the Sussex or Arun waterbodies as a result of the activities from the Proposed Development. The presence of the offshore export cables buried in the seabed will not affect current speeds and will, as a worst-case, result in a minor depth reduction at cable crossings and where cable protection is used. Therefore, changes to water depth and currents are not considered to be significant. As presented in **Chapter 6: Coastal Processes, Volume 2**, the installation of cable protection could result in a locally raised obstacle up to 1m above the present-day seabed level. Cable protection will be placed onto the seabed surface above the cable and could therefore directly trap or block sediment in transport, locally impacting down-drift locations. The assessment concluded that the presence of cable protection measures does not cause a long-term blockage to sediment transport where used within the offshore cable corridor. This is further supported by the assessment of the	No – Impact assessment is not required

Activity	Phase and associated activities	Explanation	Scoped in?
		potential changes in the wave and tidal regime presented in **Chapter 6: Coastal processes, Volume 2**. This assessment concluded that the changes in the wave regime, from the structures in the array, at the coastlines are predicted to be not measurable in practice and will be indistinguishable from normal short term natural variability in wave height (both for individual wave heights and in terms of the overall sea state). Accordingly, these changes are not predicted to have any measurable influence on alongshore or cross-shore sediment transport.	
Is in a waterbody that is heavily modified for the same use as the activity?	All phases – the installation and operation of infrastructure.	The Sussex waterbody is classed as heavily modified in terms of coastal protection (**Table A-2** of **Annex A**). It is not modified for the purpose of renewable energy and therefore no further consideration of the potential impacts associated with the Proposed Development is required. The Arun waterbody is classed as heavily modified in terms of flood protection (**Table A-2** of **Annex A**). It is not modified for the purpose of renewable energy and therefore no further consideration of the potential impacts associated with the Proposed Development is required.	No – Impact assessment is not required

Activity	Phase and associated activities	Explanation	Scoped in?
Biology			
Is the footprint of the activity 0.5 km^2 or larger?	Construction – the installation of offshore export cables. Operation and Maintenance – the maintenance, reburial and repair of export cables. Decommissioning – It is expected that the export cables will be left *in situ* in line with current Government approved practice. Therefore, no activities have been identified.	The footprint of the construction works within the Sussex waterbody, including a factor of 1.5 times the footprint in terms of dredging is approximately 0.09km^2 and is therefore below the 0.5km^2 threshold. No direct footprint of works associated with the marine infrastructure is proposed within the Arun waterbody. The lengths of cable to be replaced or reburied during the operation and maintenance phase will be shorter, and the potential impacts will be more localised and occur over a shorter duration than those considered during the construction phase.	No – Impact assessment is not required
Is the footprint of the activity 1% or more of the waterbody's area?	Construction – the installation of offshore export cables. Operation and maintenance – the maintenance, reburial and repair of export cables. Decommissioning – It is expected that the export cables will be left in situ in line with current Government approved practice.	The footprint of the works, including a factor of 1.5 times the footprint of the dredged area, totals approximately 0.14% of the waterbody area and therefore falls below the 1% threshold. No direct footprint of works associated with the marine infrastructure is proposed within the Arun waterbody.	No – Impact assessment is not required

Activity	Phase and associated activities	Explanation	Scoped in?
	Therefore, no activities have been identified.		
Is the footprint of the activity within 500m of any higher sensitivity habitat?	Construction – the installation of offshore export cables. Operation and maintenance – the maintenance, reburial and repair of export cables. Decommissioning – It is expected that the export cables will be left *in situ* in line with current Government approved practice. Therefore, no activities have been identified.	The Proposed Development is within 500m of higher sensitivity habitats in both the Sussex and Arun waterbodies (**Tables A-5** and **A-7; Graphics A-1** and **A-3** of **Annex A**).	Yes
Is the footprint of the activity 1% or more of any lower sensitivity habitat?	Construction – the installation of offshore export cables. Operation and maintenance – the maintenance, reburial and repair of export cables. Decommissioning – It is expected that the export cables will be left *in situ* in line with current Government approved practice.	The Proposed Development's footprint exceeds 1% of the lower sensitivity habitat areas for "Cobbles, gravel and shingle"; "Intertidal soft sediment" and "Rocky shore" within the Sussex waterbody. The activities associated with the offshore infrastructure are not anticipated to have any direct interaction with the lower sensitivity habitats within the Arun. However, consideration of these habitats has been scoped in	Yes

Activity	Phase and associated activities	Explanation	Scoped in?
	Therefore, no activities have been identified.	for completeness as the footprint of works, albeit outsider the waterbody, exceed the 1% threshold.	
Fish			
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary?	All phases – no activities identified.	The activities associated with the offshore export cables for the Proposed Development will not take place within an estuary (River Arun catchment) and it is highly unlikely to, or prevent, fish entering or affect fish migrating through an estuary. For each of the migratory fish species known to be present within the Arun, **Chapter 8: Fish and shellfish ecology, Volume 2** concluded no significant impacts on these fish populations were predicted as a result of the Proposed Development.	No – Impact assessment is not required
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)?	Construction – the installation of WTGs within the array. No other activities have been identified. Operation and maintenance – the presence of offshore export cables. Decommissioning – no activities have been identified.	The proposed activities for the Proposed Development will not cause a physical barrier to prevent fish from entering the estuaries or their migration patterns. The presence of the offshore export cable buried in the seabed will not affect current speeds and will, as a worst-case result in a minor reduction in terms of total water depth at cable crossings. Therefore, changes to water depth and changes in currents (both tidal and non-tidal) are not considered to be significant	No – Impact assessment is not required

Activity	Phase and associated activities	Explanation	Scoped in?
		and are not considered to impact on normal fish behaviour, such as, movement, migration or spawning. **Chapter 8: Fish and shellfish ecology, Volume 2** presents full details of the noise modelling undertaken to determine the potential impacts of noise and vibration on fish receptors as a result of the proposed activities associated with the offshore elements of the Proposed Development. No significant impacts were predicted on fish species and given the distance from the array to the water bodies, no measurable impacts on fish species are anticipated. There will not be any outfalls or discharges associated with the Proposed Development and so the proposed activities are not expected to cause a reduction in the dissolved oxygen in the water column. Therefore, the potential for chemical changes and its implication on fish species will not be taken forward as a consideration of the impact assessment.	
Could cause entrainment or impingement of fish?	All phases – no activities identified.	No entrainment or impingement will occur as a result of the Proposed Development.	No – Impact assessment is not required
Water quality			

Activity	Phase and associated activities	Explanation	Scoped in?
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)?	Construction – the installation of offshore export cables and undertaking HDD at the landfall. Operation and maintenance – the maintenance, reburial and repair of export cables. Decommissioning – It is expected that the export cables will be left in situ in line with current Government approved practice. Therefore, no activities have been identified.	It is not anticipated that the temperature or salinity will be affected as a result of export cable installation activities and therefore these parameters have not been taken forward to the impact assessment. The resuspension of sediments into the water column will result in short-term increases in suspended sediment concentrations (SSC) as a result of construction activities such as seabed preparation and cable installation. The methods used for installation will affect the amount of sediment displaced, but it is considered that the impacts will be localised, and high levels of SSC will not disperse to a significant level outside the footprint of the activity. During these periods of increased SSC, there will be a reduction in water clarity (i.e., an increase in turbidity) which could result in the greater longevity of microbiology in the water column. No additional nutrients will be introduced into the marine environment as a result of the proposed offshore activities. Whilst sediment-bound nutrients may be released as a result of the activities the concentrations are not anticipated to be significant.	Yes

Activity	Phase and associated activities	Explanation	Scoped in?
		These releases are considered to be analogous storm events and as such no deterioration from the existing baseline with respect to nutrients is anticipated.	
Is in a waterbody with a phytoplankton status of moderate, poor or bad?	All phases – the installation and operation of infrastructure.	The Sussex waterbody is currently classified as being of Good phytoplankton status (**Table A-2** of **Annex A**), and therefore this has not been taken forward for the impact assessment. The Arun waterbody is not currently classified for phytoplankton status, (**Table A-2** of **Annex A**), and therefore this has not been taken forward for the impact assessment.	No – Impact assessment is not required
Is in a waterbody with a history of harmful algae?	All phases – the installation and operation of infrastructure.	This has not been monitored for the Sussex or Arun waterbodies and has therefore not been taken forward for impact assessment.	No – Impact assessment is not required
Does the activity use or release chemicals which are on the Environmental Quality Standards Directive (EQSD) list?	Construction – undertaking HDD at the landfall. Operation and maintenance – no activities identified. Decommissioning – no activities identified.	The proposed activities do not include the use of direct discharge of any chemicals listed under the EQSD list. The only substance which may be released into the environment from the Proposed Development will be bentonite from HDD at the landfall export cable installation. Bentonite is a non-toxic, inert, natural clay mineral (<63µm particle diameter) and is not on the	No – Impact assessment is not required

Activity	Phase and associated activities	Explanation	Scoped in?
		EQSD list. It is included in the List of Notified Chemicals approved for use and discharge into the marine environment and is classified as a group E substance under the Offshore Chemical Notification Scheme (OCNS) (Cefas, 2020). Substances in group E are defined as the group least likely to cause environmental harm and are "readily biodegradable and is non-bioaccumulative". This is further supported by bentonite being included on the OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment (PLONOR) (OSPAR, 2019). Therefore, no deterioration of the status of any sites designated under the WFD is anticipated from the release of bentonite.	
Does the activity disturb sediments with contaminants above Cefas Action Level 1?	Construction – the installation of offshore export cables. Operation and maintenance – the maintenance, reburial and repair of export cables. Decommissioning – It is expected that the export cables will be left in situ in line with	The results of the sediment contaminant survey that has been undertaken across Rampion 2 were not available for inclusion within this assessment at PEIR stage however 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.	To be confirmed in the DCO Application.

Activity	Phase and associated activities	Explanation	Scoped in?
	current Government approved practice. Therefore, no activities have been identified.		
Invasive non-native species (INNS)			
Could the activities introduce or spread INNS?	Construction – the use of project vessels. Operation and maintenance – the presence of infrastructure on the seabed and project vessels. Decommissioning – the use of project vessels.	It is likely that any man-made structures placed on the seabed will be colonised by a range of marine species. These structures have the potential to act as artificial reefs and may also facilitate the spread of non-native species if these species are already present (i.e. they will not act as a vector for INNS in and of themselves). The vast majority of these structures will be located within the array area and so are not relevant to this assessment; however, cable protection may be installed within the Sussex waterbody. If required, it is likely to be limited to small areas of the offshore cable corridor. No cable protection will be installed within the Arun waterbody for the offshore export cables. Both construction and, operation and maintenance vessels have the potential to introduce or spread INNS through the discharge of ballast water within the waterbodies. This potential impact will be mitigated through designed-in	Yes

Activity	Phase and associated activities	Explanation	Scoped in?
		measures such as the marine biosecurity plan as part of the Outline Project Environmental Monitoring and Management Plan (PEMMP) (as per commitment C-95), as well as vessels complying with International Maritime Organisation (IMO) ballast water management guidelines, ensuring that risks associated with INNS are minimised. In addition, the materials and vessels are highly likely to be from within European and / or UK waters. There is currently little evidence from other offshore wind farms to suggest adverse effects on key species and habitats from INNS.	

Table 4-5 Summary of scoping of activities associated with the offshore infrastructure

Waterbody	Receptor	Potential risk to receptor	Risk issue(s) for impact assessment
Coastal waterbodies – Sussex waterbody (GB640704540003)	Hydromorphology	No	Not applicable
	Biology – habitats	Yes	Offshore cable installation repair and maintenance may result in direct and indirect effects upon the features identified.
	Biology – fish	No	Not Applicable
	Water quality	Yes	Offshore cable installation, repair and maintenance may affect water

Waterbody	Receptor	Potential risk to receptor	Risk issue(s) for impact assessment
			clarity and microbiology.
	INNS	Yes	The marine activities associated with the offshore elements of the Proposed Development may introduce or increase spread of INNS.
Transitional waterbodies - Arun waterbody (GB540704105000)	Hydromorphology	No	Not applicable
	Biology – habitats	Yes	Offshore cable installation repair and maintenance may result in direct and indirect effects upon the features identified.
	Biology – fish	No	Not applicable
	Water quality	Yes	Offshore cable installation repair and maintenance may affect water clarity and microbiology.
	INNS	Yes	The marine activities associated with the offshore elements of the Proposed Development may introduce or increase spread of INNS.

4.4 Lake water bodies

4.4.1 There are no lake WFD water bodies identified for consideration in **Chapter 27: Water environment, Volume 2**. Therefore, lake WFD water bodies have been screened out of the assessment carried out within this appendix. It is anticipated that lake WFD water bodies will remain screened out from the assessment at the ES stage as well.

4.5 Groundwater bodies

4.5.1 The assumptions made in developing the scoping methodology / process for groundwater bodies, in terms of which activities are scoped in, include:

- only significant activities / infrastructure that potentially have a direct connection to the groundwater bodies are included. This includes all trenchless onshore cable crossings, and trenched and culverted haul road watercourse crossings;
- any activities / infrastructure that require shallow foundations and shallow / limited potential for dewatering are screened out. This includes but is not limited to, temporary construction working areas, bridges, onshore cable trenching, and temporary construction compounds. It is assumed any dewatered arisings will be disposed of locally via soakaways or to an adjacent watercourse, therefore having a neutral effect on water body water balance, as set out in the UK Technical Advisory Group (UKTAG) guidance (UKTAG, 2012); and
- the mitigation measures associated with construction activities that are screened out in the assessment of groundwater bodies are, however, discussed within the assessment of the surface water bodies. These measures are assumed to protect the groundwater bodies from any potential water quality impacts.

4.5.2 Five groundwater WFD water bodies intersected by the onshore part of the PEIR Assessment Boundary are screened in for detailed assessment. This includes Littlehampton Anticline West, Littlehampton Anticline East, Sussex Lambeth Group, Worthing Chalk, and Lower Greensand Adur and Ouse. These groundwater bodies are shown in relation to the Proposed Development on **Figure 27.5, Volume 3** along with **Chapter 27: Water environment, Volume 2**. **Annex B** provides details on which activities have been screened in for each of the groundwater bodies under consideration. More detail on the scoping of individual WFD elements is given in **Annex B**. A summary of activities scoped in for detailed assessment in groundwater WFD water bodies is provided below in **Table 4-6**. The activities and elements that are screened and scoped in are considered for further assessment in **Annex C** and **Section 5**.

Table 4-6 Screening of activities / infrastructure for Groundwater WFD water bodies

Activity / Infrastructure	Phase and scoping result	Explanation
Trenchless crossing (HDD) at the Landfall works	Construction and decommissioning: **In**	Potential for pollution pathways to enter groundwater from the construction of a trenchless crossing, and associated ground disturbance and dewatering.
	Operation and maintenance: **Out**	Minimal maintenance activities during the operation and maintenance phase are unlikely to have an interaction between infrastructure and groundwater.
Onshore cable circuits	Construction and decommissioning: **Out**	Effects on the groundwater bodies are not likely to be significant due to the shallow nature of the proposed trenches and limited potential for dewatering.
	Operation and maintenance: **Out**	Minimal maintenance activities during the operation and maintenance phase are unlikely to have an interaction between infrastructure and groundwater.
Onshore cable corridor watercourse crossings - Trenchless methods (e.g. HDD)	Construction and decommissioning: **In**	Potential for pollution pathways to enter groundwater from the construction of a trenchless crossing, and associated ground disturbance and dewatering.
	Operation and maintenance: **Out**	No effects anticipated on water bodies as all associated working areas will be reinstated to their original condition, and the pre-installed ducts will be sufficiently buried beneath watercourses to avoid scour.

Activity / Infrastructure	Phase and scoping result	Explanation
Onshore cable corridor watercourse crossings – Open cut methods	Construction and decommissioning: **In**	Potential for a pollution pathway to be created through the construction of a trench across watercourses and through interactions between groundwater and surface waters in stretches losing flow to the ground.
	Operation and maintenance: **Out**	There will be no groundwater effect between the infrastructure and groundwater bodies during the operation and maintenance phase due to the lack of intrusive works.
Temporary construction haul road	Construction and decommissioning: **In**	Effects on the groundwater bodies are not likely to be significant due to the superficial nature of the proposed temporary construction haul road with very limited requirement for dewatering.
	Operation and maintenance: **Out**	No effects identified during operation and maintenance associated with the onshore elements of the Proposed Development as temporary construction haul roads will be removed after construction complete.
Temporary construction haul road watercourse crossings (culverts)	Construction and decommissioning: **In**	Note that, due to the superficial nature of bridges, there are unlikely to be any effects on groundwater bodies. There is potential for a pollution pathway to be created through the construction of culverts and through interactions between groundwater and surface waters during construction in river stretches losing flow to the ground.
	Operation and maintenance: **Out**	No effects identified during operation and maintenance associated with the onshore elements of the Proposed Development as

Activity / Infrastructure	Phase and scoping result	Explanation
		temporary construction haul road crossings will be removed after construction complete.
Temporary construction compounds	Construction and decommissioning: **In**	Effects on the groundwater bodies are not likely to be significant due to the superficial nature of the proposed temporary construction compounds with very limited requirement for dewatering.
	Operation and maintenance: **Out**	No effects identified as temporary construction compounds will be removed after construction.
Onshore substation	Construction and decommissioning: **In**	Effects on the groundwater bodies are not likely to be significant due to the shallow nature of the proposed onshore substation works and limited potential for dewatering.

4.6 Protected Areas

4.6.1 Consideration must also be paid to protected areas that are designated under European legislation. These include drinking water, bathing water and Natura 2000 protected areas.

4.6.2 There are six drinking water protected areas (DWPAs) and six Safeguard Zones that will potentially be affected by the Proposed Development. These include:

- Littlehampton Anticline East (UKGB40701G503400) DWPA;
- Littlehampton Anticline West (UKGB40701G504900) DWPA;
- Sussex Lambeth Group (UKGB40701G505100) DWPA;
- Worthing chalk (UKGB40701G505300) DWPA;
- Patching GWSGZ0225 Safeguard Zone;
- Sompting GWSGZ0229 Safeguard Zone;
- Burpham GWSGZ0141 Safeguard Zone;
- Findon GWSGZ0142 Safeguard Zone;
- Stanhope Lodge GWSGZ0230 Safeguard Zone;
- Northbrook, Worthing GWSGZ0223 Safeguard Zone;
- Lower Greensand Adur & Ouse (UKGB40701G502400) DWPA; and
- Adur & Ouse Hastings Beds (UKGB40702G502000) DWPA.

4.6.3 The designated bathing waters that have a connection to the Proposed Development are:

- Littlehampton (UK15500); and
- Middleton-on-sea (UK15600).

4.6.4 The EU Nitrates Directive (European Commission, 1991) and Urban Waste Water Treatment Directive (European Commission, 1991) areas that have a connection to the Proposed Development are:

- Sussex Chalk protected under nitrates directive (G56)
- Aldingbourne Rife Nitrate Vulnerable Zone (NVZ) S517;
- Adur East (Sakeham) NVZ (S522); and
- Adur East protected under Urban Waste Water Treatment Directive (UKENRI146).

4.6.5 The National Site Network areas that have a connection to the Proposed Development are:

- Solent and Dorset Coast SPA; and
- Arun Valley SPA and SAC.

4.6.6 Each of the protected sites are considered in **Section 5** of this appendix within the preliminary assessment process as a component of the WFD water body that they fall within.

5. Preliminary further assessment results

5.1 Structure of further assessment

5.1.1 As the design of the onshore elements of the Proposed Development, in many cases, is not proposed to vary significantly from water body to water body, the approach adopted here provides one assessment for each activity / infrastructure type per water body category (i.e. river, coastal, transitional, groundwater). These generic assessments are provided in **Annex C**. Based on the screening and scoping assessment presented in **Section 4**, those water bodies that have been identified as not requiring detailed assessment are not considered here.

5.1.2 **Annex C** also provides a detailed impact assessment of the elements scoped in, as summarised in **Table 4-5**, which may be impacted by the proposed activities associated with the offshore infrastructure.

5.1.3 This section provides a preliminary summary of findings, including consideration of both the WFD requirement for no deterioration in WFD class and the need to ensure the Proposed Development does not prevent the achievement of future target status.

5.1.4 The screening and scoping of activities / infrastructure types that was undertaken in **Section 4** did not include a consideration of any embedded environmental measures that will be implemented as part of the Proposed Development. However, in practice these measures will be incorporated in order to manage any potential effects on the water environment to an acceptable level. A description of the relevant onshore environmental measures is presented in **Chapter 27: Water environment, Volume 2**, and a description of the relevant offshore environmental measures is provided in **Chapter 9: Benthic subtidal and intertidal ecology, Volume 2.** In **Annex C**, the embedded environmental measures of particular relevance have been crossed referenced and grouped by subject against each potential effect in further detail. A complete set of environmental measures for all onshore and offshore aspects is provided in **Appendix 4.1: Commitments register, Volume 4**. Below **Table 5-1** provides a brief summary of the onshore environmental measures which will manage potential effects associated with WFD elements.

Table 5-1 Summary of embedded environmental measures and their relevance regarding potential affects

WFD element	Potential effect on WFD element	Embedded environmental measure to manage potential effect – for full description see Annex C
Hydromorphology	Alteration of flow regime – via input to watercourses and via indirect changes within the catchment	C-77, C-141 and C-142: Management of dewatered groundwater, and environmental permit for discharge activity. C-130, C-131, C-133 and C-135: Appropriate standoff distances and methodologies for temporary topsoil stockpiling. C-121 and C-140: Effective drainage so as to not increase baseline runoff rates. C-120 and C-129: Temporary construction works areas constructed from semi-permeable aggregate where possible. C-27, C-73, C-120 and C-129: Good construction practices for temporary construction compounds including drainage strategy. C-28: Land drainage management. C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177 and C-178: Appropriate temporary construction haul road watercourse crossing design and implementation. C-119, C-120 and C-175: Appropriate temporary construction haul road design and installation. C-3, C-5, C-17, C-18, C-19, C-122, C-138, C-139: Appropriate (trenchless and trenched) onshore cable watercourse crossing design. C-123: Appropriate standoff distances from watercourses for trenchless pits. C-19, C-29, C-141 and C-154 Good construction practices for trenching.
Hydromorphology	Alteration of channel morphology	C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177 and C-178. Appropriate temporary construction haul road watercourse crossing design and implementation. C-3, C-5, C-17, C-18, C-19, C-122, C-138 and C-139: Appropriate (trenchless and trenched) onshore cable watercourse crossing design. C-17 and C-182: Appropriate environmental permits and land drainage consents. C-28: Land drainage management.

WFD element	Potential effect on WFD element	Embedded environmental measure to manage potential effect – for full description see Annex C
Chemical and Physico – chemical	Mobilisation of sediment or contaminated sediment / material in the catchment that has the potential to enter the watercourse network. Introduction and / or mobilisation of sediment or contaminated sediment / material within the channel that has the potential to be transported downstream	C-77, C-141 and C-142: Management of dewatered groundwater, and environmental permit for discharge activity. C-130, C-131, C-133 and C-135: Appropriate standoff distances and methodologies for temporary topsoil stockpiling. C-121 and C-140: Effective drainage so as to not increase baseline runoff rates. C-120 and C-129: Temporary construction works areas constructed from semi-permeable aggregate where possible. C-27, C-73, C-120 and C-129: Good construction practices for temporary construction compounds including drainage strategy. C-28: Land drainage management. C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177 and C-178. Appropriate temporary construction haul road watercourse crossing design and implementation. C-119, C-120 and C-175: Appropriate temporary construction haul road design and installation. C-3, C-5, C-17, C-18, C-19, C-122, C-138 and C-139: Appropriate (Trenchless and Trenched) cable watercourse crossing design. C-123: Appropriate standoff distances from watercourses for trenchless pits. C-19, C-29, C-141 and C-154: Good construction practices for trenching. C-8, C-76, C-129, C-149, C-151 and C-167: Pollution prevention and remediation. C-69 and C-143: Outline Materials Management Plan and Unexpected Contamination Protocol.
Biological Quality	Mobilisation of sediment or contaminated sediment / material in the catchment that has the potential to enter the	C-28: Land drainage management. C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177 and C-178. Appropriate temporary construction haul road watercourse crossing design and implementation. C-3, C-5, C-17, C-18, C-19, C-122, C-138 and C-139 Appropriate (trenchless and trenched) onshore cable watercourse crossing design. C-123: Appropriate standoff distances from watercourses for trenchless pits. C-19, C-29, C-141 and C-154: Good construction practices for trenching.

WFD element	Potential effect on WFD element	Embedded environmental measure to manage potential effect – for full description see Annex C
	watercourse network and have a potential knock on impact on the habitats of fish, macrophytes, phytobenthos and invertebrates. Introduction and / or mobilisation of sediment or contaminated sediment / material within the channel that has the potential to be transported downstream and have potential knock on impact on the habitats of fish, macrophytes, phytobenthos and invertebrates.	C-8, C-76, C-129, C-149, C-151 and C-167: Pollution prevention and remediation. C-69 and C-143: Outline Materials Management Plan and Unexpected Contamination Protocol.

WFD element	Potential effect on WFD element	Embedded environmental measure to manage potential effect – for full description see Annex C
Groundwater Quantity	Alteration to groundwater quantity	C-77, C-141 and C-142: Management of dewatered groundwater, and Environmental Permit for Discharge Activity. C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177 and C-178: Appropriate temporary construction haul road watercourse crossing design and implementation. C-3, C-5, C-17, C-18, C-19, C-122, C-138 and C-139: Appropriate (trenchless and trenched) onshore cable watercourse crossing design and installation. C-19, C-29, C-141 and C-154. Good construction practices for trenching.
Groundwater Chemical	Alteration to groundwater quality	C-69 and C-143: Outline Materials Management Plan and Unexpected Contamination Protocol. C-8, C-76, C-129, C-149, C-151, and C-167: Pollution prevention and remediation.
Biological habitats	The installation of subsea export cables.	C-43 The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques. C-45: Where possible, cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.
Biological habitats	INNS	C-95: Mitigations and control of invasive species.

5.1.5 In each sub-section below, preliminary conclusions are provided on whether these environmental measures will help address potential effects on WFD water bodies, in order to achieve compliance with respective WFD body objectives.

5.1.6 Note that at the ES stage, in this section, further information will be presented on the quantities of onshore infrastructure activities and types, which will be subject to further design refinement, particularly in the north eastern section of the onshore cable corridor and onshore substation which still have flexibility in their design optionality at the PEIR stage.

5.2 Surface water bodies

Introduction

5.2.1 This section provides a summary of the preliminary assessments that were carried out in **Annex C** for all surface water bodies and activities that were screened and scoped in.

Coastal Sussex GB640704540003

5.2.2 Based on the results of the screening and scoping assessment (**Annex B**, **Table 4-3** and **Table 4-4**), activities may pose a risk to the WFD status and objectives of this water body for the elements listed below in **Table 5-2** and **Table 5-3**. A further assessment for the coastal Sussex water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-2 Summary of the further assessment results, from onshore activities, for the Coastal Sussex water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Physico - Chemical Quality Elements – **Ammonia** **Phosphate** **Dissolved oxygen** **Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, phytoplankton, macrophytes, phytobenthos, and invertebrates**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

Table 5-3 Summary of the further assessment results, from offshore activities, for the Coastal Sussex water body

WFD Element scoped in	Summary of preliminary further assessment (presented in Annex C)
Biology – Habitats	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.
Biology – INNS	
Water Quality – Clarity	
Water Quality – Microbiology	

5.2.3 The Coastal Sussex WFD water body (GB640704540003) is currently designated as having Moderate overall status with an objective to achieve Good status by 2027. The Ecological status was assessed as being less than good due to physical modifications from coastal protection use. The mitigation measures assessment had an outcome of moderate or less in 2015[7]. The reasons for failing were listed as being due to disproportionate burdens[8].

5.2.4 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-2** and **Table 5-3).** All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Coastal Sussex water body as a whole. Therefore, in the case of the Coastal Sussex WFD water body (GB640704540003), the Proposed Development is considered to be compliant with the objectives of the WFD.

5.2.5 On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the conservation objectives of the Solent and South SPA (as reported in **Chapter 14: Nature conservation, Volume 2**) which lies within part of the Coastal Sussex WFD Water Body. In addition, it can be concluded that the performance of Middleton-on-Sea and Littlehampton Bathing Waters will not be adversely affected by the Proposed Development.

[7] Mitigation Measures Assessment are used for Heavily Modified Waterbodies (HMWBs) where anthropogenic alteration (e.g. for flood defences, urbanisation or land drainage) means that natural status is not an appropriate target. The mitigation measures assessment links mitigation measures to ecological improvement targets. In relation to the Sussex WFD water body the mitigation measure is to retain habitats in relation to the coastal protection use.

[8] Disproportionate burdens applies where the measure would be

a) unaffordable to implement within a particular timetable without creating disproportionate burdens for particular sectors or parts of society); or

b) the only solution would be significantly at odds with the polluter pays principle.

Lower Arun Transitional GB540704105000

5.2.6 Based on the results of the screening and scoping assessment (**Annex B, Table 4-3** and **Table 4-4**), activities may pose a risk to the WFD status and objectives of this water body for the elements listed below in **Table 5-4** and **Table 5-5**. A summary of the further assessment for the Lower Arun transitional water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-4 Summary of the further assessment results, from onshore activities, for the Lower Arun TrAC water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub elements, specifically structure and substrate of the river bed	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.
Physico - Chemical Quality Elements – Ammonia Phosphate Dissolved oxygen Temperature **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	

Table 5-5 Summary of the further assessment results, from offshore activities, for the Lower Arun TrAC water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Biology – Habitats	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.
Biology – INNS	
Water Quality – Clarity	
Water Quality – Microbiology	

5.2.7 The Lower Arun Transitional WFD water body (GB540704105000) is currently designated as having Moderate overall status with an objective to achieve Good status by 2027. The Ecological status was assessed as being less than good due to physical modifications from flood protection use. The mitigation measures assessment had an outcome of moderate or less in 2015[9]. The reasons for failing were listed as being due to disproportionate burdens[10].

5.2.8 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-4** and **Table 5-5**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Lower Arun water body as a whole. Therefore, in the case of the Lower Arun WFD water body (GB540704105000), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the conservation objectives of the Arun Valley SPA and SAC (as reported in **Chapter 23: Terrestrial ecology and nature conservation, Volume 2**), and the Arun DWPA and Safeguard Zone which all lie within parts of the Lower Arun transitional WFD Water Body.

Ryebank Rife GB107041006620

5.2.9 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-6**. A summary of the further assessment for the Ryebank Rife water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-6 Summary of the further assessment results, from onshore activities, for the Ryebank Rife river water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub-elements, specifically structure and substrate of the river bed	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The

[9] Mitigation Measures Assessment are used for HMWBs where anthropogenic alteration (e.g. for flood defences, urbanisation or land drainage) means that natural status is not an appropriate target. The mitigation measures assessment links mitigation measures to ecological improvement targets. In relation to the Lower Arun WFD water body the mitigation measure is in relation to physical modifications for the flood protection use.

[10] Disproportionate burdens applies where the measure would be

a) unaffordable to implement within a particular timetable without creating disproportionate burdens for particular sectors or parts of society); or

b) the only solution would be significantly at odds with the polluter pays principle.

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Physico - Chemical Quality Elements – Ammonia **Phosphate** **Dissolved oxygen** **Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.2.10 The Ryebank Rife WFD water body (GB107041006620) is currently designated as having Moderate overall status with an objective to achieve Good status by 2027. The Ecological status was assessed as being less than good with dissolved oxygen identified as the failing classification element.

5.2.11 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-6**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Ryebank Rife water body as a whole. Therefore, in the case of the Ryebank Rife WFD water body (GB107041006620), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the objectives of the Aldingbourne Rife NVZ which lies within part of the Ryebank Rife WFD Water Body.

Black Ditch (West Sussex) GB107041012890

5.2.12 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-7**. A summary of the further assessment for the Black Ditch water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-7 Summary of the further assessment results, from onshore activities, for the Black Ditch (West Sussex) river water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub-elements, specifically structure and substrate of the river bed **Physico - Chemical Quality Elements – Ammonia** **Phosphate** **Dissolved oxygen** **Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.2.13 The Black Ditch (West Sussex) WFD water body (GB107041012890) is currently designated as having Poor overall status with an objective to achieve Good status by 2027. The Ecological status was assessed as being less than good with macrophytes, phytobenthos, and fish, all identified as the failing classification elements.

5.2.14 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-7**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Black Ditch water body as a whole. Therefore, in the case of the Black Ditch WFD water body (GB107041012890), the Proposed Development is considered to be compliant with the objectives of the WFD.

Honeybridge Stream GB107041012120

5.2.15 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-8**. A summary of the further assessment for the Honeybridge Stream water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-8 Summary of the further assessment results, from onshore activities, for the Honeybridge Stream river water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub-elements, specifically structure and substrate of the river bed **Physico - Chemical Quality Elements – Ammonia** **Phosphate** **Dissolved oxygen** **Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.2.16 The Honeybridge Stream WFD water body (GB107041012120) is currently designated as having Poor overall status with an overall objective of achieving Good status by 2027. The Ecological and Chemical status were both assessed as being less than good with macrophytes, phytobenthos, and fish, all identified as the failing classification elements.

5.2.17 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-8**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Honeybridge Stream water body as a whole. Therefore, in the case of the Honeybridge Stream WFD water body (GB107041012120), the Proposed Development is considered to be compliant with the objectives of the WFD.

Adur Transitional GB540704116000

5.2.18 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-9**. A summary of the further assessment for the Adur transitional water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-9 Summary of the further assessment results, from onshore activities, for the Adur TrAC water body

WFD Element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub-elements, specifically structure and substrate of the river bed **Physico - Chemical Quality Elements – Ammonia** **Phosphate** **Dissolved oxygen** **Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.2.19 The heavily modified Adur Transitional WFD water body (GB540704116000) is currently designated as having Poor overall status with an overall objective of achieving Good status by 2027. The Ecological and Chemical status were both assessed as being less than good with angiosperms, fish and tributyltin compounds, all identified as the failing classification elements.

5.2.20 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-9**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Adur transitional water body as a whole. Therefore, in the case of the Adur transitional WFD water body (GB540704116000), the Proposed Development is considered to be compliant with the objectives of the WFD.

Adur (Lockbridge) GB107041012200

5.2.21 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-10**. A summary of the further assessment for the Adur (Lockbridge) river water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-10 Summary of the further assessment results, from onshore activities, for the Adur (Lockbridge) river water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub-elements, specifically structure and substrate of the river bed **Physico - Chemical Quality Elements – Ammonia Phosphate Dissolved oxygen Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.2.22 The Adur (Lockbridge) WFD water body (GB107041012200) is currently designated as having Poor overall status with an overall objective of achieving Good status by 2027. The Ecological and Chemical status were both assessed as being less than good with macrophytes, phytobenthos, and phosphate, all identified as the failing classification elements.

5.2.23 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-10**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Adur (Lockbridge) river water body as a whole. Therefore, in the case of the Adur (Lockbridge) WFD water body (GB107041012200), the Proposed Development is considered to be compliant with the objectives of the WFD.

Adur East (Sakeham) GB107041012900

5.2.24 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-11**. A summary of the further assessment for the Adur East (Sakeham) river water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-11 Summary of the further assessment results, from onshore activities, for the Adur East (Sakeham) river water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub-elements, specifically structure and substrate of the river bed **Physico - Chemical Quality Elements – Ammonia** **Phosphate** **Dissolved oxygen** **Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.2.25 The Adur East (Sakeham) WFD water body (GB107041012900) is currently designated as having Poor overall status with an overall objective of achieving Good status by 2027. The ecological and chemical status were both assessed as being less than good with macrophytes, phytobenthos, fish, and phosphate, all identified as the failing classification elements.

5.2.26 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-11**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Adur East (Sakeham) river water body as a whole. Therefore, in the case of the Adur East (Sakeham) WFD water body (GB107041012900), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the objectives of the Adur East (Sakeham) NVZ or UKENRI146 which lie within parts of the Adur East (Sakeham) WFD water body.

Cowfold Stream GB107041012260

5.2.27 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for

the elements listed below in **Table 5-12**. A summary of the further assessment for the Cowfold Stream river water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-12 Summary of the further assessment results, from onshore activities, for the Cowfold Stream river water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub-elements, specifically structure and substrate of the river bed **Physico - Chemical Quality Elements – Ammonia** **Phosphate** **Dissolved oxygen** **Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	**Annex C** provides a comprehensive summary of the effects of these activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.2.28 The Cowfold Stream WFD water body (GB107041012260) is currently designated as having Moderate overall status with an overall objective of achieving Good status by 2027. The ecological status was assessed as being less than good with macrophytes, phytobenthos, and phosphate, all identified as the failing classification elements.

5.2.29 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-12**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Cowfold Stream river water body as a whole. Therefore, in the case of the Cowfold Stream WFD water body (GB107041012260), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the objectives of the Adur East (Sakeham) NVZ which lie within part of the Cowfold Stream WFD Water Body.

Adur East GB107041012180

5.2.30 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-13**. A summary of the further assessment for the Adur East river water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-13 Summary of the further assessment results, from onshore activities, for the Adur East river water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Hydromorphological Supporting Elements – all sub-elements, specifically structure and substrate of the river bed **Physico - Chemical Quality Elements – Ammonia Phosphate** **Dissolved oxygen** **Temperature** **Chemical Quality Elements – Specific Pollutants, Priority substances and Priority Hazardous substances** **Biological Quality Elements – Fish, macrophytes, phytobenthos, and invertebrates**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.2.31 The Adur East WFD water body (GB107041012180) is currently designated as having Poor overall status with an overall objective of achieving Good status by 2027. The ecological and chemical status were both assessed as being less than good with macrophytes, phytobenthos, fish and phosphate, all identified as the failing classification elements.

5.2.32 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-13**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Adur East river water body as a whole. Therefore, in the case of the Adur East WFD water body (GB107041012180), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that

the Proposed Development will not have any adverse effects on the objectives of the Adur East (Sakeham) NVZ or UKENRI146 which lie within parts of the Adur East WFD water body.

5.3 Groundwater bodies

Introduction

5.3.1 This section provides a summary of the preliminary assessments that were carried out in **Annex C** for all groundwater bodies and activities that were screened and scoped in.

Littlehampton Anticline West GB40701G504900

5.3.2 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-14**. A summary of the further assessment for the Littlehampton Anticline West groundwater water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-14 Summary of the further assessment results, from onshore activities, for the Littlehampton Anticline West groundwater water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Groundwater Level Elements – Quantitative dependent surface water body status and Groundwater dependent terrestrial ecosystems (GWDTEs) **Groundwater Chemical Elements – GWDTEs and General chemical test**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.3.3 The Littlehampton Anticline West WFD water body (GB40701G504900) was previously designated as having Poor status, with an overall objective of achieving Good status by 2021. The quantitative dependent surface water body test had an outcome of Poor status in 2015. The reasons for failing were listed as being due to suspect data, which means that it had not been confirmed.

5.3.4 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-14**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and/or negligible in relation to the Littlehampton Anticline West groundwater water body as a whole. Therefore, in the case of the

Littlehampton Anticline West water body (GB40701G504900), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the objectives of the Sussex Chalk G56 Nitrates Directive protected area or the Littlehampton Anticline West DWPA which lie within parts of the Littlehampton Anticline West WFD water body.

Littlehampton Anticline East GB40701G503400

5.3.5 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-15**. A summary of the further assessment for the Littlehampton Anticline East groundwater water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-15 Summary of the further assessment results, from onshore activities, for the Littlehampton Anticline East groundwater water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Groundwater Level Elements – Quantitative dependent surface water body status and GWDTEs **Groundwater Chemical Elements – GWDTEs and General chemical test**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.3.6 The Littlehampton Anticline East WFD water body (GB40701G503400) is currently designated as having Good status. Therefore, there is no requirement for this water body to achieve an improvement in WFD status, beyond 2021.

5.3.7 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-15**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Littlehampton Anticline East groundwater water body as a whole. Therefore, in the case of the Littlehampton Anticline East water body (GB40701G503400), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the objectives of the Sussex Chalk G56 Nitrates Directive protected area or the Littlehampton Anticline East DWPA which lie within parts of the Littlehampton Anticline East WFD water body.

Sussex Lambeth Group GB40701G505100

5.3.8 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements scoped in and listed below in **Table 5-16**. A summary of the further assessment for the Sussex Lambeth Group groundwater water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-16 Summary of the further assessment results, from onshore activities, for the Sussex Lambeth Group groundwater water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Groundwater Level Elements – Quantitative dependent surface water body status and GWDTEs **Groundwater Chemical Elements – GWDTEs and General chemical test**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.3.9 The Sussex Lambeth Group WFD water body (GB40701G505100) was previously designated as having Poor status, with an overall objective of achieving Good status by 2021. The quantitative dependent surface water body test had an outcome of Poor status in 2015. The reasons for failing were listed as being due to suspect data, which means that it has not been confirmed.

5.3.10 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-16**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Sussex Lambeth Group groundwater water body as a whole. Therefore, in the case of the Sussex Lambeth Group water body (GB40701G505100), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the objectives of the Sussex Chalk G56 Nitrates Directive protected area or the Sussex Lambeth Group DWPA which lie within parts of the Sussex Lambeth Group WFD water body.

Worthing Chalk GB40701G505300

5.3.11 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements scoped in and listed below in **Table 5-17**. A summary of the further assessment for the Worthing Chalk groundwater water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-17 Summary of the further assessment results, from onshore activities, for the Worthing Chalk groundwater water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Groundwater Level Elements – Quantitative dependent surface water body status and GWDTEs **Groundwater Chemical Elements – GWDTEs and General chemical test**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.3.12 The Worthing Chalk WFD water body (GB40701G505300) is currently designated as having Poor status, with an overall objective of achieving Good status by 2027. The quantitative and chemical Groundwater Waterbody (GW) status were both assessed as being of Poor status. The classification elements achieving less than Good status were the quantitative water balance, surface water body status and general chemical test, with poor nutrient management and groundwater abstraction being identified as the main activities responsible for pressures on diffuse sources of pollution and flow availability.

5.3.13 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-17**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and/or negligible in relation to the Worthing Chalk groundwater water body as a whole. Therefore, in the case of the Worthing Chalk water body (GB40701G505300), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the objectives of the Sussex Chalk G56 Nitrates Directive protected area, the Worthing Chalk DWPA and associated public water supply safeguard zones (e.g. Patching, Sompting, Burpham, Findon, Stanhope Lodge and Northbrook) which all lie within parts of the Worthing Chalk WFD water body.

Lower Greensand Adur and Ouse GB40701G502400

5.3.14 Based on the results of the screening and scoping assessment (**Annex B**), activities may pose a risk to the WFD status and objectives in this water body for the elements listed below in **Table 5-18**. A summary of the further assessment for the Lower Greensand groundwater water body, taking account of embedded environmental measures is presented within **Annex C**.

Table 5-18 Summary of the further assessment results, from onshore activities, for the Lower Greensand Adur and Ouse groundwater water body

WFD element scoped in	Summary of preliminary further assessment (presented in Annex C)
Groundwater Level Elements – Quantitative dependent surface water body status and GWDTEs **Groundwater Chemical Elements – GWDTEs and General chemical test**	**Annex C** provides a comprehensive summary of the effects of activities / infrastructure on each WFD classification element. The embedded environmental measures summarised in **Table 5-1** will be sufficient to ensure that any effects will not lead to deterioration in WFD status for any stage of the Proposed Development.

5.3.15 The Lower Greensand Adur and Ouse WFD water body (GB40701G502400) is currently designated as having Good status. Therefore, there is no requirement for this water body to achieve an improvement in WFD status, beyond 2021.

5.3.16 Incorporation of the embedded environmental measures will largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have potential to cause deterioration in WFD status (**Table 5-18**). All residual effects are considered to be short duration in relation to the RBMP planning timescales (six years) and / or negligible in relation to the Lower Greensand Adur and Ouse groundwater water body as a whole. Therefore, in the case of the Lower Greensand Adur and Ouse water body (GB40701G502400), the Proposed Development is considered to be compliant with the objectives of the WFD. On the same basis it can also be concluded that the Proposed Development will not have any adverse effects on the Lower Greensand Adur and Ouse DWPA which lies within the Lower Greensand Adur and Ouse WFD water body.

6. Preliminary conclusions on WFD compliance

6.1 Overview

6.1.1 Of the 19 water bodies in the Study Area, a total of 16 were considered to have Proposed Development activities / infrastructure types within them or in close enough proximity that will cause some degree of risk to the delivery of WFD objectives. Upon further preliminary assessment of these activities and infrastructure types, and taking into account the effectiveness of the embedded environmental measures to manage any effects, it is concluded that the Proposed Development is compliant with the WFD.

6.2 Will the Proposed Development lead to deterioration in WFD status of any WFD water body in the Study Area?

6.2.1 Based on the preliminary assessment provided in this appendix (within **Annex C** and **Section 5)**, no components or phases of the Proposed Development will lead to a deterioration in WFD Status.

6.3 Will the Proposed Development compromise the achievement of Good Status in any WFD water body in the Study Area?

6.3.1 Based on the assessment provided in this appendix (within **Annex C** and **Section 5)** no components or phases of the Proposed Development will compromise the ability of any WFD water body to attain WFD target status.

6.4 Will the Proposed Development compromise the achievement of Protected Area objectives?

6.4.1 Based on the assessment provided in **Chapter 23: Terrestrial ecology and nature conservation, Volume 2**, **Draft Report to Inform Appropriate Assessment**, **Chapter 14: Nature conservation, Volume 2** and the preliminary findings of this appendix (within **Annex C** and **Section 5**), no components or phases of the Proposed Development will compromise the conservation objectives of any Protected Area.

6.5 Statement of WFD compliance

6.5.1 The preliminary assessment provided in this appendix demonstrates that the Proposed Development is compliant with the objectives of the WFD. Therefore, there is no requirement for an Article 4.7 assessment. These conclusions will be considered at the ES stage within a final WFD Assessment, which will be based on the final outline design parameters and set of embedded environmental measures.

7. Glossary of terms and abbreviations

Term (Acronym)	Definition
ABD	Areas Benefitting from Defences
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
AStGWF	Areas Susceptible to Groundwater Flooding
AWBs	Artificial water bodies
BGS	British Geological Survey
BW	Bathing Water
CBS	Cement bound sand
cBWD	current Bathing Water Directive
Cefas	Centre for Environment, Fisheries and Aquaculture Science
COCP	Code of Construction Practice
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
DWPA	Drinking Water Protected Area
EA	Environment Agency
E. coli	*Escherchia coli*
EIA	Environmental Impact Assessment

Term (Acronym)	Definition
EPP	Evidence Plan Process
EQS	Environmental Quality Standards
EQSD	Environmental Quality Standards Directive
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
FRA	Flood Risk Assessment
FRAP	Flood Risk Activity Permits
FRSA	Flood Risk Screening Assessment
FZ	Flood Zone
GEP	Good ecological potential
GES	Good ecological status
GWDTE	Groundwater dependent terrestrial ecosystems
HDD	Horizontal Directional Drill
HMWBs	Heavily modified water bodies
IDB	Internal Drainage Board
IDD	Internal Drainage District
IE	intestinal *enterococci*
IMO	International Maritime Organisation
INNS	Invasive non-native species

Term (Acronym)	Definition
km	kilometre
LLFA	Lead Local Flood Authority
m	metre
mbgl	metres below ground level
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
N/A	Not applicable
NE	Natural England
NGR	National Grid Reference
nm	nautical mile
NPPF	National Planning Policy Framework
NPS(s)	National Policy Statement(s)
NSIP	Nationally Significant Infrastructure Project
NSWs	Nutrient Sensitive Waters
NVZ	Nitrate Vulnerable Zone
OCNS	Offshore Chemical Notification Scheme
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PEIR	Preliminary Environmental Information Report
PEMMP	Project Environmental Monitoring and Management Plan

Term (Acronym)	Definition
PINS	Planning Inspectorate
PLONOR	Pose Little or No Risk to the Environment
RBMP	River Basin Management Plan
rBWD	revised Bathing Water Directive
RoFSW	Risk of Flooding from Surface Water
SAC	Special Area of Conservation
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Area
SSC	Suspended Sediment Concentrations
SuDS	Sustainable Drainage System
TJB	Transition Joint Bay
TraC	Transitional and Coastal Waters
UK	United Kingdom
UKCEH	United Kingdom Centre for Ecology and Hydrology
UKTAG	UK Technical Advisory Group
WFD	Water Framework Directive
WSCC	West Sussex County Council
WTGs	Wind Turbine Generators

8. References

BERR, (2008). *Review of Cabling Techniques and Environmental Effects applicable to the Offshore Wind Farm Industry.' Department for Business Enterprise and Regulatory Reform in association with Defra*.

Centre for Environment, Fisheries and Aquaculture Science (Cefas), (2020). *Offshore Chemical Notification Scheme operated by Cefas.* [Online]. Available at: https://www.cefas.co.uk/cefas-data-hub/offshore-chemical-notification-scheme/hazard-assessment/ [Accessed: 02 July 2021].

Council Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 on establishing a framework for Community action in the field of water policy (the Water Framework Directive).

Council Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council (the Priority Substances Directive).

Council Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy.

Council Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (the Groundwater Directive) including Commission Directive 2014/80/EU which amends Annex II of the original Directive 2006/118/EC.

Department for Environment, Food and Rural Affairs (Defra), (2021). *Magic online mapping tool.* [online]. Available at: https://magic.defra.gov.uk/ [Accessed: 02 July 2021].

Environment Agency, (2015). *River Basin Management Plans Published 2015 – 2021.* [Online]. Available at: https://www.gov.uk/government/collections/river-basin-management-plans-2015 [Accessed: 02 July 2021].

Environment Agency, (2016). *Clearing the waters for All.* [online]. Available at: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters [Accessed: 02 July 2021].

Environment Agency, (2015). *Position 488_10 Protecting and improving the water environment: WFD compliance of physical works in rivers*.

European Commission, (1991). *Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment.* [online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271 [Accessed: 02 July 2021].

European Commission, (1991). *Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC)*. [online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1561542776070&uri=CELEX:01991L0676-20081211. [Accessed: 02 July 2021].

EMU, (2011). *Rampion 1 OWF benthic ecology baseline characterisation*.

OSPAR, (2019). '*OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment'.* [online]. Available from: https://www.ospar.org/work-areas/oic/chemicals. [Accessed: 02 July 2021].

Planning Inspectorate (PINS), (2020a). *Scoping Opinion: Proposed Rampion 2 Offshore Wind Farm. Case Reference EN010117*, [online]. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010117/EN010117-000045-EN010117 Scoping Opinion.pdf [Accessed 02 July 2021].

UK Technical Advisory Group on the Water Framework Directive, (2012). *Paper 11b(i) Groundwater Chemical Classification for the purposes of the Water Framework Directive and the Groundwater Directive.*

The Planning Inspectorate, (2017). *Advice Note 18: The Water Framework Directive.* [online]. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf [Accessed 02 July 2021].

The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Annex A
Baseline WFD Data

Annex A
Baseline WFD Data

Table A-1	Baseline WFD Data	2
Table A-2	Status of scoped in WFD waterbodies for consideration of offshore activities	18
Table A-3	Status of scoped in Bathing Waters	20
Table A-4	Natura 2000 sites within 2km of the offshore cable corridor	21
Table A-5	Higher sensitivity habitats assessment within the Sussex waterbody	22
Table A-6	Lower sensitivity habitats assessment within the Sussex waterbody	23
Table A-7	Higher and lower sensitivity habitats assessment within the Arun waterbody	24
Table A-8	Lower sensitivity habitats assessment within the Arun waterbody	25

Graphic A-1	Higher Sensitivity Habitats within the Sussex Waterbody relative to the PEIR Assessment Boundary	26
Graphic A-2	Lower Sensitivity Habitats within the Sussex Waterbody relative to the PEIR Assessment Boundary	27
Graphic A-3	Higher Sensitivity Habitats within the Arun Waterbody relative to the PEIR Assessment Boundary	28
Graphic A-4	Lower Sensitivity Habitats within the Arun Waterbody relative to the PEIR Assessment Boundary	29

Table A-1 Baseline WFD Data

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
Ryebank Rife (GB107041006620) **Arun and Western Streams**	River	7.4	13.2	Moderate Status (2016): Moderate Ecological Potential, Good Chemical Status Moderate Status (2019): Moderate Ecological Potential,	-	Dissolved oxygen	Drought	Good by 2027

[1]Heavily Modified Water body (HMWB) are bodies of water which as a result of physical alterations by human activity are substantially changed in character and cannot, therefore, meet "good ecological status" (GES). In this context physical alterations mean changes to e.g. the size, slope, discharge, form and shape of river bed of a water body

[2] Artificial Water body (AWB) are surface water bodies which have been created in a location where no water body existed before and which have not been created by the direct physical alteration, movement or realignment of an existing water body

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Fail Chemical Status				
Black Ditch (West Sussex) GB107041012890 **Arun and Western Streams**	River	8.7	46.5	Poor Status (2016): Poor Ecological Potential, Good Chemical Status Poor Status (2019): Poor Ecological Potential, Fail Chemical Status	-	Macrophytes and Phytobenthos Combined - Moderate Fish - Poor	Natural conditions - sediment and morphology Land drainage – operational management	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
Burpham Tributary (River Arun) GB107041011990 **Arun and Western Streams**	River	1.5	10.5	Moderate status (2016): Moderate Ecological Status, Good Chemical Status Moderate status (2019): Moderate Ecological Status, Fail Chemical Status	-	Hydrological regime Dissolved oxygen - Poor	Unknown (pending Environment Agency investigation) Drought	Good by 2027
Littlehampton Anticline East GB40701G503400	Groundwater		38.9	Good status (2016): Good Quantitative	-	N/A	N/A	N/A already at Good status

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Status, Good Chemical Status Poor status (2019): Poor Quantitative Status, Good Chemical Status				
Littlehampton Anticline West GB40701G504900	Groundwater		41.2	Poor status (2016): Poor Quantitative Status, Good Chemical Status		Quantitative Dependent Surface Water Body Status	No data available	Good by 2021

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Good status (2019): Good Quantitative Status, Good Chemical Status				
Sussex Lambeth Group GB40701G505100	Groundwater		71.6	Poor status (2016): Poor Quantitative Status, Good Chemical Status Good status (2019): Good Quantitative		Quantitative Dependent Surface Water Body Status	No data available	Good by 2021

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Status, Good Chemical Status				
Worthing Chalk GB40701G505300	Groundwater		135.5	Poor Status (2016): Poor Quantitative Status, Poor Chemical Status Poor Status (2019): Poor Quantitative Status, Poor Chemical Status		Quantitative Water Balance, Quantitative Dependent Surface Water Body Status Chemical Drinking Water Protected – fail, General Chemical Test – fail	Pollution from rural areas	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
Stor **Arun and Western Streams GB107041012100**	River	4.9	20.1	Moderate status (2016): Moderate Ecological Status, Good Chemical Status Moderate status (2019): Moderate Ecological Status, Fail Chemical Status		Phosphate	Water industry - sewage discharge (continuous) Agriculture and rural land management - poor nutrient management	Good by 2027
Honeybridge Stream GB107041012120 **Adur and Ouse**	River	7.2	22.8	Poor status (2016): Poor Ecological Status,	-	Macrophytes and Phytobenthos	Pollution from rural areas	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Good Chemical Status Poor status (2019): Poor Ecological Status, Fail Chemical Status		Combined – Moderate Fish – Poor Phosphate - Moderate	Pollution from waste water Physical modifications	
Adur Lockbridge GB107041012200 **Adur and Ouse**	River	6.0	15.1	Poor status (2016): Poor Ecological Status, Good Chemical Status Poor status (2019): Poor	-	Macrophytes and Phytobenthos Combined - Moderate Fish - Poor	Pollution from rural areas Pollution from waste water Physical modifications	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Ecological Status, Fail Chemical Status				
Adur East (Sakeham) GB107041012900 **Adur and Ouse**	River	6.6	18.6	Poor status (2016): Poor Ecological Status, Good Chemical Status Poor status (2019): Poor Ecological Status, Fail Chemical Status	-	Macrophytes and Phytobenthos Combined – Moderate Phosphate - Moderate	Pollution from waste water Physical modifications	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
Adur East, GB107041012180 **Adur and Ouse**	River	2.7	3.2	Poor status (2016): Poor Ecological Status, Good Chemical Status Poor status (2019): Poor Ecological Status, Fail Chemical Status		Macrophytes and Phytobenthos Combined – Moderate Dissolved Oxygen – Moderate Phosphate - Bad	Pollution from waste water	Good by 2027
Cowfold Stream GB107041012260 **Adur and Ouse**	River	9.4	30.8	Poor Status (2016): Poor Ecological Status, Good	-	Ecological: Macrophytes and Phytobenthos Combined - Poor	Pollution from rural areas Pollution from waste water	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Chemical Status Poor Status (2019): Poor Ecological Status, Fail Chemical Status		Phosphate - Moderate		
Bolney Sewer GB107041012250 **Adur and Ouse**	River	2.49	14.5	Moderate Status (2016): Moderate Ecological Status, Good Chemical Status Moderate Status (2019):	-	Macrophytes and Phytobenthos Combined – Moderate	Pollution from waste water	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Moderate Ecological Status, Fail Chemical Status				
Lower Greensand GB40701G502400 **Adur and Ouse**	Groundwater		51.2	Good Status (2016): Good Quantitative Status, Good Chemical Status Good Status (2019): Good Quantitative Status, Good		n/a	n/a	n/a already at Good status

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Chemical Status				
Adur & Ouse Hastings Beds GB40702G502000	Groundwater		351.1	Good Status (2016): Good Quantitative Status, Good Chemical Status Good Status (2019): Good Quantitative Status, Good Chemical Status		n/a	n/a	n/a already at Good status

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
Arun Lower GB540704105000 **South East Transitional (TraC)**	Transitional (HMWB – Flood Protection)		1.4	Moderate Status (2016): Moderate Ecological Potential, Good Chemical Status Moderate Status (2019): Moderate Ecological Potential, Fail Chemical Status	HMWB	Mitigation measures assessment - Moderate or less	Physical modifications	Good by 2027
Adur GB540704116000 **South East TraC**	Transitional		1.4	Moderate Status (2016): Moderate	HMWB	Mitigation measures assessment	Physical modifications	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
	(HMWB – Flood Protection)			Ecological Potential, Fail Chemical Status Moderate Status (2019): Moderate Ecological Potential, Fail Chemical Status		– Moderate or less Angiosperms – Moderate Fish – Moderate Tributyltin compounds - Fail		
Sussex GB640704540003 **South East TraC**	Coastal (HMWB – Coastal Protection)		190.6	Moderate Status (2016): Moderate Ecological Potential, Good	HMWB	Mitigation measures assessment – Moderate or less	Physical modifications	Good by 2027

Water body ID / management catchment	Water body type	Approximate length of principal water course (km)	Approximate catchment area (km^2)	Status	*HMWB[1] / AWB[2]	Supporting elements, less than Good Status / Potential	Issues preventing the attainment of Good Status	Objective
				Chemical Status Moderate Status (2019): Moderate Ecological Potential, Fail Chemical Status				

Table A-2 Status of scoped in WFD waterbodies for consideration of offshore activities

Waterbody	Sussex	Arun
ID	GB640704540003	GB540704105000
Waterbody type (estuarine or coastal)	Coastal	Estuarine
River basin district name	South East	South East
Waterbody total area (ha)	19059.70	137.85
Overall current status	Moderate	Moderate
Current status (ecological)	Moderate	Moderate
Current status (chemical)	Good	Good
Target water body status and deadline	Good, 2027	Good, 2027
Hydromorphology status of water body	Not assessed	Supports Good
Is the waterbody heavily modified (HMWB)?	Yes	Yes
Reason for HMWB	Coastal protection	Flood protection
WFD phytoplankton classifications	Good	-
History or harmful algae	Not monitored	Not monitored

Waterbody	Sussex	Arun
Distance from proposed development (km)	0	0km (from onshore cable route) and approximately 325km (from offshore cable route)

Source: Environment Agency (2017), *Clearing the Waters For All - water body summary table,* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/658333/wfd_water_body_summary_table.XLSX (Accessed 25 May 2021).

Table A-3 Status of scoped in Bathing Waters

Bathing water name	Littlehampton	Middleton-on-sea
ID	15500	15600
Type	Bathing Water	Bathing Water
Distance from Rampion 2 (m)[3]	555	1,088
Classification (2019)	Good	Excellent
Classification (2018)	Good	Excellent
Classification (2017)	Good	Excellent
Classification (2016)	Good	Excellent

[3] As calculated using MAGIC maps

Table A-4 Natura 2000 sites within 2km of the offshore cable corridor

Designated Site	Relevant Features with potential for Likely Significant Effect	Potential for Likely Significant Effect		
		Construction	Operation and maintenance	Decommissioning
Solent and Dorset Coast Special Protection Area	Common tern	Direct disturbance and displacement In-combination effects	N/A	Direct disturbance and displacement In-combination effects
	Sandwich tern	Direct disturbance and displacement In-combination effects	Direct disturbance and displacement In-combination effects	Direct disturbance and displacement In-combination effects
	Little tern	Direct disturbance and displacement In-combination effects	N/A	Direct disturbance and displacement In-combination effects

Table A-5 Higher sensitivity habitats assessment within the Sussex waterbody

Characterisation	Habitat	Area in Waterbody (ha)	Within 500 m?
Higher Sensitivity	Chalk reef	11,637	Yes - see Figure 1
Higher Sensitivity	Mussel beds	450.63	Yes - see Figure 1
Higher Sensitivity	Subtidal kelp beds	1.12	Yes - see Figure 1

Table A-6 Lower sensitivity habitats assessment within the Sussex waterbody

Characterisation	Habitat	Area in Waterbody (ha)	Area potentially affected (%)
Lower Sensitivity	Cobbles, gravel and shingle	1207.59	1.10%
Lower Sensitivity	Intertidal soft sediments	745.94	1.79%
Lower Sensitivity	Rocky Shore	924.69	1.44%
Lower Sensitivity	Subtidal rocky reef	10,896.08	0.12%
Lower Sensitivity	Subtidal soft sediments	4502.06	0.30%

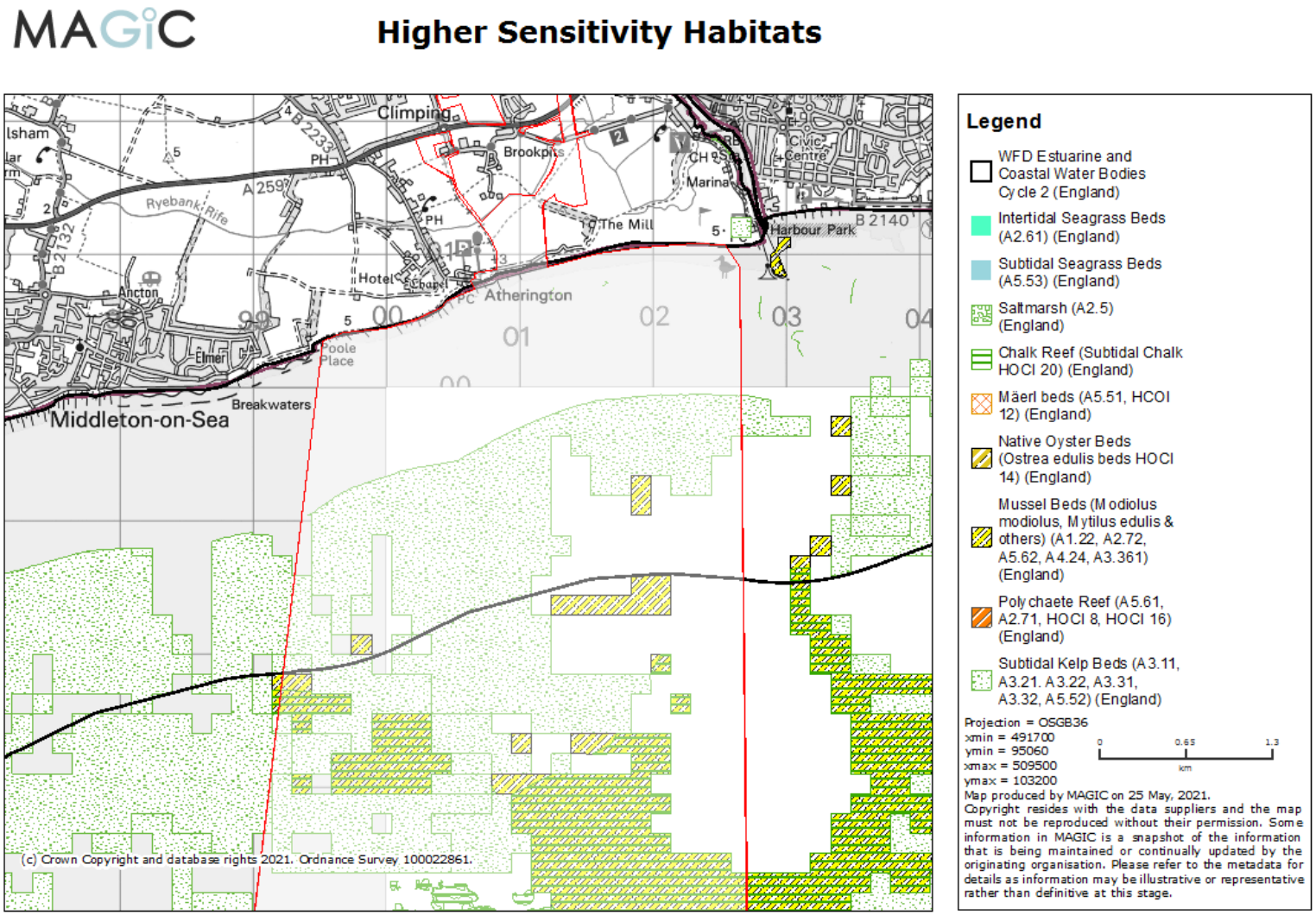
Table A-7 Higher and lower sensitivity habitats assessment within the Arun waterbody

Habitat	Within 500m of the RLB?	Area in Waterbody (ha)	Within 500 m?
Saltmarsh	Yes	10.33	Yes
Subtidal kelp beds	Yes	1.44	Yes

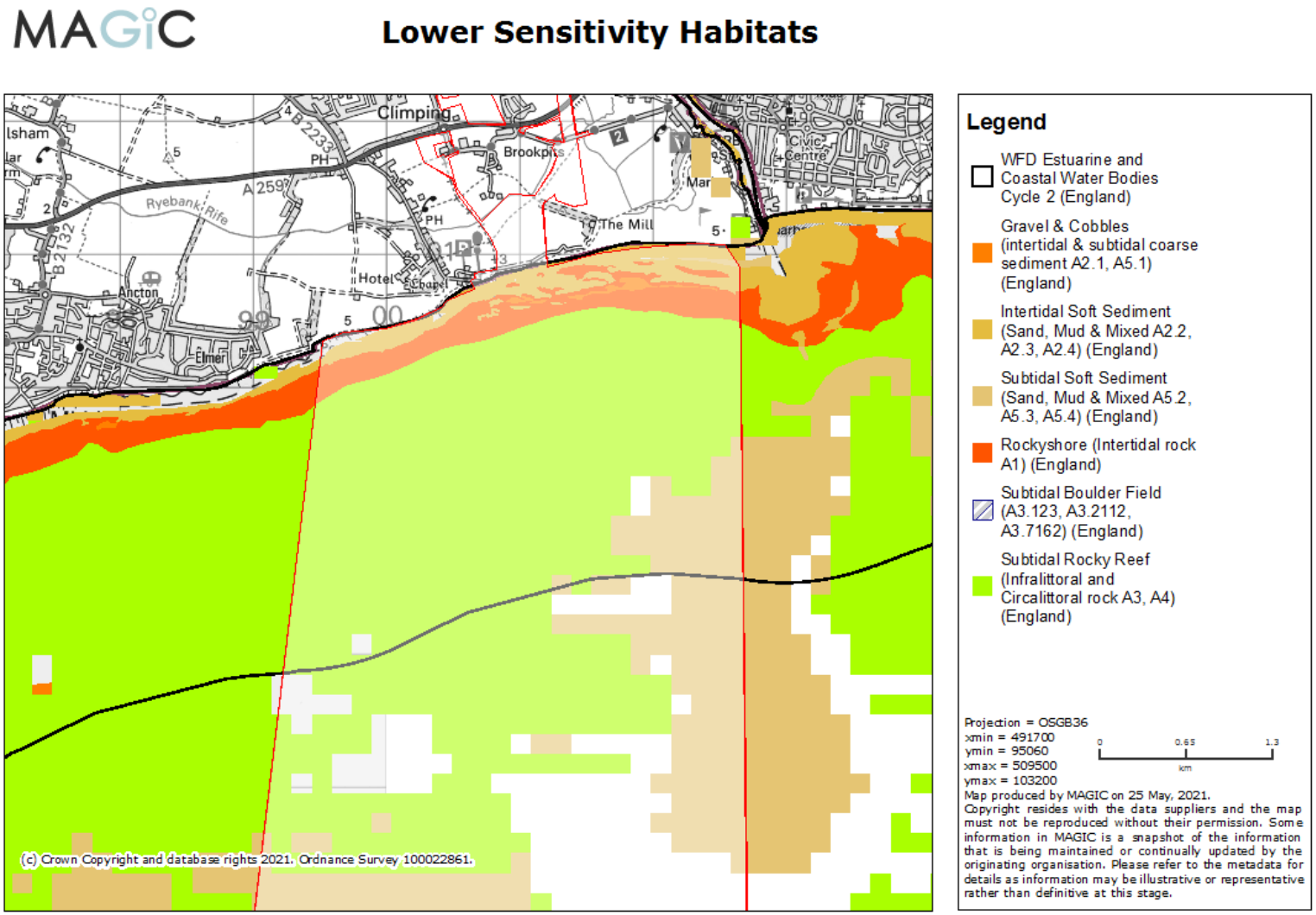
Table A-8 Lower sensitivity habitats assessment within the Arun waterbody

Habitat	Within 500m of the RLB?	Area in Waterbody (ha)	Footprint of activity relative to the area of habitat present in the Arun waterbody (%)
Intertidal soft sediment	Yes	8.06	165%
Subtidal soft sediments	Yes	6.7	199%
Subtidal rocky reef	Yes	1.44	926%

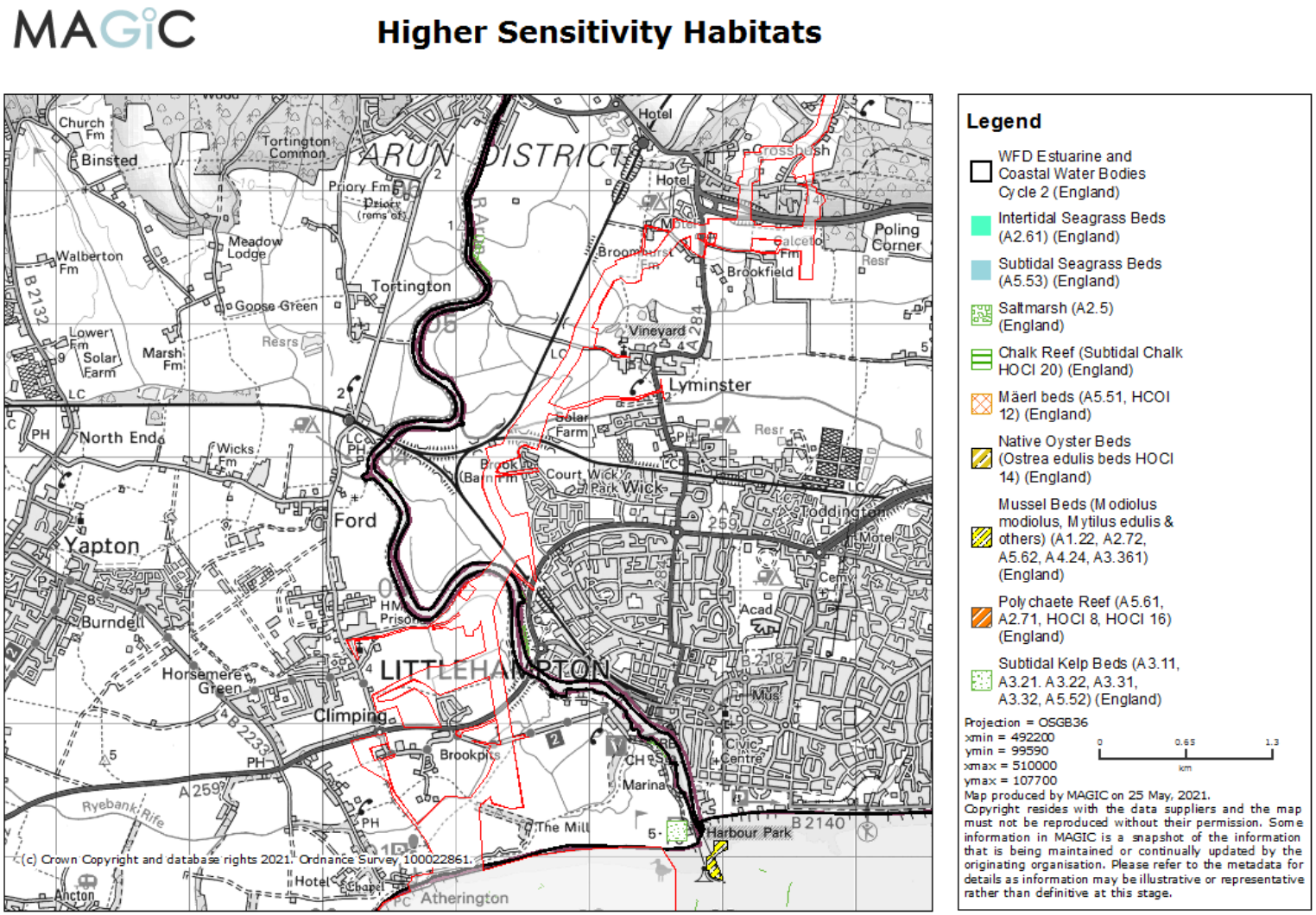
Graphic A-1 Higher Sensitivity Habitats within the Sussex Waterbody relative to the PEIR Assessment Boundary



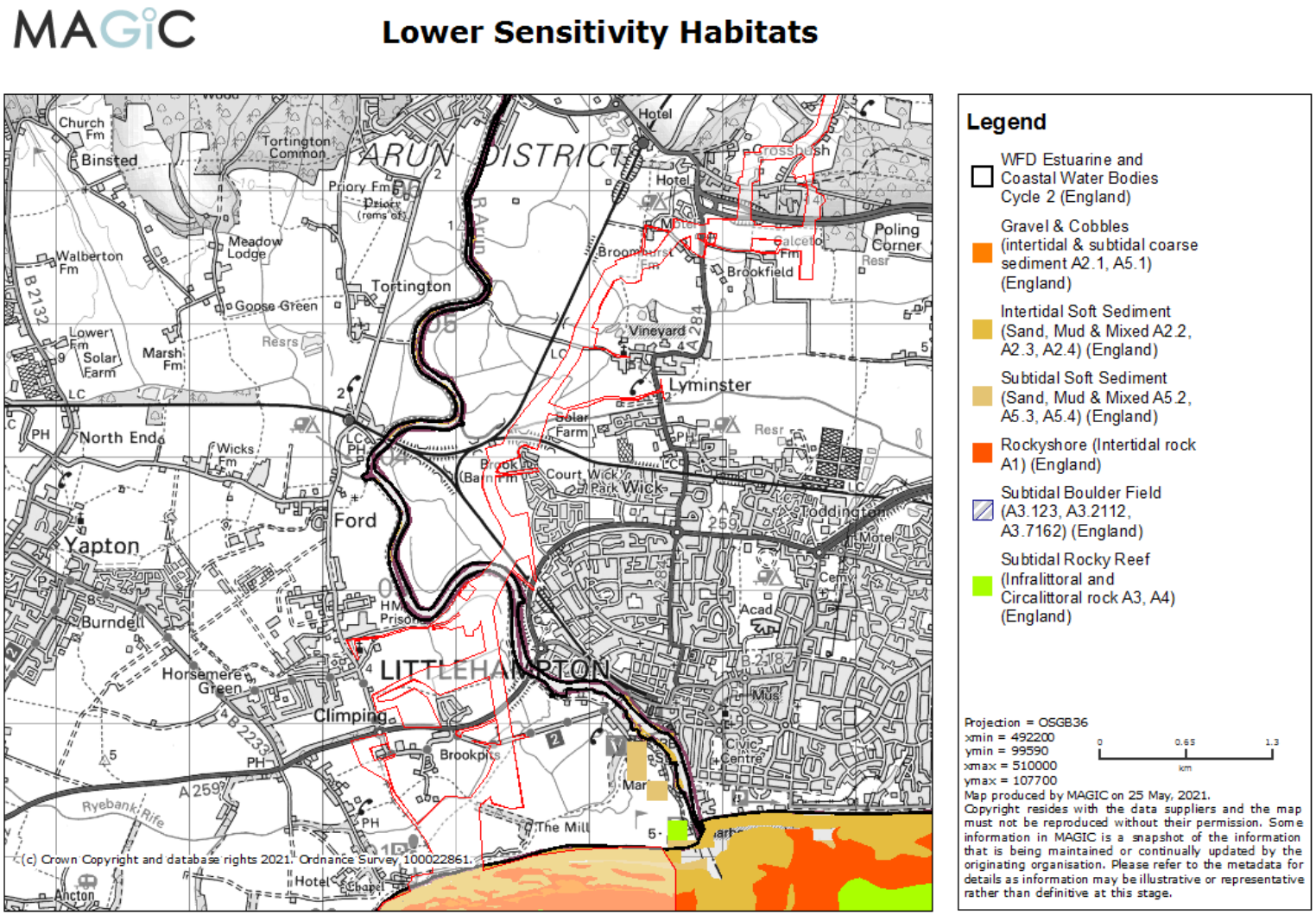
Graphic A-2 Lower Sensitivity Habitats within the Sussex Waterbody relative to the PEIR Assessment Boundary



Graphic A-3 Higher Sensitivity Habitats within the Arun Waterbody relative to the PEIR Assessment Boundary



Graphic A-4 Lower Sensitivity Habitats within the Arun Waterbody relative to the PEIR Assessment Boundary



Annex B
Screening and Scoping Assessment

Screening / Scoping Process - Traffic Light System Key

Activity Screening/ Scoping

Key Colour	Level of Potential Risk
GREEN	Project activities / infrastructure types that are considered unlikely to cause any risk to the delivery of WFD objectives are given a green traffic light (screened/ scoped out).
AMBER	Project activities / infrastructure types that carry a possible risk to the delivery of WFD objectives are given an amber traffic light (screened/ scoped in on precaution for further assessment in Section 5 of Appendix 27-3).
RED	Project activities / infrastructure types that are considered likely to carry a risk to the delivery of WFD objectives are given a red traffic light (screened/ scoped in for further assessment in Section 5 of Appendix 27-3)

Waterbody Screening

In or N/A - Out	The waterbodies are also screened in/ out depending on whether there is a potential connection between proposed activities and the WFD water body receptors. * N/A - Out is stated where the activity isn't proposed in that catchment or where its in the catchment but not subject to the screening criteria. This will be subject to review at ES design freeze

Risk scoping for WFD objectives	Proposed Development Elements	Landfall works		
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel
	Development Element	Construction of trenchless crossing (likely HDD), Transition Joint Bay (TJB) and temporary landfall compound	Construction of trenchless crossing (likely HDD) infrastructure, Transition Joint Bay (TJB) and temporary landfall compound	Permanent Transition Joint Bay
	Pathway to river water body?	Direct - overland flow and in flood	Indirect (overland flow/ infiltration)	Direct - overland flow and in flood
	WFD Element *(Receptor)* / Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during construction of the landfall and associated earthworks including soil stockpiling. Storage/use of fuels, chemicals or bentonite on site. Construction of the trenchless crossing method to install cables under Climping beach, the TJB and temporary landfall compound sited in a field behind the beach.		Isolated cable repairs and use of fuels and chemicals at TJBs. Routine maintenance of landfall will be limited (every few years) via inspection point/ manhole
Biology	Macrophytes and phytobenthos	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal
Biology	Benthic invertebrates	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal
Biology	Fish	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal

delivery of target status

ers: Ecological

Risk scoping for WFD objectives	Proposed Development Elements	Landfall works		
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel
	Development Element	Construction of trenchless crossing (likely HDD), Transition Joint Bay (TJB) and temporary landfall compound	Construction of trenchless crossing (likely HDD) infrastructure, Transition Joint Bay (TJB) and temporary landfall compound	Permanent Transition Joint Bay
	Pathway to river water body?	Direct - overland flow and in flood	Indirect (overland flow/ infiltration)	Direct - overland flow and in flood
WFD elements for Rivers		Predicted change to status of element/receptor and predicted impact on (green = unlikely, amber = possibly, red = likely)		
Hydromorphology	Hydrological regime *Quantity and dynamics of flow* *Connection to groundwater bodies*	SCREENED/SCOPED IN: Possible impacts (e.g. disruption of flow pathways) due to the size and depth of the trenches. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal
Hydromorphology	River continuity	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
Hydromorphology	Morphological conditions *River depth and width variation* *Structure and substrate of the river bed* *Structure of the riparian zone*	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
Physio-chemical	General physio-chemical & Specific Pollutants	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal
WFD elements for Rivers: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal

Risk scoping for WFD objectives	Proposed Development Elements	Landfall works		
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel
	Development Element	Construction of trenchless crossing (likely HDD), Transition Joint Bay (TJB) and temporary landfall compound	Construction of trenchless crossing (likely HDD) infrastructure, Transition Joint Bay (TJB) and temporary landfall compound	Permanent Transition Joint Bay
	Pathway to river water body?	Direct - overland flow and in flood	Indirect (overland flow/ infiltration)	Direct - overland flow and in flood
Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*	Ryebank Rife	In	N/A - Out	N/A - Out
	Black Ditch (W Sussex)	N/A - Out	N/A - Out	N/A - Out
	Burpham Tributary (R Arun)	N/A - Out	N/A - Out	N/A - Out
	River Stor	N/A - Out	N/A - Out	N/A - Out
	Honeybridge Stream	N/A - Out	N/A - Out	N/A - Out
	Adur (Lockbridge)	N/A - Out	N/A - Out	N/A - Out
	Adur East (Sakeham)	N/A - Out	N/A - Out	N/A - Out
	Cowfold Stream	N/A - Out	N/A - Out	N/A - Out
	Bolney Sewer	N/A - Out	N/A - Out	N/A - Out
	Adur (East)	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Proposed Development Elements	Onshore cable circuits			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody Catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody Catchment
	Development Element	Onshore cable circuit trenching and joint bay construction	Cable route circuit trenching and joint bays construction	Cable Route and JBs along route	Cable Route and JBs along route
	Pathway to river water body?	Indirect - overland flow and in flood	Indirect (overland flow/ infiltration)		
WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during construction of the landfall and associated earthworks including soil stockpiling. Storage/use of fuels, chemicals or bentonite on site. Assumed 1.2m deep target depth of trench, approx. 2 - 4m wide at surface and 0.9m wide at base. Includes joint bays typically every 750 - 950m. JB will be 4m wide by 14m in length. Watercourse crossings considered separately - see adjacent		Isolated cable repairs and use of fuels and chemicals at TJBs and along the route. Maintenance/ testing of onshore cable very minimal, (every 2 - 5 years) to reach relevant section of the route with testing via manholes/ inspection chambers. Assumed maintenance only short term and yielding minimal disturbance	
Biology	Macrophytes and phytobenthos	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions.	SCREENED/SCOPED OUT: Ground disturbance from excavations have no direct pathway for construction effects to reach watercourse	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
Biology	Benthic invertebrates	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions.	SCREENED/SCOPED OUT: Ground disturbance from excavations have no direct pathway for construction effects to reach watercourse	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
Biology	Fish	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions.	SCREENED/SCOPED OUT: Ground disturbance from excavations have no direct pathway for construction effects to reach watercourse	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.

ers: Ecological

delivery of target status

Risk scoping for WFD objectives	Proposed Development Elements	Onshore cable circuits			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody Catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody Catchment
	Development Element	Onshore cable circuit trenching and joint bay construction	Cable route circuit trenching and joint bays construction	Cable Route and JBs along route	Cable Route and JBs along route
	Pathway to river water body?	Indirect - overland flow and in flood	Indirect (overland flow/ infiltration)		
WFD elements for Rivers: Hydromorphology — Hydrological regime *Quantity and dynamics of flow* *Connection to groundwater bodies*	Predicted change to status of element/receptor and predicted impact on (green = unlikely, amber = possibly, red = likely)	SCREENED/SCOPED IN: Possible impacts (e.g. disruption of flow pathways) due to the size and depth of the trenches. Further assessment required	SCREENED/SCOPED OUT: . Possible source (e.g. disruption of flow pathways) due to the size and depth of the trenches. However no direct pathway to watercourses	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
WFD elements for Rivers: Hydromorphology — River continuity		SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
WFD elements for Rivers: Hydromorphology — Morphological conditions *River depth and width variation* *Structure and substrate of the river bed* *Structure of the riparian zone*		SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
WFD elements for Rivers: Physio-chemical — General physio-chemical & Specific Pollutants		SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED OUT: Ground disturbance from excavations have no direct pathway for construction effects to reach watercourse	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
WFD elements for Rivers: Chemical — Priority hazardous substances & Priority Substances		SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED OUT: Ground disturbance from excavations have no direct pathway for construction effects to reach watercourse	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.

Risk scoping for WFD objectives	Proposed Development Elements	Onshore cable circuits			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody Catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody Catchment
	Development Element	Onshore cable circuit trenching and joint bay construction	Cable route circuit trenching and joint bays construction	Cable Route and JBs along route	Cable Route and JBs along route
	Pathway to river water body?	Indirect - overland flow and in flood	Indirect (overland flow/ infiltration)		
Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*	Ryebank Rife	In	N/A - Out	N/A - Out	N/A - Out
	Black Ditch (W Sussex)	In	N/A - Out	N/A - Out	N/A - Out
	Burpham Tributary (R Arun)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	River Stor	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Honeybridge Stream	In	N/A - Out	N/A - Out	N/A - Out
	Adur (Lockbridge)	In	N/A - Out	N/A - Out	N/A - Out
	Adur East (Sakeham)	In	N/A - Out	N/A - Out	N/A - Out
	Cowfold Stream	In	N/A - Out	N/A - Out	N/A - Out
	Bolney Sewer	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Adur (East)	In	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Proposed Development Elements	Onshore cable corridor watercourse crossings			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/ drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels
	Development Element	Onshore cable corridor watercourse crossings via trenchless methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at other watercourses	Onshore cable corridor crossings via trenchless methods (e.g. HDD), at Main Rivers and other	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at other watercourses
	Pathway to river water body?	Direct	Direct		
WFD Element *(Receptor)*	Source of impacts	Crossing works near watercourses and ground disturbance/ mobilisation of sediments/ contaminants at the excavations for trenchless crossing pits. Likely to be HDD bore under one location to another under crossing. Where practicable trenching pits will be sited outside floodplains. Appropriate management and treatment of dewatering arising prior to discharge.	Crossing works in watercourses and ground disturbance/ mobilisation of sediments/ contaminants from trenched excavations (open cut methods). Fluming using a pipe, or over pumping. Installation of duct in trench with an approx. depth of 1.45m - 2m beneath watercourse. Installation over several days before reinstatement to original condition,	Isolated cable repairs and use of fuels and chemicals. As per the onshore cable circuits, maintenance is assumed to be isolated and short term in nature yielding minimal disturbance	
Biology	Macrophytes and phytobenthos	SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Will have direct temporary impacts on the watercourse and pollution/sediment impacts. Further assessment required	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
	Benthic invertebrates	SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Will have direct temporary impacts on the watercourse and pollution/sediment impacts. Further assessment required	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
	Fish	SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Will have direct temporary impacts on the watercourse and pollution/sediment impacts. Further assessment required	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
ers: Ecological	delivery of target status				

Risk scoping for WFD objectives	Proposed Development Elements	Onshore cable corridor watercourse crossings			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/ drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels
	Development Element	Onshore cable corridor watercourse crossings via trenchless methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at other watercourses	Onshore cable corridor crossings via trenchless methods (e.g. HDD), at Main Rivers and other	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at other watercourses
	Pathway to river water body?	Direct	Direct		
WFD elements for Rivers: Hydromorphology — Hydrological regime *Quantity and dynamics of flow* *Connection to groundwater bodies*	Predicted change to status of element/receptor and predicted impact on (green = unlikely, amber = possibly, red = likely)	SCREENED/SCOPED IN: Possible impacts (e.g. disruption of flow pathways). Possible discharge of dewatered groundwater to the adjacent watercourse network. further assessment required	SCREENED/SCOPED IN: Will have direct temporary impacts on the watercourse and pollution/sediment impacts. Further assessment required	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
River continuity		SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED IN: Will have direct temporary impacts on the watercourse and pollution/sediment impacts. Further assessment required	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
Morphological conditions *River depth and width variation* *Structure and substrate of the river bed* *Structure of the riparian zone*		SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED IN: Will have direct temporary impacts on the watercourse and pollution/sediment impacts. Further assessment required	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
WFD elements for Rivers: Physio-chemical — General physio-chemical & Specific Pollutants		SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED IN: Will have direct temporary impacts on the watercourse and pollution/sediment impacts. Further assessment required	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.
WFD elements for Rivers: Chemical — Priority hazardous substances & Priority Substances		SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED IN: Will have direct temporary impacts on the watercourse and pollution/sediment impacts. Further assessment required	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse.

Risk scoping for WFD objectives	Proposed Development Elements	Onshore cable corridor watercourse crossings			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/ drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels
	Development Element	Onshore cable corridor watercourse crossings via trenchless methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at other watercourses	Onshore cable corridor crossings via trenchless methods (e.g. HDD), at Main Rivers and other	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at other watercourses
	Pathway to river water body?	Direct	Direct		
Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*	Ryebank Rife	In	In	N/A - Out	N/A - Out
	Black Ditch (W Sussex)	In	In	N/A - Out	N/A - Out
	Burpham Tributary (R Arun)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	River Stor	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Honeybridge Stream	In	In	N/A - Out	N/A - Out
	Adur (Lockbridge)	In	N/A - Out	N/A - Out	N/A - Out
	Adur East (Sakeham)	N/A - Out	In	N/A - Out	N/A - Out
	Cowfold Stream	In	In	N/A - Out	N/A - Out
	Bolney Sewer	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Adur (East)	N/A - Out	In	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Proposed Development Elements	Temporary construction haul road			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or within <25m of any watercourse/ drainage channel	Wider WFD Catchment	Within Flood Zone 3 or within <25m of any watercourse/ drainage channel	Wider WFD Catchment
	Development Element	New temporary construction haul road and associated access points	New temporary construction haul road and associated access points	Not Applicable - temporary construction haul road to be removed at end of construction	Not Applicable - temporary construction haul road to be removed at end of construction
	Pathway to river water body?	Direct - overland flow and infiltration	In direct - overland flow/infiltration		
WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants from the development of the temporary construction haul road, including earthworks and soil stockpiling. Temporary roadway width 5m up to 10m (in passing places). Depth typically 0.33m. Likely to be a mix of stone aggregate tracks, and those that do not have any hard materials (e.g. trackway panelling, or bogmatting) depending on ground conditions. In fluvial floodplain where practicable trackway will be used as the preferred option. Worst case of all stone is assumed. Watercourse crossings assumed separately - see adjacent		N/A The temporary haul road will not exist during operation	N/A The temporary haul road will not exist during operation
Biology	Macrophytes and phytobenthos	SCREENED/SCOPED IN: Potential for pollutants and sediments from track construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
Biology	Benthic invertebrates	SCREENED/SCOPED IN: Potential for pollutants and sediments from track construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
Biology	Fish	SCREENED/SCOPED IN: Potential for pollutants and sediments from track construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.

ers: Ecological

delivery of target status

Risk scoping for WFD objectives	Proposed Development Elements	Temporary construction haul road			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or within <25m of any watercourse/ drainage channel	Wider WFD Catchment	Within Flood Zone 3 or within <25m of any watercourse/ drainage channel	Wider WFD Catchment
	Development Element	New temporary construction haul road and associated access points	New temporary construction haul road and associated access points	Not Applicable - temporary construction haul road to be removed at end of construction	Not Applicable - temporary construction haul road to be removed at end of construction
	Pathway to river water body?	Direct - overland flow and infiltration	In direct - overland flow/infiltration		
WFD elements for Rivers: Hydromorphology	Hydrological regime *Quantity and dynamics of flow* *Connection to groundwater bodies*	SCREENED/SCOPED IN: Potential for pollutants and sediments from track construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
	River continuity	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
	Morphological conditions *River depth and width variation* *Structure and substrate of the river bed* *Structure of the riparian zone*	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
WFD elements for Rivers: Physio-chemical	General physio-chemical & Specific Pollutants	SCREENED/SCOPED IN: Potential for pollutants and sediments from track construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
WFD elements for Rivers: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED IN: Potential for pollutants and sediments from track construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.

Predicted change to status of element/receptor and predicted impact on (green = unlikely, amber = possibly, red = likely)

Risk scoping for WFD objectives	Proposed Development Elements	Temporary construction haul road			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or within <25m of any watercourse/ drainage channel	Wider WFD Catchment	Within Flood Zone 3 or within <25m of any watercourse/ drainage channel	Wider WFD Catchment
	Development Element	New temporary construction haul road and associated access points	New temporary construction haul road and associated access points	Not Applicable - temporary construction haul road to be removed at end of construction	Not Applicable - temporary construction haul road to be removed at end of construction
	Pathway to river water body?	Direct - overland flow and infiltration	In direct - overland flow/infiltration		
Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*	Ryebank Rife	In	N/A - Out	N/A - Out	N/A - Out
	Black Ditch (W Sussex)	In	N/A - Out	N/A - Out	N/A - Out
	Burpham Tributary (R Arun)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	River Stor	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Honeybridge Stream	In	N/A - Out	N/A - Out	N/A - Out
	Adur (Lockbridge)	In	N/A - Out	N/A - Out	N/A - Out
	Adur East (Sakeham)	In	N/A - Out	N/A - Out	N/A - Out
	Cowfold Stream	In	N/A - Out	N/A - Out	N/A - Out
	Bolney Sewer	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Adur (East)	In	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Proposed Development Elements	Tempoary construction haul road watercourse crossings			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels
	Development Element	Temporary construction haul road watercourse crossings - clear span bridges	Temporary construction haul road watercourse crossings - culverts	Not Applicable - temporary construction haul road crossing to be removed at end of construction	Not Applicable - temporary construction haul road crossing to be removed at end of construction
	Pathway to river water body?	Direct	Direct		
WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during the construction of temporary construction haul road watercourse crossings. Clear span bridges will be utlised for larger more sensitive crossings. They will be removed following the completion of construction (potentially in place up to 3.5 years)	Ground disturbance and mobilisation of sediments/ contaminants during the construction of temporary construction haul road watercourse crossings. Culverts to be used on smaller tributaries and drainage channels which have less flow/ less sensitive in nature. They will be removed following the completion of construction (potentially in place for up to 3.5 years)	N/A The temporary haul road crossing will not exist during operation	N/A The temporary haul road crossing will not exist during operation
Biology	Macrophytes and phytobenthos	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Assumed culverts. Will have direct impacts on the watercourse and pollution/sediment impacts. Direct impact on watercourse. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.
Biology	Benthic invertebrates	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Assumed culverts. Will have direct impacts on the watercourse and pollution/sediment impacts. Direct impact on watercourse. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.
Biology	Fish	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Assumed culverts. Will have direct impacts on the watercourse and pollution/sediment impacts. Direct impact on watercourse. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.

ers: Ecological

delivery of target status

Risk scoping for WFD objectives	Proposed Development Elements	Tempoary construction haul road watercourse crossings			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels
	Development Element	Temporary construction haul road watercourse crossings - clear span bridges	Temporary construction haul road watercourse crossings - culverts	Not Applicable - temporary construction haul road crossing to be removed at end of construction	Not Applicable - temporary construction haul road crossing to be removed at end of construction
	Pathway to river water body?	Direct	Direct		
WFD elements for Rivers: Hydromorphology	Hydrological regime *Quantity and dynamics of flow* *Connection to groundwater bodies*	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Assumed culverts. Will have direct impacts on the watercourse and pollution/sediment impacts. Direct impact on watercourse. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.
	River continuity	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED IN: Assumed culverts. Will have direct impacts on the watercourse and pollution/sediment impacts. Direct impact on watercourse. Further	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
	Morphological conditions *River depth and width variation* *Structure and substrate of the river bed* *Structure of the riparian zone*	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED IN: Assumed culverts. Will have direct impacts on the watercourse and pollution/sediment impacts. Direct impact on watercourse. Further assessment required	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
WFD elements for Rivers: Physio-chemical	General physio-chemical & Specific Pollutants	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Assumed culverts. Will have direct impacts on the watercourse and pollution/sediment impacts. Direct impact on watercourse. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.
WFD elements for Rivers: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach watercourse, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Assumed culverts. Will have direct impacts on the watercourse and pollution/sediment impacts. Direct impact on watercourse. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossing will be removed after construction complete.

Predicted change to status of element/receptor and predicted impact on (green = unlikely, amber = possibly, red = likely)

Risk scoping for WFD objectives	Proposed Development Elements	Tempoary construction haul road watercourse crossings			
	Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels	Crossings, both WFD blue line and tributary watercourse/drainage channels
	Development Element	Temporary construction haul road watercourse crossings - clear span bridges	Temporary construction haul road watercourse crossings - culverts	Not Applicable - temporary construction haul road crossing to be removed at end of construction	Not Applicable - temporary construction haul road crossing to be removed at end of construction
	Pathway to river water body?	Direct	Direct		
Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*	Ryebank Rife	In	In	N/A - Out	N/A - Out
	Black Ditch (W Sussex)	In	In	N/A - Out	N/A - Out
	Burpham Tributary (R Arun)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	River Stor	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Honeybridge Stream	In	In	N/A - Out	N/A - Out
	Adur (Lockbridge)	N/A - Out	N/A Out	N/A - Out	N/A - Out
	Adur East (Sakeham)	In	In	N/A - Out	N/A - Out
	Cowfold Stream	In	In	N/A - Out	N/A - Out
	Bolney Sewer	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Adur (East)	N/A - Out	In	N/A - Out	N/A - Out

Risk scoping for WFD objectives		Proposed Development Elements	Temporary construction compounds (logistics & equipment along cable route)			
		Development Phase	Construction (and decommissioning)		Operation and Maintenance	
		WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment
		Development Element	Temporary construction compound and associated hardstanding	Temporary construction compound and associated hardstanding	Not Applicable - temporary construction compound to be removed at end of construction	Not Applicable - temporary construction compound to be removed at end of construction
		Pathway to river water body?	Direct (overland flow and in flood)	Indirect (infiltration)		
	WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during the construction of temporary construction compounds. Also storage of fuels, and chemicals at the temporary construction compound site. Typically compounds will be 50m by 75m in dimensions. Would take 3-4 months to establish and be in place for the duration of construction (up to 3.5 years)	N/A	N/A Infrastructure will not exist during operation	N/A Infrastructure will not exist during operation
Biology	Macrophytes and phytobenthos	delivery of target status	SCREENED/SCOPED IN: Potential for pollutants to reach watercourse in flood conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
Biology	Benthic invertebrates	delivery of target status	SCREENED/SCOPED IN: Potential for pollutants to reach watercourse in flood conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
Biology	Fish	delivery of target status	SCREENED/SCOPED IN: Potential for pollutants to reach watercourse in flood conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.

ers: Ecological

Risk scoping for WFD objectives	Proposed Development Elements	Temporary construction compounds (logistics & equipment along cable route)			
	Development Phase	Construction (and decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment
	Development Element	Temporary construction compound and associated hardstanding	Temporary construction compound and associated hardstanding	Not Applicable - temporary construction compound to be removed at end of construction	Not Applicable - temporary construction compound to be removed at end of construction
	Pathway to river water body?	Direct (overland flow and in flood)	Indirect (infiltration)		
WFD elements for Rivers: Hydromorphology	Hydrological regime *Quantity and dynamics of flow* *Connection to groundwater bodies*	SCREENED/SCOPED IN: Potential for pollutants to reach watercourse in flood conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
	River continuity	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
	Morphological conditions *River depth and width variation* *Structure and substrate of the river bed* *Structure of the riparian zone*	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
WFD elements for Rivers: Physio-chemical	General physio-chemical & Specific Pollutants	SCREENED/SCOPED IN: Potential for pollutants to reach watercourse in flood conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
WFD elements for Rivers: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED IN: Potential for pollutants to reach watercourse in flood conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.

Predicted change to status of element/receptor and predicted impact on (green = unlikely, amber = possibly, red = likely)

Risk scoping for WFD objectives	Proposed Development Elements	Temporary construction compounds (logistics & equipment along cable route)			
	Development Phase	Construction (and decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment
	Development Element	Temporary construction compound and associated hardstanding	Temporary construction compound and associated hardstanding	Not Applicable - temporary construction compound to be removed at end of construction	Not Applicable - temporary construction compound to be removed at end of construction
	Pathway to river water body?	Direct (overland flow and in flood)	Indirect (infiltration)		
Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*	Ryebank Rife	In	N/A - Out	N/A - Out	N/A - Out
	Black Ditch (W Sussex)	In	N/A - Out	N/A - Out	N/A - Out
	Burpham Tributary (R Arun)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	River Stor	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Honeybridge Stream	In	N/A - Out	N/A - Out	N/A - Out
	Adur (Lockbridge)	In	N/A - Out	N/A - Out	N/A - Out
	Adur East (Sakeham)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Cowfold Stream	In	N/A - Out	N/A - Out	N/A - Out
	Bolney Sewer	N/A Out	N/A - Out	N/A - Out	N/A - Out
	Adur (East)	N/A Out	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Proposed Development Elements	New onshore substation (Bolney Kent Road or Wineham Lane North)			
	Development Phase	Construction (and decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment
	Development Element	Installation of a new onshore substation and all associated works including enabling works)		Maintenance of the new onshore substation	Maintenance of the new onshore substation
	Pathway to river water body?	Direct (overland flow)	Indirect (infiltration)	Direct (overland flow)	Indirect (infiltration)
WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during the construction of the new onshore substation. Also storage of fuels, and chemicals at the substation site. The footprint of the onshore substation will be approximately 5.9ha, A temporary works area will be 2.5ha in area. Works will include earthworks, vegetation clearance, access road construction, installation of drainage systems, installation of a temporary construction compound, delivery of materials, plant, machinery and fuel, and any earthworks necessary for the installation of the substation foundations, trenches ducts and pits. Other relevant works include installation of underground services and substation foundations, the control and switchgear buildings and plant buildings, construction of the oil containment bund;		Occasional use of fuels and chemicals. Maintenance of substation will be limited. Monitoring of the onshore substation will be done remotely using CCTV. Unscheduled maintenance would typically involve small number of vehicles to infrequently replace equipment, which is anticipated to be short term and yield minimal disturbance	
Biology	Macrophytes and phytobenthos	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	Maintenance will be on existing access tracks and limited to machinery operation. Potential for spillage of oils/fuels. Infrequent requirement for this during operation	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.
Biology	Benthic invertebrates	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	Maintenance will be on existing access tracks and limited to machinery operation. Potential for spillage of oils/fuels. Infrequent requirement for this during operation	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.
Biology	Fish	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	Maintenance will be on existing access tracks and limited to machinery operation. Potential for spillage of oils/fuels. Infrequent requirement for this during operation	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.

ers: Ecological

delivery of target status

Risk scoping for WFD objectives	Proposed Development Elements	New onshore substation (Bolney Kent Road or Wineham Lane North)			
	Development Phase	Construction (and decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment
	Development Element	Installation of a new onshore substation and all associated works including enabling works)		Maintenance of the new onshore substation	Maintenance of the new onshore substation
	Pathway to river water body?	Direct (overland flow)	Indirect (infiltration)	Direct (overland flow)	Indirect (infiltration)
WFD elements for Rivers: Hydromorphology	Hydrological regime *Quantity and dynamics of flow* *Connection to groundwater bodies*	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	Maintenance will be on existing access tracks and limited to machinery operation. Potential for spillage of oils/fuels. Infrequent requirement for this during operation	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.
	River continuity	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
	Morphological conditions *River depth and width variation* *Structure and substrate of the river bed* *Structure of the riparian zone*	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes	SCREENED/SCOPED OUT: No in channel changes
	Physio-chemical General physio-chemical & Specific Pollutants	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance will be on existing access tracks and limited to machinery operation. Potential for spillage of oils/fuels. Infrequent requirement for this during operation	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.
WFD elements for Rivers: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment required	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.	SCREENED/SCOPED OUT: Maintenance will be on existing access tracks and limited to machinery operation. Potential for spillage of oils/fuels. Infrequent requirement for this during operation	SCREENED/SCOPED OUT: No direct pathway for construction effects to reach watercourse.

Predicted change to status of element/receptor and predicted impact on (green = unlikely, amber = possibly, red = likely)

Risk scoping for WFD objectives	Proposed Development Elements	New onshore substation (Bolney Kent Road or Wineham Lane North)			
	Development Phase	Construction (and decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment	Within Flood Zone 3 or <25m of any watercourse/ drainage channel	Wider Waterbody catchment
	Development Element	Installation of a new onshore substation and all associated works including enabling works)		Maintenance of the new onshore substation	Maintenance of the new onshore substation
	Pathway to river water body?	Direct (overland flow)	Indirect (infiltration)	Direct (overland flow)	Indirect (infiltration)
Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*	Ryebank Rife	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Black Ditch (W Sussex)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Burpham Tributary (R Arun)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	River Stor	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Honeybridge Stream	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Adur (Lockbridge)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Adur East (Sakeham)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Cowfold Stream	In	N/A - Out	N/A - Out	N/A - Out
	Bolney Sewer	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Adur (East)	In	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives		Scheme Elements	Landfall works		
		Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance
		WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment
		Scheme Element	Construction of trenchless crossing (likely HDD), Transition Joint Bay (TJB) and temporary landfall compound	Trenchless crossing (likely HDD) infrastructure	Transition Joint Bay
		Pathway to TraC /Coastal water body?	Direct - overland flow and in flood	Indirect (overland flow/ infiltration)	
	WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during construction of the landfall and associated earthworks including soil stockpiling.		Isolated cable repairs and use of fuels and chemicals at TJBs. Routine maintenance of landfall will be limited (every few years) via inspection point/ manhole
WFD elements for Transitional: Ecological	Invertebrates	delivery of target status	SCREENED/SCOPED IN: Potential for pollutants and sediments from landfall construction to reach TraC waterbody, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse or TraC waterbody.
Biology	Macroalgae		SCREENED/SCOPED IN: Potential for pollutants and sediments from landfall construction to reach TraC waterbody, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse or TraC waterbody.
	Phytoplankton		SCREENED/SCOPED IN: Potential for pollutants and sediments from landfall construction to reach TraC waterbody, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse or TraC waterbody.

Risk scoping for WFD objectives			Scheme Elements	Landfall works		
			Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance
			WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment
			Scheme Element	Construction of trenchless crossing (likely HDD), Transition Joint Bay (TJB) and temporary landfall compound	Trenchless crossing (likely HDD) infrastructure	Transition Joint Bay
			Pathway to TraC /Coastal water body?	Direct - overland flow and in flood	Indirect (overland flow/ infiltration)	
Physio-chemical	H Morph	Morphological conditions	Predicted change to status of element/receptor and predicted impact on d (green = unlikely, amber = possibly, red = likely)	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes
Physio-chemical		Dissolved Inorganic Nitrogen		SCREENED/SCOPED IN: Potential for pollutants and sediments from landfall construction to reach TraC waterbody, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse or TraC waterbody.
Physio-chemical		Dissolved oxygen		SCREENED/SCOPED IN: Potential for pollutants and sediments from landfall construction to reach TraC waterbody, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse or TraC waterbody.
Physio-chemical	Specific pollutants					
WFD elements for Transitional: Chemical		Priority hazardous substances & Priority Substances		SCREENED/SCOPED IN: Potential for pollutants and sediments from landfall construction to reach TraC waterbody, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourse or TraC waterbody.
WFD elements for Transitional: Chemical		Other Pollutants				
		Waterbody Screening (Stated In where a SCREENED/ SCOPED IN activity is within water body screening	Sussex Coastal	In	N/A - Out	N/A - Out
			Arun TrAC (including IDB unnamed IDB ditches in catchment)	In	N/A - Out	N/A - Out
			Adur TrAC (including unnamed channels in TrAC catchment)	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Scheme Elements	Onshore cable circuits			
	Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody Catchment
	Scheme Element	Onshore cable circuit trenching and joint bay construction	Onshore cable circuit trenching and joint bay (JBs) construction	Onshore cable circuit and joint bays	Onshore cable circuit and joint bays
	Pathway to TraC /Coastal water body?	Indirect - overland flow and in flood	Indirect (overland flow/ infiltration)		
WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during construction of the landfall and associated earthworks including soil stockpiling. Storage/use of fuels, chemicals or bentonite on site. Assumed 1.2m deep target depth of trench, approx. 2 - 4m wide at surface and 0.9m wide at base. Includes joint bays typically every 750 - 950m. JB will be 4m wide by 14m in length. Watercourse crossings considered separately - see adjacent		Isolated cable repairs and use of fuels and chemicals at TJBs and along the route. Maintenance/ testing of onshore cable very minimal, (every 2 - 5 years) to reach relevant section of the route with testing via manholes/ inspection chambers. Assumed maintenance only short term and yielding minimal disturbance	
WFD elements for Transitional: Ecological Biology	Invertebrates	SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching TrAC, particularly during high rainfall conditions. Further assessment Required	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
	Macroalgae	SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching TrAC, particularly during high rainfall conditions. Further assessment Required	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
	Phytoplankton	SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching TrAC, particularly during high rainfall conditions. Further assessment Required	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
		delivery of target status			

Risk scoping for WFD objectives			Scheme Elements	Onshore cable circuits			
			Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance	
			WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody Catchment
			Scheme Element	Onshore cable circuit trenching and joint bay construction	Onshore cable circuit trenching and joint bay (JBs) construction	Onshore cable circuit and joint bays	Onshore cable circuit and joint bays
			Pathway to TraC /Coastal water body?	Indirect - overland flow and in flood	Indirect (overland flow/ infiltration)		
H Morph	Physio-chemical	Morphological conditions	Predicted change to status of element/receptor and predicted impact on d (green = unlikely, amber = possibly, red = likely)	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes
	Physio-chemical	Dissolved Inorganic Nitrogen		SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment Required	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
	Physio-chemical	Dissolved oxygen		SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment Required	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
	Specific pollutants						
WFD elements for Transitional: Chemical		Priority hazardous substances & Priority Substances		SCREENED/SCOPED IN: Ground disturbance from excavations have potential to result in pollutants reaching watercourses, particularly during high rainfall conditions. Further assessment Required	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
		Other Pollutants					
		Waterbody Screening (Stated In where a SCREENED/ SCOPED IN activity is within water body screening	Sussex Coastal	N/A - Out	N/A - Out	N/A - Out	N/A - Out
			Arun TrAC (including IDB unnamed IDB ditches in catchment)	In	N/A - Out	N/A - Out	N/A - Out
			Adur TrAC (including unnamed channels in TrAC catchment)	N/A - Out	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Scheme Elements	Onshore cable corridor watercourse crossings			
	Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings, both TraC and tributary watercourse/drainage channels within TrAC catchment	Crossings, both TraC and TrAC tributary watercourse/drainage channels within TrAC catchment	Crossings, both TraC and TrAC tributary watercourse/drainage channels within TrAC catchment	Crossings, both TraC and TrAC tributary watercourse/drainage channels within TrAC catchment
	Scheme Element	Onshore cable corridor watercourse crossings via trenchless methods (e.g. HDD), of TrAC Waterbody	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at Other watercourses	Onshore cable corridor watercourse crossings via trenchless methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at Other watercourses
	Pathway to TraC /Coastal water body?	Direct	Direct		
	WFD Element *(Receptor)*	Source of impacts	Crossing works near watercourses and ground disturbance/ mobilisation of sediments/ contaminants at the excavations for trenchless crossing pits. Likely to be HDD bore under one location to another under crossing. Where practicable trenching pits will be sited outside	Crossing works in watercourses and ground disturbance/ mobilisation of sediments/ contaminants from trenched excavations (open cut methods). Fluming using a pipe, or over pumping. Installation of duct in trench with an approx. depth of 1.45m - 2m beneath watercourse.	Isolated cable repairs and use of fuels and chemicals. As per the onshore cable circuits, maintenance is assumed to be isolated and short term in nature yielding minimal disturbance
WFD elements for Transitional: Ecological	Invertebrates	delivery of target status	SCREENED/SCOPED IN: Ground disturbance and dewatering from excavations have potential to result in pollutants reaching TrAC waterbodies particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Ground disturbance from open cut crossings of unnamed ditches/ channels have potential to result in pollutants reaching downstream TrAC waterbodies, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
Biology	Macroalgae		SCREENED/SCOPED IN: Ground disturbance and dewatering from excavations have potential to result in pollutants reaching TrAC waterbodies particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Ground disturbance from open cut crossings of unnamed ditches/ channels have potential to result in pollutants reaching downstream TrAC waterbodies, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
	Phytoplankton		SCREENED/SCOPED IN: Ground disturbance and dewatering from excavations have potential to result in pollutants reaching TrAC waterbodies particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Ground disturbance from open cut crossings of unnamed ditches/ channels have potential to result in pollutants reaching downstream TrAC waterbodies, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC

Risk scoping for WFD objectives		Scheme Elements	Onshore cable corridor watercourse crossings			
		Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance	
		WFD Waterbody area	Crossings, both TraC and tributary watercourse/drainage channels within TrAC catchment	Crossings, both TraC and TrAC tributary watercourse/drainage channels within TrAC catchment	Crossings, both TraC and TrAC tributary watercourse/drainage channels within TrAC catchment	Crossings, both TraC and TrAC tributary watercourse/drainage channels within TrAC catchment
		Scheme Element	Onshore cable corridor watercourse crossings via trenchless methods (e.g. HDD), of TrAC Waterbody	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at Other watercourses	Onshore cable corridor watercourse crossings via trenchless methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched methods (e.g. open cut) at Other watercourses
		Pathway to TraC /Coastal water body?	Direct	Direct		
H Morph	Morphological conditions	Predicted change to status of element/receptor and predicted impact on d (green = unlikely, amber = possibly, red = likely)	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED IN: Ground disturbance from open cut crossings of unnamed ditches/ channels have potential to result in pollutants reaching downstream TrAC waterbodies, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes
Physio-chemical	Dissolved Inorganic Nitrogen		SCREENED/SCOPED IN: Ground disturbance and dewatering from excavations have potential to result in pollutants reaching TrAC waterbodies particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Ground disturbance from open cut crossings of unnamed ditches/ channels have potential to result in pollutants reaching downstream TrAC waterbodies, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
Physio-chemical	Dissolved oxygen		SCREENED/SCOPED IN: Ground disturbance and dewatering from excavations have potential to result in pollutants reaching TrAC waterbodies particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Ground disturbance from open cut crossings of unnamed ditches/ channels have potential to result in pollutants reaching downstream TrAC waterbodies, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
Specific pollutants						
WFD elements for Transitional: Chemical	Priority hazardous substances & Priority Substances		SCREENED/SCOPED IN: Ground disturbance and dewatering from excavations have potential to result in pollutants reaching TrAC waterbodies particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED IN: Ground disturbance from open cut crossings of unnamed ditches/ channels have potential to result in pollutants reaching downstream TrAC waterbodies, particularly during high rainfall conditions. Further assessment required.	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC	SCREENED/SCOPED OUT: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach TrAC
WFD elements for Transitional: Chemical	Other Pollutants					
Waterbody Screening (Stated In where a SCREENED/ SCOPED IN activity is within water body screening		Sussex Coastal	N/A - Out	N/A - Out	N/A - Out	N/A - Out
		Arun TrAC (including IDB unnamed IDB ditches in catchment)	In	In	N/A - Out	N/A - Out
		Adur TrAC (including unnamed channels in TrAC catchment)	N/A - Out	In	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Scheme Elements	Temporary construction haul road			
	Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider WFD Catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider WFD Catchment
	Scheme Element	Tempoary construction haul road and associated access points	Temporary construction haul road and associated access points	Not Applicable - temporary construction haul road to be removed at end of construction	Not Applicable - temporary haul road to be removed at end of construction
	Pathway to TraC /Coastal water body?	Direct - overland flow and infiltration	In direct - overland flow/infiltration		
	WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants from the development of the temporary construction haul road, including earthworks and soil stockpiling. Temporary roadway width 5m up to 10m (in passing places). Depth typically 0.33m. Likely to be a mix of stone aggregate tracks, and those that do not have any hard materials (e.g. trackway panelling, or bogmatting) depending on ground conditions. In fluvial floodplain where practicable trackway will be used as the preferred option. Worst case of all stone is assumed. Watercourse crossings assumed separately - see adjacent		The temporary haul road will not exist during operation	The temporary haul road will not exist during operation
WFD elements for Transitional: Ecological	Invertebrates	delivery of target status	SCREENED/SCOPED IN: Potential for pollutants and sediments from haul road construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
Biology	Macroalgae		SCREENED/SCOPED IN: Potential for pollutants and sediments from haul road construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
	Phytoplankton		SCREENED/SCOPED IN: Potential for pollutants and sediments from haul road construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.

Risk scoping for WFD objectives	Scheme Elements	Temporary construction haul road			
	Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider WFD Catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider WFD Catchment
	Scheme Element	Tempoary construction haul road and associated access points	Temporary construction haul road and associated access points	Not Applicable - temporary construction haul road to be removed at end of construction	Not Applicable - temporary haul road to be removed at end of construction
	Pathway to TraC /Coastal water body?	Direct - overland flow and infiltration	In direct - overland flow/infiltration		
H Morph	Morphological conditions	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes
Physio-chemical	Dissolved Inorganic Nitrogen	SCREENED/SCOPED IN: Potential for pollutants and sediments from haul road construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
Physio-chemical	Dissolved oxygen	SCREENED/SCOPED IN: Potential for pollutants and sediments from haul road construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
Specific pollutants					
WFD elements for Transitional: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED IN: Potential for pollutants and sediments from haul road construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT - no effects on TrAC WFD waterbody	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road will be removed after construction complete.
WFD elements for Transitional: Chemical	Other Pollutants				

Predicted change to status of element/receptor and predicted impact on d

(green = unlikely, amber = possibly, red = likely)

Waterbody Screening (Stated In where a SCREENED/ SCOPED IN activity is within water body screening					
	Sussex Coastal	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Arun TrAC (including IDB unnamed IDB ditches in catchment)	In	N/A - Out	N/A - Out	N/A - Out
	Adur TrAC (including unnamed channels in TrAC catchment)	In	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Scheme Elements	Tempoary construction haul road watercourse crossings			
	Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Crossings within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Crossings within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Crossings within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment
	Scheme Element	Temporary construction haul road watercourse crossings - clear span bridges	Temporary construction haul road watercourse crossings - culverts	Not Applicable - temporary construction haul road crossing to be removed at end of construction	Not Applicable - temporary construction haul road crossing to be removed at end of construction
	Pathway to TraC /Coastal water body?	Direct	Direct		
WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during the construction of temporary construction haul road watercourse crossings. Clear span bridges will be utlised for larger more sensitive crossings. They will be removed following the completion of construction (potentially in place up to 3.5 years)	Ground disturbance and mobilisation of sediments/ contaminants during the construction of temporary construction haul road watercourse crossings. Culverts to be used on smaller tributaries and drainage channels which have less flow/ less sensitive in nature. They will be removed following the completion of construction (potentially in place for up to 3.5 years)	Ground disturbance and mobilisation of sediments/ contaminants during the construction of temporary construction haul road watercourse crossings. The temporary haul road crossing will not exist during operation	The temporary haul road crossing will not exist during operation
WFD elements for Transitional: Ecological — Biology: Invertebrates	delivery of target status	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Culverts will have direct impacts on the watercourse and pollution/sediment impacts that may travel to downstream TraC waterbody. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.
Macroalgae		SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Culverts will have direct impacts on the watercourse and pollution/sediment impacts that may travel to downstream TraC waterbody. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.
Phytoplankton		SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED IN: Culverts will have direct impacts on the watercourse and pollution/sediment impacts that may travel to downstream TraC waterbody. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.

Risk scoping for WFD objectives	Scheme Elements	Tempoary construction haul road watercourse crossings			
	Scheme Phase	Construction (and Decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Crossings within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Crossings within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Crossings within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Crossings within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment
	Scheme Element	Temporary construction haul road watercourse crossings - clear span bridges	Temporary construction haul road watercourse crossings - culverts	Not Applicable - temporary construction haul road crossing to be removed at end of construction	Not Applicable - temporary construction haul road crossing to be removed at end of construction
	Pathway to TraC /Coastal water body?	Direct	Direct		
H Morph	Morphological conditions	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED IN: Culverts will have direct impacts on the watercourse and pollution/sediment impacts that may travel to downstream TraC waterbody. Further assessment required	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes
Physio-chemical	Dissolved Inorganic Nitrogen	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach TraC, particularly in flood conditions. More assessment required.	Culverts will have direct impacts on the watercourse and pollution/sediment impacts that may travel to downstream TraC waterbody. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.
Physio-chemical	Dissolved oxygen	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach TraC, particularly in flood conditions. More assessment required.	Culverts will have direct impacts on the watercourse and pollution/sediment impacts that may travel to downstream TraC waterbody. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.
Specific pollutants					
WFD elements for Transitional: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED IN: Potential for pollutants and sediments from bridge construction to reach TraC, particularly in flood conditions. More assessment required.	Culverts will have direct impacts on the watercourse and pollution/sediment impacts that may travel to downstream TraC waterbody. Further assessment required	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary haul road crossings will be removed after construction complete.
WFD elements for Transitional: Chemical	Other Pollutants				

Predicted change to status of element/receptor and predicted impact on d (green = unlikely, amber = possibly, red = likely)

Waterbody Screening (Stated In where a SCREENED/ SCOPED IN activity is within water body screening					
	Sussex Coastal	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Arun TrAC (including IDB unnamed IDB ditches in catchment)	In	In	N/A - Out	N/A - Out
	Adur TrAC (including unnamed channels in TrAC catchment)	In	In	N/A - Out	N/A - Out

Risk scoping for WFD objectives		Scheme Elements	Temporary construction compounds (logistics & equipment along cable route)			
		Scheme Phase	Construction (and decommissioning)		Operation and Maintenance	
		WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment
		Scheme Element	Temporary construction compound and associated hardstanding	Temporary construction compound and associated hardstanding	Not Applicable - temporary construction compound to be removed at end of construction	Not Applicable - temporary construction compound to be removed at end of construction
		Pathway to TraC /Coastal water body?	Direct (overland flow and in flood)	Indirect (infiltration)		
	WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during the construction of temporary construction compounds. Also storage of fuels, and chemicals at the temporary construction compound site. Typically 50m by 75m in dimensions. Would take 3-4 months to establish and be in place for the duration of construction (up to 3.5 years)			
WFD elements for Transitional: Ecological	Invertebrates	delivery of target status	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction of compound to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
Biology	Macroalgae		SCREENED/SCOPED IN: Potential for pollutants and sediments from construction of compound to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
	Phytoplankton		SCREENED/SCOPED IN: Potential for pollutants and sediments from construction of compound to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.

Risk scoping for WFD objectives	Scheme Elements	Temporary construction compounds (logistics & equipment along cable route)			
	Scheme Phase	Construction (and decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment
	Scheme Element	Temporary construction compound and associated hardstanding	Temporary construction compound and associated hardstanding	Not Applicable - temporary construction compound to be removed at end of construction	Not Applicable - temporary construction compound to be removed at end of construction
	Pathway to TraC /Coastal water body?	Direct (overland flow and in flood)	Indirect (infiltration)		
H Morph	Morphological conditions	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes
Physio-chemical	Dissolved Inorganic Nitrogen	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction of compound to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
Physio-chemical	Dissolved oxygen	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction of compound to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
Specific pollutants					
WFD elements for Transitional: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED IN: Potential for pollutants and sediments from construction of compound to reach TraC, particularly in flood conditions. More assessment required.	SCREENED/SCOPED OUT: No direct pathway for construction effects to TrAC	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.	SCREENED/SCOPED OUT: No effects identified as result of scheme element as temporary construction compound will be removed after construction complete.
WFD elements for Transitional: Chemical	Other Pollutants				

Predicted change to status of element/receptor and predicted impact on d (green = unlikely, amber = possibly, red = likely)

Waterbody Screening (Stated In where a SCREENED/ SCOPED IN activity is within water body screening					
	Sussex Coastal	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Arun TrAC (including IDB unnamed IDB ditches in catchment)	In	N/A - Out	N/A - Out	N/A - Out
	Adur TrAC (including unnamed channels in TrAC catchment)	In	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives	Scheme Elements	New onshore substation (Bolney Kent Road or Wineham Lane North)			
	Scheme Phase	Construction (and decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment
	Scheme Element	Installation of a new onshore substation and all associated works including enabling works)		Maintenance of the new onshore substation	Maintenance of the new onshore substation
	Pathway to TraC /Coastal water body?	Direct (overland flow)	Indirect (infiltration)		
	WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during the construction of the new onshore substation. Also storage of fuels, and chemicals at the substation site. The footprint of the onshore substation will be approximately 5.9ha, A temporary works area will be 2.5ha in area. Works will include earthworks, vegetation clearance, access road construction, installation of drainage systems, installation of a temporary construction compound, delivery of materials, plant, machinery and fuel, and any earthworks necessary for the installation of the substation foundations, trenches ducts and pits. Other relevant works include installation of underground services and substation foundations, the control and switchgear buildings and plant buildings, construction of the oil		Occasional use of fuels and chemicals. Routine maintenance of substation will be limited. Monitoring of the onshore substation will be done remotely using CCTV. Unscheduled maintenance would typically involve small number of vehicles to infrequently replace equipment, which is anticipated to be short term and yield minimal disturbance	
WFD elements for Transitional: Ecological	Invertebrates	delivery of target status	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)
Biology	Macroalgae		SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)
	Phytoplankton		SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)

Risk scoping for WFD objectives	Scheme Elements	New onshore substation (Bolney Kent Road or Wineham Lane North)			
	Scheme Phase	Construction (and decommissioning)		Operation and Maintenance	
	WFD Waterbody area	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment	Within TraC, within 25m of TraC waterbody Boundary and unnamed channels in TrAC catchment	Wider Waterbody catchment
	Scheme Element	Installation of a new onshore substation and all associated works including enabling works)		Maintenance of the new onshore substation	Maintenance of the new onshore substation
	Pathway to TraC /Coastal water body?	Direct (overland flow)	Indirect (infiltration)		
H Morph	Morphological conditions	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes	SCREENED/SCOPED OUT - No in TraC waterbody channel changes
Physio-chemical	Dissolved Inorganic Nitrogen	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)
Physio-chemical	Dissolved oxygen	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)
Specific pollutants					
WFD elements for Transitional: Chemical	Priority hazardous substances & Priority Substances	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)	SCREENED/SCOPED OUT: no infrastructure located within or near to TrAC catchment (approx. 6km away)
WFD elements for Transitional: Chemical	Other Pollutants				

Predicted change to status of element/receptor and predicted impact on d (green = unlikely, amber = possibly, red = likely)

Waterbody Screening (Stated In where a SCREENED/ SCOPED IN activity is within water body screening					
	Sussex Coastal	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Arun TrAC (including IDB unnamed IDB ditches in catchment)	N/A - Out	N/A - Out	N/A - Out	N/A - Out
	Adur TrAC (including unnamed channels in TrAC catchment)	N/A - Out	N/A - Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives				
		Proposed Development Elements	Landfall works	
		Development Phase	Construction (and Decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	Construction of trenchless crossing (likely HDD), Transition Joint Bay (TJB) and temporary landfall compound	Permanent Landfall TJB
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
	WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during construction of the landfall and associated earthworks. Dewatering from excavations.	Routine maintenance of landfall will be limited (every few years) via inspection point/ manhole
WFD elements for Groundwater: Quantity	Quantitative dependent surface water body status		SCREENED/SCOPED IN: Dewatering, ground disturbance from excavations have potential to result in pathway changes between groundwaters and surface waters. Further assessment Required.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater.
Groundwater level	Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED IN: Possible reduction in groundwater flow and reduced groundwater levels in groundwater supported wetlands affecting GWDTEs	SCREENED/SCOPED OUT: No anticipated changes to water quality to groundwater supported wetlands affecting GWDTEs.
	Saline and other intrusions		SCREENED/SCOPED OUT: Excavation of TJB and HDD and associated dewatering will be shallow so unlikely to cause or affect any saline intrusion (relative to existing conditions).	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any required maintenance would be minimal and have little effect on saline intrusions.
	Water balance		SCREENED/SCOPED IN: Construction of foundations and ground disturbance etc may interact with groundwater and affect existing saline intrusion. Further assessment required	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any required maintenance would be minimal and have little effect on groundwater flow.

nd predicted impact on delivery of target status

= possibly, red = likely)

Risk scoping for WFD objectives				
		Proposed Development Elements	Landfall works	
		Development Phase	Construction (and Decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	Construction of trenchless crossing (likely HDD), Transition Joint Bay (TJB) and temporary landfall compound	Permanent Landfall TJB
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
WFD elements for Groundwater: Chemical	General / conductivity	Chemical dependent surface water body status	SCREENED/SCOPED IN: Dewatering for HDD has the potential to result in pollutants interacting between groundwater and surface waters, changing water qualities. Further assessment required.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any required maintenance would be minimal and have little effect on groundwater quality.
		Groundwater dependent terrestrial ecosystems (GWDTEs)	SCREENED/SCOPED IN: Possible changes to water quality in groundwater supported wetlands affecting GWDTEs	SCREENED/SCOPED OUT: No anticipated changes to water quality to groundwater supported wetlands affecting GWDTEs.
		Saline and other intrusions	SCREENED/SCOPED OUT: Excavation of TJB and HDD and associated dewatering will be shallow so unlikely to cause or affect any saline intrusion (relative to existing conditions).	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any required maintenance would be minimal and have little effect on saline and other intrusions.
		Chemical test	SCREENED/SCOPED IN: Pathway changes for HDD has the potential to affect the flow and movement of contaminants to groundwaters. Further assessment Required.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any required maintenance would be minimal and have little effect on groundwater quality.

Predicted change to status of element/receptor an (green = unlikely, amber =

Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*			
	Littlehampton Anticline West	In	N/A - Out
	Littlehampton Anticline East	N/A - Out	N/A - Out
	Sussex Lambeth Group	N/A - Out	N/A - Out
	Worthing Chalk	N/A - Out	N/A - Out
	Lower Greensand Adur and Ouse	N/A - Out	N/A - Out
	Adur and Ouse Hastings Beds	N/A - Out	N/A - Out

Risk scoping for WFD objectives				
		Proposed Development Elements	Onshore cable circuits	
		Development Phase	Construction (and Decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	Onshore cable circuit trenching and joint bay construction	Onshore cable circuits and joint bays
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
	WFD Element *(Receptor)*	Source of impacts	Assumed 1.2m deep target depth of trench, approx. 2 - 4m wide at surface and 0.9m wide at base. Includes joint bays typically every 750 - 950m. JB will be 4m wide by 14m in length. Watercourse crossings considered separately - see adjacent	
WFD elements for Groundwater: Quantity	Quantitative dependent surface water body status	and predicted impact on delivery of target status	SCREENED/SCOPED OUT: Dewatering and ground disturbance for cable circuits has the potential to reduce flows and levels and interactions between groundwater and surface waters. However, this effect is likely to be shallow and not significant.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing trenches. Any excavations required would be minimal and have little effect on groundwater flow and quantity.
Groundwater level	Groundwater dependent terrestrial ecosystems (GWDTEs)	(green = possibly, red = likely)	SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in adverse quantity effects on GWDTEs.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing trenches. Any excavations required would be minimal and have little effect on groundwater flow and quantity.
	Saline and other intrusions		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in saline intrusion.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing trenches. Any excavations required would be minimal and have little effect on groundwater flow and quantity.
	Water balance		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to affect water balance.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing trenches. Any excavations required would be minimal and have little effect on groundwater flow and quantity.

Risk scoping for WFD objectives				
		Proposed Development Elements	Onshore cable circuits	
		Development Phase	Construction (and Decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	Onshore cable circuit trenching and joint bay construction	Onshore cable circuits and joint bays
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
WFD elements for Groundwater: Chemical	General / conductivity	Chemical dependent surface water body status	Predicted change to status of element/receptor an (green = unlikely, amber =	SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in changes to groundwater quality.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing trenches. Any excavations required would be minimal and have little effect on groundwater flow and quantity.
		Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in changes to GWDTEs.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing trenches. Any excavations required would be minimal and have little effect on groundwater flow and quantity.
		Saline and other intrusions		SCREENED/SCOPED OUT: Construction of substations unlikely to cause or affect any saline intrusion.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing trenches. Any excavations required would be minimal and have little effect on groundwater flow and quantity.
		Chemical test		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in changes to groundwater chemical quality.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing trenches. Any excavations required would be minimal and have little effect on groundwater flow and quantity.

Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*			
	Littlehampton Anticline West	N/A - Out	N/A - Out
	Littlehampton Anticline East	N/A - Out	N/A - Out
	Sussex Lambeth Group	N/A - Out	N/A - Out
	Worthing Chalk	N/A - Out	N/A - Out
	Lower Greensand Adur and Ouse	N/A - Out	N/A - Out
	Adur and Ouse Hastings Beds	N/A - Out	N/A - Out

Risk scoping for WFD objectives						
		Proposed Development Elements	Onshore cable corridor watercourse crossings			
		Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
		WFD Waterbody area	Onshore cable corridor watercourse crossings, on top of WFD Groundwater Body	Onshore cable corridor watercourse crossings, on top of WFD Groundwater Body	Onshore cable corridor watercourse crossings, on top of WFD Groundwater Body	Onshore cable corridor watercourse crossings, on top of WFD Groundwater Body
		Development Element	Onshore cable corridor watercourse crossings via trenchless Methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched Methods (e.g. open cut) at Other watercourses	Onshore cable corridor watercourse crossings via trenchless Methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched Methods (e.g. open cut) at Other watercourses
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)	Indirect (Infiltration)	Indirect (Infiltration)
	WFD Element *(Receptor)*	Source of impacts	Ground disturbance and mobilisation of sediments/ contaminants during construction of trenchless crossings. Dewatering from excavations. Likely to be HDD bore under one location to another under crossing. Where practicable trenching pits will be sited outside floodplains. Appropriate management and treatment of dewatering arising prior to discharge.	Ground disturbance and mobilisation of sediments/ contaminants during construction of trenched crossings. Fluming using a pipe, or over pumping. Installation of duct in trench with an approx. depth of 1.45m - 2m beneath watercourse. Installation over several days before reinstatement to	As per the onshore cable circuits, maintenance is assumed to be isolated and short term in nature yielding minimal disturbance	
WFD elements for Groundwater: Quantity	Groundwater level	Quantitative dependent surface water body status		SCREENED/SCOPED IN: Will have potential impacts on the watercourse and potential pollution/sediment interactions between groundwaters and surface waters. Further assessment required	SCREENED/SCOPED IN: Will have potential for impacts on the watercourse and potential pollution/sediment interactions between groundwaters and surface waters. Further assessment required	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and quantity.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and
		Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED IN: Possible reduction in groundwater flow and reduced groundwater levels in groundwater supported wetlands affecting GWDTEs	SCREENED/SCOPED IN: Possible reduction in groundwater flow and reduced groundwater levels in groundwater supported wetlands affecting GWDTEs	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and quantity.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and
		Saline and other intrusions		SCREENED/SCOPED OUT: HDD and associated dewatering will be shallow so unlikely to cause or affect any saline intrusion.	SCREENED/SCOPED OUT: Trenching and associated dewatering will be shallow so unlikely to cause or affect any saline intrusion.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and quantity.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and
		Water balance		SCREENED/SCOPED IN: Dewatering may be required for HDD which has the potential to affect the flow between surface and groundwaters, and change flow pathways. Further assessment Required.	SCREENED/SCOPED IN: Dewatering may be required for open cut crossing which has the potential to affect the flow between surface and groundwaters, and change flow pathways. Further assessment Required.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and quantity.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and

nd predicted impact on delivery of target status

= possibly, red = likely)

Risk scoping for WFD objectives						
		Proposed Development Elements	Onshore cable corridor watercourse crossings			
		Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
		WFD Waterbody area	Onshore cable corridor watercourse crossings, on top of WFD Groundwater Body	Onshore cable corridor watercourse crossings, on top of WFD Groundwater Body	Onshore cable corridor watercourse crossings, on top of WFD Groundwater Body	Onshore cable corridor watercourse crossings, on top of WFD Groundwater Body
		Development Element	Onshore cable corridor watercourse crossings via trenchless Methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched Methods (e.g. open cut) at Other watercourses	Onshore cable corridor watercourse crossings via trenchless Methods (e.g. HDD), at Main Rivers and other sensitive locations	Onshore cable corridor watercourse crossings via trenched Methods (e.g. open cut) at Other watercourses
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)	Indirect (Infiltration)	Indirect (Infiltration)
WFD elements for Groundwater: Chemical	General / conductivity	Chemical dependent surface water body status	Predicted change to status of element/receptor an (green = unlikely, amber =	SCREENED/SCOPED IN: Pathway changes for HDD has the potential to affect the flow and movement of contaminants to groundwaters. Further assessment Required.	SCREENED/SCOPED IN: Pathway changes for open has the potential to affect the flow and movement of contaminants to groundwaters. Further assessment Required.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and quantity.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and
		Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED IN: Possible changes to water quality in groundwater supported wetlands affecting GWDTEs	SCREENED/SCOPED IN: Possible changes to water quality in groundwater supported wetlands affecting GWDTEs	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and quantity.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and
		Saline and other intrusions		SCREENED/SCOPED OUT: Excavation of HDD and associated dewatering will be shallow so unlikely to cause or affect any saline intrusion.	SCREENED/SCOPED OUT: Open cut crossing and associated dewatering will be shallow so unlikely to cause or affect any saline intrusion.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and quantity.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and
		Chemical test		SCREENED/SCOPED IN: Pathway changes for HDD has the potential to affect the flow and movement of contaminants to groundwaters. Further assessment Required.	SCREENED/SCOPED IN: Pathway changes for open cut has the potential to affect the flow and movement of contaminants to groundwaters. Further assessment Required.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and quantity.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater as will occur within existing underground ducts. Any excavations required would be minimal and have little effect on groundwater flow and

Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*					
	Littlehampton Anticline West	In	In	N/A - Out	N/A - Out
	Littlehampton Anticline East	In	In	N/A - Out	N/A - Out
	Sussex Lambeth Group	In	In	N/A - Out	N/A - Out
	Worthing Chalk	In	In	N/A - Out	N/A - Out
	Lower Greensand Adur and Ouse	In	In	N/A - Out	N/A - Out
	Adur and Ouse Hastings Beds	N/A - Out	N/A Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives				
		Proposed Development Elements	Temporary construction haul road	
		Development Phase	Construction (and Decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	New temporary haul road and associated Access Points	Not Applicable - temporary haul road to be removed at end of construction
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
	WFD Element *(Receptor)*	Source of impacts	Temporary construction haul road width 5m up to 10m (in passing places). Depth typically 0.33m. Likely to be a mix of stone aggregate tracks, and those that do not have any hard materials (e.g. trackway panelling, or bogmatting) depending on ground conditions. In fluvial floodplain where practicable trackway will be used as the preferred option. Worst case of all stone is assumed. Watercourse crossings	The temporary haul road will not exist during operation
WFD elements for Groundwater: Quantity	Quantitative dependent surface water body status		SCREENED/SCOPED OUT: Potential for a change to water available at the surface waterbody from effects to the groundwater body are limited due to the surface nature of the access tracks.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
Groundwater level	Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED OUT: No anticipated reduction in groundwater flow and reduced groundwater levels in groundwater supported wetlands affecting GWDTEs.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
	Saline and other intrusions		SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect existing saline intrusion.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
	Water balance		SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect water balance	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase

nd predicted impact on delivery of target status

= possibly, red = likely)

Risk scoping for WFD objectives				
		Proposed Development Elements	Temporary construction haul road	
		Development Phase	Construction (and Decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	New temporary haul road and associated Access Points	Not Applicable - temporary haul road to be removed at end of construction
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
WFD elements for Groundwater: Chemical	General / conductivity	Chemical dependent surface water body status	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
		Groundwater dependent terrestrial ecosystems (GWDTEs)	SCREENED/SCOPED OUT: No anticipated changes to water quality to groundwater supported wetlands affecting GWDTEs.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
		Saline and other intrusions	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect existing saline intrusion.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
		Chemical test	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater. Limited changes to existing water pathways	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase

Predicted change to status of element/receptor an (green = unlikely, amber =

Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*	Littlehampton Anticline West	N/A - Out	N/A - Out
	Littlehampton Anticline East	N/A - Out	N/A - Out
	Sussex Lambeth Group	N/A - Out	N/A - Out
	Worthing Chalk	N/A - Out	N/A - Out
	Lower Greensand Adur and Ouse	N/A - Out	N/A - Out
	Adur and Ouse Hastings Beds	N/A - Out	N/A - Out

Risk scoping for WFD objectives						
		Proposed Development Elements	Temporary construction haul road watercourse crossings			
		Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
		WFD Waterbody area	Temporary construction haul road watercourse crossings, on top of WFD groundwater body	Temporary construction haul road watercourse crossings, on top of WFD groundwater body	Haul road watercourse crossings, on top of WFD groundwater body	Temporary construction haul road watercourse crossings, on top of WFD groundwater body
		Development Element	Temporary construction haul Road watercourse Crossings - clear span bridges	Temporary construction haul road watercourse crossings - culverts	Not Applicable - temporary haul road crossing to be removed at end of construction	Not Applicable - temporary construction haul road crossing to be removed at end of construction
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)	Indirect (Infiltration)	Indirect (Infiltration)
	WFD Element *(Receptor)*	Source of impacts	Clear span bridges will be utilised for larger more sensitive crossings. They will be removed following the completion of construction (potentially in place up to 3.5 years)	Ground disturbance and mobilisation of sediments/ contaminants during the construction of temporary construction haul road watercourse crossings. Culverts to be used on smaller tributaries and drainage channels which	The temporary haul road crossing will not exist during operation	The temporary haul road crossing will not exist during operation
WFD elements for Groundwater: Quantity	Quantitative dependent surface water body status		SCREENED/SCOPED OUT: Potential for a change to water available at the surface waterbody from effects to the groundwater body are limited due to the surface nature of the access tracks.	SCREENED/SCOPED IN: Interactions between groundwater and surface waters during culvert construction are possible. More assessment Required.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
Groundwater level	Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED OUT: No anticipated reduction in groundwater flow and reduced groundwater levels in groundwater supported wetlands affecting GWDTEs.	SCREENED/SCOPED OUT: No anticipated reduction in groundwater flow and reduced groundwater levels in groundwater supported wetlands affecting GWDTEs.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
	Saline and other intrusions		SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect existing saline intrusion.	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect existing saline intrusion.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
	Water balance		SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect water balance	SCREENED/SCOPED IN: Alteration to pathways between groundwater and surface waters during culvert construction are possible. More assessment Required.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase

nd predicted impact on delivery of target status

= possibly, red = likely)

Risk scoping for WFD objectives						
		Proposed Development Elements	Temporary construction haul road watercourse crossings			
		Development Phase	Construction (and Decommissioning)		Operation and Maintenance	
		WFD Waterbody area	Temporary construction haul road watercourse crossings, on top of WFD groundwater body	Temporary construction haul road watercourse crossings, on top of WFD groundwater body	Haul road watercourse crossings, on top of WFD groundwater body	Temporary construction haul road watercourse crossings, on top of WFD groundwater body
		Development Element	Temporary construction haul Road watercourse Crossings - clear span bridges	Temporary construction haul road watercourse crossings - culverts	Not Applicable - temporary haul road crossing to be removed at end of construction	Not Applicable - temporary construction haul road crossing to be removed at end of construction
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)	Indirect (Infiltration)	Indirect (Infiltration)
WFD elements for Groundwater: Chemical	General / conductivity	Chemical dependent surface water body status	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater	SCREENED/SCOPED IN: Interactions between groundwater and surface waters during culvert construction are possible. More assessment Required.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
		Groundwater dependent terrestrial ecosystems (GWDTEs)	SCREENED/SCOPED OUT: No anticipated changes to water quality to groundwater supported wetlands affecting GWDTEs.	SCREENED/SCOPED OUT: No anticipated changes to water quality to groundwater supported wetlands affecting GWDTEs.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
		Saline and other intrusions	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect existing saline intrusion.	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect existing saline intrusion.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase
		Chemical test	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater. Limited changes to existing water pathways	SCREENED/SCOPED IN: Interactions between groundwater and surface waters during culvert construction are possible. More assessment Required.	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase	SCREENED/SCOPED OUT: Temporary road infrastructure will not exist during operational phase

Predicted change to status of element/receptor an (green = unlikely, amber =

Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*					
	Littlehampton Anticline West	N/A - Out	In	N/A - Out	N/A - Out
	Littlehampton Anticline East	N/A - Out	In	N/A - Out	N/A - Out
	Sussex Lambeth Group	N/A - Out	In	N/A - Out	N/A - Out
	Worthing Chalk	N/A - Out	In	N/A - Out	N/A - Out
	Lower Greensand Adur and Ouse	N/A - Out	In	N/A - Out	N/A - Out
	Adur and Ouse Hastings Beds	N/A - Out	N/A Out	N/A - Out	N/A - Out

Risk scoping for WFD objectives				
		Proposed Development Elements	Temporary construction compounds (logistics & equipment along cable route)	
		Development Phase	Construction (and decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	Temporary construction compound and associated hardstanding	Not Applicable - temporary compound to be removed at end of construction
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
	WFD Element *(Receptor)*	Source of impacts	Typically 50m by 75m in dimensions. Would take up to 3 - 4 months to establish and be in place for the duration of construction (up to 3.5 years)	
WFD elements for Groundwater: Quantity	Quantitative dependent surface water body status		SCREENED/SCOPED OUT: Potential for a change to water available at the surface waterbody from effects to the groundwater body are limited due to the surface nature of the compounds	SCREENED/SCOPED OUT: Temporary Compound will not exist during operational phase
Groundwater level	Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED OUT: No anticipated reduction in groundwater flow and reduced groundwater levels in groundwater supported wetlands affecting GWDTEs.	SCREENED/SCOPED OUT: Temporary Compound will not exist during operational phase
	Saline and other intrusions		SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect existing saline intrusion.	SCREENED/SCOPED OUT: Temporary Compound will not exist during operational phase
	Water balance		SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect water balance	SCREENED/SCOPED OUT: Temporary Compound will not exist during operational phase

nd predicted impact on delivery of target status

= possibly, red = likely)

Risk scoping for WFD objectives				
		Proposed Development Elements	Temporary construction compounds (logistics & equipment along cable route)	
		Development Phase	Construction (and decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	Temporary construction compound and associated hardstanding	Not Applicable - temporary compound to be removed at end of construction
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
WFD elements for Groundwater: Chemical	General / conductivity	Chemical dependent surface water body status	Predicted change to status of element/receptor an (green = unlikely, amber =	SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater	SCREENED/SCOPED OUT: Temporary Compound will not exist during operational phase
		Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED OUT: No anticipated changes to water quality to groundwater supported wetlands affecting GWDTEs.	SCREENED/SCOPED OUT: Temporary Compound will not exist during operational phase
		Saline and other intrusions		SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater in significant enough scales to affect existing saline intrusion.	SCREENED/SCOPED OUT: Temporary Compound will not exist during operational phase
		Chemical test		SCREENED/SCOPED OUT: Construction all very close to the surface and therefore unlikely to have an interaction with groundwater. Limited changes to existing water pathways	SCREENED/SCOPED OUT: Temporary Compound will not exist during operational phase

Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*			
	Littlehampton Anticline West	N/A - Out	N/A - Out
	Littlehampton Anticline East	N/A - Out	N/A - Out
	Sussex Lambeth Group	N/A - Out	N/A - Out
	Worthing Chalk	N/A - Out	N/A - Out
	Lower Greensand Adur and Ouse	N/A - Out	N/A - Out
	Adur and Ouse Hastings Beds	N/A - Out	N/A - Out

Risk scoping for WFD objectives				
		Proposed Development Elements	**New onshore substation (Bolney Kent Road or Wineham Lane North)**	
		Development Phase	**Construction (and decommissioning)**	**Operation and Maintenance**
		WFD Waterbody area	**On top of WFD Groundwater Body**	**On top of WFD Groundwater Body**
		Development Element	**Installation of a new substation and all associated works including enabling works)**	**Maintenance of the onshore substation**
		Pathway to GW water body?	**Indirect (Infiltration)**	**Indirect (Infiltration)**
	WFD Element *(Receptor)*	**Source of impacts**	The footprint of the onshore substation will be approximately 5.9ha, A temporary works area will be 2.5ha in area. Works will include earthworks, vegetation clearance, access road construction, installation of drainage systems, installation of a temporary construction compound, delivery of materials, plant, machinery and fuel, and any earthworks necessary for	Routine maintenance of substation will be limited. Monitoring of the onshore substation will be done remotely using CCTV. Unscheduled maintenance would typically involve small number of vehicles to infrequently replace equipment, which is anticipated to be short term and yield minimal disturbance
WFD elements for Groundwater: Quantity	**Quantitative dependent surface water body status**		SCREENED/SCOPED OUT: Dewatering and ground disturbance for foundations has the potential to reduce flows and levels and interactions between groundwater and surface waters. However, this effect is likely to be shallow and not significant.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any excavations required would have little effect on groundwater flow and quantity.
Groundwater level	**Groundwater dependent terrestrial ecosystems (GWDTEs)**		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in adverse quantity effects on GWDTEs.	SCREENED/SCOPED OUT: No anticipated reduction in groundwater flow and reduced groundwater levels in groundwater supported wetlands affecting GWDTEs.
	Saline and other intrusions		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in saline intrusion.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any excavations required would have little effect on groundwater flow and quantity.
	Water balance		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to affect water balance.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any excavations required would have little effect on groundwater flow and quantity.

nd predicted impact on delivery of target status

= possibly, red = likely)

Risk scoping for WFD objectives				
		Proposed Development Elements	New onshore substation (Bolney Kent Road or Wineham Lane North)	
		Development Phase	Construction (and decommissioning)	Operation and Maintenance
		WFD Waterbody area	On top of WFD Groundwater Body	On top of WFD Groundwater Body
		Development Element	Installation of a new substation and all associated works including enabling works)	Maintenance of the onshore substation
		Pathway to GW water body?	Indirect (Infiltration)	Indirect (Infiltration)
WFD elements for Groundwater: Chemical	General / conductivity	Chemical dependent surface water body status	Predicted change to status of element/receptor an (green = unlikely, amber =	SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in changes to groundwater quality.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any excavations required would have little effect on groundwater quality.
		Groundwater dependent terrestrial ecosystems (GWDTEs)		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in changes to GWDTEs.	SCREENED/SCOPED OUT: No anticipated changes to water quality to groundwater supported wetlands affecting GWDTEs. Standard design measures ensure minimal chance of effects reaching GWDTEs.
		Saline and other intrusions		SCREENED/SCOPED OUT: Construction of substations unlikely to cause or affect any saline intrusion.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any excavations required would have little effect on groundwater quality.
		Chemical test		SCREENED/SCOPED OUT: Dewatering for foundations and ground disturbance unlikely to result in changes to groundwater chemical quality.	SCREENED/SCOPED OUT: Routine and non-routine maintenance activities during the operational phase are unlikely to have an interaction between infrastructure and groundwater. Any excavations required would have little effect on groundwater quality.

Waterbody Screening (Stated In where a SCREENED/SCOPED IN activity is within water body screening limits where applicable)*			
	Littlehampton Anticline West	N/A - Out	N/A - Out
	Littlehampton Anticline East	N/A - Out	N/A - Out
	Sussex Lambeth Group	N/A - Out	N/A - Out
	Worthing Chalk	N/A - Out	N/A - Out
	Lower Greensand Adur and Ouse	N/A - Out	N/A - Out
	Adur and Ouse Hastings Beds	N/A - Out	N/A - Out

Annex C
Preliminary Further Assessment

Annex C
Preliminary Further Assessment

Table C-1 Further impact assessment for onshore landfall and onshore cable circuits (including onshore cable corridor watercourse crossings)

Table C-2 Further impact assessment for onshore temporary construction haul roads and associated watercourse crossings (including bridges and culverts)

Table C-3 Further impact assessment for onshore temporary construction compounds and the new onshore substation

Table C-4 Further impact assessment for proposed marine infrastructure activities

Table C-5 Conclusions of the Draft RIAA Natura 2000 sites within 2km of the offshore cable corridor

Table C-6 List of embedded environmental measures with reference to the further assessment tables (also presented in the Outline Code of Construction Practice)

The further assessment in this annex has been undertaken based on the Rampion 2 activities rather than undertaking a separate further assessment for the individual activities that take place within each individual water body. As the design of the Rampion 2 infrastructure, in many cases, is not proposed to vary significantly from water body to water body, the approach adopted here provides one assessment for each activity / infrastructure type per water body category (i.e. river, lake, coastal / transitional, groundwater). These generic assessments are provided in the following tables.

As discussed in **Appendix 27-3: Preliminary Water Framework Directive Assessment, Volume 4**, many activities / infrastructure types do not substantially vary in design where located within more than one water body. Furthermore, most of the embedded environmental measures that are proposed would also be generally applied across the whole Proposed Development and would be unlikely to vary from water body to water body. Therefore, a generic further assessment of each activity / infrastructure type is presented rather than providing unnecessary repetition that is of no value to the assessment.

Table C-1 Further impact assessment for onshore landfall and onshore cable circuits (including onshore cable corridor watercourse crossings)

Water Framework Directive (WFD) element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water environment, Volume 2)	Assessment of effects on WFD
RIVER WATER BODIES (Ryebank Rife, Black Ditch (W Sussex), Honeybridge Stream, Adur (Lockbridge), Adur East (Sakeham), Cowfold Stream, Adur (East)			
Hydromorphological Supporting Elements	Quantity and dynamics of flow	C-3, C-5, 17, C-18, C-19, C-122, C-138, C-139 **Appropriate (trenchless and trenched) cable watercourse crossing design and installation** C-123 **Appropriate standoff distances from watercourses for trenchless pits** C-77, C-141, C-142 **Management of dewatered groundwater, and Environmental Permit for Discharge Activity** C-121, C-140 **Effective drainage so as to not increase baseline runoff rates** C-19, C-29, C-141 **Good construction practices for trenching** C3, C-5, C-17, C-18, C-19, C-122, C-138, C-139 **Appropriate (Trenchless and Trenched) cable watercourse crossing design and installation** C-28 **Land drainage management** C-120,129 **Works areas constructed from semi – permeable aggregate where possible** C-130, C-131, C-133, C-135 **Appropriate standoff distances and methodologies for topsoil stockpiling**	**Construction of trenchless (likely HDD) cable watercourse crossing at Landfall Site, and along the onshore cable corridor:** Any dewatering requirements would be associated solely with the horizontal directional drill (HDD) drive and receive pits at either end of the crossing. As such, dewatering volumes would be of low volume and short duration such that there would be no effects on adjacent watercourse baseflow. Should the small quantities of dewatered groundwater be discharged to an adjacent watercourse there would be only a negligible change on flow regime, on account of the fact that HDD crossings are large watercourses with substantial baseline flow volumes. **Trenched cable laying along the onshore cable corridor:** Any dewatering requirements to facilitate the necessary conditions for cable installation would be of shallow depth and low volume (both depending on ground conditions, but a typical depth of 1.65m to the base of the trench is assumed) and short duration (typically dewatering would not take place at one individual location for more than several days) such that there would be no effects on adjacent watercourse baseflow. Should the low quantities of dewatered groundwater be discharged to an adjacent watercourse any effects on the baseline flow volume would be negligible. **Underground trenched cable watercourse crossing along the onshore cable corridor:** The installation of trenched underground cable watercourse crossings would generally be achieved by localised damming of the flow upstream of the proposed crossing location, with overpumping of water to leave a dry area in which to install the cables. This would naturally lead to a period of localised flow regime alteration. During this period, which is likely to be less than two days in duration, there would be a temporary change in both the quantity and dynamics of flow over a short, localised extent, upstream and downstream of each crossing. The upstream damming is likely to locally increase water quantity and reduce flow/velocity variability due to the impounding of flow. The extent to which these effects will propagate upstream of the dam would depend on the amount of flow within and gradient of the watercourse. The discharge location of the overpumped water, downstream of the crossing, is likely to be a point discharge rather than being spread across the full width of the channel. However, it is anticipated that the full channel width would be occupied with normal flow quantity and variability within a short distance of the discharge point. The channel that falls between the damming and discharge points would have all recognisable flow removed from it until the cables are installed and the bed and bank material have been reinstated, when the overpumping of water is no longer necessary. This process is likely to last less than one day in duration. Whilst these local alterations to the quantity and dynamics of flow are not insignificant, the effects would be fully reversible once the flow is re-connected following cable installation. Once the cables are installed, the baseline quantity of water within the channel and morphological conditions of the channel cross-section would be re-established. Therefore, the baseline quantity and dynamics of flow would be restored within approximately less than two days. Considering the scale and duration of these activities in the context of WFD water body size and the River Basin Management Plan (RBMP) reporting timescales, there is a high degree of confidence that the localised and short duration changes in the quantity and dynamics of flow would not have any effect on WFD water body status.

Water Framework Directive (WFD) element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water environment, Volume 2)	Assessment of effects on WFD
			Effects on hydromorphology quality element: Based on the criteria set out in Table 27-18 of Chapter 27: Water environment, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Low magnitude of change on quantity and dynamics of flow. However, this would be for a very short duration and would be fully reversible. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	River continuity (lateral and longitudinal)	None required None required C3, C-5, C-17, C-18, C-19, C-122, C-138, C-139 **Appropriate (Trenchless and Trenched) cable watercourse crossing design and installation** C-130, C-131, C-133, C-135 **Appropriate standoff distances and methodologies for topsoil stockpiling** C-19, C-29, C-141, C-154 **Good construction practices for trenching**	**Trenched cable laying along the onshore cable corridor:** There would no effects on river continuity as there would be no in-channel works. **Underground HDD cable watercourse crossing along the onshore cable corridor:** There would no effects on river continuity as there would be no in-channel works. **Underground trenched cable watercourse crossing along the onshore cable corridor:** The construction / decommissioning and maintenance works to facilitate underground cable watercourse crossings would not result in any permanent reduction in the lateral connectivity of river flow and the adjacent floodplain, as the topsoil and sediment that is removed in the trenching process would be reinstated on completion of the onshore cable installation. Similarly, the interruption of longitudinal river continuity as a result of the temporary damming and overpumping of water (for a period of less than two days) would be fully reversed on completion of cable installation. Considering the scale and duration of these activities in the context of WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the effects of these localised changes in the river continuity would not have any effect on WFD water body status. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2 and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on river continuity. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	River width and depth variation	None required C-3, C-5, C-17, C-18, C-19, C-122, C-138, C-139 **Appropriate (Trenchless and Trenched) cable watercourse crossing design and installation** C-19, C-29, C-141, C-154 **Good construction practices for trenching**	**Trenched cable laying along the onshore cable corridor:** There would no effects on river width and depth variation as there would be no in-channel works. **Underground trenchless (HDD) cable watercourse crossing along the onshore cable corridor:** There would no effects on river width and depth variation as there would be no in-channel works and the implementation of embedded environmental measures on appropriate cable watercourse crossing design and installation would ensure that HDD drive and receive pits are located sufficiently clear of river banks to be exposed by lateral channel erosion. **Underground trenched cable watercourse crossing along the onshore cable corridor:** The construction / decommissioning and maintenance works to facilitate underground cable watercourse crossings would result in no perceptible alteration of the baseline river width and depth variation as the sediment and cross-sectional form that is removed in the trenching process would be reinstated on completion of the onshore cable installation (a period of less than two days duration). This would be secured by implementation of embedded environmental measures on appropriate cable watercourse crossing design and installation. Considering the scale and duration of these activities in the context of WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the effects of these localised changes in the river continuity would not have any effect on WFD water body status.

Water Framework Directive (WFD) element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water environment, Volume 2)	Assessment of effects on WFD
			Effects on hydromorphology quality element: Based on the criteria set out in Table 27.18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on river width and depth variation. There would be no need to provide mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	Structure and substrate of the river bed	C-130, C-131, C-133, C-135 **Appropriate standoff distances and methodologies for topsoil stockpiling** C-19, C-29, C-141, C-154 **Good construction practices for trenching** C-123 **Appropriate standoff distances from watercourses for trenchless pits** C-77, C-141, C-142 **Management of dewatered groundwater, and Environmental Permit for Discharge Activity** C-123 **Appropriate standoff distances from watercourses for trenchless pits**	**Trenched cable laying and underground Trenchless (HDD) cable watercourse crossings along the onshore cable corridor:** The construction / decommissioning and maintenance works associated with cable trenching in floodplains and / or adjacent to watercourses and the excavation of HDD starter and exit pits, either side of an HDD crossings, would result in the short-term exposure and disturbance of ground resulting in the generation of sediment in run-off. This is expected to be managed by embedded environmental measures such that the levels of fine-grained sediment delivered to adjacent watercourses would be minimised as far as practicable. However, there may be a very minor, short-duration and localised change in the structure and substrate of the river bed associated with delivery and transfer of fine-grained sediment as a result of the works that is temporarily elevated relative to baseline levels. **Underground trenched cable watercourse crossing along the onshore cable corridor:** The construction / decommissioning and maintenance works to facilitate underground cable watercourse crossings would result in no perceptible alteration of the substrate of the river bed as the sediment and cross-sectional form that is removed in the trenching process would be reinstated on completion of the onshore cable installation. However, it would not be possible to replace the exact structure of the river bed which, in many cases, will have evolved over time into a natural grain size and fabric arrangement. Based on an assumption of 27 trenched cable watercourse crossings (based on PEIR design freeze) each with a worst case width of 15m, there would be a total of 405m of river trenching across the Study Area during construction / decommissioning. This total trenched length would represent less than ~0.9% the total length of mapped principal watercourses (48km) screened in within the Water Environment Study Area, which itself is a gross underestimation of the total watercourse length within the Water Environment Study Area. Even based on these reasonable worst case assumptions, the scale of trenching is considered to be minimal. Furthermore, any effects would be short-lived and the structure of the river bed would become re-established following the first significant flow event after onshore cable installation. It is possible that, following the reconnection of river flow once cables are installed, there would be a minor pulse of fine-grained sediment transported downstream associated with any loose/unconsolidated sediment that remains following the covering of the trench. However, this is likely to be very short-lived and would be within the normal range of suspended sediment transport rates associated with natural bed/bank disturbance (e.g. small-scale bank erosion). Considering the scale and duration of these activities in the context of WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the effects of these localised changes in the river continuity would not have any effect on WFD water body status. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on the structure and substrate of the river bed. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.

Water Framework Directive (WFD) element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water environment, Volume 2)	Assessment of effects on WFD
Hydromorphological Supporting Elements	Connectivity with groundwater	C-77, C-141, C-142 **Management of dewatered groundwater, and Environmental Permit for Discharge Activity** C-19, C-29, C-141, C-154 **Good construction practices for trenching** C-3, C-5, C-17, C-18, C-19, C-122, C-138, C-139 **Appropriate (Trenchless and Trenched) cable watercourse crossing design and installation**	**Trenched cable laying along the onshore cable corridor:** The works associated with onshore cable trenching in floodplains and/or adjacent to watercourses would not result in any alteration of the connectivity of river and groundwater bodies as there would be no in-channel works or structures introduced to the channel boundary. Furthermore, any dewatering requirements to facilitate the necessary conditions for onshore cable installation would be of shallow depth, low volume and short duration such that there would be no effects on adjacent watercourse baseflow. **Underground trenchless (HDD) cable watercourse crossing along the onshore cable corridor:** Any dewatering requirements would be of shallow depth and associated with the starter and exit pits at either end of the crossing. As such, dewatering volumes would be of low volume and short duration such that there would be no effects on adjacent watercourse baseflow. It is possible that the HDD drilling process may alter the baseline pathway between the river and the hyporheic zone. However, given the sufficient depth of the HDD crossings below river beds (on the basis of the embedded environmental measures) and the very localised scale of this effect in the context of both river and groundwater bodies, it is logical to conclude that any change would be negligible relative to baseline conditions. **Underground trenched cable watercourse crossing along the onshore cable corridor:** Given the localised scale of the trenched underground cable installations (in the downstream direction and below the baseline river bed level) and the fact that the cables themselves would not provide any perceptible alteration of the pathway from rivers to the hyporheic zone, there is a high degree of confidence that any localised disturbance of the connectivity between watercourses and the underlying groundwater bodies would be negligible. Considering the scale and duration of any effects in the context of WFD water body size (both river and groundwater), there is a high degree of confidence that the effects of these localised changes on the connectivity with groundwater would not have any effect on WFD water body status. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on connectivity with groundwater. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	Structure of the riparian zone	C-21, C-135 **Riparian vegetation protection and maintenance**	**Trenched cable laying, underground trenchless (HDD) cable watercourse crossings, and underground trenched cable watercourse crossings along the onshore cable corridor:** The installation of underground cables may result in local alterations to the type of riparian vegetation present on the channel margins such that there would be sufficient clearance for periodic cable maintenance and / or repair works during their operational lifetime. However, given that cable maintenance will be minimal and targeted, it is likely that any localised removal of riparian vegetation would be negligible in relation to the length of existing riparian corridors. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on the structure of the riparian zone. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Physico-chemical quality elements	Ammonia (Phys-Chem) Phosphate	C-123 **Appropriate standoff distances from watercourses for trenchless pits**	**Trenched cable laying, underground trenchless (HDD) cable watercourse crossings, and underground trenched cable watercourse crossings along the onshore cable corridor:**

Water Framework Directive (WFD) element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water environment, Volume 2)	Assessment of effects on WFD
Chemical quality elements	Dissolved oxygen Temperature Specific Pollutants, Priority substances and Priority Hazardous substances	C-130, C-131, C-133, C-135 **Appropriate standoff distances and methodologies for topsoil stockpiling** C-19, C-29, C-141, C-154 **Good construction practices for trenching** C-69, C-143 **Materials Management Plan and Unexpected Contamination Protocol** C-3, C-5, C-17, C-18, C-19, C-122, C-138, C-139 **Appropriate (Trenchless and Trenched) cable watercourse crossing design and installation** C-19, C-29, C-141, C-154 **Good construction practices for trenching** C-8, C-76, C-129, C-149, C-151, C-167 **Pollution prevention and remediation**	Small indirect effects on the existing baseline water quality could occur via the disturbance of contaminated sediments. This could be within the channel and / or on the river banks at the location of trenched underground cable watercourse crossing installations, or the disturbance of contaminated surface sediments at HDD starter and exit pits or where cables are trenched through the floodplain and / or close to watercourses. This risk is greatest in respect of trenched underground cable crossings where a short term 'pulse' of contaminated water quality could propagate downstream once the flow is reconnected following the completion of cable installation and the reinstatement of bed and bank materials. However, it could also potentially occur as a result of the short-term soil stockpiling alongside the trenched onshore cable corridor adjacent to watercourses. Considering the embedded environmental measures and the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on WFD water body status. Where construction / decommissioning and maintenance works coincide with areas that have historic landfills (for instance near Brookbarn and Old Mead Landfills north west of Littlehampton) the risk would be higher. These areas are identified in **Chapter 25: Ground conditions, Volume 2**, and appropriate embedded environmental measures on materials management and unexpected contamination protocol have been identified within to manage any effects on water quality. Direct effects, specifically on WFD chemical status, could occur as a result of accidental spillage or leakage of Polycyclic Aromatic Hydrocarbons (PAHs) associated with vehicle / machinery fuels and oils, or metals (from machinery itself) at or adjacent to the location of the trenched cable route, trenched cable watercourse crossing or HDD starter/exit pits. Whilst the embedded environmental measures relating to pollution prevention and remediation are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks directly into or adjacent to the watercourse) cannot be discounted. However, considering the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of localised and short duration changes in water quality would not have any effect on WFD water body status. **Effects on identified Physico-chemical and Chemical quality elements:** Based on the criteria set out in **Table 27-18** of **Chapter 27, Volume 2**, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change associated with underground cables. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Biological quality elements	Fish, Macrophytes and phytobenthos, and invertebrates	C-28 **Land drainage management** C-3, C-5, C-17, C-18, C-19, C-122, C-138, C-139 **Appropriate (trenchless and trenched) cable watercourse crossing design** C-123 **Appropriate standoff distances from watercourses for trenchless pits** C-19, C-29, C-141, C-154 **Good construction practices for trenching**	**Trenched cable laying, underground trenchless (HDD) cable watercourse crossings, and underground trenched cable watercourse crossings along the onshore cable corridor:** Effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and/or water quality of a watercourse that collectively make up the habitat upon which fish, macrophytes / phytobenthos and invertebrates are dependent. The main potential effect would be specifically related to the mobilisation of sediments from cable crossings and short term soil stockpiling adjacent to the watercourses. This could result in a short term pulse of sediments downstream, which could in turn harm the habitats of fish, macrophytes and phytobenthos, and invertebrates. Considering the successful implementation of embedded environmental measures and the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of these localised and short duration changes on biological quality elements would not have any effect on WFD water body status.

Water Framework Directive (WFD) element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water environment, Volume 2)	Assessment of effects on WFD
		C-8, C-76, C-129, C-149, C-151, C-167 **Pollution prevention and remediation** C-69, C-143 **Materials Management Plan and Unexpected Contamination Protocol**	**Effects on identified on Biological quality elements:** Based on the criteria set out in Table 27-16 of Chapter 23, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Very Low magnitude of change associated with cable crossings, and soil stockpiling. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
TRANSITIONAL AND COASTAL BODIES (Lower Arun, and Adur TrAC and Sussex Coastal) The activities, potential effects and embedded environmental measures presented above are of relevance to onshore activities proposed within the catchment of the Transitional Lower Arun and Adur waterbodies. The trenchless crossings of the Lower Arun and trenched crossings of unnamed unreportable ditch channels of the Adur are of most relevance. The conclusions of the assessment of effects on WFD elements and sub elements are applicable to these transitional water bodies. Therefore, based on the successful implementation of the embedded environmental measures, each potential effect is not likely to have a significant impact on these water bodies status' and there would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development. It is assumed that the embedded environmental measures associated with these activities provide a sufficient level of protection for the Sussex Coastal WFD water body. Any residual effects would be very minimal given the distance from the to the coastal water body as well as the considerable dilution associated with the pathway of the effects to this receptor. There would be no effects on the WFD status of any of the Transitional and Coastal water bodies in the Study Area as a result of onshore landfall and cabling works.			
GROUNDWATER BODIES (Littlehampton Anticline West, Littlehampton Anticline East, Sussex Lambeth Group, Lower Greensand Adur and Ouse)			
Groundwater Level elements	Quantitative dependent surface water body status	C-77, C-141, C-142 **Management of dewatered groundwater, and Environmental Permit for Discharge Activity** C-3, C-5, C-17, C-18, C-19, C-122, C-138, C-139 **Appropriate (trenchless and trenched) cable watercourse crossing design and installation** C-19, C-29, C-141, C-154 **Good construction practices for trenching**	**Dewatering effects during underground cable trenching, trenched and trenchless crossings along the onshore cable corridor on spring flows and base flows to watercourses:** During underground onshore cable construction, trenches and trenchless methods may require dewatering to remove shallow inflows of groundwater. Where these construction methods are located within aquifers, these aquifers may be a source of groundwater flow to springs and base flow to watercourses that could be reduced by dewatering. Any springs or watercourses with a potential connection to the Proposed Development have been identified in Chapter 27. On the basis of embedded environmental measures being implemented, this effect is considered to be insignificant and unlikely to cause a deterioration in quantitative status for the good status groundwater bodies in the Water Environment Study Area.
Groundwater Level elements	Groundwater dependent terrestrial ecosystems (GWDTEs)	C-77, C-141, C-142 **Management of dewatered groundwater, and Environmental Permit for Discharge Activity** C-3, C-5, C-17, C-18, C-19, C-122, C-138, C-139 **Appropriate (Trenchless and Trenched) cable watercourse crossing design and installation**	**Dewatering effects during underground cable trenching, trenched and trenchless crossings along the onshore cable corridor on groundwater levels in GWDTEs** In Chapter 27, Volume 2 (Appendix 27.1, Volume 4) a number of potential GWDTEs have been identified within the Water Environment Study Area, with a potential connection to the Proposed Development. These wetlands are therefore being treated as potential quantitative receptors. On the basis of embedded environmental measures being implemented, it is considered that any effect on the groundwater quantity serving these receptors would be negligible and unlikely to cause a deterioration in quantitative status for their associated groundwater bodies.

Water Framework Directive (WFD) element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water environment, Volume 2)	Assessment of effects on WFD
		C-19, C-29, C-141, C-154 **Good construction practices for trenching**	
Groundwater chemical elements	Groundwater dependent terrestrial ecosystems (GWDTEs)	**Site Investigation Works at higher risk locations along the temporary onshore construction corridor** C-69, C-143 **Materials Management Plan and Unexpected Contamination Protocol** C-8, C-76, C-129, C-149, C-151, C-167 **Pollution prevention and remediation**	**Groundwater quality effects on GWDTEs from mobilisation of historic land contamination** Historic land contamination represents a baseline situation in certain sections of the route (e.g. Brookbarn and Old Mead Landfills north west of Littlehampton) as identified in **Chapter 25: Ground conditions, Volume 2**. Earth movements during the Construction phase of the Proposed Development has the potential to re-mobilise contaminants and, if a suitable pathway exists to groundwater, contaminate groundwater in aquifers supporting groundwater levels in GWDTEs. The GWDTEs which have been identified in **Chapter 27, Volume 2** are situated remotely away from these potential higher risk areas of known contamination. Potential effects will be mitigated by site investigation and embedded good practice construction methods (such as the Materials Management Plan, Unexpected Contamination Protocol and a Pollution Prevention Plan) to prevent deterioration in status due to pollution of GWDTEs through a groundwater pathway.
Groundwater chemical elements	General chemical test	**Site investigation works at higher risk locations along the temporary onshore construction corridor** C-69, C-143 **Materials Management Plan and Unexpected Contamination Protocol** C-8, C-76, C-129, C-149, C-151, C-167 **Pollution prevention and remediation**	**Groundwater quality effects from historic land contamination** Historic land contamination represents a baseline situation in certain sections of the route (e.g. Brookbarn and Old Mead Landfills north west of Littlehampton) as identified in **Chapter 25, Volume 2**. Earth movements during the Construction phase of the Proposed Development has the potential to re-mobilise contaminants and, if a suitable pathway exists to groundwater, contaminate groundwater in a Principal or Secondary aquifer. Potential effects will be mitigated by site investigation works and embedded good practice construction methods (such as the Materials Management Plan, Unexpected Contamination Protocol and a Pollution Prevention Plan) to prevent deterioration in status due to contamination of aquifers.

Table C-2 Further impact assessment for onshore temporary construction haul roads and associated watercourse crossings (including bridges and culverts)

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
RIVER WATER BODIES (Ryebank Rife, Black Ditch (W Sussex), Honeybridge Stream, Adur (Lockbridge), Adur East (Sakeham), Cowfold Stream, Adur (East)			
Hydromorphological Supporting Elements	Quantity and dynamics of flow	C-119, C-120, C-175 **Appropriate haul road design and installation** C-120, C-129 **Works areas constructed from semi – permeable aggregate where possible** C-77, C-141, C-142 **Management of dewatered groundwater, and Environmental Permit for Discharge Activity** C-130, C-131, C-133, C-135 **Appropriate standoff distances and methodologies for topsoil stockpiling** C-73, C-121, C-140 **Effective drainage so as to not increase baseline runoff rates** As above, plus: C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177, C-178. **Appropriate haul road watercourse crossing design and implementation**	**Temporary construction haul roads** There would be no effects on quantity and dynamics of flow as there would be no in channel works or alterations to the flow regime following the implementation of embedded environmental measures. **Temporary construction clear-span watercourse crossings** There would be no effects on quantity and dynamics of flow as there would be no in channel works or alterations to the flow regime associated with the construction of clear span access track watercourse crossings following the implementation of embedded environmental measures. **Temporary construction culverted watercourse crossings** The construction of culverted access track watercourse crossings would generally be achieved by localised damming of the flow upstream of the proposed crossing location, with overpumping of water to leave a dry area in which to install the culvert. This would naturally lead to a period of localised flow regime alteration. During this period, which is likely to be less than two days in duration, there would be a temporary change in both the quantity and dynamics of flow over a localised distance upstream downstream of each crossing. The upstream damming is likely to locally increase water quantity and reduce flow / velocity variability due to the impounding of flow. The extent to which these effects will propagate upstream of the dam would depend on the amount of flow within and gradient of the watercourse. The discharge location of the overpumped water, downstream of the crossing, is likely to be a point discharge rather than being spread across the full width of the channel. However, it is anticipated that the full channel width would be occupied with normal flow quantity and variability within a short distance of the discharge point. The channel that falls between the damming and discharge points would have all recognisable flow removed from it until the culvert is installed and overpumping of water is no longer necessary. This is likely to be less than one day in duration. Whilst these local alterations to the quantity and dynamics of flow are not insignificant, the effects would be fully reversible once the flow is re-connected following culvert installation. Once the culvert is installed, the baseline quantity of water within the channel would be re-established. Given the introduction of a straight and homogeneous culvert lining, it is likely that there may be some localised changes to more uniform flow types as water passes under the culvert. However, as the conveyance capacity of the channel would not be reduced as a result of any watercourse crossing, it is unlikely that any local change in flow dynamics would propagate any further than 10m up or downstream of the culvert itself.

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
			Considering the scale and duration of these activities in the context of WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the effects of these localised changes in the quantity and dynamics of flow would not have any effect on WFD water body status following the implementation of embedded environmental measures. Furthermore, as all of the access track watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2 there would be a Low magnitude of change on quantity and dynamics of flow. However, this would be for a very short duration and would be reversible. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	River continuity (lateral and longitudinal)	None required C-17, C-182 **Appropriate environmental permits and land drainage consents** C-135 **Appropriate standoff distances** C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177, C-178. **Appropriate haul road watercourse crossing design and implementation** As above	**Temporary construction haul Roads** As temporary construction haul roads would not involve any in channel works, and therefore would not affect the ability of water to connect either upstream / downstream or laterally with the adjacent floodplain, there would be no effects associated with river continuity. **Temporary construction clear-span watercourse crossings** There would be no effects on river continuity as there would be no in channel works (e.g. piers or bank reinforcement) or alterations to the flow regime associated with the construction of clear span access track watercourse crossings following the implementation of embedded environmental measures. **Temporary construction culverted watercourse crossings** The temporary construction culverted access track watercourse crossings themselves would be enclosed structures that would result in a very minor / localised reduction of the lateral connectivity of river flow with the adjacent floodplain. Furthermore, as the culverts would be solid structures, they would locally restrict the ability of the watercourse to alter its planform via changes to bed and bank morphology through changing erosion / deposition patterns. Whilst culvert beds are likely to reduce the flow resistance relative to the background conditions (i.e. the existing river channel boundary), the conveyance capacity of the channel would not be reduced as a result of any watercourse crossing, in line with the embedded environmental measures. This would be accommodated through appropriate hydraulic design, and via the permitting process for in-channel works. Therefore, it would be unlikely for there to be any discernible change in water and / or sediment transfer relative to baseline conditions. The number of temporary haul road culvert crossings are still to be identified and will be subject to further investigation at the Environmental Statement (ES) stage. However, on the basis that trenchless crossings will not require haul road crossings, it is assumed that there will be a similar number to the number of open cut watercourse / drain crossings (27) identified in the draft crossing schedule in Appendix 4.2: Crossings schedule, Volume 4.

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
			Based on a worst case estimate of width at 10m, there would be a total of 270m of culverted watercourse. These would be installed for a period of three years, during construction, after which they would be removed. This total culvert length would represent approximately 0.6% of the total length of mapped WFD principal watercourses in the Water Environment Study Area (48km). Even based on these reasonable worst case assumptions, the scale of culverting is considered to be minimal. Considering the scale and duration of these activities in the context of WFD water body size, there is a high degree of confidence that the effects of any localised changes in the river continuity would not have any effect on WFD water body status. Furthermore, as all of the road track watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on river continuity. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	River width and depth variation	None required C-17, C-182 **Appropriate environmental permits and land drainage consents** C-135 **Appropriate standoff distances** C-17, C-64, C-126, C-127, C-128, C-139, C-145 C-177, C-178. **Appropriate haul road watercourse crossing design and implementation** As above	**Temporary construction haul Roads** There would be no effects on river width and depth variation as there would be no in channel works. **Temporary construction clear-span watercourse crossings** There would be no effects on river width and depth variation as there would be no in channel works (e.g. piers or bank reinforcement) or alterations to the flow regime associated with the construction of clear span access track watercourse crossings, provided bridge abutments are set back sufficiently from the banktop. This would be secured via the implementation of embedded environmental measures. **Temporary construction culverted watercourse crossings** The temporary construction culverted access track watercourse crossings would have a localised effect on both the planform and cross-sectional form of all relevant watercourses. The culverts would introduce a straight planform and a uniform cross-section. The degree of change that this may introduce would be dependent on the type of watercourse in question. For example, a culverted crossing of a man-made drainage ditch (making up approximately 10 of the 27 (cable) watercourse crossings) is unlikely to introduce much of a change relative to the baseline planform and cross-section of the channel. However, culverted crossings of relatively natural watercourses (making up approximately 17 of the 27 (cable) watercourse crossings) are likely to experience a greater magnitude of change as their baseline width and depth variability is likely to be greater. However, as the maximum culvert crossing would not extend beyond 10m of river length, it is reasonable to conclude that these effects would be very localised. Furthermore, the avoidance of locating culverts in obviously mobile reaches of watercourse would further limit any change in width and depth variation relative to the baseline conditions.

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
			Considering the scale of any effects in the context of WFD water body size (as presented above, the entire culverted length across the Study Area is only ~0.6% of the length of the mapped length of principal WFD watercourses in the Water Environment Study Area), there is a high degree of confidence that the effects of these localised changes on river width and depth variation would not have any effect on WFD water body status. Furthermore, as the majority of access track watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on river width and depth variation. There would be no need to provide mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	Structure and substrate of the river bed	None required C-17, C-182 **Appropriate environmental permits and land drainage consents** C-135 **Appropriate standoff distances** C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177, C-178. **Appropriate haul road watercourse crossing design and implementation** As above	**Temporary construction haul roads** There would be no effects on structure and substrate of the river bed as there would be no in channel works. **Temporary construction clear-span watercourse crossings** There would be no effects on structure and substrate of the river bed as there would be no in channel works (e.g. piers or bank reinforcement) or alterations to the flow regime associated with the construction of clear span haul road watercourse crossings. **Temporary construction culverted watercourse crossings** The culverted haul road watercourse crossings would present a localised alteration to the structure and substrate of the river bed. This is as a result of the culvert introducing a short section of new physical modification that would be composed of hard/resistant material. In most circumstances this will replace the existing bed material, which may range from gravels / cobbles for more natural watercourses to fine grained / silty beds on man-made drainage ditches. Considering the scale of any effects in the context of WFD water body size (as presented above, the entire estimated culverted length across the Water Environment Study Area is only ~0.5% of the length of the mapped length of principal WFD watercourse), there is a high degree of confidence that the effects of these localised changes on the structure and substrate of the river bed would not have any effect on WFD water body status. Furthermore, as all of the haul road watercourse crossings would be temporary (in place for <3 years), any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of **Chapter 27: Water Environment,** and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on the structure and substrate of the river bed. There would be no need to provide mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	Connectivity with groundwater	None required	**Temporary construction haul Roads** There would be no effects on the connectivity between the river and groundwater as there would be no in channel works.

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
		None required C-17, C-182 **Appropriate environmental permits and land drainage consents** C-135 **Appropriate standoff distances** C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177, C-178. **Appropriate haul road watercourse crossing design and implementation**	**Temporary construction clear-span watercourse crossings** There would be no effects on the connectivity between the river and groundwater as there would be no in channel works. **Temporary construction culverted watercourse crossings** Given the scale of the culverts under consideration (reasonable worst case of 10m in the downstream direction) and the fact that they would not extend sufficiently beyond the depth of the current bed level, there is a high degree of confidence that any localised disturbance of the connectivity between watercourses and the underlying groundwater bodies would be negligible. Considering the scale of any effects in the context of WFD water body size (both river and groundwater), there is a high degree of confidence that the effects of these localised changes on the connectivity with groundwater would not have any effect on WFD water body status. Furthermore, as all haul road watercourse crossings would be temporary (in place for < 3 years), any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on connectivity with groundwater. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Hydromorphological Supporting Elements	Structure of the riparian zone	C-21, C-135 **Riparian vegetation protection and maintenance** C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177, C-178. **Appropriate haul road watercourse crossing design and implementation**	**Temporary construction haul road clear-span watercourse crossings and culverted watercourse crossings** The culverted haul road watercourse crossings may result in local alterations to the type of riparian vegetation present on the channel margins such that the track or crossing can be built with sufficient space to accommodate the vehicles that would be used to transport materials to works locations. However, considering the size of the proposed tracks and crossings, it is likely that any localised removal of riparian vegetation would be negligible in relation to the length of the existing riparian corridor. Considering the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of these localised changes on the structure of the riparian zone would not have any effect on WFD water body status. Furthermore, as each of the haul road watercourse crossings would be temporary (in place for <3 years), any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on the structure of the riparian zone. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
Physico-chemical quality elements Chemical quality elements	Ammonia (Phys-Chem) Phosphate Dissolved oxygen Temperature Specific Pollutants, Priority substances and Priority Hazardous substances	C-17, C-182 **Appropriate environmental permits and land drainage consents** C-135 **Appropriate standoff distances** C-119, C-120, C-175 **Appropriate haul road design and installation** C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177, C-178. **Appropriate haul road watercourse crossing design and implementation** C-77, C-141, C-142 **Management of dewatered groundwater, and Environmental Permit for Discharge Activity** C-130, C-131, C-133, C-135 **Appropriate standoff distances and methodologies for topsoil stockpiling** C-69, 143 **Materials Management Plan and Unexpected Contamination Protocol** C-8, 76,129, 149, 151, 167 **Pollution prevention and remediation**	**Temporary construction haul Road clear-span watercourse crossings and culverted watercourse crossing** Small indirect effects on the existing baseline water quality could occur via the disturbance of contaminated sediments within the channel and / or on the river banks at the location of culvert or clear span installation or the disturbance of contaminated surface sediments where access tracks are constructed on the floodplain and / or close to watercourses. This risk is greatest in respect of culvert watercourse crossings where a short term 'pulse' of contaminated water quality could propagate downstream once the flow is reconnected following culvert completion, although it could also occur as a result of soil stockpiling for access track construction adjacent to watercourses. However, considering the embedded environmental measures, and the scale of any effects in the context of WFD water body size (as presented above, the estimated culverted length across the Water Environment Study Area is only ~0.6% of the length of the mapped length of principal WFD watercourse), there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on WFD water body status. Direct effects, specifically on WFD chemical status, could be with accidental spillage or leakage of Polycyclic Aromatic Hydrocarbons (PAHs) associated with vehicle / machinery fuels and oils, or metals (from machinery itself) at or adjacent to the location of culvert or clear span bridge installation. Whilst the embedded environmental measures are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks directly into or adjacent to the watercourse) cannot be discounted. However, considering the embedded environmental measures, and the scale of any effects in the context of WFD water body size (as presented above, the entire culverted length across the Water Environment Study Area is only ~0.6% of the length of the mapped length of principal WFD watercourse), there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on WFD water body status. **Effects on identified Physico-chemical and Chemical quality elements:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change associated with haul roads and their watercourse crossings. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Biological quality elements	Fish, Macrophytes and phytobenthos, and invertebrates	C-17, C-64, C-126, C-127, C-128, C-139, C-145, C-177, C-178. **Appropriate haul road watercourse crossing design and implementation** C-8, C-76, C-129, C-149, C-151, C-167 **Pollution prevention and remediation**	**Temporary construction haul road clear-span watercourse crossings and culverted watercourse crossings** Effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and/or water quality of a watercourse that collectively make up the habitat upon which fish, macrophytes / phytobenthos and invertebrates are dependent. The main potential effect would be specifically related to the mobilisation of sediments from clear span watercourse crossings and watercourse crossings. This could result in a short term pulse of sediments downstream, which could in turn harm the habitats of fish, macrophytes and phytobenthos, and invertebrates.

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
		C-69, C-143 **Materials Management Plan and Unexpected Contamination Protocol**	Considering the successful implementation of embedded environmental measures and the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of these localised and short duration changes on biological quality elements would not have any effect on WFD water body status. **Effects on identified on Biological quality elements:** Based on the criteria set out in **Table 27-16** of **Chapter 23, Volume 2**, and considering the implementation of the embedded environmental measures, there would be a Very Low magnitude of change associated with haul road watercourse crossings. As such there would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
TRANSITIONAL AND COASTAL BODIES (Lower Arun, and Adur TrAC and Sussex Coastal) The activities, potential effects and embedded environmental measures presented above are of relevance to onshore activities proposed within the catchment of the Transitional Lower Arun and Adur waterbodies. The trenchless crossings of the Lower Arun and trenched crossings of unnamed unreportable ditch channels of the Adur are of most relevance. The conclusions of the assessment of effects on WFD elements and sub elements are applicable to these transitional water bodies. Therefore, based on the successful implementation of the embedded environmental measures each potential effect is not likely to have a significant impact on these water bodies status' and there would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development. It is assumed that the embedded environmental measures associated with these activities provide a sufficient level of protection for the Sussex Coastal WFD water body. Any residual effects would be very minimal given the distance from the to the coastal water body as well as the considerable dilution associated with the pathway of the effects to this receptor. There would be no effects on the WFD status of any of the Transitional and Coastal water bodies in the Study Area as a result of temporary haul road works and their associated watercourse crossings.			
GROUNDWATER BODIES – None screened in for this activity (due to shallow nature of works)			

Table C-3 Further impact assessment for onshore temporary construction compounds and the new onshore substation

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
RIVER WATER BODY (Ryebank Rife, Black Ditch (W Sussex), Honeybridge Stream, Adur (Lockbridge), Adur East, Cowfold Stream)			
Hydromorphological Supporting Elements	All sub-elements, and specifically structure and substrate of the river bed	C-121, C-140 **Effective drainage so as to not increase baseline runoff rates** C-130, C-131, C-133, C-135 **Appropriate standoff distances and methodologies for topsoil stockpiling** C-27, C-73, C-120, C-129 **Good construction practices for compounds including drainage strategy** C-8, C-76, C-129, C-149, C-151, C-167 **Pollution prevention and remediation** C-120, C-129 **Works areas constructed from semi – permeable aggregate where possible** C-28 **Land drainage management**	There would be no direct effects on hydromorphology as there would be no in channel works or alterations to the flow regime. However, the initial ground works associated with these infrastructure types would result in the short-term exposure and disturbance of sediment. This is expected to be managed by embedded environmental measures such that the levels of fine-grained sediment delivered to adjacent watercourses would be minimised as far as practicable. However, there may be a very minor, short-duration and localised change in the structure and substrate of the river bed associated with delivery of fine-grained sediment that is elevated relative to baseline levels. Furthermore, any indirect effects on river flow regime would be managed via measures to ensure infiltration of any locally displaced runoff. **Effects on hydromorphology quality elements:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on the structure and substrate of the river bed. There would be no need to provide mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Physico-chemical quality elements Chemical quality elements	Ammonia (Phys-Chem) Phosphate Dissolved oxygen Temperature Specific Pollutants, Priority substances and Priority Hazardous substances	C-130, C-131, C-133, C-135 **Appropriate standoff distances and methodologies for topsoil stockpiling** C-27, C-73, C-120, C-129 **Good construction practices for compounds including drainage strategy** C-8, C-76, C-129, C-149, C-151, C-167 **Pollution prevention and remediation** C-120, C-129 **Works areas constructed from semi – permeable aggregate where possible**	Temporary construction compounds and potential onshore substation areas that are scoped in for further assessment are those located within Flood Zone 3 or within 25m from any watercourse. The objective of these scoping thresholds is to ensure that effects on water quality associated with the activities at these areas are fully accounted for. Effects during construction would principally be associated with activities that would involve the disturbance of sediments that have a pathway to the adjacent watercourse via runoff. This would particularly be associated with high rainfall periods or during a flood but is expected to be fully managed by the incorporation of embedded environmental measures.

WFD element	WFD sub element	Embedded environmental measures (C) and their subjects of particular relevance (described further in Chapter 27: Water Environment)	Assessment of effects on WFD
			Furthermore, effects, specifically on WFD chemical status, could be associated with accidental spillage or leakage of Polycyclic Aromatic Hydrocarbons (PAHs) associated with vehicle / machinery fuels and oils, or metals (from machinery itself) that could have a pathway to an adjacent watercourse. The same effects could be associated with the disturbance and mobilisation of contaminated sediment that forms part of the baseline conditions. Whilst the embedded environmental measures are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks) cannot be discounted. However, considering the embedded environmental measures, and the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on WFD water body status. **Effects on identified Physico-chemical and Chemical quality elements:** Based on the criteria set out in Table 27-18 of Chapter 27, Volume 2, and considering the implementation of the embedded environmental measures, there would be a Negligible magnitude of change on the structure of the riparian zone. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Biological quality elements	Fish, Macrophytes and phytobenthos, and invertebrates	None required	Effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and /or water quality of a watercourse that collectively make up the habitat upon which fish, macrophytes / phytobenthos and invertebrates are dependent. Given that no effects on hydromorphology or water quality (physico-chemical and chemical) WFD element status have been identified as a result of temporary construction compounds and onshore substation works, it is logical to conclude that there would also be no effects on the WFD status of any biological quality elements.
TRANSITIONAL AND COASTAL BODIES (Lower Arun, and Adur TrAC and Sussex Coastal) The activities, potential effects and embedded environmental measures presented above are of relevance to onshore activities proposed within the catchment of the Transitional Lower Arun and Adur waterbodies. The conclusions of the assessment of effects on WFD elements and sub elements are applicable to these transitional water bodies. Therefore, based on the successful implementation of the embedded environmental measures each potential effect is not likely to have a significant impact on these water bodies status' and there would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development. It is assumed that the embedded environmental measures associated with these activities provide a sufficient level of protection for the Sussex Coastal WFD water body. Any residual effects would be very minimal given the distance from the to the coastal water body as well as the considerable dilution associated with the pathway of the effects to this receptor. There would be no effects on the WFD status of any of the Transitional and Coastal water bodies in the Study Area as a result of the temporary construction compounds and works associated with the installation of the new onshore substation.			
GROUNDWATER BODIES – None screened in for this activity (due to shallow nature of works)			

Table C-4 Further impact assessment for proposed marine infrastructure activities

WFD element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance	Assessment of effects on WFD
Biology	Habitats	**C-43** The subsea export cable ducts will be drilled underneath the beach using horizontal directional drill (HDD) techniques. **C-45** Where possible, subsea cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	**Temporary habitat loss** Offshore export cable installation may result in temporary habitat loss/disturbance of up to 0.13km^2 within the Sussex water body during the construction phase. No direct interaction with the habitats, including the saltmarsh and subtidal kelp, from the installation of offshore infrastructure is anticipated within the Arun water body. A characterisation of the benthic and subtidal habitats which may be directly or indirectly impacts by Rampion 2 is provided in **Chapter 9: Benthic subtidal and intertidal ecology, Volume 2**. The benthic habitats that characterise the Rampion 2 PEIR Assessment Boundary are not geographically restricted to within the offshore part of the PEIR Assessment Boundary and are typically widespread throughout the wider eastern English Channel region (as described in **Chapter 9, Volume 2**), therefore the temporary habitat disturbance during construction activities would have an impact on a limited footprint only compared to their overall extent. The sensitivity of all subtidal biotopes that have been predicted to characterise the Rampion 2 PEIR Assessment Boundary have been assessed according to the detailed Marine Evidence based Sensitivity Assessment (MarESA) sensitivity assessments (as described in **Chapter 9, Volume 2**). This assessment has determined that all biotopes have a 'low' to 'medium' sensitivity to a disturbance of this nature and an associated 'medium' to 'high' degree of tolerance to this impact. Comparable habitats are distributed within the wider region and eastern English Channel. Therefore, given the relatively small spatial scales for the total temporary habitat disturbance, this loss is not expected to undermine regional ecosystem functions or diminish biodiversity. If a section of the cable became exposed or damaged it would require reburial and / or replacement. Reburial (or replacement) would be undertaken using similar techniques to those associated with cable installation activities. The lengths of exposed cable would be shorter, the potential impacts would likely be more localised and to occur over a shorter duration than those considered during the construction phase. This is supported by Department for Business Enterprise & Regulatory Reform (BERR) (2008) which noted that the impact of cable reburial operations mainly relates to a localised and temporary re-suspension and subsequent settling of sediments (see Water Clarity below). Since the loss of habitats is only temporary and recovery will occur, deterioration is only predicted to be on a small scale and only for a limited period of time. As such there is not predicted to be a deterioration in the ecological status of this waterbody receptor. The Proposed Development therefore considered to be compliant with the WFD requirements and there would not be a deterioration in the status of the Sussex or Arun waterbodies. **Long-term or permanent habitat loss** The presence of cable protection measures used at cable crossings and areas where cable burial is not possible, will lead to a change from a sedimentary habitat to one characterised by hard substrate. This will be either a long-term habitat loss (for the 30-year design life duration of the project) or a permanent change and is therefore considered an impact of the operation and maintenance phase of the development and potentially beyond. It is assessed here as habitat loss and a potential adverse effect (due to the potential shift in the baseline condition), although it is noted that this also comprises potential beneficial effects, providing new habitats for different faunal assemblages to colonise, resulting in a likely increase in biodiversity and biomass. The maximum footprint for all cable protection in the offshore cable corridor is 61,000m^2. It should also be noted that no long-term habitat loss will occur in the intertidal area of the Rampion 2 offshore cable corridor as cable protection will not be used in this area. As assessed in described in **Chapter 9, Volume 2**, while the impact will be locally significant and comprise a long-term or permanent change in seabed habitat within the footprint of the cable protection, the footprint of the area affected is highly localised. As the habitats and characterising biotopes are not geographically restricted to the PEIR Assessment Boundary and are generally widespread throughout the

WFD element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance	Assessment of effects on WFD
			wider region. The loss of these habitats is assessed as discernible and does not threaten the long-term viability of the benthic resource within the PEIR Assessment Boundary (as described in **Chapter 9, Volume 2**). As such there is not predicted to be a deterioration in the ecological status of this waterbody receptor. The proposed development therefore considered to be compliant with the WFD requirements and there would not be a deterioration in the status of the Sussex or Arun waterbodies.
Biology	Invasive non-native species (INNS)	**C-95** The assessment will take into consideration the mitigation and control of invasive species measures that will be incorporated into an Outline Project Environmental Monitoring and Management Plan (PEMMP).	An assessment of the increased risk of introduction or spread of marine INNS due to presence of infrastructure and vessel movements associated with the Proposed Development is provided in **Chapter 9, Volume 2**. There is a risk that the introduction of hard substrate into a sedimentary habitat will enable the colonisation of the introduced substrate by invasive/ non-indigenous species that might otherwise not have had a suitable habitat for colonisation, thereby enabling their spread. This along with the movement of vessels in and out of the offshore export cable corridor has the potential to impact upon benthic ecology and biodiversity locally and in the broader region. Colonisation in general may result in an overall increased biodiversity; however, it represents a change from the baseline that occurs in the area. Whether this is considered a positive or negative can be subjective, and both are possible. Positive effects could include an increase in abundance of commercially important invertebrate species, which would benefit commercial fisheries. Negative effects could include providing habitat that may allow the establishment of non-native species. Rock outcroppings are known to occur throughout the region; therefore, the introduction of hard substrate will not fundamentally change the type of available habitats available within the wider study area. The existing rocky outcrops may already act as a vector for the spread of INNS. Therefore, the addition of cable protection within the offshore export cable corridor is not considered to provide a significant risk in the spread of INNS. There is a risk that through increased vessel movements during construction will contribute to the risk of introduction or spread of INNS through ballast water discharge. There will be up to 2,576 and 33,390 round trips to port during the construction phase and operation and maintenance phase respectively. However, the movement of commercial vessels is common throughout the region (**Chapter 14: Shipping and navigation, Volume 2**) and this provides an existing and potentially more likely method of transport for INNS species (due to the higher variety of ports and passage routes). Embedded environmental measures which include an Outline PEMMP with a biosecurity plan (C-95) will ensure that the risk of potential introduction and spread of INNS from increased vessel activity is minimised. As noted in **Chapter 9, Volume 2**, the region is not a pristine environment in terms of the absence of INNS. Therefore, taking into the existing hard substrate within the waterbody, existing vessel movements and the proposed management of INNS, there is not predicted to be a deterioration in the status of the waterbody receptor in the Sussex or Arun waterbodies.
Water Quality	Clarity	**C-43** The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques**.** **C-45**	As presented in **Chapter 6: Coastal Processes, Volume 2**, the potential extent, duration and concentration of suspended sediment plumes is assessed using a combination of the available evidence base, and project specific spreadsheet based numerical models. The potential extent and thickness of sediment deposition is assessed using a combination of the available evidence base, and project specific spreadsheet based numerical models has also been assessed. The change is assessed in terms of the difference caused, relative the normal range of natural occurrence and variability. Further details are provided in **Chapter 6, Volume 2** and **Appendix 6.1: Coastal Processes Technical Report: Impact Assessment, Volume 4.** Cable burial is the preferred option for cable protection. The cable burial will be informed by the cable burial risk assessment and detailed within the cable specification plan (C-45). The potential effects of sediment release due to cable burial are typically localised to the cable route or the active cable burial location. Jetting and mass flow excavation methods have the greatest potential to energetically fluidise and

WFD element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance	Assessment of effects on WFD
		Where possible, subsea cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.	eject material from the trench into suspension. By contrast, the other cable installation techniques (e.g. ploughing or cutting) are expected to re-suspend a smaller amount of material into the water column. The main findings of the assessment of cable burial can be summarised as follows: 1 Medium to coarse sand and gravels are likely to result in a temporally and spatially limited plume affecting suspended sediment concentration (SSC) levels (and settling out of suspension) in close proximity to the point of release. SSC will be locally elevated within the plume close to active cable burial up to tens or hundreds of thousands of mg/l. However, the change will only be present for a very short time locally, in the order of seconds to tens of seconds for sand or gravel, before the material resettles to the seabed. Depending on the height to which the material is ejected and the current speed at the time of release, changes in SSC and deposition will be spatially limited to within metres (up to 20 m) downstream of the cable for gravels and within tens of metres (up to a few hundred metres) for sands; 2 Finer material will be advected away from the release location by the prevailing tidal current. High initial concentrations (similar to sands and gravels) are to be expected but will be subject to rapid dispersion, both laterally and vertically, to near-background levels (tens of mg/l) within hundreds to a few thousands of metres of the point of release. In practice, only a small proportion of the material disturbed is expected to be fines, with a corresponding reduction in the expected levels of SSC; and 3 Irrespective of sediment type, the volumes of sediment being displaced and deposited locally are relatively limited (up to 3m³ per metre of cable burial) which also limits the combinations of sediment deposition thickness and extent that might realistically occur. Fundamentally, the maximum distance from each metre of cable trench over which 3m³ of sediment can be spread to an average thickness of (for example) 0.05m is 60m (or to 0.15m is 20m); any larger distance would correspond to a smaller average thickness. The assessment suggests that the extent and so the area of deposition will normally be much smaller for sands and gravels (although leading to a greater average thickness of deposition in the order of tens of centimetres, up to around one metre) and that fine material will be distributed much more widely, becoming so dispersed that it is unlikely to settle in measurable thickness locally. Based on this evidence, sediment plumes associated with cable burial and seabed preparation are expected to quickly dissipate after cessation of the activities, due to settling and wider dispersion with the concentrations reducing quickly over time to background levels. Therefore, the consequence will be noticeable but brief changes in suspended sediment concentration concentrations occurring during cable installation (or reburial) and preparation within the near-field and the adjacent areas of the far-field. When bentonite is released into the water column owing to its fine nature (clay) it will be advected away from the release location by the prevailing tidal current. High initial concentrations are to be expected but will be subject to rapid dispersion, both laterally and vertically, to near-background levels (tens of mg/l) within hundreds to a few thousands of metres of the point of release. The bentonite may persist for hours to days or longer but will become diluted to very low concentrations (<5 mg/l, indistinguishable from natural background levels and variability) within timescales of around one day. The material will be dispersed widely within the surrounding region and will not settle with measurable thickness. Therefore, given the temporal nature of the works, the Proposed Development therefore is considered to be compliant with the WFD requirements and there would not be a deterioration in the status of the Sussex or Arun water bodies.

WFD element	WFD sub-element	Embedded environmental measures (C) and their subjects of particular relevance	Assessment of effects on WFD
Water Quality	Microbiology	N/A	As detailed above, the proposed offshore activities associated have the potential to increase SSC in the marine environment through the generation of sediment plumes. Increases in SSC and so turbidity may result in a decrease in the depth to which natural light can penetrate into the water column. This in turn may result in an increase in bacterial growth. The mortality of bacteria, including E.coli and IE, within the water column is strongly influenced by the amount of ultraviolet (UV) light penetrating the water column. Under higher UV scenarios the mortality of bacterium is higher. Therefore, the reduced water clarity resulting from the proposed activities, from the release of sediments into suspension, could potentially result in temporary increases in bacterial counts within the water column. If these elevated counts were present at Littlehampton or Middleton-on-sea Bathing Waters during the designated bathing season, this could theoretically cause a deterioration in their performance classification (**Table A-3** of **Annex A**). Though it should be noted that the mortality rates within the sediment are greater than those within the water column. However, given the predicted dilution levels, the temporary nature of the activities, and transport and dispersion of SSC and bacteria by tidal currents it is expected that any bacterial increases in the water column would be in the order of days, i.e. as long as the plumes persisted. Following the sediment plumes dispersion, and subsequent increases in UV light, the bacterial counts in the water column will return to baseline conditions. The resultant decrease in water clarity would be analogous to storm events and the potential resultant changes in microbiology are within the natural variation of the marine environment in the study area during high energy low frequency events. Given the current and historical performance of the Bathing Waters (BWs) (**Table A-3** of **Annex A**) this indicates that the levels of bacteria within the sediments, in close proximity to these BWs, do not result in a reduction in water quality when mobilised during storm events. This suggests that there are not elevated bacterial concentrations in the seabed sediments in the vicinity of the BWs or the offshore export cable corridor. This is also supported by analysis of the Bathing Water Profiles for Middleton-on-sea and Littlehampton which indicated no continuous sources of wastewater were identified. However, it is noted that there were two storm overflows and the natural drainage from the Arun catchment which may impact Littlehampton. Both Bathing Water Profiles indicated one surface water outfall for the respective Bathing Waters. Furthermore, given the short term nature of the potential impact and the anticipated increases in bacteria are considered to be negligible in terms of Bathing Water compliance. No deterioration or non-compliances at the two identified bathing waters are anticipated to occur as a result of the proposed activities, as such no additional mitigation measures are considered necessary.
Protected Areas	Bathing waters: Middleton-on-Sea and Littlehampton	N/A	
Protected Areas	Solent and Dorset Coast SPA	N/A	The identified protected area (Solent and Dorset Coast Special Protection Area (SPA)) has been subjected to a Habitats Regulation Assessment (HRA) process. The Report to Inform Appropriate Assessment applied the conclusions on the potential for a Likely Significant Effect (LSE), as drawn in the Screening Report (**Table A-4** of **Annex A**), with respect to the conservation objectives of the screened in European sites, to determine the potential for an Adverse Effect on Integrity (AEoI). No potential for AEoI has been identified for the Solent and Dorset Coast SPA of relevance to this WFD assessment (**Table A-5** of **Annex C**). Further details are provided in **Draft Report to Inform Appropriate Assessment**.

Table C-5 Conclusions of the Draft RIAA Natura 2000 sites within 2km of the offshore cable corridor

Designated Site	Relevant Features	Conclusion of Adverse Effects on Integrity (AEoI)		
		Construction	**Operation and maintenance**	**Decommissioning**
Solent and Dorset Coast SPA	Common tern	Direct disturbance and displacement – **no AEoI** In-combination effects - **no AEoI**	N/A	Direct disturbance and displacement - **no AEoI** In-combination effects - **no AEoI**
	Sandwich tern	Direct disturbance and displacement – **no AEoI** In-combination effects – **no AEoI**	Direct disturbance and displacement – **no AEoI** In-combination effects – **no AEoI**	Direct disturbance and displacement – **no AEoI** In-combination effects – **no AEoI**
	Little tern	Direct disturbance and displacement – **no AEoI** In-combination effects – **no AEoI**	N/A	Direct disturbance and displacement – **no AEoI** In-combination effects – **no AEoI**

Table C-6 List of embedded environmental measures with reference to the further assessment tables (also presented in the Outline Code of Construction Practice)

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
C-1	The onshore cable route will be completely buried underground for its entire length where practicable.		DCO works plans, description of development and requirements
C-3	At sensitive crossing locations the working width will be reduced as far as practicable.	**Appropriate (trenchless and trenched) cable watercourse crossing design and installation** **Appropriate haul road watercourse crossing design and implementation**	DCO works plans, description of development and requirements
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).	**Appropriate (trenchless and trenched) cable watercourse crossing design and installation**	DCO works plans and order limits
C-6	Where practical, sensitive sites will be avoided by the temporary and permanent onshore project footprint 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).		DCO works plans and order limits
C-7	Post construction, the work area will be reinstated to pre-existing conditions as far as reasonably practical in line with the Materials Management Plan (MMP) (C-69) and Defra 2009 Code of Construction Practice for the Sustainable Use of Soils on Construction Sites PB13298.		Outline Code of Construction Practice (COCP) and DCO requirement
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 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.	**Pollution prevention and remediation**	Outline COCP and DCO requirement
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.		DCO works plans, description of development and requirements
C-10	No blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods.		Outline COCP and DCO requirement
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 separate stockpiles in line with		Outline COCP and DCO requirement

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
	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.		
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 geotextiles will be considered by the principal contractor for sensitive sections of the route to reduce impact.		Outline COCP and DCO requirement
C-17	Where trenchless techniques are not required or are not practical, 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 Environment Agency (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).	**Appropriate (trenchless and trenched) cable watercourse crossing design and installation** **Appropriate haul road watercourse crossing design and implementation** **Appropriate environmental permits and land drainage consents**	Outline COCP and DCO requirement
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	**Appropriate (trenchless and trenched) cable watercourse crossing design and installation;** **Appropriate haul road watercourse crossing design and implementation**	Outline 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 will be installed to enable the cable installation and connection process.	**Appropriate (trenchless and trenched) cable watercourse crossing design and installation;** **Good construction practices for trenching**	Outline COCP and DCO requirement
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).		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 species is removed sensitively and in a legally compliant way.	**Riparian vegetation protection and maintenance**	Outline COCP and DCO articles/ requirement
C-23	Where possible micro-siting will be undertaken during detailed design to avoid ponds.		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.		Outline COCP and DCO requirement

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
C-27	Following construction, construction compounds will be returned to previous conditions as far as reasonably possible.	**Good construction practices for temporary construction compounds including drainage strategy**	Outline COCP and DCO requirement
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 trench. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.	**Land drainage management**	Outline COCP and DCO requirement
C-29	A depth of cover of 1.2m is assumed. Deeper trenches may be required at specific crossing locations (such as watercourses).	**Good construction practices for trenching**	Outline COCP and DCO requirement
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.		Outline COCP and DCO requirement
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.		Outline COCP and DCO requirement
C - 43	The subsea export cable ducts will be drilled underneath the beach using horizontal directional drilling (HDD) techniques.		DCO requirements or DML conditions.
C - 45	Where possible, subsea cable burial will be the preferred option for cable protection. Cable burial will be informed by the cable burial risk assessment and detailed within the Cable Specification Plan.		DCO requirements or DML conditions.
C - 53	An Outline Marine Pollution Contingency Plan (MPCP) will be developed. This MPCP will outline procedures to protect personnel working and to safeguard the marine environment and mitigation measures in the event of an accidental pollution event arising from offshore operations relating to Rampion 2. The MPCP will also include relevant key emergency contact details		DCO requirements or DML conditions.
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.	**Appropriate haul road watercourse crossing design and implementation**	Outline COCP and DCO requirement

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
C - 69	Construction strategies will be implemented that will seek to maximise the reuse of excavated clean materials from the onshore cable construction corridor where practicable and feasible. Prior to construction, a Materials Management Plan (MMP) will be prepared that outlines where excavated non-waste materials will be reused in line with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). The MMP will include a declaration by a Qualified Person that the MMP has been completed in accordance with the DoWCoP and that best practise is being followed.	**Materials Management Plan**	Outline COCP and DCO requirement
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 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.	**Good construction practices for temporary construction compounds including drainage strategy**	Outline COCP and DCO requirement
C-74	All sub-surface infrastructure will be designed to retain sub-surface flow pathways to avoid any localised increases in groundwater flooding.		Outline COCP and DCO requirement
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.		Outline COCP and DCO requirement
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 associated with critical or very near receptors.	**Pollution prevention and remediation**	Outline COCP and DCO requirement
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.	**Management of dewatered groundwater, and Environmental Permit for Discharge Activity**	Outline COCP and DCO requirement
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.		Outline COCP and DCO requirement
C - 95	The assessment will take into consideration the mitigation and control of invasive species measures that will be incorporated into a Project Environmental Monitoring and Management Plan (PEMMP).		DCO requirements or DML conditions.
C - 111	A decommissioning plan will be prepared for the project in line with the latest relevant available guidance.		Outline COCP and DCO requirement

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
C-117	Works in the floodplain will be programmed to occur in late summer/ early autumn if possible, to avoid interaction with known flooding periods to minimise the potential for displacement of floodwater.		Outline COCP and DCO requirement
C-118	Emergency Response Plans (ERPs) for flood events will be prepared 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.		Outline COCP and DCO requirement
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.		Outline COCP and DCO requirement
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.	**Works areas constructed from semi – permeable aggregate where possible** **Good construction practices for temporary construction compounds including drainage strategy**	Outline COCP and DCO requirement
C-121	Run-off from access routes / haul road and working areas will be allowed to infiltrate wherever possible.	**Effective drainage so as to not increase baseline runoff rates**	Outline COCP and DCO requirement
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.	**Appropriate (trenchless and trenched) cable watercourse crossing design and installation**	Outline COCP and DCO requirement
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).	**Appropriate standoff distances from watercourses for trenchless pits**	Outline COCP and DCO requirement
C-124	Where HDD 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.		Outline COCP and DCO requirement
C-125	Where the cable route crosses an Environment Agency flood defence, trenchless methodologies will be used.	**Appropriate (trenchless) cable watercourse crossing design and installation**	Outline COCP and DCO requirement
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 (LLFA).	**Appropriate haul road watercourse crossing design and implementation**	Outline COCP and DCO requirement
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.	**Appropriate haul road watercourse crossing design and implementation**	Outline COCP and DCO requirement

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
C-128	Any temporary crossings will be in place for the minimal time possible.	**Appropriate haul road watercourse crossing design and implementation**	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.	**Works areas constructed from semi – permeable aggregate where possible** **Good construction practices for temporary construction compounds including drainage strategy** **Pollution prevention and remediation**	Outline COCP and DCO requirement
C-130	During construction, no soil 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.	**Appropriate standoff distances and methodologies for topsoil stockpiling**	Outline COCP and DCO requirement
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 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.	**Appropriate standoff distances and methodologies for topsoil stockpiling**	Outline COCP and DCO requirement
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).		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.	**Appropriate standoff distances and methodologies for topsoil stockpiling**	Outline COCP and DCO requirement
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 impacts on flood flow conveyance and to maintain access for watercourse maintenance.		Outline COCP and DCO requirement
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.	**Appropriate standoff distances and methodologies for topsoil stockpiling** **Riparian vegetation protection and maintenance**	Outline COCP and DCO requirement
C-136	Measures (if any) required to address risks at the permanent onshore substation will be identified as part of the Flood Risk Assessment.		Outline COCP and DCO requirement
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 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.		Outline COCP and DCO requirement

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
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.	**Appropriate (trenchless) cable watercourse crossing design and installation**	Outline COCP and DCO requirement
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.	**Appropriate (trenched) cable watercourse crossing design and installation** **Appropriate haul road watercourse crossing design and implementation**	Outline COCP and DCO requirement
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.	**Effective drainage so as to not increase baseline runoff rates**	Outline COCP and DCO requirement
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.	**Management of dewatered groundwater, and Environmental Permit for Discharge Activity** **Good construction practices for trenching**	Outline COCP and DCO requirement
C-142	If water being pumped from excavations is suspected to be contaminated, appropriate measures will be taken in accordance with the Environment Agency guidance and the Environmental Permitting Regulations to prevent uncontrolled or unauthorised releases of this water to ground or to the water environment.	**Management of dewatered groundwater, and Environmental Permit for Discharge Activity**	Outline COCP and DCO requirement
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 Materials Management Plan (C-69).	**Materials Management Plan and Unexpected Contamination Protocol**	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 bogmat where necessary to prevent the track from settling into the ground to help maintain sub-surface flow.		Outline COCP and DCO requirement
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.	**Appropriate haul road watercourse crossing design and implementation**	Outline COCP and DCO requirement
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.		Outline COCP and DCO requirement

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
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 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.		Outline COCP and DCO requirement
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.		Outline COCP and DCO requirement
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.	**Pollution prevention and remediation**	Outline COCP and DCO requirement
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.		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.	**Pollution prevention and remediation**	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.		Outline COCP and DCO requirement
C-153	An Operations and Maintenance Plan will be provided with a Pollution Incident Control Plan (PICP) for implementation during the operational phase.		Outline COCP and DCO requirement
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)	**Good construction practices for trenching**	DCO works plans, description of development and requirements
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	**Pollution prevention and remediation**	Outline COCP and DCO requirement

ID	Environmental measure proposed	Subject of key measure specifically referenced in assessment tables (C-1 to C-3) above	How the environmental measures will be secured
	capacity, whichever it is 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).		Outline COCP and DCO requirement
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.		Outline COCP and DCO requirement
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).	**Appropriate haul road watercourse crossing design and implementation**	Outline COCP and DCO requirement
C-178	Circular culverts for temporary watercourse crossings to have concrete bedding in locations where ground conditions suggest that settlement could occur, e.g. Internal Drainage Board (IDB) district.	**Appropriate haul road watercourse crossing design and implementation**	Outline COCP and DCO requirement
C-179	Stockpile gaps would be located at topographic low points to preserve existing flow paths.		Outline COCP and DCO requirement
C-180	Where stockpiles are placed on both sides of the access routes/ haul road the gaps will coincide.		Outline COCP and DCO requirement
C-181	Access roads will have cross drainage provided where necessary at topographic low points.		Outline COCP and DCO requirement
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 EA (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).	**Appropriate environmental permits and land drainage consents**	Outline COCP and DCO requirement

wood.