

MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Environmental Statement

Volume 3, Annex 2.3: Flood risk assessment - part 2 of 3 (Tracked)



~~December 2024~~ May 2025

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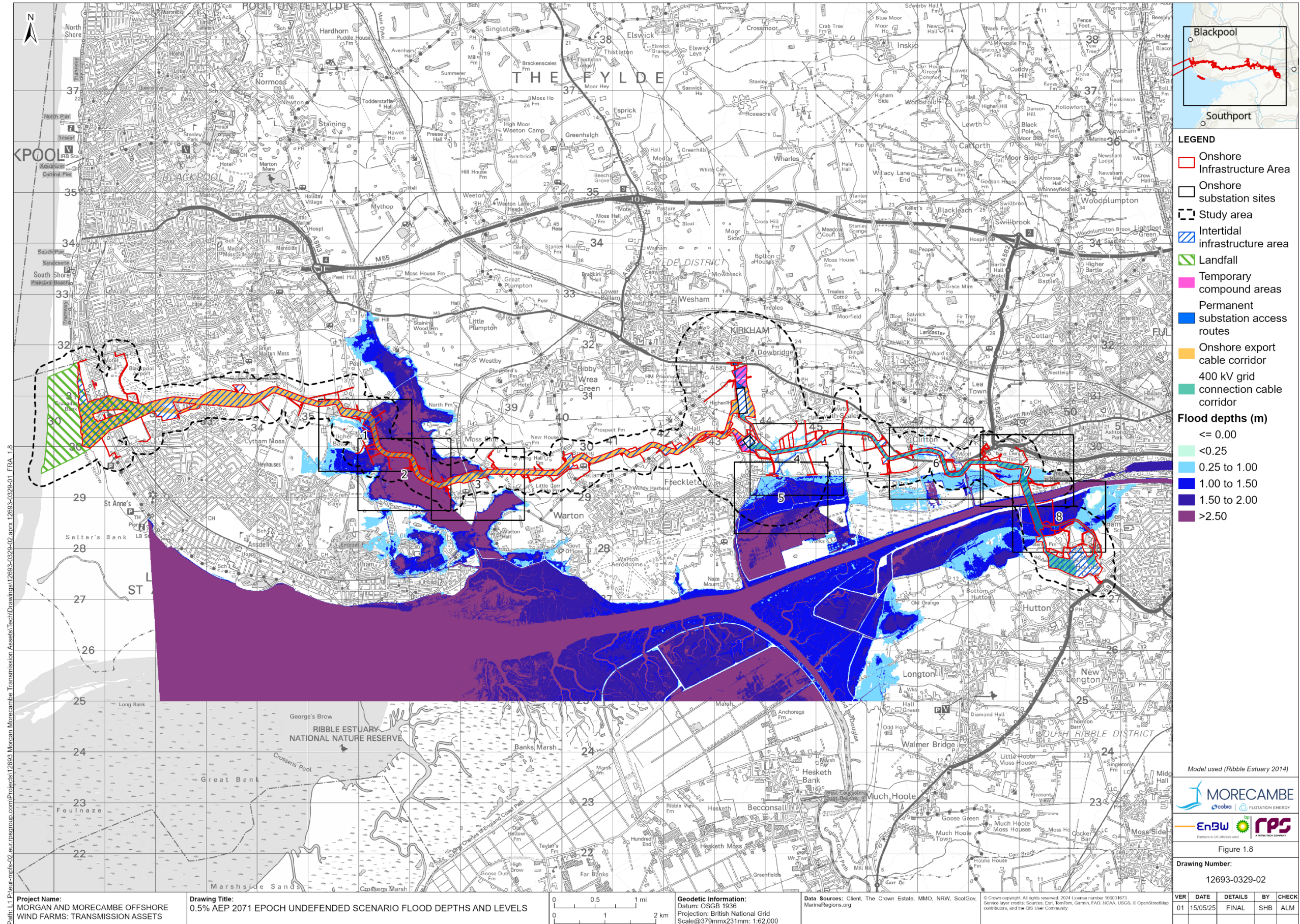


Figure 1.8: 0.5% AEP 2067-2071 epoch undefended scenario flood depths and levels

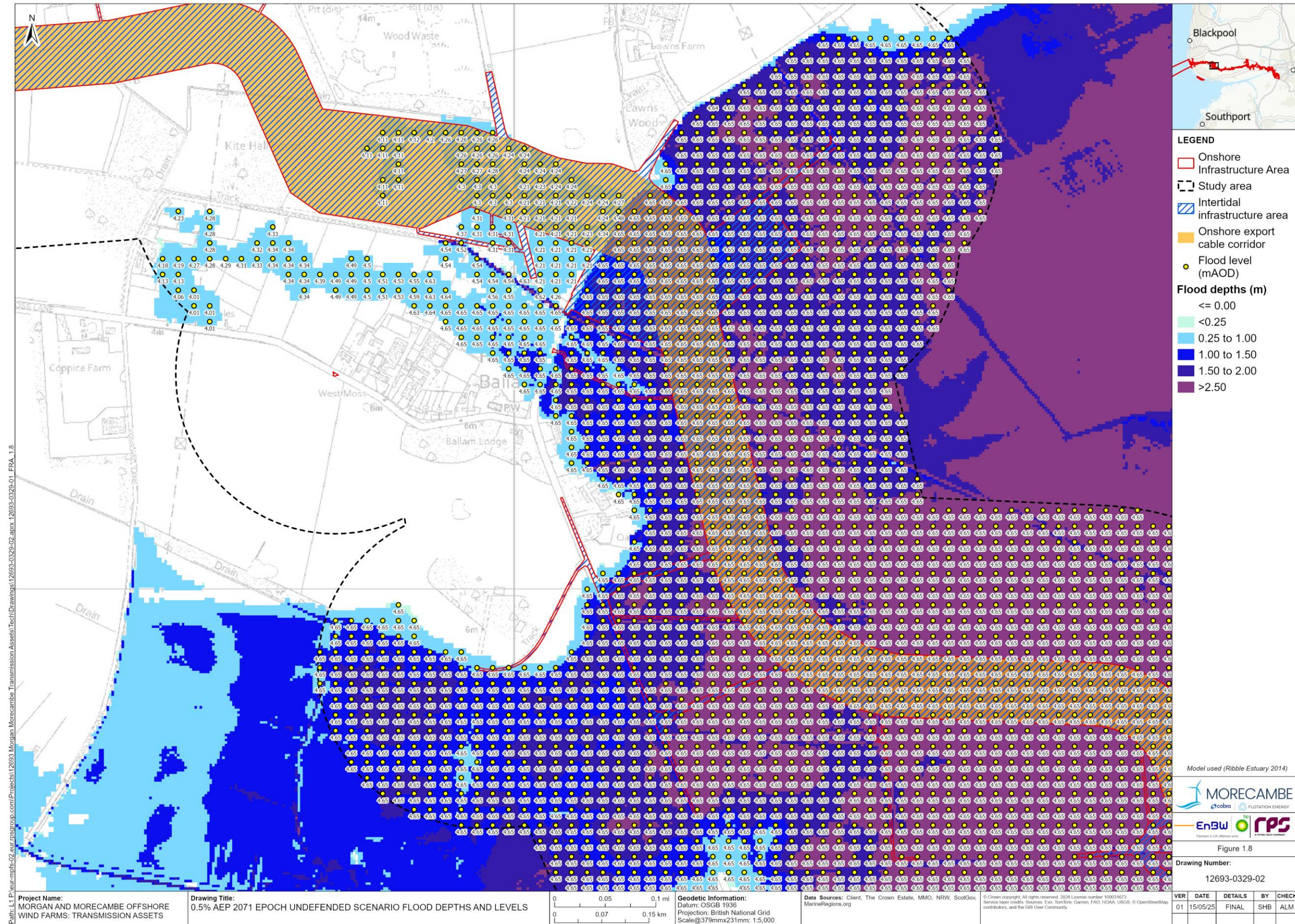


Figure 1.8: 0.5% AEP 2071 epoch undefended scenario flood depths and levels

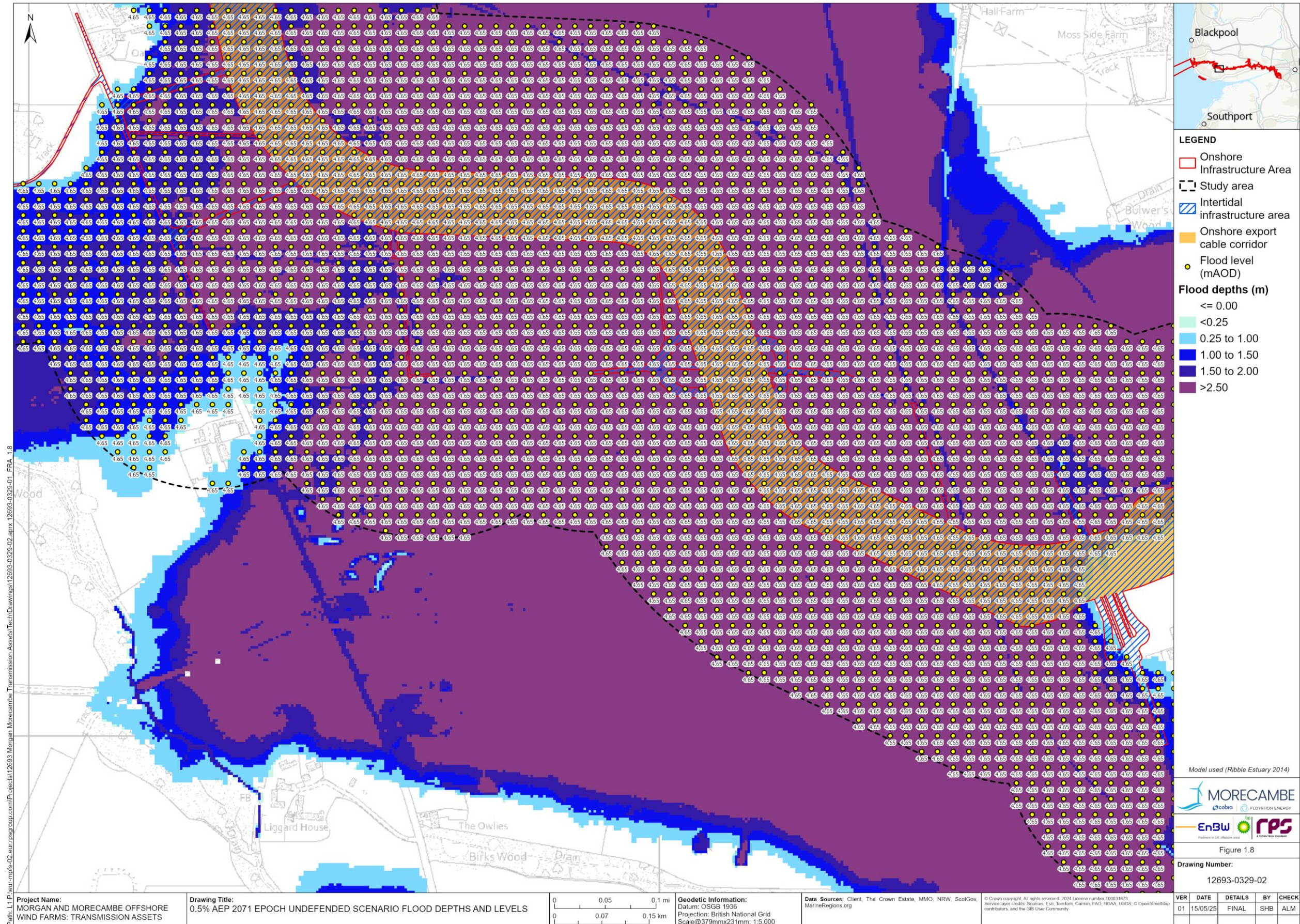


Figure 1.8: 0.5% AEP 2071 epoch undefended scenario flood depths and levels

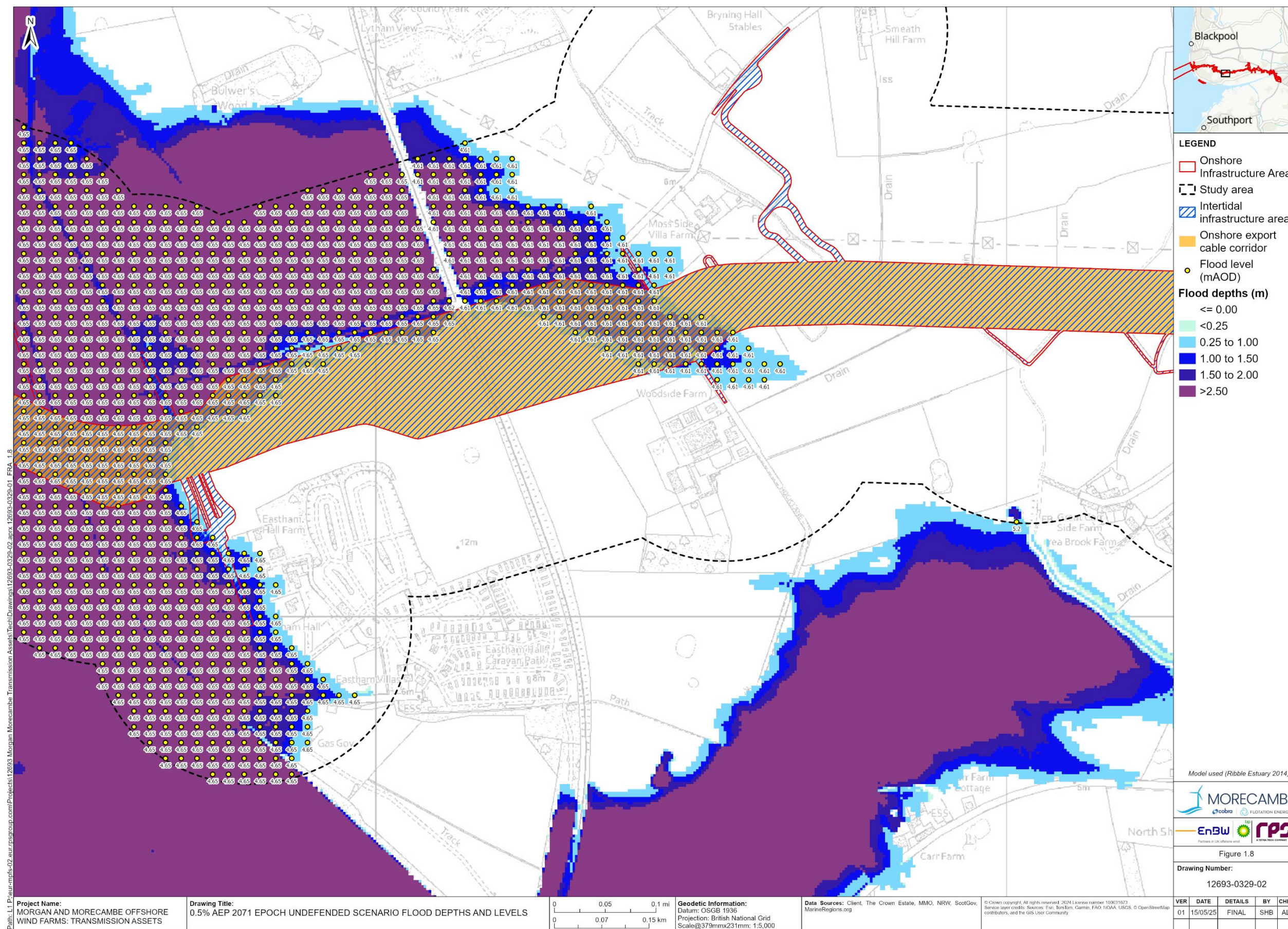


Figure 1.8: 0.5% AEP 2071 epoch undefended scenario flood depths and levels

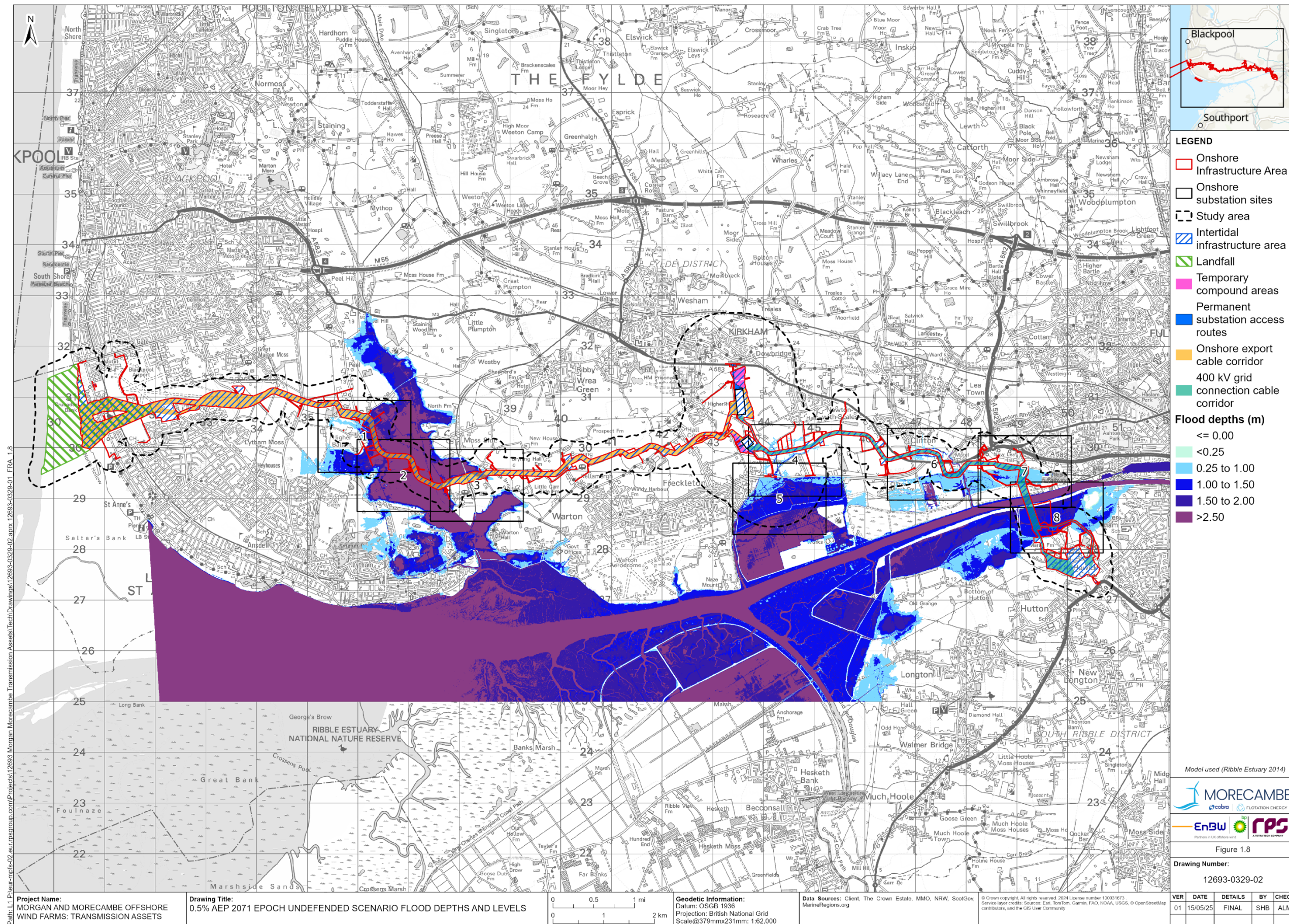


Figure 1.8: 0.5% AEP 2071 epoch undefended scenario flood depths and levels

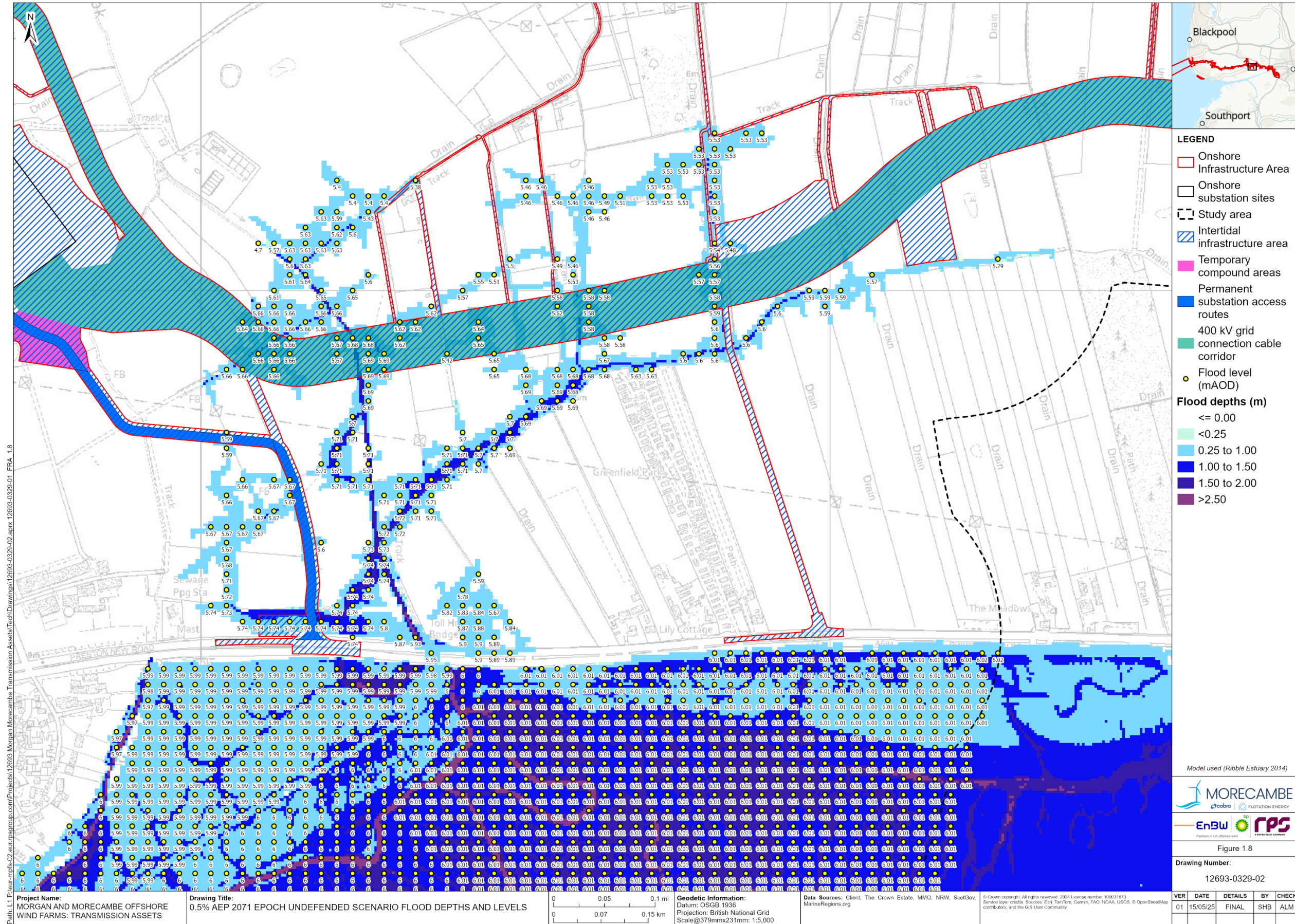


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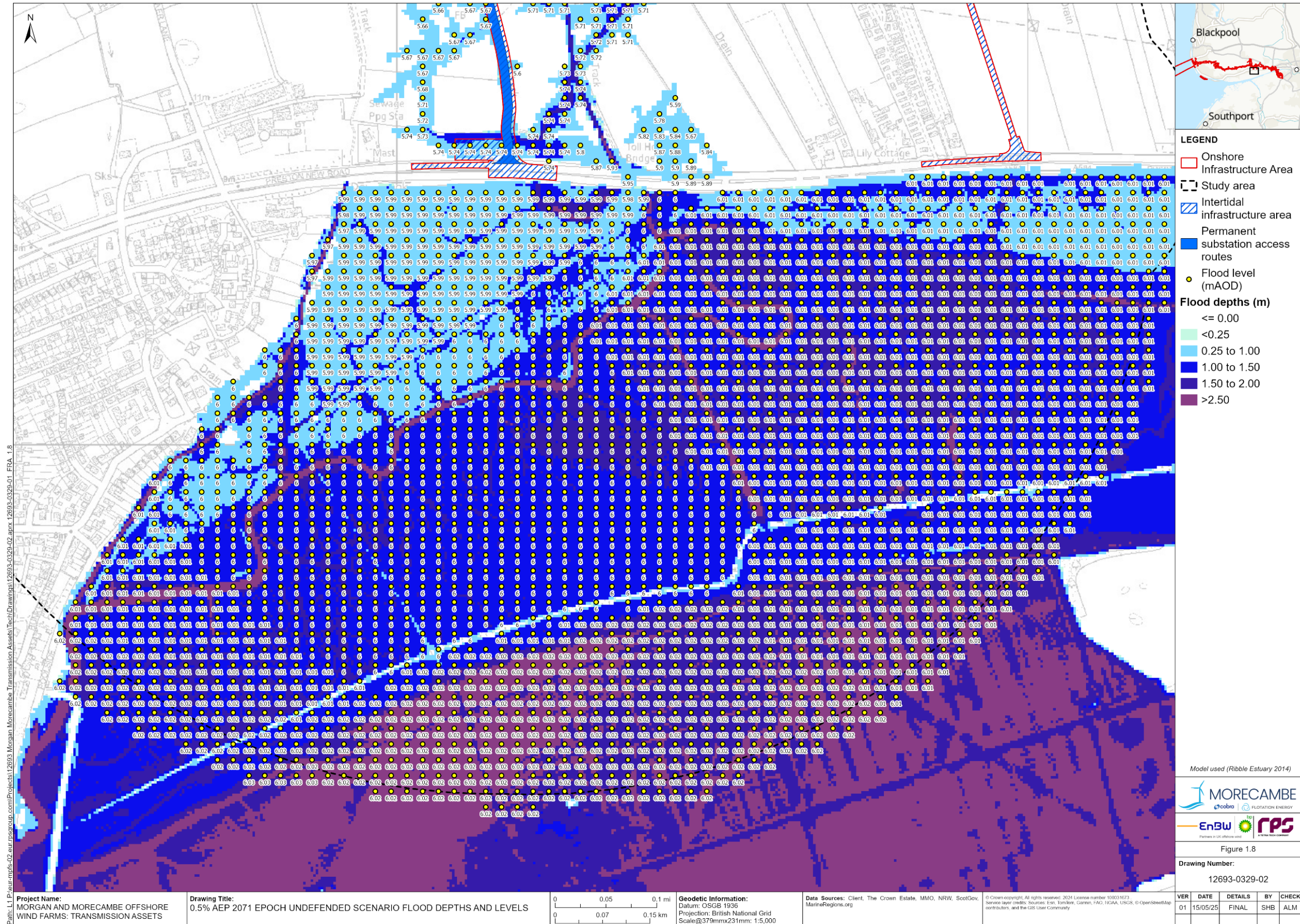


Figure 1.8: 0.5% AEP 2071 epoch undefended scenario flood depths and levels

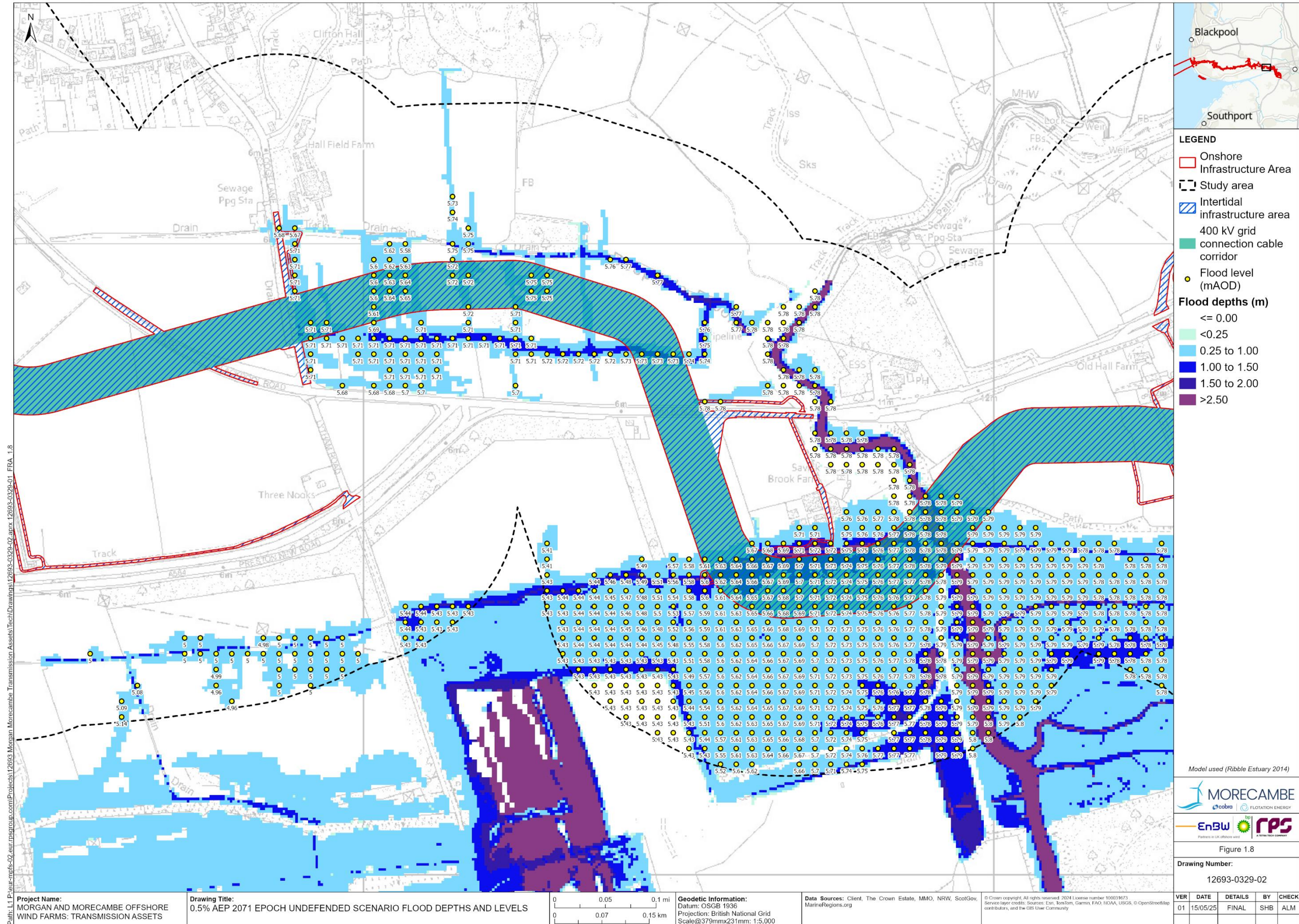


Figure 1.8: 0.5% AEP 2071 epoch undefended scenario flood depths and levels

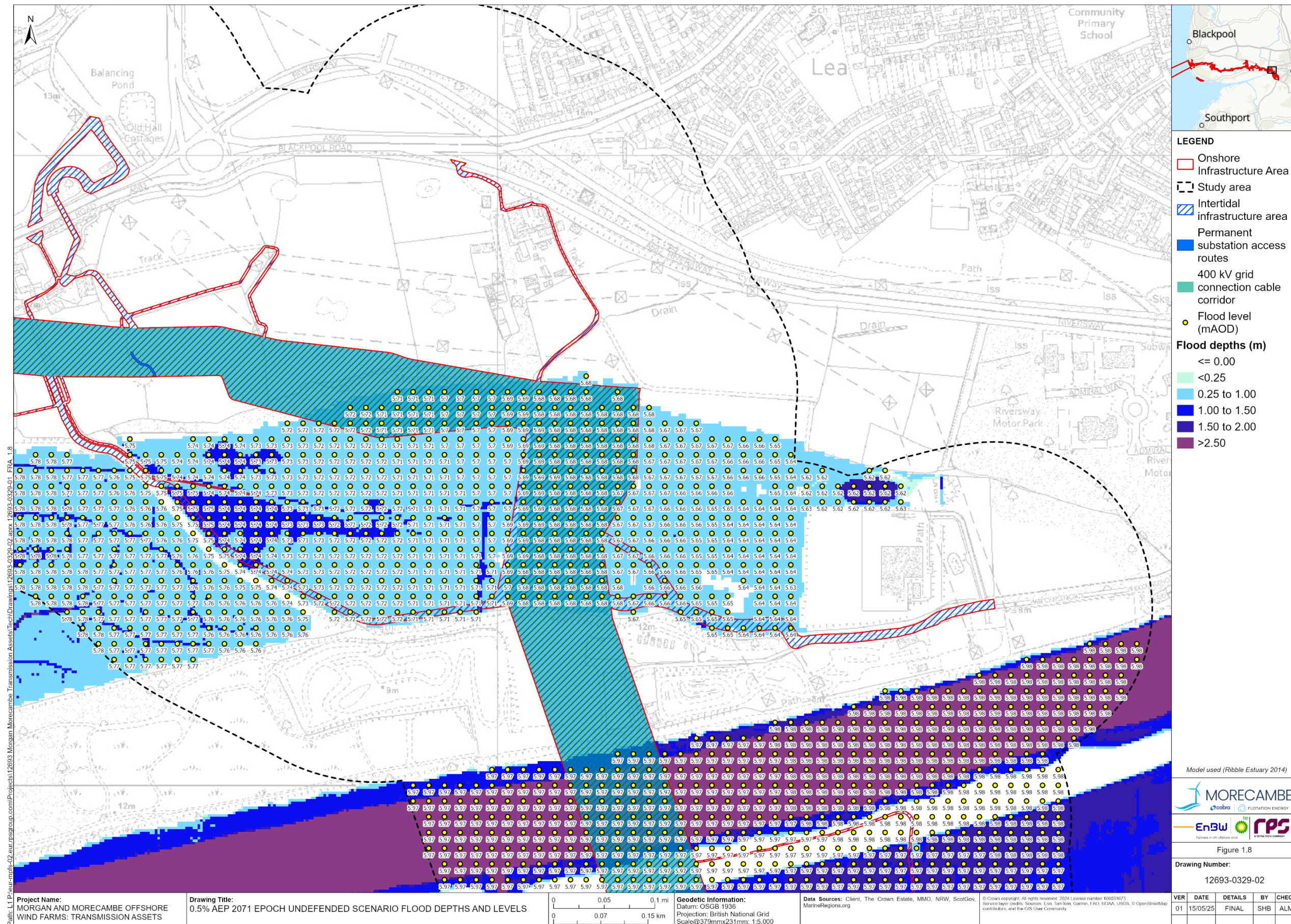


Figure 1.8: 0.5% AEP 2071 epoch undefended scenario flood depths and levels

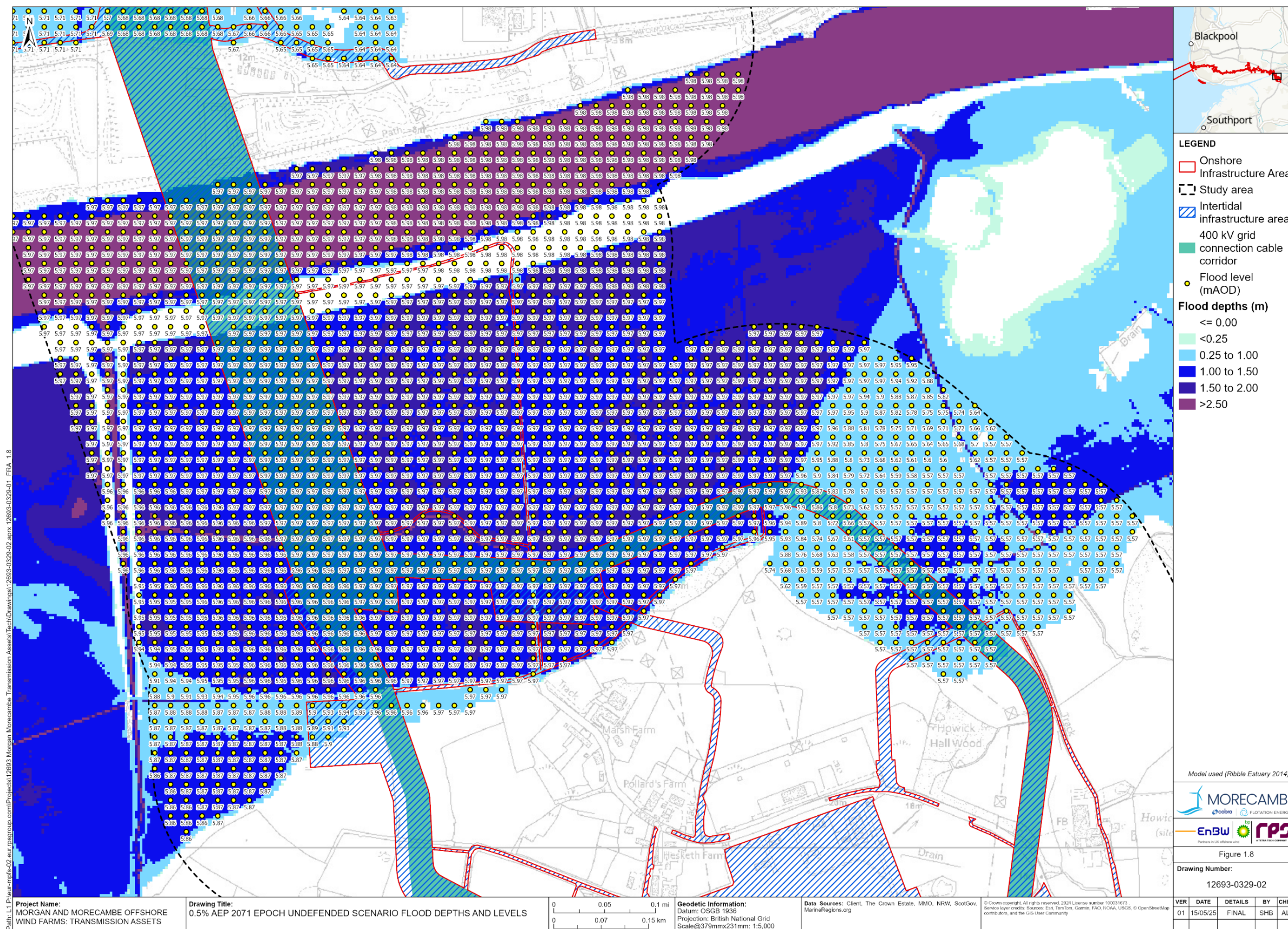


Figure 1.8: 0.5% AEP 2071 epoch undefended scenario flood depths and levels

Mitigation measures (commitments)

~~1.5.4.20~~1.5.4.21 The following mitigation measures (commitments) presented below within **Table 1.18** are proposed to manage flood risk and vulnerability to site workers during the construction phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.18: Summary of CoT for fluvial flood risk for Morgan onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT08	Post-construction, the working area will be reinstated to pre-existing condition as far as reasonably practical in line with the DEFRA Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (PB13298), Institute of Quarrying (IQ) Good Practice Guide for Handling Soils in Mineral Workings (IQ, 2021) and British Society of Soil Science (BSSS) Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction (BSSS, 2022).	To ensure working areas are reinstated to pre-existing conditions after construction has been completed	DCO Schedules 2A & 2B, Requirement 18 (Restoration of land temporarily used for construction); DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT27	All temporary compounds will be removed and sites will be reinstated when construction has been completed.	To ensure working areas are reinstated to pre-existing conditions after construction has been completed	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice); and DCO Schedules 2A and 2B, Requirement 16 (Restoration of land used temporarily for construction)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address:	To implement control measures in regards to fluvial and tidal flooding, including: <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; 	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)

CoT	Summary	Reason	How CoT is to be secured
	<ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and pollution prevention [...] 	<ul style="list-style-type: none"> Measures regarding dewatering; and Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk. 	
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)
CoT82	Where trenchless techniques are proposed for crossing ordinary watercourses, the entry and exit pits will be set back a minimum of 8 m from the bank of the watercourse. These crossings are detailed in the Onshore Crossing Schedule. Where required, geomorphological surveys will be undertaken on ordinary watercourses that may be crossed by trenched techniques. These will be used to inform detailed designs prior to construction.	To reduce fluvial flood risk	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT121	Where watercourses are to be crossed by haul roads and temporary access tracks, the culverting or bridging will be appropriately sized to ensure conveyance of existing flows to mitigate the potential for increased flood risk. This will be agreed in consultation with the Lead Local Flood Authority for	To ensure fluvial flood risk is not increased	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

CoT	Summary	Reason	How CoT is to be secured
	Ordinary watercourses; or the Environment Agency for Environment Agency Main Rivers.		

Summary

[1.5.4.21](#)[1.5.4.22](#) The Morgan onshore substation development platform, associated surface water attenuation and temporary and permanent access tracks are located within Flood Zone 1. The temporary construction compounds are located within Flood Zone 1, 2 and 3a and is inundated by fluvial flooding during the construction phase. The Morgan onshore substation is not at risk during the operation and maintenance phase, or from tidal sources. With the implementation of mitigation measures presented within **Table 1.18** flood risk from fluvial and tidal sources is assessed to be low.

1.5.5 Groundwater flood risk

[1.5.5.1](#) Groundwater flood risk mapping included within the Groundsure Enviro and Geo Insight report (2023) shows the Morgan onshore substation site has a 'moderate' to 'high' risk of groundwater flooding. The majority of the 1 km study area is shown to have a 'low' to 'high' risk of flooding with limited areas with a 'negligible' risk of flooding.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

[1.5.5.2](#) Relevant information to groundwater flood risk from the FCA SFRA to the Morgan onshore substation has been extracted and included as follows.

- [Within the Fylde Council area, the Environment Agency 'Areas Susceptible to Groundwater Flooding' map shows considerable variability across Fylde. The JBA groundwater emergence map shows large parts of Fylde are at 'no risk' of groundwater emergence. Groundwater levels are highest in the southwest of the area, across Lytham and St Annes, where they are mainly within 0.5m of the ground surface.](#)
- [From the 'Groundwater Emergence Mapping \(JBA\)' the Morgan onshore substation is located in a mapped area of 'no risk'.](#)

[1.5.5.1](#) • [From the 'Groundwater Flooding susceptibility \(EA\)' mapping, the northern extent of the Morgan onshore substation is shown to be located within an area with a susceptibility to groundwater flooding of less than 25%. The remainder of the Morgan onshore substation is not susceptible to groundwater flooding. A risk of 50% – 75% susceptibility is present within the north of the hydrology and flood risk study area \(1 km from the Morgan onshore substation\).](#)

Mitigation measures (commitments)

1.5.5.21.5.5.3

Mitigation measures (commitments)

presented below within **Table 1.19** are proposed to manage flood risk and vulnerability to site workers during the construction phase. No commitments relating to groundwater flooding are required during the operation and maintenance phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.19: Summary of CoT for groundwater flood risk for Morgan onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address: <ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and pollution prevention [...] 	To implement control measures in regards to fluvial and tidal flooding, including: <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; Measures regarding dewatering; Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)

CoT	Summary	Reason	How CoT is to be secured
	Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.		

Summary

~~1.5.5.3~~ 1.5.5.4 With the implementation of commitments listed within **Table 1.19** the overall risk of flooding from groundwater is assessed to be low.

1.5.6 Surface water flood risk

- 1.5.6.1 The EA's Long Term Flood Risk Mapping includes Risk of Flooding from Surface Water mapping (both present day and climate change information) which was updated in January 2025 and is, available online and presented within **Figure 1.9**. ~~shows Mapping~~ that the majority of study area is classified at 'very low' ~~risk~~ chance, with localised areas at 'low' to 'high' ~~risk~~ chance of flooding from surface water.
- 1.5.6.2 The temporary construction compounds and Morgan onshore substation development platform is shown to have a 'low' to 'high; chance ~~risk~~ of flooding from ~~isolated areas of~~ surface water ponding with greatest depths up to ~~900-300~~ mm during the present day and climate change epochs ~~worst-case scenario event~~.
- 1.5.6.3 The temporary and permanent access road is shown to have a 'low' to 'high' risk of flooding associated with out of bank flooding from small watercourses, with greatest flood depths up to 300mm for both present day and climate change epochs. Out of bank flooding is presented by a 'low' chance of flooding. ~~and flood velocities of up to 1200 mm and over 0.25 m/s. Greatest flood depths are conveyed within the channels of watercourses.~~
- 1.5.6.4 Within the 1 km study area, Flooding is predominantly associated with overland flow pathways and isolated areas of flooding. There are also isolated areas of surface water ponding across the Morgan substation site and associated 1 km study area, likely associated with topographical low points.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

- 1.5.6.5 Relevant information regarding surface water risk from the FCA SFRA to the Morgan onshore substation has been extracted and included as follows.
- Within the Fylde Council area, surface water flood risk is very localised but generally follows the main watercourses through the area and follows the roads through the settlements. There is considerable surface water flood risk across both St Anne's and Lytham in the west of the area, but all settlements across the area are affected by surface water risk.
 - FCA details the following historical flood events recorded by councils:

- Widespread historic flood events have affected properties in Kirkham and Newton-with-Scales, including the following:
 - The Poulton Street, Station Road junction in Kirkham town centre
 - The roundabout on Preston Street in the east of Kirkham town centre
 - On Ash Avenue to the east of Progress Business Area within the south of Kirkham
 - On Station Road to the south of Kirkham and Wesham Station
 - Along Orders Lane in the South of Kirkham
 - Along Blackpool Road, Townshill Drive and Brookwood Drive to the west of Kirkham
 - Kirkham Road, immediately to the east of HMP Kirkham
 - Along Lower Lane and Anson Road at Hall Cross in the south of Kirkham

~~1.5.6.5 — Fylde Borough Council Strategic Flood Risk Assessment (2011)~~

~~1.5.6.6 — The Fylde Council SFRA indicates that no known flooding hotspots from surface water are located within the Morgan onshore substation site or the study area.~~

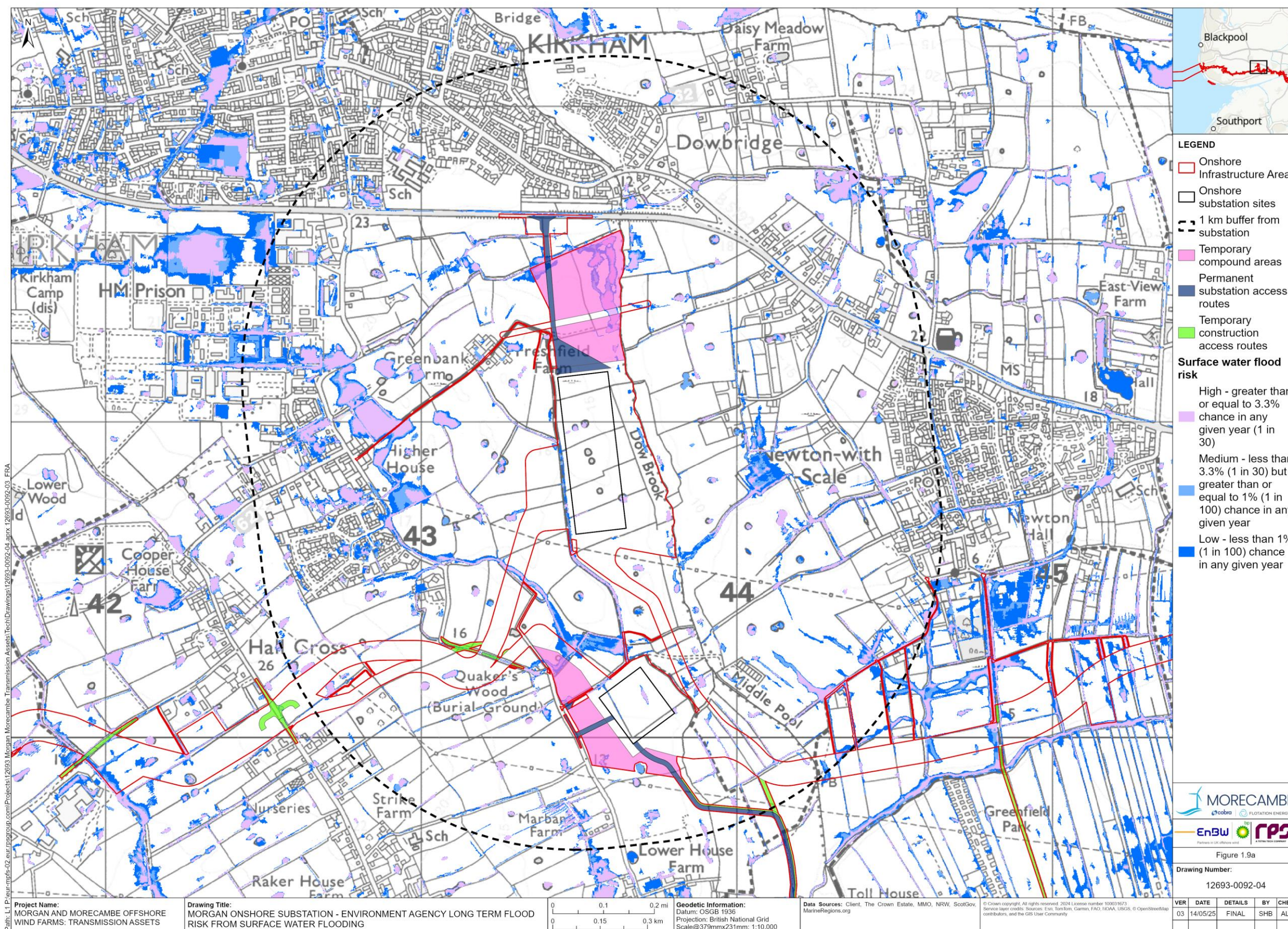


Figure 1.9: Morgan onshore substation – Environment Agency long term flood risk from surface water flooding

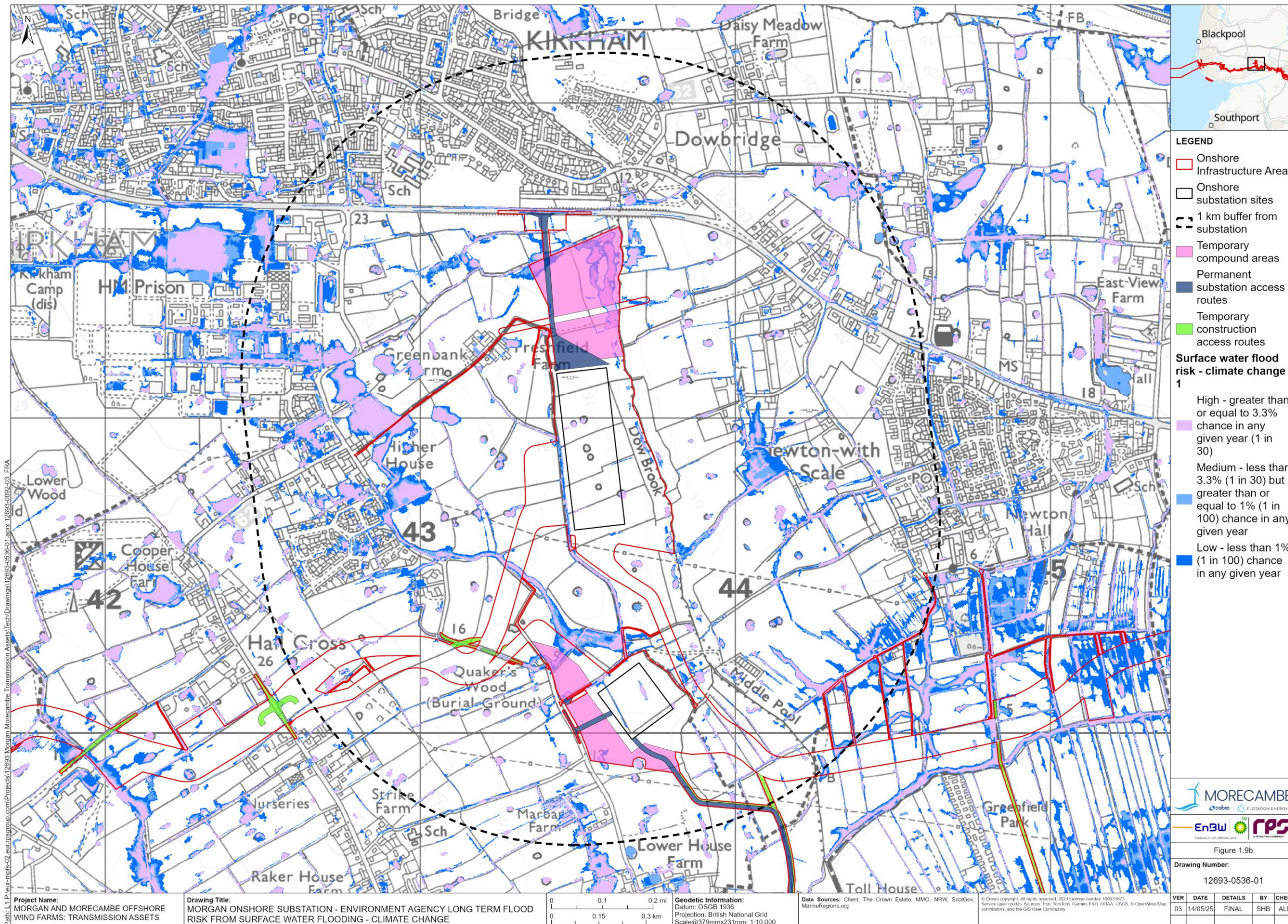


Figure 1.9: Morgan onshore substation – Environment Agency long term flood risk from surface water flooding – climate change

Mitigation measures (commitments)

~~1.5.6.7~~1.5.6.6 Mitigation measures (commitments) presented below within **Table 1.20** are proposed to manage flood risk and vulnerability to site workers during the construction phase and operation and maintenance phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.20: Summary of CoT for surface water flood risk for Morgan onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT11	An Outline Operational Drainage Management Plan for the substation sites has been prepared and submitted with the application for development consent. The Plan will include measures to ensure that existing land drainage is reinstated and/or maintained. This will include measures to limit discharge rates and attenuate flows to maintain greenfield runoff rates at the onshore substations. It will also include measures to control surface water runoff, including measures to prevent flooding of the working areas or offsite and to ensure any runoff is treated appropriately. Detailed Operational Drainage Management Plan(s) will be developed in accordance with the Outline Operational Drainage Management Plan and in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority (Lancashire County Council).	To ensure flood risk is not increased during operation.	DCO Schedules 2A and 2B, Requirement 20 (Outline Operational Drainage Management Plan)
CoT24	Where practicable, during construction, access routes within the onshore export cable corridor and 400 kV grid connection corridor (i.e. for example, the use of haul roads) will be used, to minimise potential impacts to the local road network.	To not increase impermeable areas associated with haul roads and in turn increase surface water runoff and flood risk from this source	DCO Schedules 2A & 2B, Requirement 9 (Traffic and Transport) Access to Works Plan
CoT27	All temporary compounds will be removed and sites will be reinstated when construction has been completed.	To not increase surface water runoff as a result of greater impermeable areas during the operation and maintenance phase	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice); and

CoT	Summary	Reason	How CoT is to be secured
			DCO Schedules 2A and 2B, Requirement 16 (Restoration of land used temporarily for construction)
CoT35	<p>An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address:</p> <ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and pollution prevention [...] 	<p>To implement control measures in regards to fluvial and tidal flooding, including:</p> <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; Measures regarding dewatering; <p>Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;</p>	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT36	<p>Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.</p>	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)

Summary

~~1.5.6.8~~ 1.5.6.7

Commitments listed in **Table 1.20** above will ensure the Morgan onshore substation will not be impacted by or cause any adverse effect on surface water flooding during the construction phase. As such, flood risk from this source is assessed to be low.

1.5.7 Reservoir flood risk

1.5.7.1 A portion of the land adjacent to the Dow Brook within the permanent Morgan onshore substation and associated 1 km study area is located within the reservoir flood extent. Flooding from reservoirs is associated with when there is also flooding from rivers. The site is not at risk of flooding from reservoirs when rivers are normal. Reservoir flood risk mapping within the study area is presented within **Figure 1.10**.

1.5.7.2 Due to the regular inspection and maintenance regime in place for large reservoirs, the likelihood of catastrophic failure and therefore risk of flooding to the site from this source is unlikely to occur. Flood risk from this source is therefore assessed to be very low.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

1.5.7.3 Relevant information regarding flood risk from reservoirs from the FCA SFRA to the Morgan onshore substation has been extracted and included as follows.

1.5.7.2 • There are two reservoirs located within Fylde: Weeton and Westby. Both are located centrally with the 'Dry Day' scenario impacting the centre of the area, although the areas impacted are mainly rural. There is considerable risk along the south of the area from the 'Wet Day' extents from reservoirs outside of the area. However, the risk is mostly confined to the rural area between Freckleton and Clifton.

1.5.8 Flood risk from sewer and water main failure

1.5.8.1 Flooding from sewerage failure occurs when a rainfall event exceeds the maximum capacity of the surrounding network. The most common causes of flooding from sewers are inadequate flow capacity, blockages, pumping station failures, burst water mains, water inflow from rivers or the sea, tide locking, siltation, fats/greases, and sewer collapse. Should any of these events occur there is a risk of flooding within the vicinity of the sewer by surcharge where the flood is in excess of the sewer capacity (usually 1 in 30-year event or greater).

1.5.8.2 Morgan onshore substation is agricultural and therefore, unlikely to have sewer assets within the site.

1.5.8.3 As per section 3.16.8 of Volume 1, Chapter 3: Project description of the ES, to ensure damage to sewers and water pipelines and thus flooding from this source is prevented during the construction phase, prior to the commencement of works, any construction activities will need to be undertaken in accordance with the water authorities design standards prior to gaining approval. This includes providing evidence to confirm the presence/lack of presence of any water authority assets (e.g. sewers and water mains) and if they are present, how final design and construction methods will be implemented to divert their assets (which will need additional approval) or avoid their assets.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

1.5.8.4 Relevant information regarding flood risk from sewers from the FCA SFRA to the Morgan onshore substation has been extracted and included as follows.

~~1.5.8.3~~ Within the Fylde Council area, the main postal districts covering Fylde are FY4, FY6, FY8 and PR4 (which the Morgan onshore substation is located within). Across these postal districts a total of 521 sewer flooding incidents have been recorded by United Utilities in data provided from 2009 to October 2023. Over half of these incidences occurred within the FY6 postcode area.

Mitigation measures (commitments)

~~1.5.8.4~~1.5.8.5 Mitigation measures (commitments) presented below within **Table 1.21** are proposed to manage flood risk and vulnerability to site workers during the construction phase. No commitments relating to groundwater flooding are required during the operation and maintenance phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.21: Summary of CoT for flood risk from sewers for Morgan onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)

CoT	Summary	Reason	How CoT is to be secured
CoT35	<p>An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address:</p> <ul style="list-style-type: none"> • [...] flood protection and control measures; • -water environment and drainage; and • pollution prevention [...] 	<p>To implement control measures in regards to fluvial and tidal flooding, including:</p> <ul style="list-style-type: none"> • Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; • Measures regarding dewatering; <p>Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;</p>	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT36	<p>Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.</p>	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)

Summary

~~1.5.8.5~~ 1.5.8.6 With implementation of commitments listed within **Table 1.21**, flood risk from sewers is therefore assessed to be very low.

1.5.9 Flood risk from artificial sources

1.5.9.1 Field drainage is expected to be present within agricultural land within the study area and could pose localised sources of flooding if impacted during construction.

Mitigation measures (commitments)

1.5.9.2 Mitigation measures (commitments) presented below within **Table 1.22** are proposed to manage flood risk and vulnerability to site workers during the construction phase. No commitments relating to flooding from artificial sources

are required during the operation and maintenance phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.22: Summary of CoT for flood risk from artificial sources for Morgan onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address: <ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and pollution prevention [...] 	To implement control measures in regards to fluvial and tidal flooding, including: <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; Measures regarding dewatering; Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)

CoT	Summary	Reason	How CoT is to be secured
CoT84	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. In order to manage impacts to field drainage, the Outline CoCP stipulates field drainage plans will be developed in consultation with the relevant landowners. If required, additional field drainage will be installed to ensure the existing drainage of the land is maintained during and after construction.	To prevent flooding from field drainage	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)

Summary

1.5.9.3 With implementation of commitments listed within **Table 1.22**, flood risk from artificial sources is therefore assessed to be very low.

1.5.10 Historic flooding

1.5.10.1 The Environment Agency Historic Flood Map shows the entirety of the Morgan onshore substation site and surrounding 1 km study area is located outside of the mapped extent of historical flooding. The Environment Agency historical flood extent mapping is presented within **Figure 1.11**.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

1.5.10.2 [See 'Strategic Flood Risk Assessment' sections for relevant flood risk sections above.](#)

Strategic Flood Risk Assessment (Fylde Borough Council, 2011)

~~1.5.10.2 Fylde Council do not hold any records of historical flooding.~~

1.5.11 Summary of flood risk

1.5.11.1 A summary of assessed flood risk is presented below within **Table 1.23**:

Table 1.23: Morgan onshore substation flood risk summary

Source of flooding	Assessed risk to Morgan onshore substation	Commitment measures to be adopted
Fluvial and tidal	Low	CoT08, CoT09, CoT27, CoT35, CoT36, CoT82, CoT121

Source of flooding	Assessed risk to Morgan onshore substation	Commitment measures to be adopted
Groundwater	Low	CoT09, CoT35, CoT36, CoT41
Surface water	Low	CoT09, CoT11, CoT24, CoT27, CoT35, CoT36
Reservoir	Very low	None
Sewer	Very low	CoT09, CoT35, CoT36
Artificial Sources	Very low	CoT09, CoT35, CoT36, CoT84

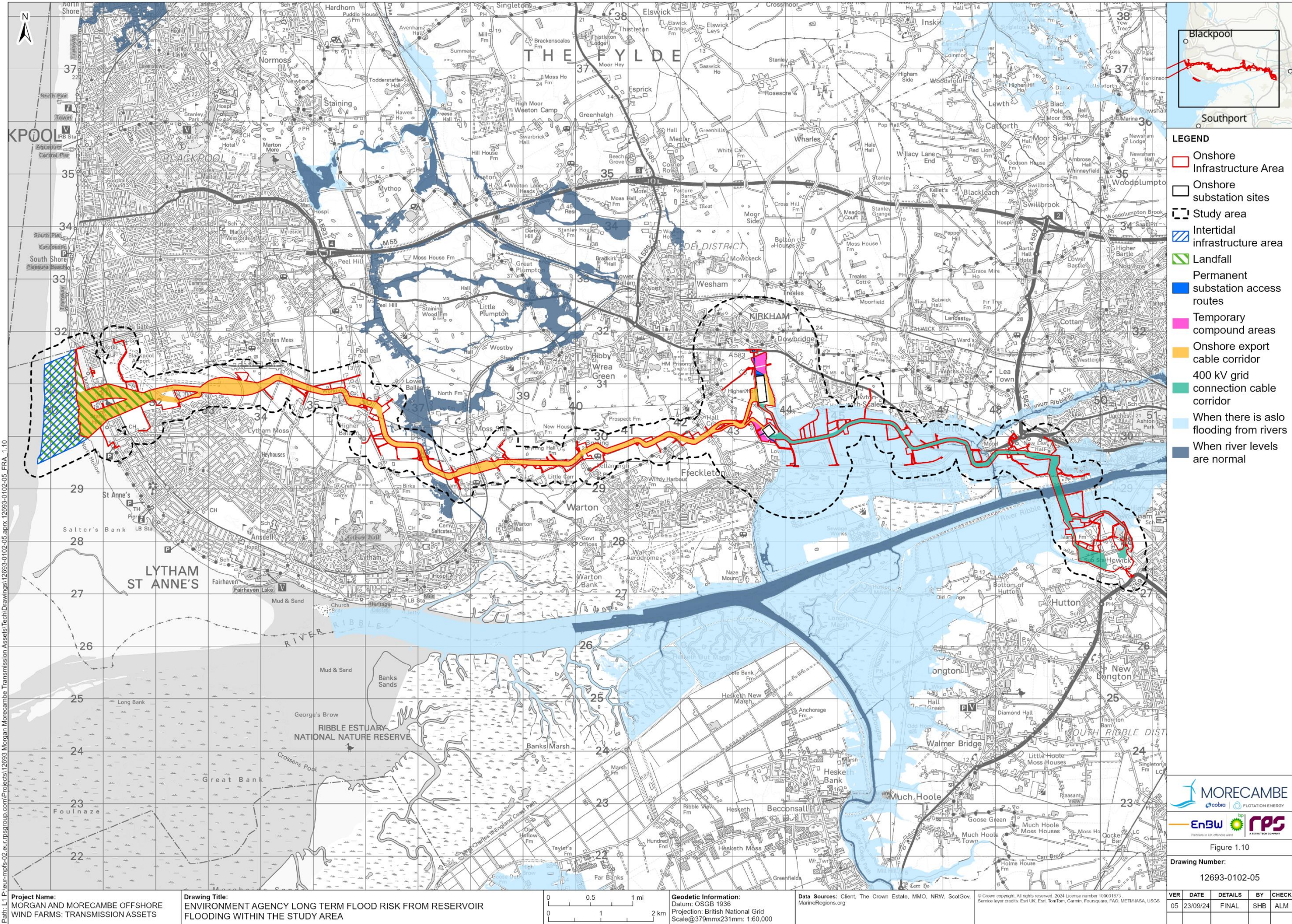


Figure 1.10: Environment Agency long term flood risk from reservoir flooding within the study area

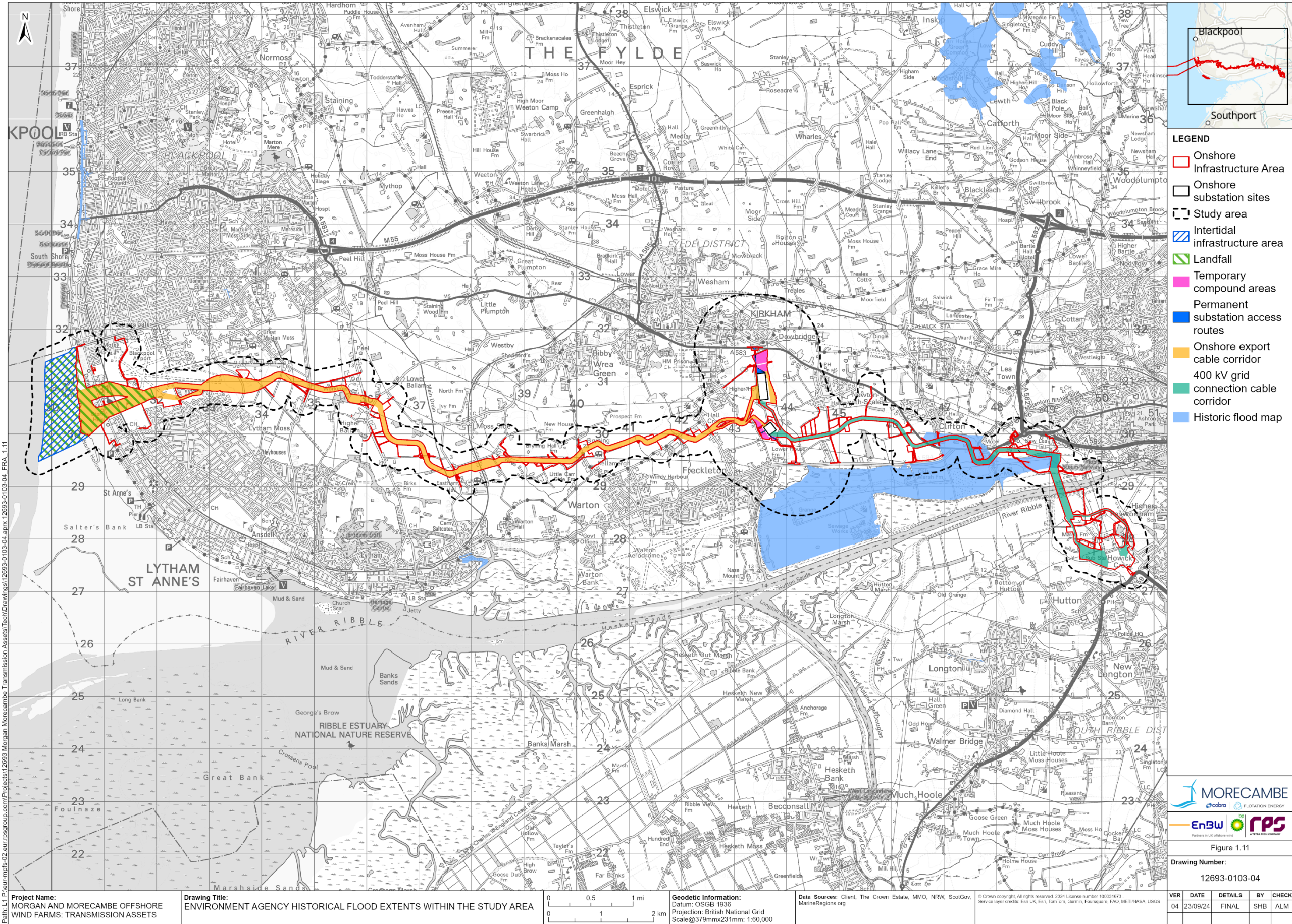


Figure 1.11: Environment Agency historical flood extents within the study area

1.6 Morecambe onshore substation site flood risk assessment

1.6.1 Baseline conditions

Location

- 1.6.1.1** This substation site is located to the south of the Morgan onshore substation site, east of Lower Lane and to the north of Freckleton. A track bisects the proposed development and Dow Brook is located to the east. The location of the Morecambe onshore substation site study area is presented within **Figure 1.1**.

Topography

- 1.6.1.2** The proposed site boundary associated with the Morecambe onshore substation site falls from 12 m AOD within the west of the site to approximately 7 m AOD within the east. The local topography within the 1 km study area generally falls towards Dow Brook, located to the east of the site.

Existing use

- 1.6.1.3** The Morecambe onshore substation site currently comprises agricultural fields, with field margins delineated by mature trees and hedgerows. A track bisects the proposed development. Several ordinary watercourses are located within the north of the site, conveying flow to Dow Brook and one pond is within the southern extent of the site.
- 1.6.1.4** The 1 km study area associated with the Morecambe onshore substation site comprises predominantly agricultural land use, with residential areas associated with Freckleton to the south. Several additional ordinary watercourses, ponds and agricultural reservoirs are also present within the study area. Newton Marsh Site of Special Scientific Interest (SSSI) is located approximately 175 m to the south east, downstream of the site at its closest point and is presented within **Figure 1.12**.

Proposed use

- 1.6.1.5** The MDS for Morecambe onshore substation is presented within **Table 1.24**. Additional information is provided within Volume 1, Chapter 3: Project description of the ES.

Table 1.24: Morecambe onshore substation MDS

Substation compounds/buildings	Morecambe MDS
Permanent development	
Area of permanent footprint (m ²) including attenuation pond/ditch, access and landscaping.	59,500
Area of permanent LSS footprint (m ²) excluding attenuation area and landscaping	29,700
Area of permanent attenuation (m ²)	5,010

Substation compounds/buildings	Morecambe MDS
Area of main building (m ²)	450
Area of secondary buildings (m ²)	3,500
Number of permanent access tracks	1
Permanent access track width with drainage and potential services (m)	15
Information on operational activities	Unmanned substation; continuously monitoring remotely. operational and maintenance staff visiting to undertake preventative and corrective works on a regular basis.
Temporary development	
Substation temporary construction compound (m ²)	52,500
Substation temporary construction compound asphalt surface area (m ²)	Not available
Substation temporary construction compound hardstanding area (m ²)	Not available
Area of asphalt surface with substation compound (m ²)	Not available
Number of temporary access tracks	1
Temporary access width (including passing places) (m)	20
Construction duration (months)	24

1.6.1.6 Temporary construction access tracks are to be taken via Preston New Road (A584) and is to be retained into the operation and maintenance phase. A second permanent access is to be taken via Lower Lane.

1.6.1.7 The drainage strategy for the Morecambe onshore substation are presented within the Outline Operational Drainage Management Plan (document reference J10) and is to be secured through requirements of the DCO.

Decommissioning

1.6.1.8 The design life for the onshore substations will exceed 35 years. The case for decommissioning the onshore substations in the event of the Generation Assets being decommissioned will be reviewed in discussion with the transmission system operator and any relevant regulators in the light of any other existing or proposed future use of the onshore substations.

1.6.1.9 Activities associated with decommissioning will operate within the parameters of those established for construction. If complete decommissioning takes place, then all the electrical infrastructure will be removed, and any waste arising disposed of in accordance with relevant regulations and where applicable any legislative requirements at the time. Foundations will be broken up and the site reinstated, or alternately repurposed for another use. Where alternate uses may be explored, these may be subject to additional relevant consents and licenses at the time. For the purposes of EIA, decommissioning

of the onshore substations is assumed to be similar to the construction and in reverse sequence.

- 1.6.1.10 An Onshore Decommissioning Plan (see **Section 1.8, Table 1.44**) will be developed prior to decommissioning in a timely manner. The Onshore Decommissioning Plan will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant available guidance.

1.6.2 Hydrological overview

- 1.6.2.1 A 1 km study area was selected for the Morecambe onshore substation site to identify any potential receptors that might be affected by the substation. The 1 km study area is considered an appropriate study area to identify changes in flood risk in the surrounding area.
- 1.6.2.2 The Dow Brook bifurcates into two Environment Agency designated Main Rivers to the east of the site; forming Dow Brook and Middle Pool watercourses. The Dow Brook flows southwards along the eastern boundary of the Morecambe onshore substation site while Middle Pool conveys flow southwards some 180 m to the east at its closest point. The temporary and permanent access road crosses the Dow Brook. The watercourses are shown to converge within the southern extent of the 1 km study area. Watercourses are shown within Figure 1.13.
- 1.6.2.3 The Dow Brook discharges into the River Ribble at a point 1.9 km downstream. As such, the site is considered to be at risk of flooding from tidal and fluvial sources.

Flood defences

- 1.6.2.4 The Environmental Agency Spatial Flood Defences (including standardised attributes_ mapping is presented within Figure 1.13 and shows that flood defences classified as 'natural high ground' are present along the banks of the Dow Brook within the 1km study area. Flood defences comprise of naturally high ground, providing an average 50-year standard of protection. Information regarding flood defences is presented within **Table 1.25** below.

Table 1.25: Flood defences within the Morecambe onshore substation

FRMS code	Asset id	Asset type	Asset maintainer	current condition	Design standard of protection
FR/09/S124	64839	Natural High Ground	Unknown	unknown	50 years
FR/09/S124	90994	Natural High Ground	Unknown	unknown	50 years
FR/09/S124	64308	Natural High Ground	Unknown	unknown	50 years

- 1.6.2.5 The Lancashire County Council asset register lists several flood risk assets within the county council's boundary. No assets specifically for flood defence were recorded within Morecambe onshore substation or 1 km study area.

Flood warning/flood alert

- 1.6.2.6 The eastern extent of the Morecambe onshore substation site and associated 1 km study area is located within the 'Lancashire coastline at Clifton Marsh, between Freckleton and Savick Brook' Flood Warning Area 012FWCTL14B and 'Ribble estuary west of Preston' Flood Alert Area 012WATRE. Flood warnings and flood alerts are presented within **Figure 1.3**.

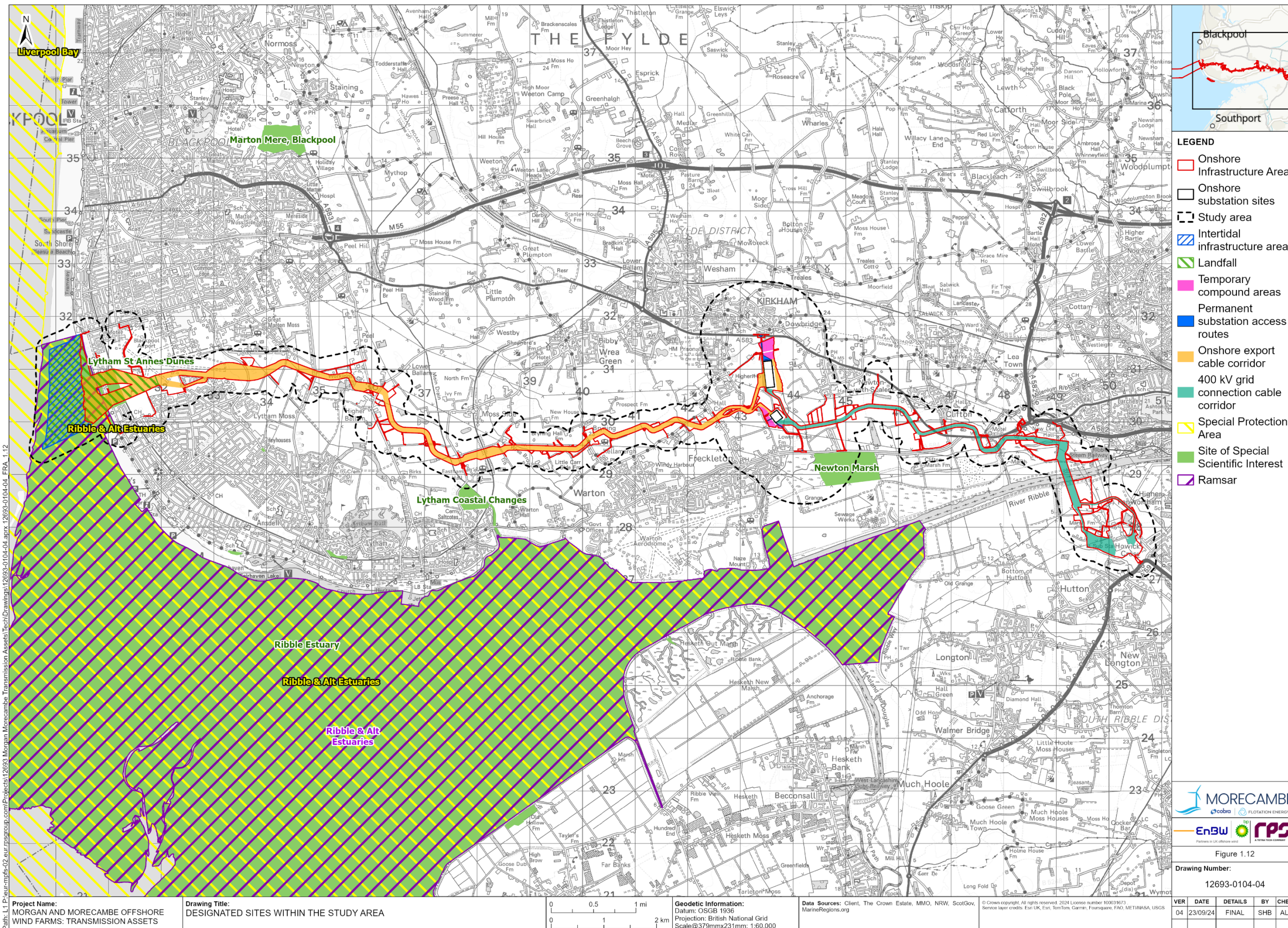


Figure 1.12: Designated Sites within the study area

1.6.3 Hydrogeological overview

Geological setting

- 1.6.3.1 The BGS Geology of Britain mapping (1:50,000 scale) indicates the majority of the Morecambe onshore substation site is underlain by Devensian till (diamicton). A small area within the eastern extent is underlain by tidal flat deposits, 1 (silt, clay and sand). The associated 1 km study area is also predominantly underlain by Devensian Till (diamicton) with limited areas also underlain by tidal flat deposits, 1 (silt, clay and sand), head (clay, silt, sand and gravel) and Devensian glaciofluvial ice contact deposits (gravel, sand and silt). Superficial deposits within the study area are presented within **Figure 1.4**.
- 1.6.3.2 The western extent of the Morecambe onshore substation site and majority of the associated 1 km study area is underlain by Breckells Mudstone Member (mudstone). The eastern extent of the site and remainder of the 1 km study area is underlain by Sherwood Sandstone Group (sandstone). Bedrock geology within the study area is presented within **Figure 1.5**.
- 1.6.3.3 The geological setting is discussed in further detail within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Groundwater

- 1.6.3.4 A BGS borehole record reference SD42NW47 (located at SD 43820 29720) is present within the Morecambe onshore substation site where permanent and temporary access tracks are proposed and encountered groundwater at 3.00 m below ground level.

Aquifer designation

- 1.6.3.5 Bedrock Geology Aquifer Designation mapping indicates mudstones of the Breckells Mudstone Member are designated as a Secondary B aquifer. These are predominantly lower permeability layers which may store and yield limited amounts of groundwater. Sherwood sandstone group (sandstone) is classified as a principal aquifer; permeable geology able to provide a high level of water storage and able to support water supply and/or river base flow on a strategic scale.
- 1.6.3.6 Superficial Deposits Aquifer Designation mapping indicates extents of blown sand deposits within the 1 km study area comprise Secondary A aquifers (formations of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers). Secondary (Undifferentiated) aquifers (i.e., rock considered to have variable and insignificant contributions to water resources and river base flows) reflect the distribution of superficial deposits with low permeability such as glacial till and tidal flat deposits.
- 1.6.3.7 Additional detail can be found within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Source Protection Zones

- 1.6.3.8 The entirety of Morecambe onshore substation site and the associated 1 km study area is located outside of any SPZ. SPZs within the study area are presented within **Figure 1.6**.

Soils classification

- 1.6.3.9 The National Soils Research Institute Soilscales viewer classifies soils underlying Morecambe onshore substation site to be '*slightly acid loamy and clayey soils with impeded drainage*'.
- 1.6.3.10 The associated 1 km study area also includes 'slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils' within the east and west, 'slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils' within the south west and 'loamy and clayey soils of coastal flats with naturally high groundwater' within the south east.

1.6.4 Fluvial and tidal flood risk

Flood Map for Planning

- 1.6.4.1 The Flood Map for Planning was updated by the EA in March 2025 and contains ~~The~~ Environment Agency Flood Zones which refer to the probability of flooding from rivers and sea in a given year, assuming no defences (as presented within ~~Table 1.8~~) are in place. Mapping does not account for climate change. A figure demonstrating Environment Agency Flood Zones in relation to Morecambe onshore substation is presented within Figure 1.13. Land not included within hatching associated with Flood Zone 2 and 3 is considered to be Flood Zone 1.
- 1.6.4.2 The Morecambe onshore substation, including surface water attenuation and temporary construction compounds are located within Flood Zone 1.
- 1.6.4.3 The permanent access track to be taken via Lower Lane is located within Flood Zone 1. The temporary and permanent access track taken via Preston New Road (A584) is partially located within Flood Zone 1 but predominantly located within Flood Zone 2 and 3.
- 1.6.4.4 Throughout the 1 km study area, land adjacent to the Dow Brook and Middle Pool is assessed to be located within Flood Zones 2 and 3.

Delineation of Flood Zone 3a and 3b

- ~~1.6.4.5 The delineation between Flood Zone 3a and 3b has been undertaken via the use of the 3.3% AEP extent from with the Ribble Estuary (2014) hydraulic model and the 4% AEP extent from the Ribble Douglas (2010) hydraulic model.~~
- ~~1.6.4.6 The Morecambe onshore substation is not located within the Flood Zone 3b extent and is such classified to be located within Flood Zone 3a. Further information regarding SFRA data is presented within Paragraph 1.6.4.26.~~
- 1.6.4.5 The delineation between Flood Zone 3a and 3b has been undertaken via the use of the 'River and Sea with Defences' dataset which is included within the

updated Flood Map for Planning. The mapped 1 in 30-year annual likelihood of flooding extent ~~can be used as~~ provides an indicative extent of Flood Zone 3b.

1.6.4.6 The rivers and sea with flood defences dataset shows the temporary and permanent access tracks are partially located within indicative Flood Zone 3a and 3b. Areas of Flood Zone 3 within the 1km study area is also shown to be indicatively located within Flood Zone 3b; associated with fluvial and tidal flooding. ~~The majority of Flood Zone 3 within the 1 km study area are classified as Flood Zone 3a. A small extent within the south of the 1 km study area is located within Flood Zone 3b.~~

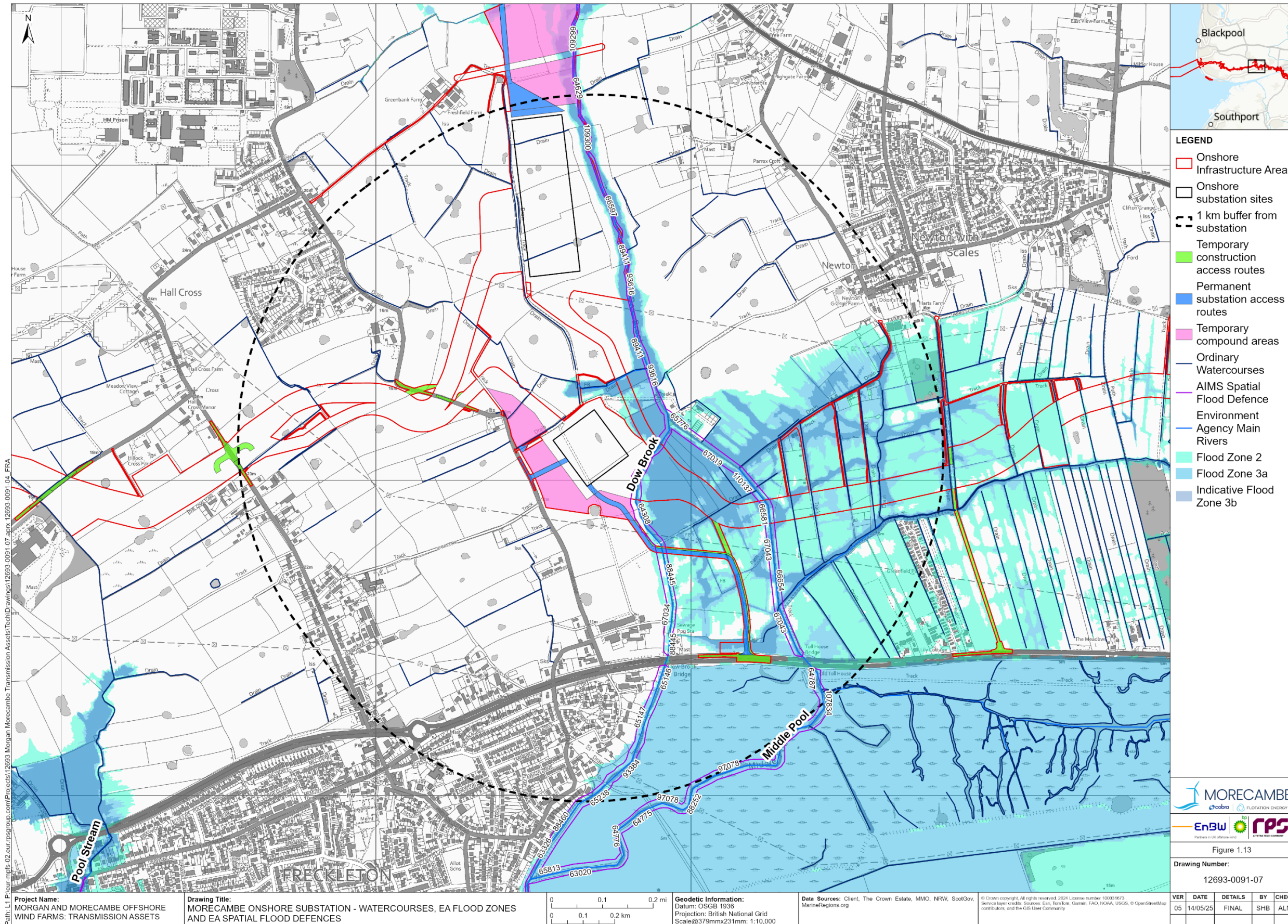


Figure 1.13: Morecambe onshore substation - Watercourses, EA Flood Zones and EA Spatial Flood Defences

Environment Agency Flood Model data

Fluvial flooding

- 1.6.4.7 The Environment Agency confirmed flood extents within proximity to the Dow Brook have been informed by JFLOW modelling which does not account for the effects of climate change and is not appropriate to use within FRAs, as per standard Environment Agency guidance.
- 1.6.4.8 The fluvial catchment of the Dow Brook is relatively small, incorporating an area of 16.69 km² at a point downstream of the Morgan and Morecambe onshore substations. Due to the small nature of the catchment, flood risk from this catchment can be assessed within the Environment Agency Long Term Flood Risk from surface water mapping.
- 1.6.4.9 In lieu of no available climate change information available for the Dow Brook within proximity to the Morecambe onshore substation, the Long Term Flood Risk from surface water mapping 1% and 0.1% AEP data has been used to assess how fluvial flood risk from the Dow Brook evolves due to climate change. It is noted flows associated with the 1% AEP event from the Dow Brook catchment are conveyed within the river channel.
- 1.6.4.10 In order to establish if the use of the 0.1% AEP surface water event as a proxy for the 1% AEP year plus climate change event is appropriate an assessment of local flow rates based on catchment descriptors has been undertaken. The descriptors for the Dow Brook have been extracted for this watercourse with the main catchment features presented below.
- Area: 16.69 km².
 - SAAR 61-90: 940 mm.
 - PROP WET: 0.5.
 - BFIHOST19: 0.43.
- 1.6.4.11 At this location the watercourse is situated within the Ribble Management Catchment as such the 29% allowance should be used which assess the 2050's higher central peak river flow allowance.
- 1.6.4.12 Extracted ReFH2 values for the peak flow indicate that the 0.1% AEP produces higher results than 1% + 29% climate change and 1% + 44% climate change allowance, as presented within **Table 1.27**. It is therefore, considered acceptable to use the 0.1% AEP surface water flood extents at this location in the absence of climate change data at this location.

Table 1.26: ReFH2 Peak flows for the Dow Brook

Location	Description	Peak flow (m ³ /s)			
		1% AEP	1% AEP + 29% CC	1% AEP + 44% CC	0.1% AEP
343950, 429450	Dow Brook	8.21	10.59	11.82	12.02

- 1.6.4.13 Using the National LIDAR Programme 1 m resolution Digital Surface Model data, the 0.1% AEP surface water flooding extent from the Long Term Flood Risk mapping corresponds to the 5.80 m AOD contour level. Flood depths associated with this event outside of the river channel are up to 300mm. The Morecambe onshore substation is to be raised upon a platform between 8.46 and 10.18 m AOD. The surface water attenuation is located above 9.17m AOD. The Morecambe onshore substation and access track via Lower Lane is located between 10 m AOD and 12 m AOD and are located within the 0.1% AEP Long Term Flood Risk from surface water mapping event, with flood depths outside of watercourse channels assessed to be up to 300 mm.
- 1.6.4.14 Whilst not used within the assessment of flood risk, the extent of Flood Zone 3 (which includes Flood Zone 3a and 3b) from JFLOW data has been used to inform extents where no profiling of ground levels is to take place, as presented within the Outline CoCP. The retaining of existing ground levels within Flood Zone 3 (which includes Flood Zone 3a and 3b) will ensure floodplain capacity is maintained as well as flow conveyance as to not increase flood risk downstream of the development. Mitigation measures to reduce development and user vulnerability are presented within **Table 1.27**.

Credible maximum climate change scenario

- 1.6.4.15 The upper estimate peak river flow allowance has been used to assess the credible maximum climate change scenario from fluvial flows. This is 44% for the Dow Brook under the 2050's epoch, as per **Table 1.9**. As demonstrated within **Table 1.27**, peak flows from the 1% AEP + 44% climate change scenario event are lower than the 0.1% AEP event which has been used to assess fluvial flood risk to the onshore substation. As such the Morecambe onshore substation is not considered to be at risk from the credible maximum climate change scenario from fluvial flows.

Tidal flooding

- 1.6.4.16 The Environment Agency provided the Ribble Estuary Tidal model (2014) under a conditional licence. Tidal flood depths have been ascertained from provided Environment Agency modelled flood levels from the Ribble Estuary tidal model (2014).
- 1.6.4.17 The 0.5% AEP scenario from the Ribble Estuary tidal model (2014) has been used to assess tidal flood risk to the Morecambe onshore substation by applying an allowance for sea level rise from the year of dataset production (2014 for the Ribble Estuary Tidal model) to the end of the construction and the development lifetime of the Transmission Assets.
- 1.6.4.18 The Morecambe onshore substation and access track via Lower Lane is located between 10 m AOD and 12 m AOD and remains flood-free until the end of the operation and maintenance phase. The permanent and temporary access track via Preston New Road has a residual flood risk from flooding if defences were not present (undefended scenario) during the ~~2032-2036~~ and ~~2067-2071~~ epochs.
- 1.6.4.19 It is noted the Ribble Estuary tidal model (2014) has smaller flood extents in comparison to the Flood Map for Planning within the temporary and permanent

access tracks. It is expected the additional extent within the Flood Map for Planning is also incorporates JFLOW modelling extents which reflects flooding from fluvial sources.

Construction phase

- 1.6.4.20 To account for sea level rise to the end of the construction period (~~2032-2036~~ epoch), ~~135.3~~~~108.3~~ mm has been applied to the 2014 0.5% AEP undefended tidal flood extent from the Ribble Estuary tidal flood model (~~2032-2036~~ 0.5% AEP).
- 1.6.4.21 During the ~~2032-2036~~ 0.5% AEP event, maximum flood depths up to 0.~~68~~~~71~~ m inundate the temporary access road, associated with tidal flooding propagating upstream and causing out of bank flooding from the channels of ordinary watercourses within the area. The construction compound to the west of the access road's junction with Preston New Road is inundated with flood depths up to 0.~~68m~~~~71m~~.

Operational and maintenance phase

- 1.6.4.22 To account for sea level rise up to ~~2067~~~~2071~~, ~~507.7~~~~450.9~~ mm has been applied to the 2014 0.5% AEP undefended tidal flood level from the Ribble Estuary tidal flood model. Mapping of flood levels and depths associated with this event are presented within **Figure 1.7**.
- 1.6.4.23 During the ~~2067-2071~~ 0.5% AEP, maximum flood depths up to 1.~~23~~~~29~~ m are present and associated with out of bank flooding from ordinary watercourses within the area.

Credible maximum climate change scenario

- 1.6.4.24 H++ sea level rise projections have been assessed via the application of 1.9m to the 0.5% AEP 2014 tidal scenario. This produces a maximum H++ tidal flood level of 7.41 m AOD within the south of the study area. The onshore The Morecambe onshore substation is to be raised upon a platform between 8.46 and 10.18 m AOD and remain above the H++ tidal flood level. As such, the H++ approach is not considered necessary to be applied.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

- 1.6.4.25 Relevant information regarding fluvial and tidal flood risk from the FCA SFRA to the Morgan onshore substation has been extracted and included as follows.
- Within the Fylde Council area, The main fluvial flood risk in Fylde comes from tributaries of the River Ribble which flow south through the area to join the River Ribble, which runs along the southern border of the area. Considerable parts of the fluvial flood risk affect rural areas; however, settlements affected by fluvial flood risk include Lytham, Kirkham, Warton, and Freckleton.

- Within the Fylde Council area, the Ribble estuary presents a tidal flood risk to the south of the area. In the southwest, the east side of the settlement of Lytham is shown to be at tidal risk. In the southeast, it is largely rural areas to the east of Freckleton that are shown to be at risk.
- Extents of Flood Zone 2 and 3 broadly correspond to the EA Flood Map for Planning, with a broader extent mapped within the LCA SFRA mapping than the Flood Map for Planning. This is thought to be due to more up to date information being used within Environment Agency data which was released in March 2025.
- All Flood Zone 3 extents associated with the Dow Brook are classified as Flood Zone 3b.
- No tidal flood extents are located within the study area.
- Flooding from Dow Brook is classified as 'surface water' rather than 'fluvial', assumed due to the watercourses small hydrological catchment.

Fylde Borough Council Strategic Flood Risk Assessment (2011)

- ~~1.6.4.25 — The FC SFRA classifies flood extents adjacent to the Dow Brook are classified as Flood Zone 3a. It is assumed a small extent beyond the extent of Flood Zone 3a is classified as Flood Zone 2, however mapping resolution is too low to confirm this. The extent of Flood Zone 3a is slightly greater in extent than the EA Flood Map for Planning Flood Zone 3.~~
- ~~1.6.4.26 — It is noted the maps to inform the FC SFRA were created in May 2011 and as such are considered to be superseded by data presented within the EA Flood Map for Planning.~~

Mitigation measures

- ~~1.6.4.27~~ 1.6.4.26 The permanent and temporary access track via Preston New Road is located within Flood Zones 1, 2 and 3a and is to serve as access to the Morecambe onshore substation for HGVs. During construction, If a Flood Warning/Flood Alert is issued for the 'Lancashire coastline at Lytham St. Annes, along the coast from Squires Gate to Warton Bank' Flood Warning Area (reference 012FWCTL13A) and the 'Coast at Lytham St Annes' Flood Alert area (reference 012WACLS) works within the relevant areas within the landfall area would also be stopped whilst the Flood Warning/Flood Alert is active (CoT97). The permanent use would be for heavy goods vehicle and abnormal loads deliveries only and therefore operational use would be rare and an outline operational drainage management plan (document reference J10) has been submitted with the application.
- ~~1.6.4.28~~ 1.6.4.27 The following mitigation measures (commitments) presented below within **Table 1.27** are proposed to manage flood risk and vulnerability to site workers during the development lifetime. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.27: Summary of CoT for fluvial flood risk for Morecambe onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT08	Post-construction, the working area will be reinstated to pre-existing condition as far as reasonably practical in line with the DEFRA Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (PB13298), Institute of Quarrying (IQ) Good Practice Guide for Handling Soils in Mineral Workings (IQ, 2021) and British Society of Soil Science (BSSS) Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction (BSSS, 2022).	To ensure working areas are reinstated to pre-existing conditions after construction has been completed	DCO Schedules 2A & 2B, Requirement 18 (Restoration of land temporarily used for construction); DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT27	All temporary compounds will be removed and sites will be reinstated when construction has been completed.	To ensure working areas are reinstated to pre-existing conditions after construction has been completed	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice); and DCO Schedules 2A and 2B, Requirement 16 (Restoration of land used temporarily for construction)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address: <ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and pollution prevention [...] 	To implement control measures in regards to fluvial and tidal flooding, including: <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; Measures regarding dewatering; Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)

CoT	Summary	Reason	How CoT is to be secured
		(where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;	
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)
CoT82	Where trenchless techniques are proposed for crossing ordinary watercourses, the entry and exit pits will be set back a minimum of 8 m from the bank of the watercourse. These crossings are detailed in the Onshore Crossing Schedule. Where required, geomorphological surveys will be undertaken on ordinary watercourses that may be crossed by trenched techniques. These will be used to inform detailed designs prior to construction.	To reduce fluvial flood risk	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT95	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. The Outline CoCP includes that during the construction phase the Principal Contractor(s) will sign up to the Flood Warning Service and will be alerted by a phone call or text when a Flood Warning becomes active. The flood warning will be applied to the entire Onshore Infrastructure Area located within Flood Zones 2 and 3 to enable site personnel to be evacuated from the site in a timely manner prior to a flood event occurring, if appropriate.	To reduce vulnerability to flood risk	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

CoT	Summary	Reason	How CoT is to be secured
CoT121	Where watercourses are to be crossed by haul roads and temporary access tracks, the culverting or bridging will be appropriately sized to ensure conveyance of existing flows to mitigate the potential for increased flood risk. This will be agreed in consultation with the Lead Local Flood Authority for Ordinary watercourses; or the Environment Agency for Environment Agency Main Rivers.	To ensure fluvial flood risk is not increased	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

Summary

~~1.6.4.29~~ 1.6.4.28 The permanent Morecambe onshore substation, associated surface water attenuation and permanent access track via Lower Lane is located within Flood Zone 1 and remains flood free until the end of the operation and maintenance phase. The temporary and permanent access track taken from Preston New Road is located within Flood Zones 1, 2 and 3a and is inundated by the tidal undefended 0.5% AEP event during the construction phase and during the development lifetime. With the implementation of mitigation measures presented within **Table 1.27** flood risk from fluvial and tidal sources is assessed to be low.

1.6.5 Groundwater flood risk

1.6.5.1 Groundwater flood risk mapping shows the Morecambe onshore substation site has a 'moderate' to 'high' risk of groundwater flooding. The majority of the 1 km study area is shown to have a 'low' to 'high' risk of flooding with limited areas with a 'negligible' risk of flooding.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

1.6.5.2 Relevant information to groundwater flood risk from the FCA SFRA to the Morecambe onshore substation has been extracted and included as follows.

- Within the Fylde Council area, the Environment Agency Areas Susceptible to Groundwater Flooding map shows considerable variability across Fylde. The JBA groundwater emergence map shows large parts of Fylde are at 'no risk' of groundwater emergence. Groundwater levels are highest in the southwest of the area, across Lytham and St Annes, where they are mainly within 0.5m of the ground surface.
- From the 'Groundwater Emergence Mapping (JBA)' the study area is located in an mapped area of 'no risk'.

1.6.5.1 From the 'Groundwater Flooding susceptibility (EA)' mapping, the study area is not susceptible to groundwater flooding.

Mitigation measures (commitments)

1.6.5.2 Mitigation measures (commitments) presented below within **Table 1.28**: are proposed to manage flood risk and vulnerability to site workers during the construction phase. No commitments relating to groundwater flooding are required during the operation and maintenance phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.28: Summary of CoT for groundwater flood risk for Morecambe onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address: <ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and pollution prevention [...] 	To implement control measures in regards to fluvial and tidal flooding, including: <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; Measures regarding dewatering; Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)

CoT	Summary	Reason	How CoT is to be secured
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)
CoT41	Where the onshore export cable corridor or 400 kV grid connection cable corridor crosses sites of particular sensitivity (e.g. embanked Environment Agency surface watercourses, Sites of Special Scientific Interest or groundwater inner Source Protection Zones) hydrogeological risk assessment(s) will be undertaken to inform a site-specific crossing method statement(s) where required. These will be agreed with the relevant stakeholders prior to construction.	To inform groundwater flood risk	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

Summary

~~1.6.5.3~~ 1.6.5.4 With the implementation of commitments listed within **Table 1.28** the overall risk of flooding from groundwater is assessed to be low.

1.6.6 Surface water flood risk

- 1.6.6.1 The Environment Agency Long Term Flood Risk mapping includes Risk of Flooding from Surface Water mapping (both present day and climate change information) which was updated in January 2025 and is~~from Surface Water mapping~~, presented within Figure 1.14. Mapping shows that although the majority of the Morecambe onshore substation and study area has 'very low' ~~risk~~ chance of flooding from surface water.
- 1.6.6.2 A 'low' to 'high' ~~risk~~ chance of surface water ponding located within the centre of the Morecambe onshore substation development platform, associated with an isolated topographical low point. Two areas of 'low' ~~risk~~ chance is also present within the extent of the development platform, one in the west and a

second ~~upon in~~ the eastern boundary. ~~Flood depths up to 300mm are presented for the 'low' chance scenario for both present-day and climate change epochs. During the worst case 0.1% surface water flooding event, flood depths are shown to be up to 900 mm within areas of ponding.~~

- 1.6.6.3 Within the study area, flooding is predominantly associated with overland flow pathways. There are also isolated areas of surface water ponding across study area, likely associated with topographical low points.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

- 1.6.6.4 Relevant information regarding surface water risk from the FCA SFRA to the Morecambe onshore substation has been extracted and included as follows.

- Within the Fylde Council area, surface water flood risk is very localised but generally follows the main watercourses through the area and follows the roads through the settlements. There is considerable surface water flood risk across both St Anne's and Lytham in the west of the area, but all settlements across the area are affected by surface water risk.
- FCA details the following historical flood events recorded by councils:
 - Widespread historic flood events have affected properties in Freckleton, including the following:
 - Lytham Road, at the junction with Knott Drive, Freckleton
 - Lower Lane, to the north of the A584, Preston New Road, in the east of Freckleton

~~Strategic Flood Risk Assessment (Fylde Borough Council, 2011)~~

~~The FC SFRA indicates that no known flooding hotspots are located within the Morecambe onshore substation site or the 1 km study~~

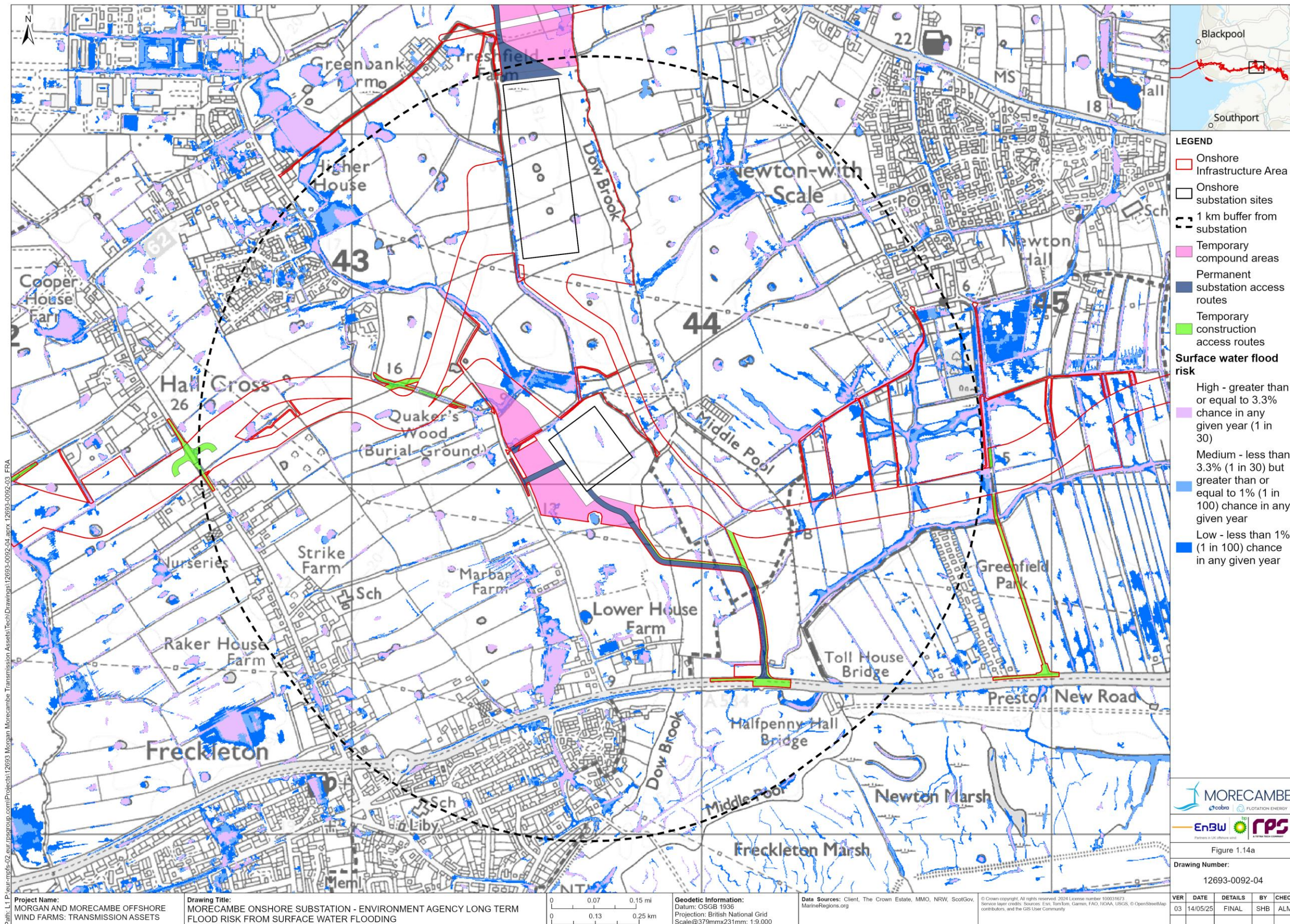


Figure 1.14a: Morecambe onshore substation - Environment Agency Long term flood risk from surface water flooding

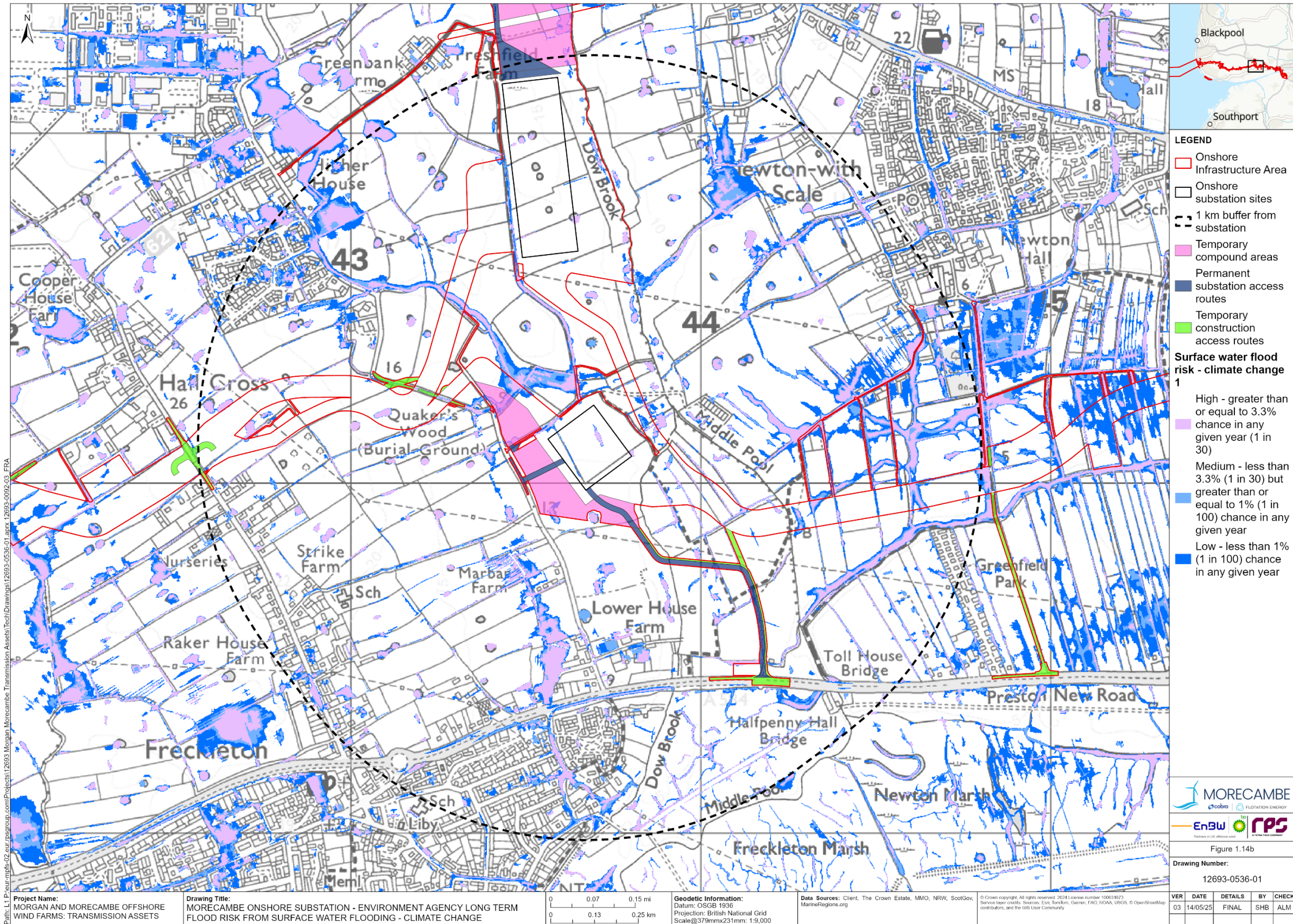


Figure 1.14a: Morecambe onshore substation - Environment Agency Long term flood risk from surface water flooding – climate change

Mitigation measures (commitments)

~~1.6.6.4~~ 1.6.6.5 Mitigation measures (commitments) presented below within **Table 1.29** are proposed to manage flood risk and vulnerability to site workers during the construction phase and operation and maintenance phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.29: Summary of CoT for surface water flood risk for Morecambe onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT11	An Outline Operational Drainage Management Plan for the substation sites has been prepared and submitted with the application for development consent. The Plan will include measures to ensure that existing land drainage is reinstated and/or maintained. This will include measures to limit discharge rates and attenuate flows to maintain greenfield runoff rates at the onshore substations. It will also include measures to control surface water runoff, including measures to prevent flooding of the working areas or offsite and to ensure any runoff is treated appropriately. Detailed Operational Drainage Management Plan(s) will be developed in accordance with the Outline Operational Drainage Management Plan and in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority (Lancashire County Council).	To ensure flood risk is not increased during operation.	DCO Schedules 2A and 2B, Requirement 20 (Outline Operational Drainage Management Plan)
CoT24	Where practicable, during construction, access routes within the onshore export cable corridor and 400 kV grid connection corridor (i.e. for example, the use	To not increase impermeable areas associated with haul roads and in turn increase surface water runoff and flood risk from this source	DCO Schedules 2A & 2B, Requirement 9 (Traffic and Transport)

CoT	Summary	Reason	How CoT is to be secured
	of haul roads) will be used, to minimise potential impacts to the local road network.		Access to Works Plan
CoT27	All temporary compounds will be removed and sites will be reinstated when construction has been completed.	To not increase surface water runoff as a result of greater impermeable areas during the operation and maintenance phase	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice); and DCO Schedules 2A and 2B, Requirement 16 (Restoration of land used temporarily for construction)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address: <ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and pollution prevention [...] 	To implement control measures in regards to fluvial and tidal flooding, including: <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; Measures regarding dewatering; Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)

Summary

1.6.6.5 1.6.6.6

Commitments listed in **Table 1.29** above will ensure the Morecambe onshore substation will not be impacted by or cause

any adverse effect on surface water flooding during the construction phase. As such, flood risk from this source is assessed to be low.

1.6.7 Reservoir flood risk

1.6.7.1 The western portion of the Morecambe onshore substation and associated 1 km study area is identified to be within the reservoir flood extent, when there is also river flooding. Environment Agency reservoir flood risk within the study area is presented within **Figure 1.10**.

1.6.7.2 Due to the regular inspection and maintenance regime in place on large reservoirs, the likelihood of catastrophic failure and therefore risk of flooding to the site from this source is unlikely to occur. Flood risk from this source is therefore assessed to be very low.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

1.6.7.3 Relevant information regarding flood risk from reservoirs from the FCA SFRA to the Morecambe onshore substation has been extracted and included as follows.

1.6.7.2 Within the Fylde Council area, there are two reservoirs located within Fylde: Weeton and Westby. Both are located centrally with the 'Dry Day' scenario impacting the centre of the area, although the areas impacted are mainly rural. There is considerable risk along the south of the area from the 'Wet Day' extents from reservoirs outside of the area. However, the risk is mostly confined to the rural area between Freckleton and Clifton.

1.6.8 Flood risk from sewer and water main failure

1.6.8.1 Flooding from sewerage failure occurs when a rainfall event exceeds the maximum capacity of the surrounding network. The most common causes of flooding from sewers are inadequate flow capacity, blockages, pumping station failures, burst water mains, water inflow from rivers or the sea, tide locking, siltation, fats/greases, and sewer collapse. Should any of these events occur there is a risk of flooding within the vicinity of the sewer by surcharge where the flood is in excess of the sewer capacity (usually 1 in 30-year event or greater).

1.6.8.2 Morecambe onshore substation is agricultural and therefore, unlikely to have sewer assets within the site.

1.6.8.3 As per **section 3.16.8** of Volume 1, Chapter 3: Project description of the ES, to ensure damage to sewers and water pipelines and thus flooding from this source is prevented during the construction phase, prior to the commencement of works, any construction activities will need to be undertaken in accordance with the water authorities design standards prior to gaining approval. This includes providing evidence to confirm the presence/lack of presence of any water authority assets (e.g. sewers and water mains) and if they are present,

how final design and construction methods will be implemented to divert their assets (which will need additional approval) or avoid their assets.

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

1.6.8.4 Relevant information regarding flood risk from sewers from the FCA SFRA to the Morecambe onshore substation has been extracted and included as follows.

1.6.8.3 Within the Fylde Council area, the main postal districts covering Fylde are FY4, FY6, FY8 and PR4 (which the Morecambe onshore substation is located within). Across these postal districts a total of 521 sewer flooding incidents have been recorded by United Utilities in data provided from 2009 to October 2023. Over half of these incidences occurred within the FY6 postcode area.

Mitigation measures (commitments)

1.6.8.4 1.6.8.5 Mitigation measures (commitments) presented below within **Table 1.30** below are proposed to manage flood risk and vulnerability to site workers during the construction phase. No commitments relating to groundwater flooding are required during the operation and maintenance phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.30: Summary of CoT for flood risk from sewers for Morecambe onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address: <ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and 	To implement control measures in regards to fluvial and tidal flooding, including: <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; Measures regarding dewatering; Measures regarding restricting the placement of stockpiling, storage	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)

CoT	Summary	Reason	How CoT is to be secured
	<ul style="list-style-type: none"> pollution prevention [...] 	of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;	
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)

Summary

~~1.6.8.5~~ 1.6.8.6 With implementation of commitments listed within **Table 1.30**, flood risk from sewers is therefore assessed to be very low.

1.6.9 Flood risk from artificial sources

1.6.9.1 Field drainage is expected to be present within agricultural land within the study area and could pose localised sources of flooding if impacted during construction.

Mitigation measures (commitments)

1.6.9.2 Mitigation measures (commitments) presented below within **Table 1.30** below are proposed to manage flood risk and vulnerability to site workers during the construction phase. No commitments relating to flooding from artificial sources are required during the operation and maintenance phase. Commitments are also presented within **Section 1.8, Table 1.44**. Commitments are to be secured through requirements of the DCO.

Table 1.31: Summary of CoT for flood risk from artificial sources for Morecambe onshore substation

CoT	Summary	Reason	How CoT is to be secured
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	To implement construction phase drainage to control runoff during this phase of the Transmission Assets.	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include measures to maintain and address: <ul style="list-style-type: none"> [...] flood protection and control measures; -water environment and drainage; and pollution prevention [...] 	To implement control measures in regards to fluvial and tidal flooding, including: <ul style="list-style-type: none"> Measures to prevent a reduction in the capacity of the fluvial floodplain which can increase flood risk downstream; Measures regarding dewatering; Measures regarding restricting the placement of stockpiling, storage of fuels and chemicals and refuelling to Flood Zone 1 (where practical) and at least 8 m from ordinary watercourses and Main Rivers and 16m from tidal Main Rivers to reduce vulnerability to flood risk;	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	To manage flood risk during decommissioning	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)
CoT84	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. In order to manage	To prevent flooding from field drainage	DCO Schedules 2A and 2B, Requirement 8 (Code of Construction Practice)

CoT	Summary	Reason	How CoT is to be secured
	impacts to field drainage, the Outline CoCP stipulates field drainage plans will be developed in consultation with the relevant landowners. If required, additional field drainage will be installed to ensure the existing drainage of the land is maintained during and after construction.		

Summary

1.6.9.3 With implementation of commitments listed within **Table 1.30**, flood risk from artificial sources is therefore assessed to be very low.

1.6.10 Historic flooding

1.6.10.1 The Environment Agency Historic Flood Map shows the Morecambe onshore substation site is located outside the mapped extent of historical flooding. The southern extent of the 1 km study area is shown to be located within an Environment Agency historical flood extent, comprising an area of 97ha. Historical flood extents within the Transmission Assets study area are presented within Figure 1.11

Strategic Flood Risk Assessment

The Fylde Coast Authorities Strategic Flood Risk Assessment (2024)

1.6.10.2 [See 'Strategic Flood Risk Assessment' sections for relevant flood risk sections above.](#)

~~Strategic Flood Risk Assessment (Fylde Borough Council, 2011)~~

~~1.6.10.3 Fylde Council do not hold any records of historical flooding.~~

1.6.11 Summary of flood risk

1.6.11.1 A summary of assessed flood risk is presented below within **Table 1.32**.

Table 1.32: Morecambe onshore substation flood risk summary

Source of flooding	Assessed risk to Morecambe onshore substation	Commitment measures to be adopted
Fluvial and tidal	Low	CoT08, CoT09, CoT27, CoT35, CoT36, CoT82, CoT95, CoT121
Groundwater	Low	CoT09, CoT35, CoT36, CoT41

Source of flooding	Assessed risk to Morecambe onshore substation	Commitment measures to be adopted
Surface water	Low	CoT09, CoT11, CoT24, CoT27, CoT35, CoT36
Reservoir	Very low	None
Sewer	Very low	CoT09, CoT35, CoT36
Artificial Sources	Very low	CoT09, CoT35, CoT36, CoT84

1.7 Landfall, onshore export cables and 400 kV grid connection cable corridor flood risk assessment

1.7.1 Baseline conditions

Location

1.7.1.1 The landfall, onshore export cables and 400 kV grid connection cable corridor FRA focuses on the 250 m study area relevant to the intertidal infrastructure area and onshore infrastructure area, including the following elements:

- Landfall:
 - Landfall site: this is where the offshore export cables are jointed to the onshore export cables. This term applies to the entire landfall area between Mean Low Water Springs (MLWS) and the TJBs. This includes all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
- Onshore elements:
 - onshore export cables: these cables will link the landfall site and the proposed onshore substations; and
 - 400 kV grid connection cable corridor: these 400 kV cables will connect the proposed onshore substations to the existing National Grid Penwortham substation. Circuit breaker infrastructure may also be required within the 400 kV grid connection cable corridor.

1.7.1.2 The onshore substations are considered within the previous sections and are not considered further in this section.

1.7.1.3 The landfall is located at Lytham St. Annes. From the landfall, the onshore export cable corridor routes east away from the coast to the onshore substations just west of Newton-with-Scales. The 400 kV grid connection cable corridor routes eastwards and crosses the River Ribble to the west of Preston and connects to the National Grid Penwortham substation located to the west of Penwortham. The study area is presented within **Figure 1.1**.

Existing use

1.7.1.4 The Transmission Assets makes landfall at Lytham St Annes beach and crosses Blackpool Airport before running through predominantly agricultural land uses. There are several built-up areas and settlements within and adjacent to the study area, including Blackpool, Preston, Kirkham, Penwortham, Ashton-on-Ribble, Lytham St Annes, and Freckleton.

1.7.1.5 The A583 and A584 route broadly east to west are located within the eastern extent of the study area. Other infrastructure within the study area include several major roads and the Blackpool South to Preston railway line which bisects the central extent of the study area.

1.7.1.6 The study area crosses several watercourses across the route, including the River Ribble at a location to the east of Freckleton.

1.7.1.7 Several designated sites are located within the study area, as presented within **Figure 1.12**, including:

- Ribble and Alt Estuaries Special Protection Area and Ramsar within the southern extent of the study area and seaward of the landfall area;
- Ribble Estuary SSSI (biological) within the southern extent of the study area and seaward of the landfall area;
- Newton Marsh SSSI (biological) within the central-eastern part of the study area;
- Lytham St Anne's Dunes SSSI (biological) in the landfall part of the study area;
- Lytham Coastal Changes SSSI (geological) within the central-southern part of the study area, which is also designated as the Lytham St. Annes – Starr Hills Dunes Local Geodiversity Site.

Proposed use

1.7.1.8 For the purpose of this FRA, the maximum design scenarios for the Transmission Assets are identified within Volume 1, Chapter 3: Project description of the ES and are summarised below.

- Up to four compounds required between the TJBs and MLWS
 - Compound 1 (welfare): 300 m² to be active for 36 weeks;
 - Compound 2: 2,500 m² to be active for 48 weeks;
 - Compound 3: 510 m² to be active for 48 weeks; and
 - Compound 4: 600 m² to be active for 36 months.
- Up to two compounds within Blackpool Airport to facilitate construction works for the TJBs, to be active for up to 66 months
 - Landfall compound: 10,000 m² for Morgan and 10,000 m² for Morecambe; and
 - Maximum working area of the TJB: 4,900 m² for Morgan and 2,800 m² for Morecambe
- The offshore export cables between the TJB working area and the beach will be installed using the direct pipe trenchless technique for a maximum length of 1,500m. It is anticipated the direct pipe exit will be within the intertidal area.
- Entry pits within the TJB area are to be each 450 m² in area for each circuit and 6 m in depth, to be active for up to 66 months. There will also be up to six exit pits on the beach 15m from the boundary of Lytham St Annes Dunes SSSI, each with a cofferdam area of 15 * 5m (75 m²) and depth of 3 m, to be active for two weeks.
- Following the completion of the pulling-in of offshore export cables into the TJBs, the offshore export cables will be buried between the direct pipe/duct exit pits and MLWS. The initial burial starts at the direct pipe/duct exit pit (i.e. at the cofferdam locations) via open trenching,

towards MLWS. The maximum number of trenches between the direct pipe exit and MLWS is six. Each trench is to be stepped with depth, with a maximum width at ground level of 10m. The maximum length of each trench is 300m. The maximum volume of excavated material is 35,100 m³. Cable pull in and burial will take up to six weeks per cable, spread across a 36 month construction period.

- Onshore export cable corridor (approximately 100 m wide (including temporary area) and 17 km in length; once installed the cables will occupy a permanent corridor up to 70 m wide):
 - Up to six cable trenches, each trench up to 4 m wide at ground level with a 1.8m target trench depth.
 - To be active for a maximum of 66 months
- 400 kV grid connection cable corridor (approximately 76 m wide (including temporary area) and 13 km in length; once installed the cables will occupy a permanent corridor of approximately 50 m wide):
 - Up to four cable trenches, each trench up to 4 m wide at ground level.
- Up to 120 HDD locations with main HDD compounds measuring up to 100 m x 50 m (5,000 m²) in size.
 - HDD launch and reception pit areas both a maximum of 10 * 10m (100m²). Maximum HDD cable burial depth is 15m.
- Up to 16 temporary compounds along the onshore export cable corridor and 400 kV grid connection cable corridor:
 - 4 Type A compounds measuring up to 15,000m² (150 x 100) in size;
 - 8 Type B compounds measuring up to 15,000m² (150 x 100) in size; and
 - 4 Type C compounds measuring up to 10,000m² (100 x 100) in size.
- Two temporary 6 m wide haul roads constructed using imported engineering granular fill with geotextile style layers and a nominal thickness of 400 mm and maximum thickness of up to 1,000 mm; and
- River Ribble to be crossed by micro tunnelling or direct pipe up to 650m in length with:
 - Up to 4 starting pits each 450m² and up to 45m in depth within a launch pit measuring up to 60,000m² in size,
 - Up to 4 finishing pits each 750m² and up to 45m in depth within a launch pit measuring up to 7,500m² in size.

Decommissioning

1.7.1.9

An Onshore Decommissioning Plan (see CoT36, **Table 1.31**) will be developed prior to decommissioning in a timely manner. The Onshore Decommissioning Plan will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground

infrastructure and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant available guidance.

1.7.1.10 Activities associated with decommissioning will operate within the parameters of those established for construction. To minimise the environmental disturbance during decommissioning the onshore export cables and 400 kV grid connection cables may be recovered and removed by pulling the cables through the ducts (e.g., for recycling). Otherwise, they will be left in place in the ground with the cable ends cut, sealed and securely buried as a precautionary measure.

1.7.1.11 Joint bays and link boxes will be removed only if it is feasible with minimal environmental disturbance or if their removal is required to return the land to its current agricultural use.

1.7.2 Hydrological overview

1.7.2.1 A 250 m study area was selected for the landfall, onshore export cables and 400 kV grid connection cable corridor. Further justification of the study area is presented within **Section 1.2.2**.

1.7.2.2 The study area is situated within the North West River Basin District and is located within Ribble and Douglas Environment Agency management catchments, respectively located to the north and south of the Ribble Estuary. Designated Main Rivers, ordinary watercourses and offshore water bodies within the study area are presented within Figure 1.15.

Sea

1.7.2.3 The landfall of the Transmission Assets is located at Lytham St Anne's. The Irish Sea is located beyond the intertidal area.

Main rivers

1.7.2.4 The study area includes the following designated Main Rivers:

- Main Drain and associated tributaries, including Branch Drain;
- Moss Sluice (also known as Liggard Brook downstream of the study area) and associated tributaries;
- Dow Brook and associated tributaries;
- Middle Pool;
- Wrea Brook;
- Pool Stream;
- Ribble Link/Savick Brook;
- River Ribble; and
- Mill Brook.

- 1.7.2.5 It is noted the Canal and Rivers Trust lease Savick Brook to enable navigation and connectivity to the Lancaster Canal (commencing in Preston). The Canal and Rivers Trust own and manage several locks upon the watercourse to enable navigation and connectivity to the Lancaster Canal. The Canal and Rivers Trust also have a right of navigation over the Ribble Link (River Ribble) which provides connectivity to Savick Brook.

Ordinary watercourses

- 1.7.2.6 The study area includes the following ordinary watercourse features:

- Deepdale Brook;
- Tributaries of Moss Sluice;
- Tributaries of Branch Drain and Main Drain;
- Tributaries of Wrea Brook;
- Tributaries of Pool Stream;
- Tributaries of Middle Pool; and
- Tributaries of Mill Brook;

Internal drainage boards

- 1.7.2.7 The study area does not encompass any watercourses under the jurisdiction of an internal drainage board.

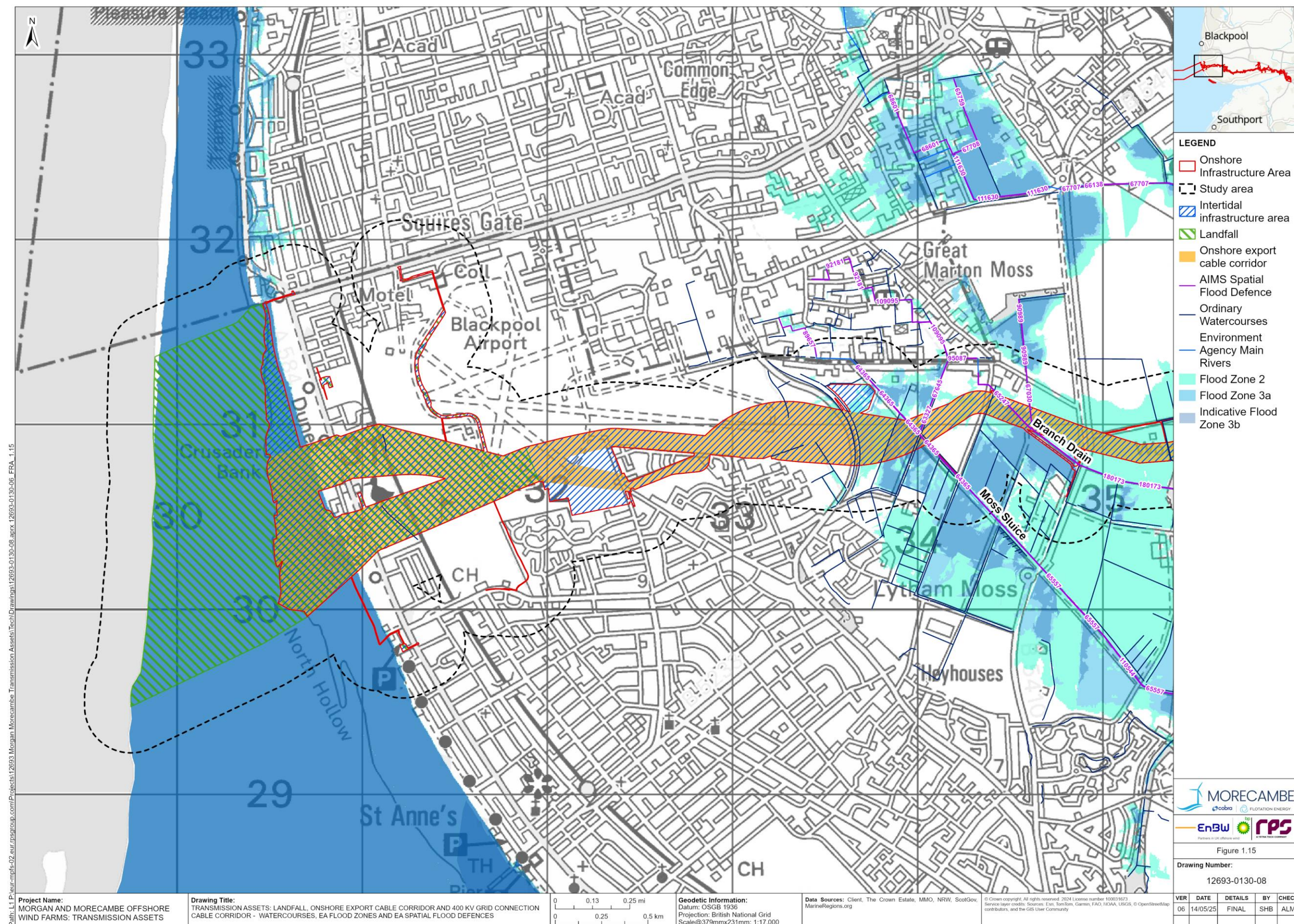


Figure 1.15: Transmission Assets: landfall, onshore export cable corridor and 400 kV grid connection cable corridor - Watercourses, EA Flood Zones and EA Spatial Flood Defences

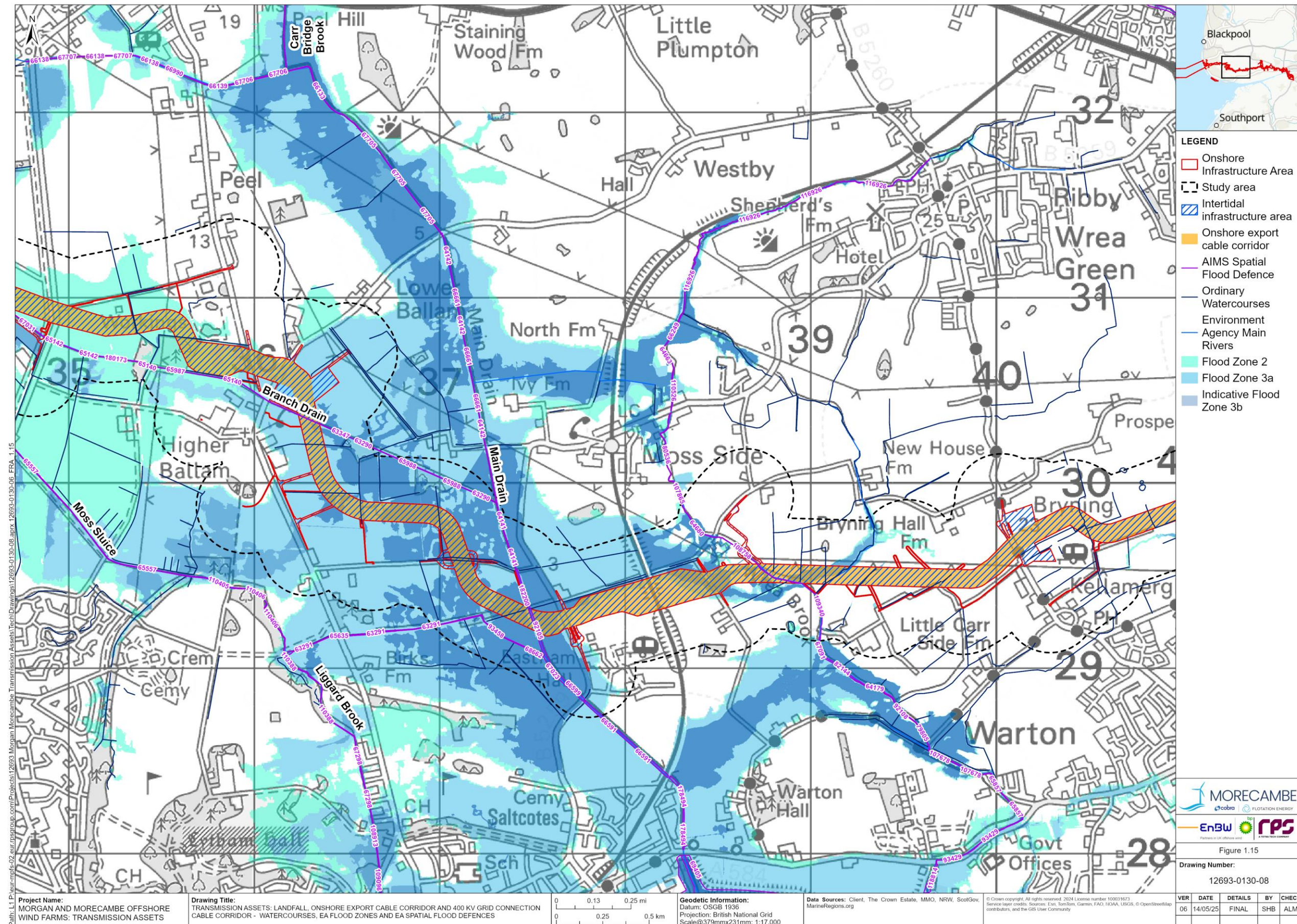


Figure 1.15: Transmission Assets: landfall, onshore export cable corridor and 400 kV grid connection cable corridor - Watercourses, EA Flood Zones and EA Spatial Flood Defences

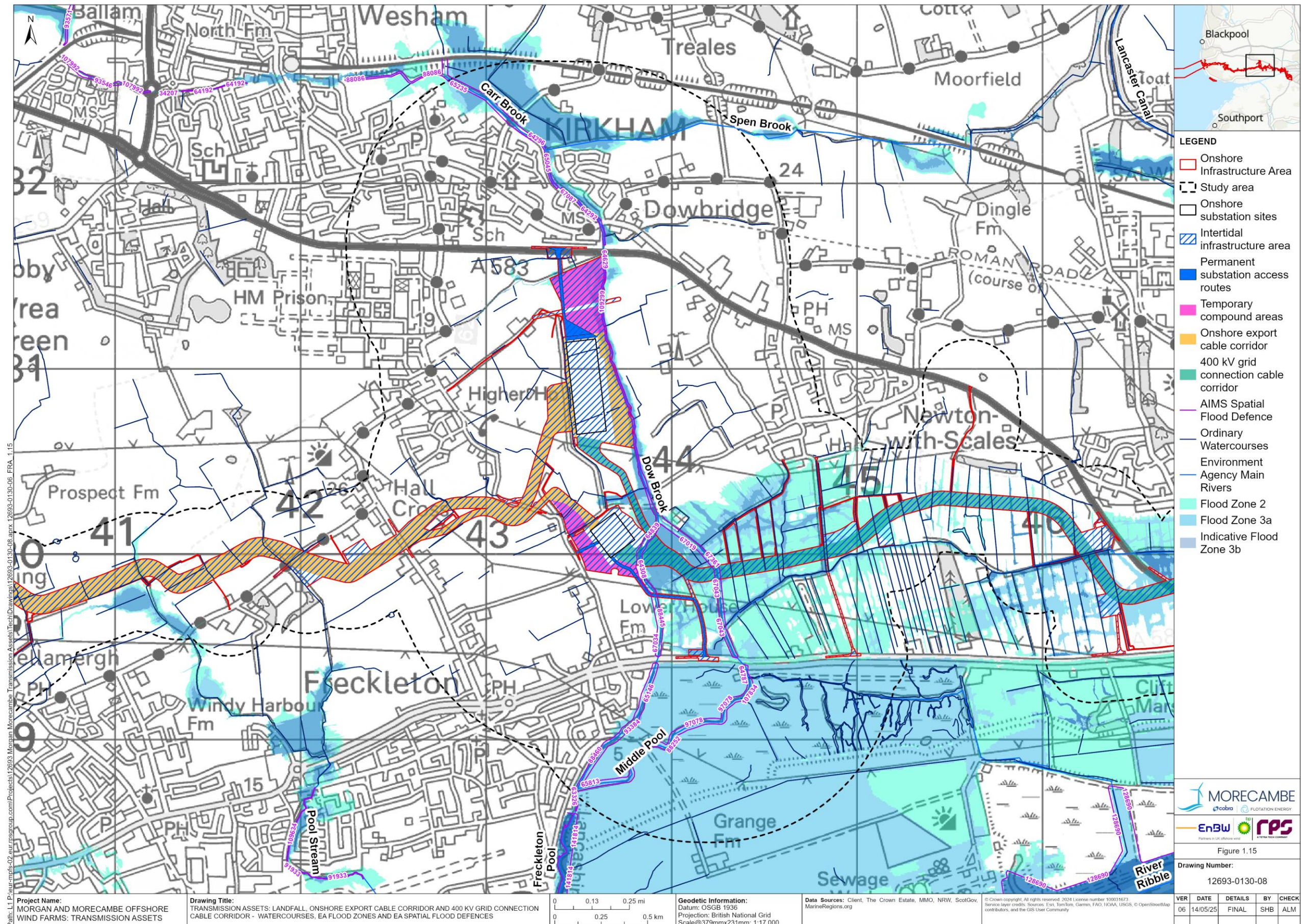


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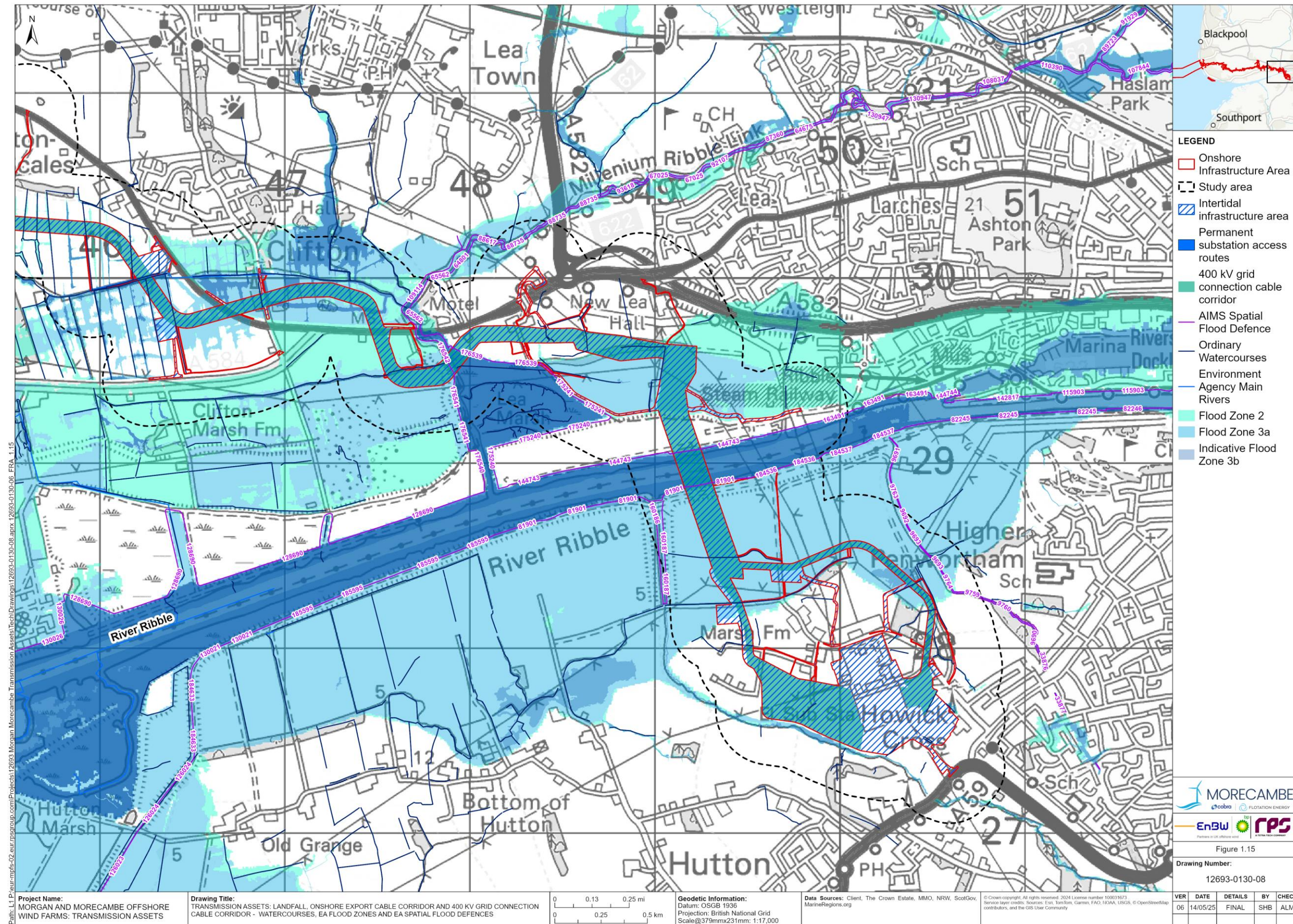


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