

Lower Thames Crossing 9.147 Coalhouse Point Flood Risk Assessment

Infrastructure Planning (Examination
Procedure) Rules 2010

Volume 9

DATE: October 2023
DEADLINE: 6

Planning Inspectorate Scheme Ref: TR010032
Examination Document Ref: TR010032/EXAM/9.147

VERSION: 1.0

Lower Thames Crossing

9.147 Coalhouse Point Flood Risk Assessment

List of contents

		Page number
1	Introduction	1
1.1	Aim of this technical note	1
1.2	Area of interest and proposed works	1
1.3	Other considerations - low lying flood bund	2
1.4	Technical note structure	3
1.5	The Project	4
2	Model specification	5
2.1	Available data	5
2.2	Existing Environment Agency model	5
2.3	Coalhouse Point wetland model development	8
2.4	Model tidal boundary	15
3	Model scenarios	17
3.1	Overview	17
4	Modelling results and interpretation	19
4.1	Impact of proposed works on offsite flood risk	19
4.2	Impacts of structure failure on flood risk	25
4.3	Impact of proposed works on floodplain storage	25
4.4	Consideration of change in flood risk for key stakeholders at Coalhouse Point	27
5	Operational activities to minimise flood impacts elsewhere from the Project ..	28
5.1	Water inlet structure	28
6	Conclusion	29
	Annexes	30
	Annex A	31
	Annex B	136

List of plates

	Page number
Plate 1.1 Area of interest and proposed works	2
Plate 2.1 Existing Coalhouse Point model extent	6
Plate 2.2 Topographic survey extent	9
Plate 2.3 Illustrative cross-section of scrapes	10
Plate 2.4 Illustrative cross-section of main channel	11
Plate 2.5 Illustrative side channel cross-section	12
Plate 2.6 Mass balance/dVol plot for pre-development 2-year event in 2032: Breach scenario.....	13
Plate 2.7 Mass balance/dVol plot for post-development 2-year event in 2032: Breach scenario.....	13
Plate 2.8 Mass balance/dVol plot for pre-development 200-year event in 2032: Overtopping scenario.....	14
Plate 2.9 Mass balance/dVol plot for post-development 200-year event in 2032: Overtopping scenario.....	14
Plate B.1 The locations of third-party stakeholder assets assessed in Table B.1 to Table B.5.....	137

List of tables

	Page number
Table 2.1 Key layers in the Environment Agency model.....	7
Table 2.2 Roughness values in the Environment Agency model.....	8
Table 2.3 Representation of scrapes and bunds in post-development model	10
Table 2.4 Representation of main channel in post-development model	11
Table 2.5 Representation of side channels in post-development model.....	12
Table 2.6 Representation of weirs in post-development model	12
Table 2.7 Extreme water level values applied in the modelling.....	16
Table 3.1 Modelled simulations	18
Table 4.1 Differences in offsite maximum flood depths	21
Table 4.2 Differences in offsite maximum flood velocities.....	22
Table 4.3 Differences in offsite maximum flood hazard score categories	24
Table 4.4 Impact of the proposed Coalhouse Point wetland works on floodplain storage .	26
Table B.1 Pre- and post-development maximum flood depth and hazard category at the National Gas Transmission receptor	138
Table B.2 Pre- and post-development maximum flood depth and hazard category at the Anglian Water receptor.....	139
Table B.3 Pre- and post-development maximum flood depth and hazard category at the UK Power Network location 1	140

Table B.4 Pre- and post-development maximum flood depth and hazard category at the UK Power Network location 2.....	141
Table B.5 Pre- and post-development maximum flood depth and hazard category at the UK Power Network location 3.....	142
Table B.6 Pre- and post-development maximum flood depth and hazard category at the Coalhouse Fort car park.....	143
Table B.7 Pre- and post-development maximum flood depth and hazard category adjacent to Coalhouse Fort.....	144

1 Introduction

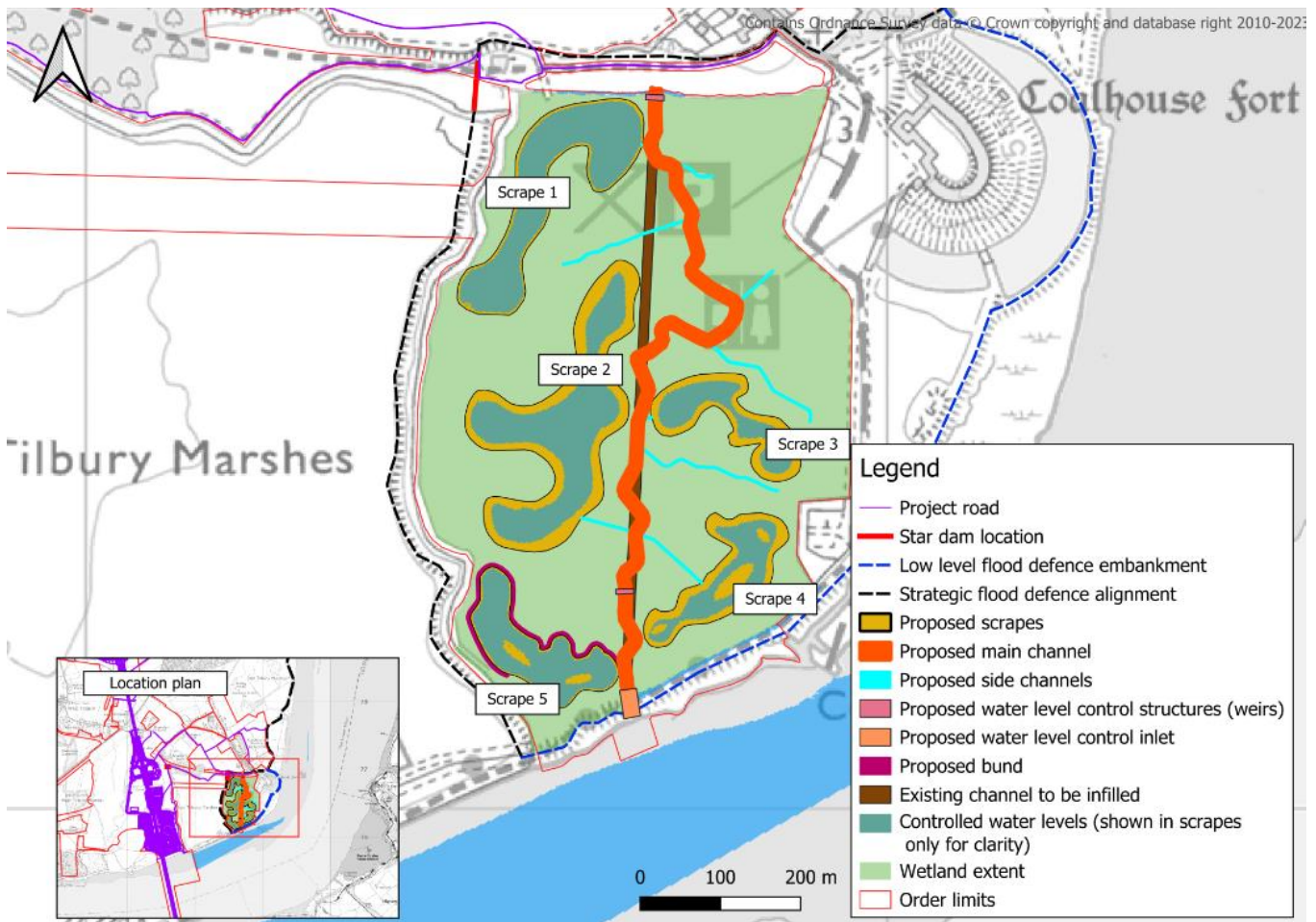
1.1 Aim of this technical note

- 1.1.1 The aim of this technical note is to report hydraulic modelling undertaken to assess the impacts of the proposed Coalhouse Point wetland area on flood risk, and to provide an interpretation of model results.
- 1.1.2 This technical note has been produced to inform technical engagement with the Environment Agency and progress agreements for item 2.1.35RRE within the Statement of Common Ground between (1) National Highways and (2) the Environment Agency [[REP5-034](#)].

1.2 Area of interest and proposed works

- 1.2.1 The proposed Coalhouse Point wetland area is required to provide habitat mitigation as part of the Project.
- 1.2.2 The proposed Coalhouse Point wetland area is located to the east of the Project road alignment and adjacent to the western boundary of the Coalhouse Fort. It is located on the landward side of a relatively low-level tidal River Thames flood defence embankment (providing an approximate two-year standard of protection). The flood defence embankment extends from the south-western boundary of the proposed wetland mitigation area to the eastern extreme of the Coalhouse Fort.
- 1.2.3 The proposed wetland area is approximately 334,000m², relatively flat and low lying (with ground levels typically between approximately 1.7mAOD and 2.1mAOD).
- 1.2.4 The proposed works will include the excavation of scrapes and inter-connecting channels, with controlled water levels in the scrapes and channels. The proposed works will also include infilling of an existing drainage channel, creation of some localised raised bunds at the edges of the proposed scrapes to retain water at the controlled water levels, and a new self-regulating water inlet structure through the low-level tidal River Thames flood defence embankment to enable supply of water to the wetland area when required.
- 1.2.5 The area of interest and proposed works are shown in Plate 1.1.

Plate 1.1 Area of interest and proposed works



1.3 Other considerations - low lying flood bund

- 1.3.1 The purpose of this note is to assess potential effects of the proposed Coalhouse Point wetland mitigation on flood risk.
- 1.3.2 The existing flood bund adjacent to the proposed wetland at Coalhouse Point has been incorporated into the Project Order Limits and would be subject to compulsory acquisition (Plot 19-09, Land Plans, Sheet 19). Therefore, National Highways would take permanent ownership of the extent of the feature that falls within the Order Limits as presented on Plate 1.1.
- 1.3.3 A Riparian Landowner's responsibilities are summarised in an Environment Agency internal guidance document '*Riparian responsibilities*', July 2018. This guidance clarifies that, as a general rule:

"Landowners are not required, to maintain flood defences on their land. They may choose not to maintain them but accept a higher risk of flooding [on their land]. Conversely, they may choose to maintain a defence to ensure it continues to protect their land."

This general rule is subject to, e.g., local legislation, historic obligations or agreements between landowners.

1.3.4 The guidance continues:

“Landowners can, however, be held legally responsible for the impact to others of the failure to maintain flood defences on their land. This is because all landowners owe each other a ‘measured duty of care’ to do what is reasonable to see that hazards (such as flooding and coastal erosion) caused or exacerbated by the condition of their land do not harm their neighbours.

What is ‘reasonable’ depends on all the circumstances.”

1.3.5 National Highways would become a Riparian Landowner after compulsory acquisition of the relevant land, and would therefore become subject to this “measured duty of care” as regards its neighbours. However, further consideration of long-term Riparian landowner duties falls outside of the scope of this technical note and modelling exercise.

1.3.6 Identified interested parties are presented in Annex B and include the following:

- a. Thurrock Council (as a fellow Riparian landowner, owning the remaining part of the low lying flood bund, east of the Order Limits)
- b. National Gas Transmission (gas compound and gas infrastructure adjacent and to the south east of the Coalhouse Point wetland)
- c. Anglian Water (pumping station, located within the Coalhouse Fort car park, adjacent and to the north east of the Coalhouse Point wetland)
- d. UK Power Networks (electricity poles within the Coalhouse Point wetland, identified as UKPN locations 1, 2 and 3 for the flood risk analysis in Annex B)
- e. Thurrock Council and Historic England (as operators and statutory stakeholders of Coalhouse Fort, including the Fort car park, located adjacent to the east of the Coalhouse Point wetland)

1.4 Technical note structure

1.4.1 The technical note is structured as follows:

- a. Section 2 provides details of hydraulic model development and tidal boundary conditions.
- b. Section 3 summarises the events simulated.
- c. Section 4 includes model results and their interpretation.
- d. Section 5 provides details of management arrangements of the water inlet structure
- e. Section 6 includes conclusions of the modelling analysis.

1.4.2 Model result figures are presented in Annex A, whilst Annex B provides analysis at specified receptor points.

1.5 The Project

- 1.5.1 The A122 Lower Thames Crossing (the Project) would provide a connection between the A2 and M2 in Kent, east of Gravesend, crossing under the River Thames through a tunnel, before joining the M25 south of junction 29.
- 1.5.2 The Project would be approximately 23km long, 4.25km of which would be in tunnel. On the south side of the River Thames, the Project route would link the tunnel to the A2 and M2. On the north side, it would link to the A13 and junction 29 of the M25. The tunnel entrances would be located to the east of the village of Chalk on the south of the River Thames and to the west of East Tilbury on the north side.
- 1.5.3 An application for Development Consent Order was submitted to the Planning Inspectorate by National Highways in October 2022. The application was supported by hydraulic modelling and a flood risk assessment:
- a. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 1 [\[APP-460\]](#)
 - b. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 2 [\[APP-461\]](#)
 - c. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 3 [\[APP-462\]](#)
 - d. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 4 [\[APP-463\]](#)
 - e. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 5 [\[APP-464\]](#)
 - f. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 6 [\[REP1-171\]](#)
 - g. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 7 [\[APP-466\]](#)
 - h. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 8 [\[APP-467\]](#)
 - i. Environmental Statement - Appendix 14.6 - Flood Risk Assessment - Part 9 [\[APP-468 - APP-476\]](#)
 - j. Environmental Statement - Appendix 14.6 - Flood Risk Assessment – Part 10 [\[APP-477\]](#)

2 Model specification

2.1 Available data

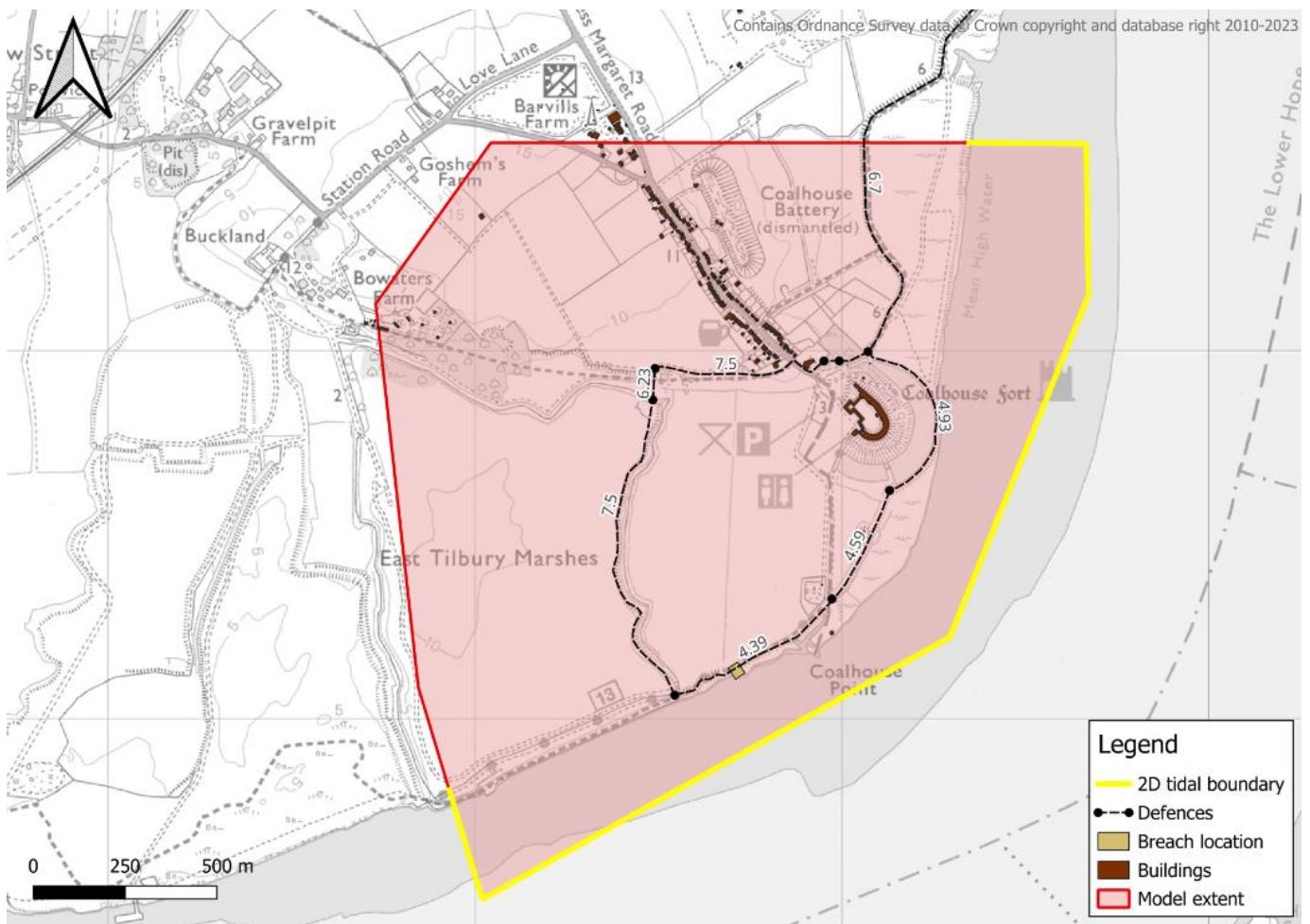
- 2.1.1 The following data were available to inform development of the Project's Coalhouse Point hydraulic model:
- a. An existing Environment Agency Coalhouse Point model¹, which was developed in 2020 after the occurrence of embankment damage during the high tide on 29 and 30 September 2019. This model included Environment Agency LiDAR data (25cm Digital Surface Model (DSM) dataset from 2016), sampled at the 2m model grid resolution.
 - b. Topographic survey undertaken by the Project in 2023 for the Coalhouse Point wetland area modelling including cross-sections thorough existing drainage ditches and tidal flood embankments. Topographic survey extents are shown in Plate 2.2.
 - c. Updated Environment Agency River Thames Extreme Water Level (EWL) dataset (received via email correspondence in May 2023)

2.2 Existing Environment Agency model

- 2.2.1 The existing Environment Agency model simulates tidal inundation of the Coalhouse Point area, by overtopping and breaching of the low-lying flood defence embankment. The Environment Agency model results were "sense-checked" (including a review of model stability and ensuring results did not include negative water depths). In the absence of suitable data, calibration was not undertaken.
- 2.2.2 The Environment Agency model domain covers the entire proposed wetland area at Coalhouse Point, and is shown in Plate 2.1. The flood defence levels shown in Plate 2.1 are those specified in the Environment Agency model.

¹ Coalhouse Point, East Tilbury (Essex) - Thames Estuary Inundation Model (Environment Agency, 2020)

Plate 2.1 Existing Coalhouse Point model extent



- 2.2.3 The Environment Agency model is a 2D TUFLOW model. The Environment Agency modelling report² indicates the data used to build this model includes:
- Thames 1D estuary model from 2012
 - Topographic survey obtained by the Environment Agency on 30 September 2019, including cross-sections of the breach that formed during the high tide on 29 and 30 September 2019
 - LIDAR data, specifically a 25cm DSM LiDAR dataset from 2016 which was used to provide a topographical base to specify a 2m grid resolution in the model
 - Output water levels obtained from the Thames Estuary 1D model at various model nodes

² Coalhouse Point, East Tilbury (Essex) - Thames Estuary Inundation Modelling Summary Report (Environment Agency, 2020)

- e. An ESRI shapefile containing local tidal defence information extracted from the Environment Agency’s Asset Information Management System dataset (AIMS).

2.2.4 Table 2.1 lists the key layers in the Environment Agency model and their respective functions.

Table 2.1 Key layers in the Environment Agency model

Layer	Function
2d_zsh_Coalhouse_Buildings_03.shp	Layer used to raise the LiDAR in the location of the buildings by 0.3m and roughness values were increased to 0.3 for buildings (i.e. applying the “stubby buildings” approach).
2d_zsh_Coalhouse_defences_03.shp	Layer based on the AIMS shapefile, used to specify flood defence levels According to the EA modelling report, this information was supplied by the PSO Coastal team as follows: ‘An ESRI shapefile containing local tidal defence information extracted from AIMS. This shapefile already contained the required elevation for the model. E&R were recommended to use the “effective crest level” field from the attribute table for the purpose of this modelling exercise.’
2d_vzsh_Coalhouse_Breach_02_R.shp	Breach layer, set up to trigger when tidal water level reaches 3.29mAOD adjacent to the breach location (following Environment Agency breach modelling guidance ³).

2.2.5 The provided model runs pertain to breaches and overtopping. The location of the breach and the model components are shown on Plate 2.1.

2.2.6 Ordnance Survey Mastermap Topography Layer⁴ was used to extract footprints of the buildings and specify the roughness values for all land uses in the Environment Agency model. Roughness values applied in the model are listed in Table 2.2.

³ Breach of Defences Guidance (Environment Agency 2021)

⁴ Ordnance Survey Mastermap Topography Layer. Available at:

<https://www.ordnancesurvey.co.uk/products/os-mastermap-topography-layer>. Accessed May 2023

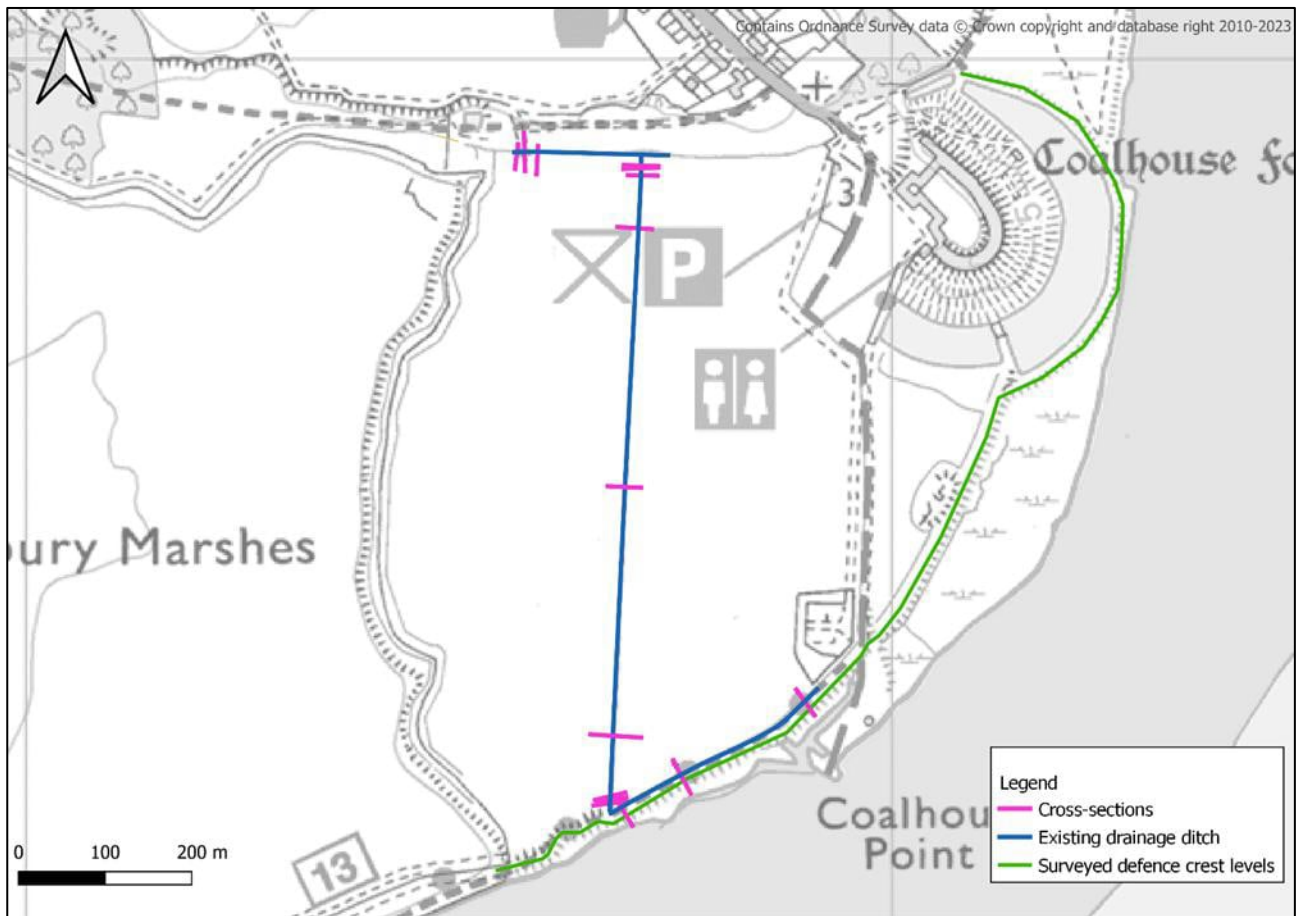
Table 2.2 Roughness values in the Environment Agency model

Material ID	Manning's value	Land use description
1	0.3	Buildings
2	0.1	Structures
3	0.03	Inland and coastal water
4	0.07	Natural surface and gardens
5	0.025	Manmade surface roads and paths
6	0.1	Trees, roughland and scrub
7	0.046	Marsh, reeds or saltmarsh
10	0.03	Default Floodplain Value (Water)

2.3 Coalhouse Point wetland model development

Pre-development

- 2.3.1 For the purposes of this study the Environment Agency model was updated. The updates included incorporating new topographic survey data, collected by the Project, and updating the EWLs applied in the model tidal boundary conditions, in line with the Environment Agency's updated TE2100 EWL dataset, provided to the Project in May 2023 via email correspondence (further details are in Section 2.4). The updated model retained the same grid size (2m) as the Environment Agency model.
- 2.3.2 The model was updated with new topographic survey data, acquired in July 2023, as follows:
- Updated flood defence crest levels. The extents of surveyed flood defence crest levels are shown in Plate 2.2. The surveyed flood defence crest levels are generally between 3cm and 10cm higher than in the provided Environment Agency model.
 - Incorporating the new survey data to represent the drainage ditches. The location of channel cross-sections surveyed are shown in Plate 2.2.

Plate 2.2 Topographic survey extent

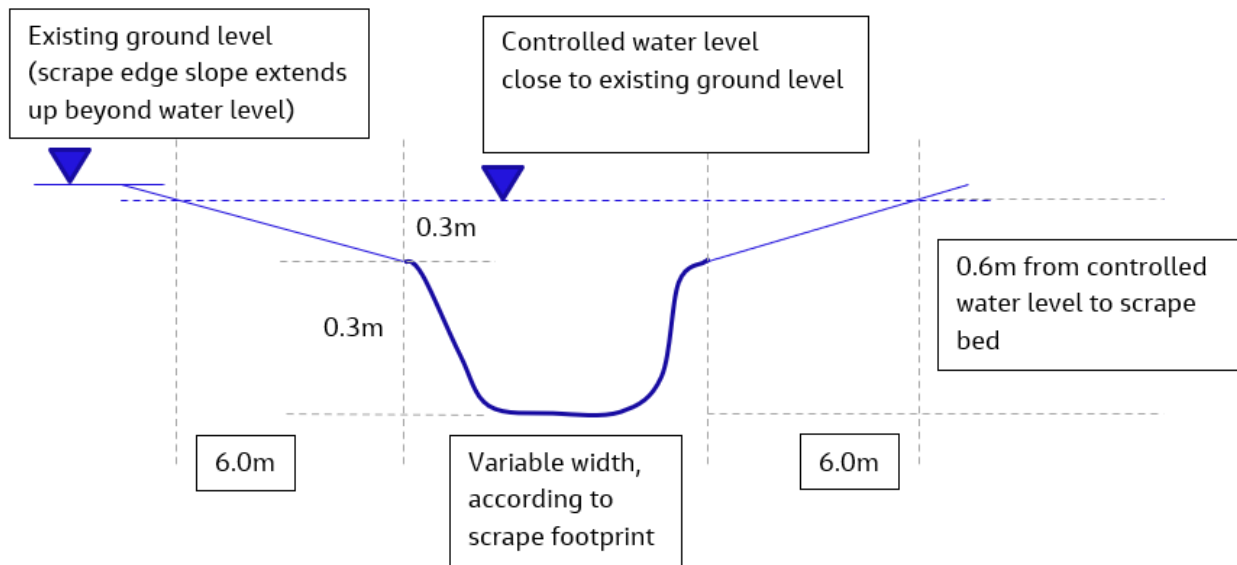
Post development model

- 2.3.3 The pre-development model was used as the basis for the construction of the post-development model (i.e. representing the proposed Coalhouse Point wetland area).
- 2.3.4 The proposed Coalhouse Point wetland area consists of scrapes and inter-connecting channels (comprising a main central channel and side channels), with controlled raised water levels in the scrapes and channels. An overview of the proposed arrangement of the scrapes and channels is shown in Plate 1.1. Water levels are controlled by in-channel weirs. To contain the raised controlled water levels, a low height embankment is included at the edges of scrape 5 (Plate 1.1). The maximum height of this embankment is approximately 0.15m above ground level.

Representation of scrapes

- 2.3.5 Each scrape is specified by lowering the ground by 0.3m below the controlled water level, following a 1:20 slope from the edge of the scrape. The central part of the scrape is then lowered by an additional 0.3m, following a 1:2 slope. An illustrative scrape profile is shown in Plate 2.3. As noted above, at locations where existing ground levels at the edges of the proposed scrapes are below the proposed controlled water level, localised bunds are required to contain controlled water levels. Plate 2.3 does not include such bunds.

Plate 2.3 Illustrative cross-section of scrapes



2.3.6 Scrapes and bunds are integrated into the model using z-shaped layers. Each scrape comprises a polygon that defines the object's boundaries and points that provide its elevation and spatial dimensions. The model scrapes and bunds layers are listed in Table 2.3.

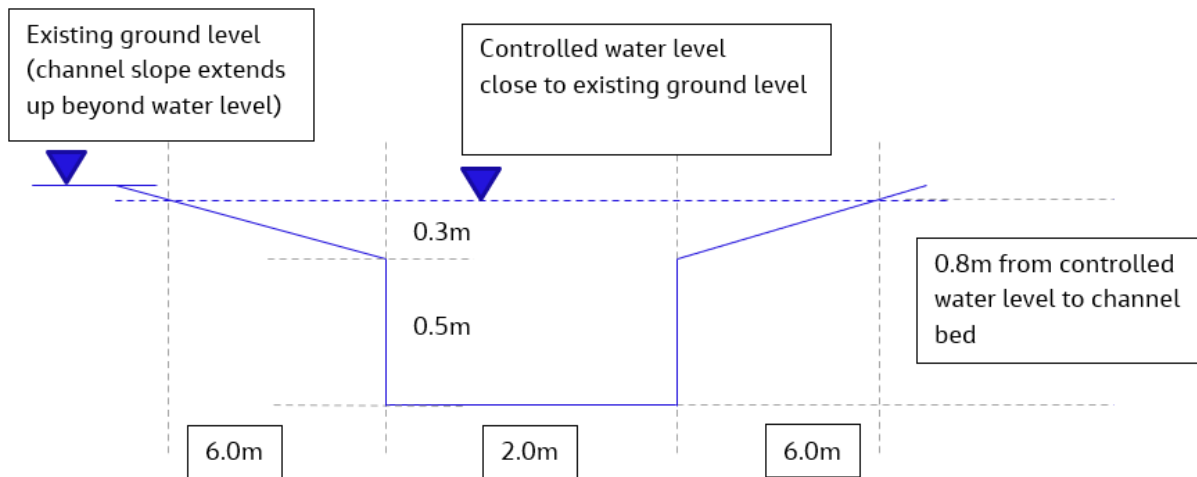
Table 2.3 Representation of scrapes and bunds in post-development model

Layer	Function
2d_zsh_Scrapes_protection_zone_R_01.shp 2d_zsh_Scrape_1_protection_zone_P_02.shp	Z-shape polygon and points representing scrapes
2d_zsh_Scrapes_embankments_R_04.shp 2d_zsh_Scrapes_embankments_P_04.shp	Z-shape polygon and points representing embankments

Representation of main channel

2.3.7 The main channel, as illustrated on Plate 1.1, has been divided into two reaches, each with a controlled water level which also applies in the connected scrapes (Plate 1.1). The water levels are controlled by weirs located at the downstream (north) end of each section. The main channel features shallow banks with a 1:20 slope and a deeper section in the middle. The total wetted channel width is approximately 10m. An illustrative example cross-section of the main channel is shown in Plate 2.4.

Plate 2.4 Illustrative cross-section of main channel



2.3.8 The main channel is integrated into the model using z-shaped layers. The main channel comprises a polygon that defines the object's boundaries and points that provide its elevation and spatial dimensions. Additionally, there is a polygon layer implemented at the bottom of the channel to ensure smooth triangulation. The main channel model layers are listed in Table 2.4.

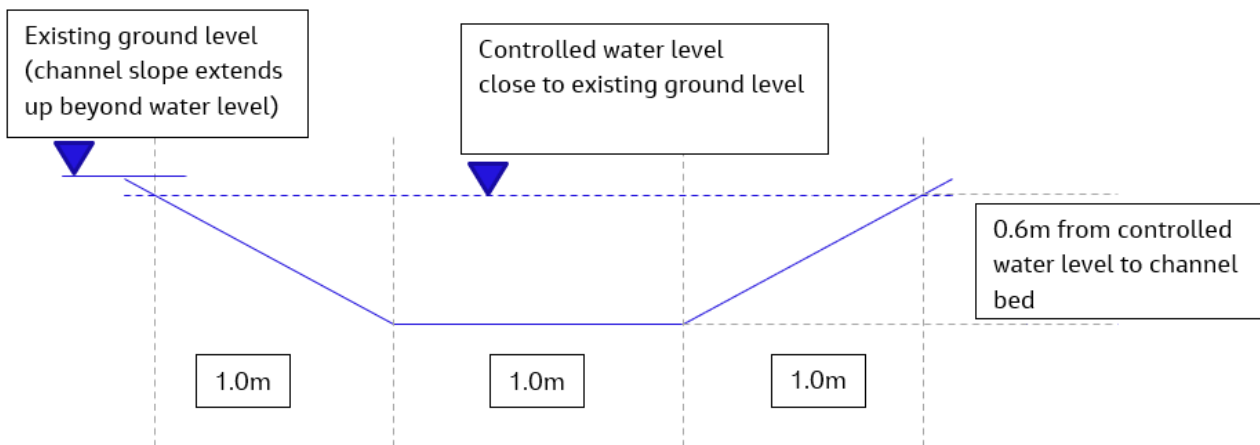
Table 2.4 Representation of main channel in post-development model

Layer	Function
2d_zsh_Main_Channel_R_01.shp 2d_zsh_Main_Channel_P_01.shp	Z-shape polygon and points representing main channel banks
2d_zsh_Main_Channel_Bottom_R_01.shp	Z-shape polygon representing main channel bottom

Representation of side channels

2.3.9 Side channels (as illustrated on Plate 1.1) are specified with a width of 3.0m and a depth of 0.6m. An illustrative example cross-section of a side channel is shown in Plate 2.5.

Plate 2.5 Illustrative side channel cross-section



2.3.10 Similarly to the main channel, side channels are integrated into the model using z-shaped layers. Each channel comprises a polygon that defines the object's boundaries and points that provide its elevation and spatial dimensions. The side channel model layers are listed in Table 2.5.

Table 2.5 Representation of side channels in post-development model

Layer	Function
2d_zsh_Side_Channel_R_01.shp 2d_zsh_Side_Channel_P_01.shp	Z-shape polygon and points representing side channel banks

Representation of weirs to control water levels

2.3.11 Weirs are integrated into the model using z-shape polygons with fixed elevation used to modify the topography in the model. The weir model layer is in Table 2.6.

Table 2.6 Representation of weirs in post-development model

Layer	Function
2d_zsh_In_Channel_Weirs_R_01.shp	Z-shape polygon representing weirs that control water level

Model stability

- 2.3.12 A fixed timestep of one second was applied in the model simulations. This timestep provides stability for the corresponding cell size of the 2D grid.
- 2.3.13 Plate 2.6 to Plate 2.9 show cumulative mass error versus dVol which is change in the model's volume from the previous timestep.
- 2.3.14 Cumulative mass error is large at the start of a simulation as there are 2D cells rapidly wetting along the 2D tidal boundary, but it reduces to almost 0% throughout the simulation. In every simulation, the cumulative mass error

remains bounded within the +/-1% threshold, which according to TUFLOW documentation⁵ is indicative of reasonable model stability. The Dvol plot is relatively smooth and mirrors the 2D tidal boundary. In the overtopping scenario, there is a minor peak at around 15.5 hours into the simulation, which coincides with the moment when water overtops the flood defence.

- 2.3.15 The plots look similar for all events simulated, both pre- and post-development. Overall, the model can be characterised as stable, given the absence of negative depth values in the domain and smooth stage and flow hydrographs.

Plate 2.6 Mass balance/dVol plot for pre-development 2-year event in 2032: Breach scenario

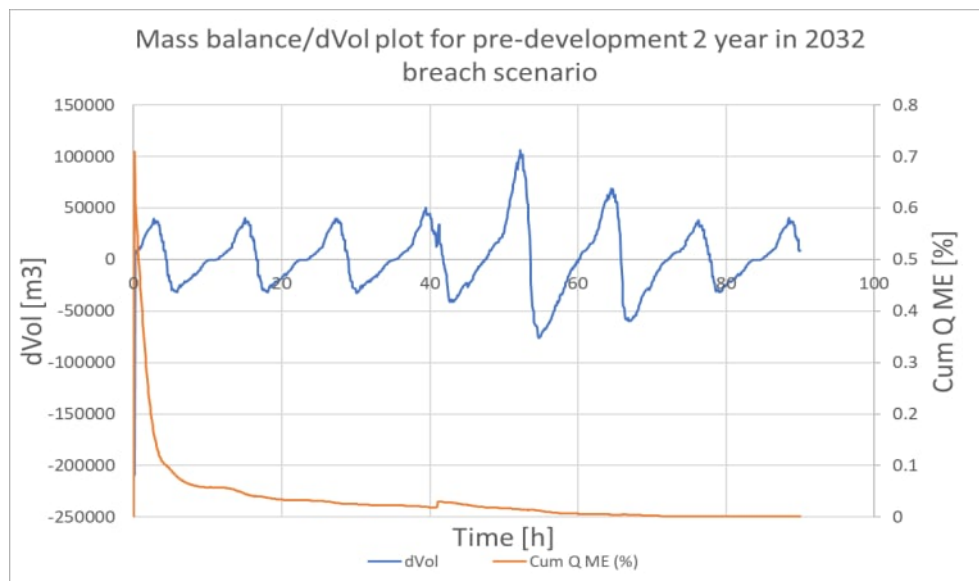
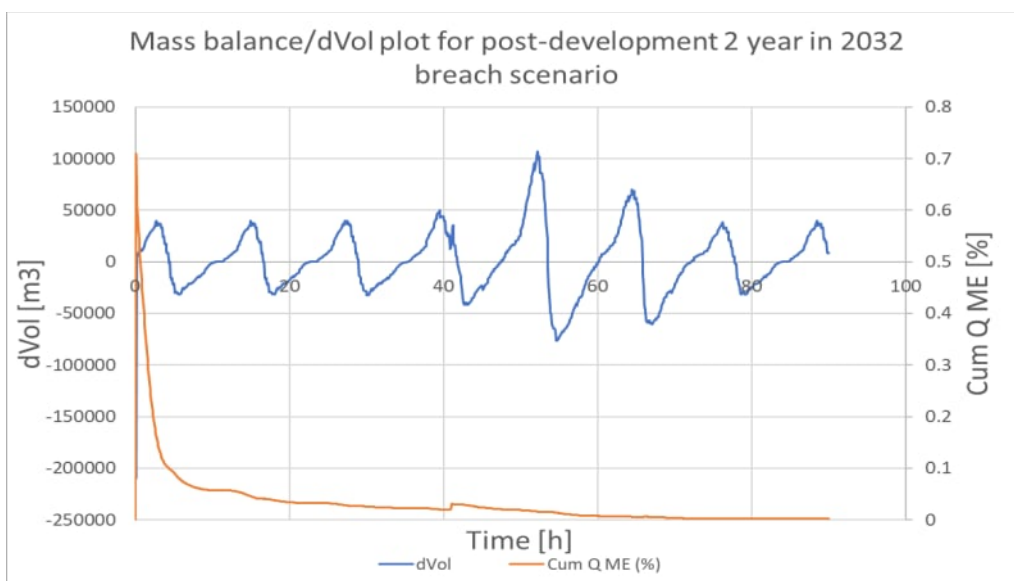


Plate 2.7 Mass balance/dVol plot for post-development 2-year event in 2032: Breach scenario



⁵ TUFLOW Classic/HPC User Manual, Build 2018-03-AD. (BMT, 2018).

Plate 2.8 Mass balance/dVol plot for pre-development 200-year event in 2032: Overtopping scenario

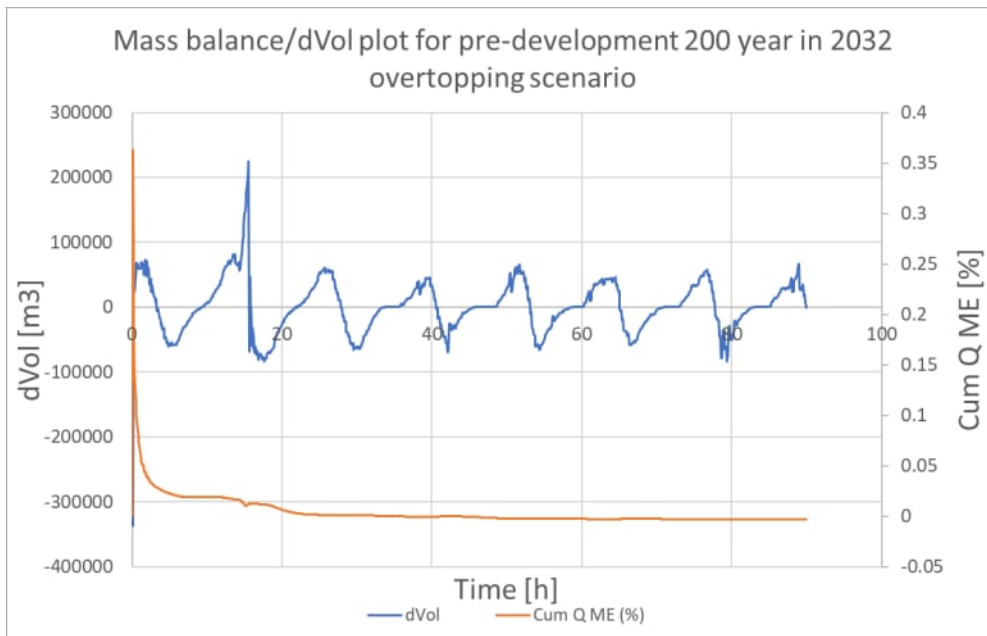
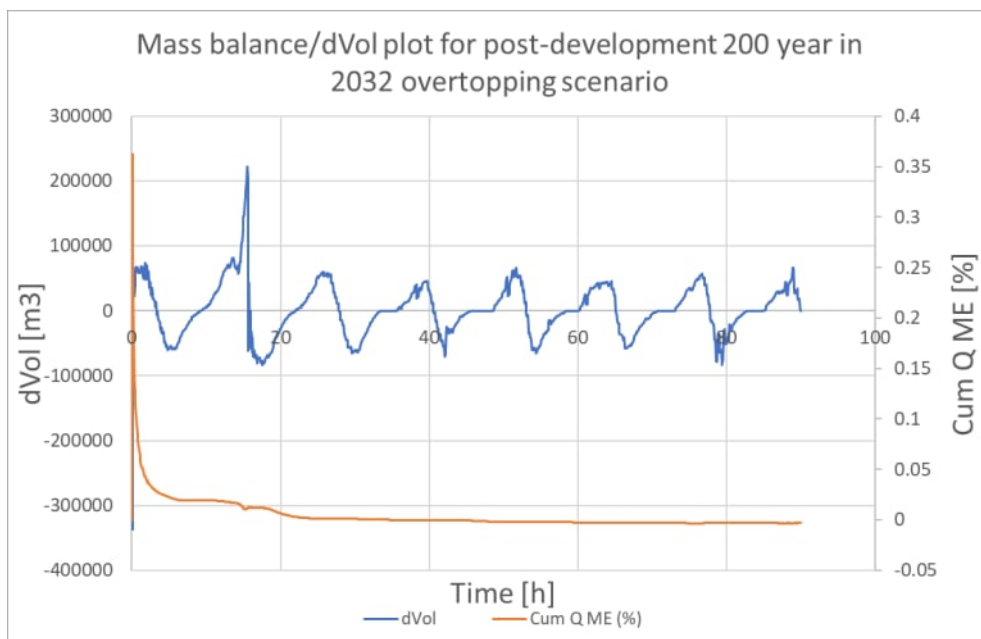


Plate 2.9 Mass balance/dVol plot for post-development 200-year event in 2032: Overtopping scenario



2.4 Model tidal boundary

- 2.4.1 The EWLs applied in the modelling are derived from the updated Environment Agency River Thames Extreme Water Level (EWL) dataset. This dataset includes EWLs for a range of years, accounting for projected future climate change and sea level rise. EWLs for the Higher climate change scenario have been applied in the Coalhouse Point modelling, as follows:
- 2032 EWLs have been specified by linearly interpolating between the EWL values for 2020 and 2040.
 - 2132 EWLs have been specified by linearly interpolating between the EWL values for 2120 and 2135.
- 2.4.2 The simulated design tidal conditions were incorporated into the model as a 2D tidal boundary. The time series for this data was specified applying the updated Environment Agency River Thames EWLs dataset. The location of the 2D tidal boundary as shown in Plate 2.1 (the same as for the existing Environment Agency model).
- 2.4.3 The tidal boundary condition time series were constructed as follows:
- For the 4.38mAOD event the time series provided with the Environment Agency model was used.
 - For the 2-year and 5-year return period events in 2032, with peak levels of 4.47mAOD and 4.62mAOD respectively, an upward shift was applied to the Environment Agency's 4.38mAOD time series to achieve the required peak water levels.
 - For the 2-year and 5-year return period events in 2132, with peak levels of 5.90mAOD and 6.05mAOD respectively, an upward shift was applied to the Environment Agency's 4.38mAOD time series to achieve the required peak water levels.
 - For the 200-year and 1,000-year return period events in both 2032 and 2132, adjustments to the DCO application Flood Risk Assessment breach modelling boundaries (ES Appendix 14.6: Flood Risk Assessment - Part 5 [APP-464]) (specifically, the TIL006 breach modelling boundaries) were made to match the required peak EWL value. The TIL006 boundary was elongated to accommodate a 90h simulation and shifted to match the required EWL value.
- 2.4.4 EWLs applied in the modelling are listed in Table 2.7.

Table 2.7 Extreme water level values applied in the modelling

Return period	Epoch	EWL (mAOD)
2	2032	4.47
5	2032	4.62
2	2132	5.9
5	2132	6.05
200	2032	5.26
200	2132	6.6
1,000	2032	5.59
1,000	2132	6.89

3 Model scenarios

3.1 Overview

- 3.1.1 For the purpose of this study, three scenarios were simulated to assess the potential effects of the proposed wetland on flood risk elsewhere: overtopping, breaching, and structure failure.
- 3.1.2 The overtopping scenarios simulate overtopping of the low-level embankment (without breaching of the embankment) during events when River Thames tidal levels exceed the embankment level.
- 3.1.3 The breach scenarios simulate a 30m wide breach of the low-level embankment, at the location of the proposed water inlet structure, in accordance with the Environment Agency breach modelling guidance. The simulated breach is activated in the model when the tidal water level reaches 3.29mAOD. (The value applied in the Environment Agency breach modelling guidance has been adopted, as the value is specified based on the crest level of the embankment at the breach location, which has only changed by +3cm applying the updated topographic survey). The breach simulations assume the breach is closed 30 hours after its formation.
- 3.1.4 An actual breach event, if it were to occur, could have different properties to those specified in the Environment Agency breach modelling guidance (e.g. different breach width, different water level at which breach commences, different breach closure time). The results presented in Section 4 indicate the proposed wetland works would not have an adverse impact on flood risk elsewhere during a breach, due to the proposed overall increase in available floodplain storage, with no significant impact on floodplain conveyance. The breach events simulated are therefore considered to also provide a qualitative representation of alternative breach events which may occur, in terms of the potential for the proposed works to impact flood risk elsewhere.
- 3.1.5 The structure failure scenario assumes the water inlet structure fails in the open position (i.e. the structure is stuck open), and it is closed 30 hours after its failure. This is represented in the model by a culvert with a length of 34m and upstream invert level of 1.27mAOD, which is just above the LiDAR elevation around the inlet of the culvert, located at the toe of the embankment. The model culvert dimensions are 0.3m wide and 0.25m high (similar area to a 0.3m diameter pipe). The inlet to this culvert is controlled in the model by a ".toc file", which specifies the same opening time as would be specified for a breach simulation.
- 3.1.6 For the overtopping and breach simulations the structure is not explicitly represented in the model, as during overtopping simulations the structure remains closed, and during a breach the structure is assumed to be within the breach width (i.e. at the same location).
- 3.1.7 Modelled simulations include overtopping during the 2, 5, 200 and 1,000 year events. The 200 and 1,000 year events were included as these are standard design events used in flood risk assessment. The 2 and 5 year events are also simulated as for these events there is a greater potential for the proposed works to result in offsite impacts.

3.1.8 The breach and structure failure events were simulated for the 2-year event and an event with peak tidal water level (4.38mAOD⁶) slightly below the lowest crest level of the existing low-level embankment. Higher return period breach events were not simulated as, for these events, overtopping volumes would be greater than any breach volumes. Therefore, the simulated overtopping events are considered representative.

3.1.9 Modelled simulations are listed in Table 3.1.

Table 3.1 Modelled simulations

Scenario	Development stage	Tidal design event	Epoch
Breach	Pre-development	4.38mAOD	N/A
Breach	Pre-development	2yr	2032
Breach	Pre-development	2yr	2132
Overtopping	Pre-development	2yr	2032
Overtopping	Pre-development	2yr	2132
Overtopping	Pre-development	5yr	2032
Overtopping	Pre-development	5yr	2132
Overtopping	Pre-development	200yr	2032
Overtopping	Pre-development	200yr	2132
Overtopping	Pre-development	1,000yr	2032
Overtopping	Pre-development	1,000yr	2132
Breach	Post-development	4.38mAOD	N/A
Breach	Post-development	2yr	2032
Breach	Post-development	2yr	2132
Overtopping	Post-development	2yr	2032
Overtopping	Post-development	2yr	2132
Overtopping	Post-development	5yr	2032
Overtopping	Post-development	5yr	2132
Overtopping	Post-development	200yr	2032
Overtopping	Post-development	200yr	2132
Overtopping	Post-development	1,000yr	2032
Overtopping	Post-development	1,000yr	2132
Structure failure	Post-development	2yr	2032
Structure failure	Post-development	2yr	2132
Structure failure	Post-development	4.38mAOD	N/A

⁶ This relates to simulated EWL for an event almost reaching the top of embankment level:

The EA model simulated a peak EWL of 4.38mAOD to represent the case that peak water levels are just below the minimum embankment level of 4.39mAOD (as assumed in the EA modelling). The Project's topographic survey indicates a 3cm higher lowest embankment level of 4.42mAOD. This increase in embankment level is minor and within overall modelling assumptions/uncertainty. Simulating a peak EWL of 4.38mAOD to represent the case that peak water levels are just below the minimum embankment level is considered reasonable as a slight increase in peak EWL would not qualitatively change the model results and conclusions.

4 Modelling results and interpretation

4.1 Impact of proposed works on offsite flood risk

4.1.1 Simulated flood map figures are presented in Annex A. These show maximum flood depths, velocities and hazard scores for the simulated events; as well as differences between simulated post-development and pre-development maximum flood depths, velocities and hazard score categories.

Differences in maximum depths

4.1.2 Figures A.76 to A.84 in Annex A show differences in peak flood depths (post-development minus pre-development) for all events simulated up to the 200-year return period event. Flood depth differences within +/- 10mm are considered insignificant and are coloured grey in the figures. Table 4.1 summarises differences in offsite peak flood depths (shown in Figures A.76 to A.84) and provides commentary on any areas representing an offsite increase in maximum depths.

4.1.3 There are no offsite areas in Figures A.76 to A.84 with an increase in flood depth greater than 10mm, except for some pixels near Star Dam in Figure A.78 (during 2-year return period breach event in 2132). However, these localised pixels are within an area that generally shows an insignificant increase in flood depth (approximately +9mm), and so the higher differences shown at these pixels are not considered representative of the wider area, for which depth differences are considered insignificant. It is therefore concluded that there are no offsite areas with a significant increase in flood depth as a result of the proposed Coalhouse Point wetland works.

Differences in maximum velocities

4.1.4 Figures A.85 to A.93 in Annex A show the differences in peak flood velocities (post-development minus pre-development) for events simulated up to the 200-year return period event. Flood velocity differences within +/- 0.25m/s are considered insignificant and are coloured grey in the figures. Table 4.2 summarises differences in offsite peak flood velocities (shown in Figures A.85 to A.93) and provides commentary on any areas representing an offsite increase in maximum velocities.

4.1.5 Where the model results show increases in flood velocities, Table 4.2 concludes these increases occur at shallow depths or at localised pixels within areas that generally show no significant increase (i.e. differences at the localised pixels are not considered representative of the wider area). For all areas showing an increase in maximum flood velocity there is no corresponding increase in maximum hazard score category. It is therefore considered that there are no offsite areas with a significant increase in flood risk due to increased maximum flood velocities as a result of the proposed Coalhouse Point wetland works.

Differences in maximum hazard score categories

4.1.6 Figures A.94 to A.102 in Annex A show the differences in peak flood hazard categories (post-development minus pre-development) for events simulated up to the 200-year return period event. Table 4.2 summarises differences in offsite

peak flood hazard categories. There are no offsite areas with an increase in maximum hazard score category.

Summary

- 4.1.7 Sections 4.1.2 to 4.1.6 and Table 4.1 to Table 4.3 consider simulated offsite impacts as a result of the proposed Coalhouse Point wetland works, and conclude there would be no adverse impacts on offsite flood risk as a result of the proposed works.

Table 4.1 Differences in offsite maximum flood depths

Figure number	Tidal design event	Epoch	Scenario	Offsite increases in maximum flood depth	Comment
Figure A76	4.38mAOD	N/A	Breach	None	None
Figure A77	2yr	2032	Breach	None	None
Figure A78	2yr	2132	Breach	Some pixels show increases in flood depth near Star Dam	Localised pixels within area that generally shows an insignificant increase (+9mm), and so considered insignificant.
Figure A79	2yr	2032	Overtopping	None	Decrease in maximum flood depths within proposed wetland area close to low level embankment.
Figure A80	2yr	2132	Overtopping	None	None
Figure A81	5yr	2032	Overtopping	None	Decrease in maximum flood depths within proposed wetland area (except for in proposed scrapes/channels where ground levels will be lowered).
Figure A82	5yr	2132	Overtopping	None	None
Figure A83	200yr	2032	Overtopping	None	None
Figure A84	200yr	2132	Overtopping	None	None

Table 4.2 Differences in offsite maximum flood velocities

Figure number	Tidal design event	Epoch	Scenario	Offsite increases in maximum velocity	Comment
Figure A85	4.38mAOD	N/A	Breach	None	None
Figure A86	2yr	2032	Breach	None	None
Figure A87	2yr	2132	Breach	Some increases in maximum velocities in Coalhouse Fort moat	Within Coalhouse Point moat. Hazard score category unchanged (“danger for all” for both the pre- and post-development cases).
Figure A88	2yr	2032	Overtopping	None	None
Figure A89	2yr	2132	Overtopping	Some increases in maximum velocities near Star Dam and in Coalhouse Fort car park.	Peak velocity occurs at a shallow depth (approximately 0.22m). There is no corresponding increase in maximum hazard score category (“danger for all” for both the pre- and post-development cases).
Figure A90	5yr	2032	Overtopping	None	None
Figure A91	5yr	2132	Overtopping	(i) Generally within +/- 0.25m/s. Some increases in maximum velocities in Coalhouse Fort car	(i) Peak velocity in the Coalhouse Fort area occurs at a shallow depth (approximately 0.13m). There is no

Figure number	Tidal design event	Epoch	Scenario	Offsite increases in maximum velocity	Comment
				<p>park and adjacent to Coalhouse Fort.</p> <p>(ii) Some localised increases in maximum velocities near Star Dam.</p>	<p>corresponding increase in maximum hazard score category (“danger for all” for both the pre- and post-development cases).</p> <p>(ii) Localised pixels within area that generally shows no significant increase. There is no corresponding increase in maximum hazard score category (“danger for all” for both the pre- and post-development cases).</p>
Figure A92	200yr	2032	Overtopping	<p>Generally within +/- 0.25m/s.</p> <p>Some localised pixels with increases in maximum velocities near Star Dam and near the north-east corner of the proposed Coalhouse Point wetland area.</p>	<p>Localised pixels within areas that generally show no significant increase. There is no corresponding increase in maximum hazard score category (“danger for all” for both the pre- and post-development cases).</p>

Figure number	Tidal design event	Epoch	Scenario	Offsite increases in maximum velocity	Comment
Figure A93	200yr	2132	Overtopping	Generally within +/- 0.25m/s. Some increases in maximum velocities near Star Dam.	Localised pixels within area that generally shows no significant increase. There is no corresponding increase in maximum hazard score category ("danger for all" for both the pre- and post-development cases).

Table 4.3 Differences in offsite maximum flood hazard score categories

Figure number	Tidal design event	Epoch	Scenario	Offsite increases in maximum hazard score category
Figure A94	4.38mAOD	N/A	Breach	None
Figure A95	2yr	2032	Breach	None
Figure A96	2yr	2132	Breach	None
Figure A97	2yr	2032	Overtopping	None
Figure A98	2yr	2132	Overtopping	None
Figure A99	5yr	2032	Overtopping	None
Figure A100	5yr	2132	Overtopping	None
Figure A101	200yr	2032	Overtopping	None
Figure A102	200yr	2132	Overtopping	None

4.2 Impacts of structure failure on flood risk

- 4.2.1 Figures A.23 and A.24 show maximum simulated flood depths for the structure failure (i.e. stuck open) scenario during the 2-year return period River Thames tidal event in 2032 and 2132 respectively. Figure A.25 shows maximum simulated flood depths for the structure failure scenario during a River Thames tidal event with a peak level of 4.38m AOD.
- 4.2.2 Peak River Thames levels for the simulated events in Figures A.23 and A.25 are below the low-level flood embankment crest level. For these events flood extents as a result of structure failure are contained within the proposed Coalhouse Point wetland area, and within the proposed channels and scrapes, except for an area on the landward side of the proposed structure, shown in Figure A.23 (2-year return period River Thames tidal event in 2032).
- 4.2.3 The peak River Thames level for the simulated event in Figure A.24 (2-year return period River Thames tidal event in 2132) is above the low-level flood embankment crest level. For this event there is overtopping of the low-level flood embankment over a significant length of embankment (approximately 1.24km). Consequently, for this event there is widespread simulated flooding extending over all of the proposed wetland area and adjacent land, with maximum depths on the proposed wetland area exceeding 2m. For this event (and larger events), the influence of structure failure on flooding is insignificant as overtopping flood volumes are much higher than flood volumes flowing through the “stuck open” structure.
- 4.2.4 The impact of structure failure on flood risk elsewhere is therefore considered to be insignificant.
- 4.2.5 A discussion on the operational activities, including securing mechanism to minimise offsite flood impacts is provided in Section 5.

4.3 Impact of proposed works on floodplain storage

- 4.3.1 Table 4.4 presents a comparison between the pre- and post-development flood storage capacity, accounting for the proposed scrapes and channels within the proposed wetland area, and the pre- and post-development “normal” water levels (as flood storage would not be available below “normal” water levels during a flood event). The pre- and post-development flood storage comparison also accounts for infilling of the existing straight ditch (which is proposed to be replaced with a meandering ditch network). The comparison has been calculated on a “level-for-level” basis.
- 4.3.2 Table 4.4 shows a calculated total gain in floodplain storage of approximately 17,601m³ as a result of the proposed Coalhouse Point wetland works. While Table 4.4 shows a reduction in total floodplain storage for levels below 1.6m AOD (and an increase in total floodplain storage for all levels above 1.6m AOD), the reduction in storage below 1.6m AOD does not result in offsite impacts during flood events as all nearby potential receptors are above 1.6m AOD. This is demonstrated by the flood map figures in Annex A, and their discussion in Section 4.1.

4.4 Consideration of change in flood risk for key stakeholders at Coalhouse Point

- 4.4.1 Annex B provides an assessment of potential adverse effect to flood risk at adjacent third-party assets.
- 4.4.2 Assets adjacent to the Coalhouse Point wetland are identified in Plate B.1 of Annex B and include:
- a. National Gas Transmission compound and gas infrastructure
 - b. Anglian Water pumping station (located within the Coalhouse Fort car park)
 - c. UK Power Networks electricity poles (identified as UKPN location 1, 2 and 3 for the flood risk analysis)
 - d. Coalhouse Fort, including the Fort car park
- 4.4.3 Table B.1 to Table B.7 present the difference in maximum flood depths (in metres) and flood hazard category both in the pre- and post-development phases for all modelled scenarios and tidal design events and demonstrates that the Project proposals would not result in an adverse change to the flood risk profile at these receptors.
- 4.4.4 The draft DCO [[REP5-024](#)] also includes measures to protect the interests of stakeholders via the Protective Provisions. The Protective Provisions set out that, prior to commencement of construction of certain works (and so, in practice, during the detailed design phase), the undertaker must obtain the approval of the Environment Agency (Schedule 14, Part 9, paragraph 116 and paragraph 117) and Thurrock Council (as a drainage authority, Schedule 14, Part 3, paragraph 20 and paragraph 21) as regards the design of certain works, and that those bodies may impose conditions in respect of those works to ensure the continued efficiency of flood defences. This would include the detailed design and the proposed inspection and maintenance regime for the water inlet structure.

5 Operational activities to minimise flood impacts elsewhere from the Project

5.1 Water inlet structure

- 5.1.1 An inspection and maintenance plan for the proposed water inlet structure will be developed during detailed design of the structure, to reduce the risk of the structure failing (e.g. stuck open) or a breach forming at the structure location. This is secured via project commitment RDWE014 within the Code of Construction Practice [[REP5-048](#)].
- 5.1.2 This commitment references the requirement for inspection and maintenance in accordance with National Highways' DMRB GS 801 Asset Delivery Asset Inspection Requirements (Highways England, 2020) and DMRB GM 701 Asset Delivery Asset Maintenance Requirements (ADAMr) (Highways England, 2020). GS 801 specifies an annual inspection frequency for 'tidal valves and flaps' and RDWE014 secures that, where there are any additional specific inspection or maintenance requirements, these would be documented in a Maintenance and Repair Statement.
- 5.1.3 The Protective Provisions (draft Development Consent Order [[REP5-024](#)]) set out that, prior to commencement of construction of certain works (and so, in practice, during the detailed design phase), the undertaker must obtain the approval of the Environment Agency (Schedule 14, Part 9, paragraph 116 and paragraph 117) and Thurrock Council (as a drainage authority, Schedule 14, Part 3, paragraph 20 and paragraph 21) as regards the design of certain works, and that those bodies may impose conditions in respect of those works to ensure the continued efficiency of flood defences. This would include the detailed design and the proposed inspection and maintenance regime for the water inlet structure.

6 Conclusion

- 6.1.1 This technical note reports the hydraulic modelling undertaken to assess impacts of the proposed Coalhouse Point wetland area on flood risk.
- 6.1.2 The modelling assesses impacts following breach and/or overtopping of the low-level River Thames flood embankment adjacent to the wetland area, and failure of the proposed water inlet structure, for a range of events (from below a 2-year return period to the 200-year return period event), for the years 2032 and 2132.
- 6.1.3 Interpretation of the hydraulic modelling results demonstrates that the proposed wetland area will not have an adverse impact on flood risk elsewhere.
- 6.1.4 During the detailed design phase there would be a requirement under the Protective Provisions (draft Development Consent Order [\[REP5-024\]](#)) for the Environment Agency (Schedule 14, Part 9, paragraph 118 and paragraph 119) and Thurrock Council (as a drainage authority, Schedule 14, Part 3, paragraph 20 and paragraph 21), to agree they are satisfied with aspects of the design. This would include the detailed design and the proposed inspection and maintenance plan.
- 6.1.5 The proposed wetland works will result in a gain in available floodplain storage for all levels above 1.6 mAOD within the proposed wetland area (with a total gain of approximately 17,600m³).
- 6.1.6 Residual risks include the structure failing (e.g. stuck open) or a breach forming at the structure location. An inspection and maintenance plan for the proposed water inlet structure will be developed during detailed design of the structure, to reduce these risks. The Protective Provisions (draft Development Consent Order [\[REP5-024\]](#)) set out that, prior to commencement of construction of certain works (and so, in practice, during the detailed design phase), the undertaker must obtain the approval of the Environment Agency (Schedule 14, Part 9, paragraph 116 and paragraph 117) and Thurrock Council (as a drainage authority, Schedule 14, Part 3, paragraph 20 and paragraph 21) as regards the design of certain works, and that those bodies may impose conditions in respect of those works to ensure the continued efficiency of flood defences. This would include the detailed design and the proposed inspection and maintenance regime for the water inlet structure.

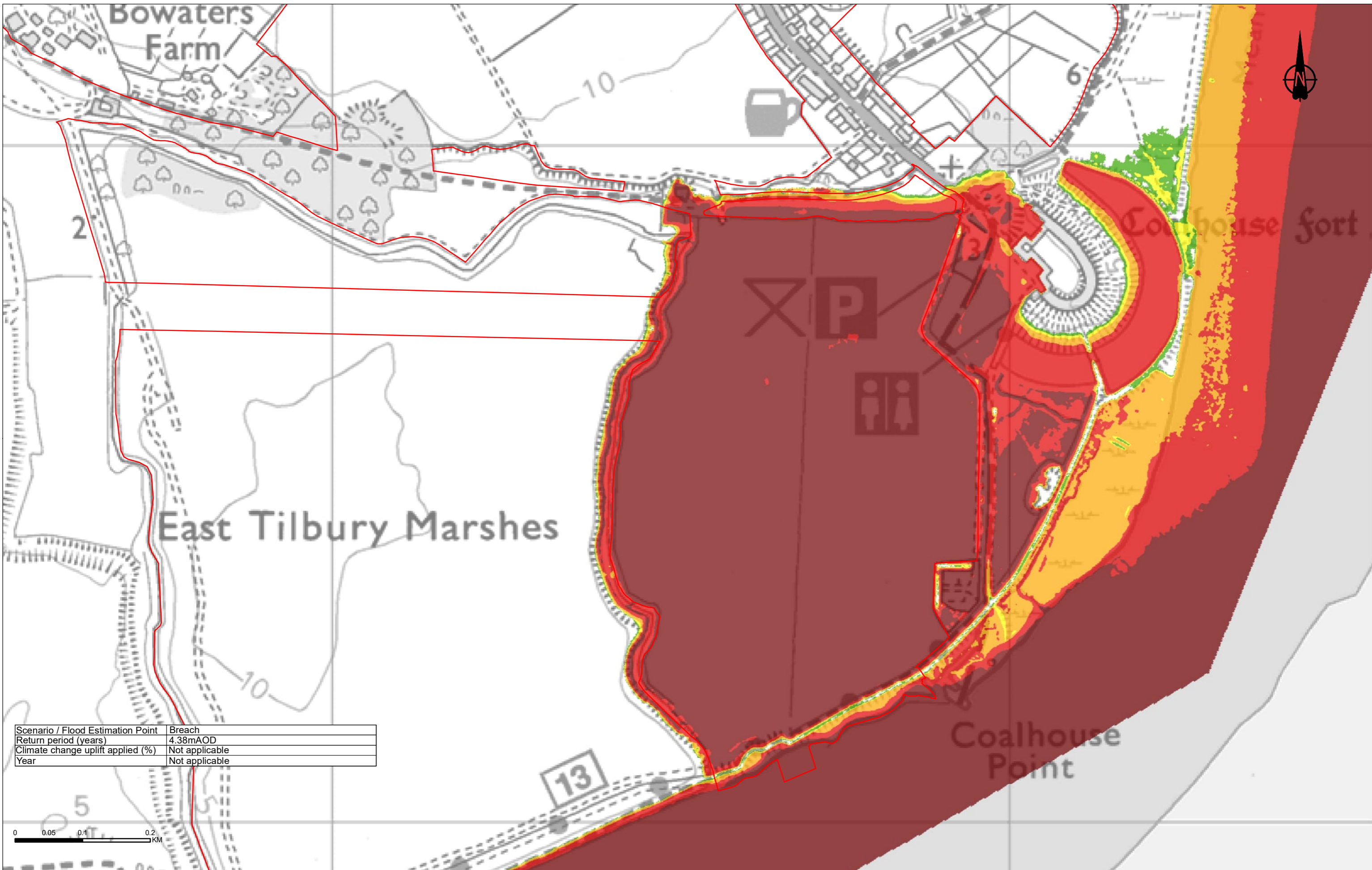
Annexes

Annex A

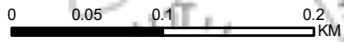
A.1 Figures

Figure number	Type	Scenario	Development stage	Tidal design event	Epoch
Figure A1	Maximum depth map	Breach	Pre-development	4.38mAOD	N/A
Figure A2	Maximum depth map	Breach	Pre-development	2yr	2032
Figure A3	Maximum depth map	Breach	Pre-development	2yr	2132
Figure A4	Maximum depth map	Overtopping	Pre-development	2yr	2032
Figure A5	Maximum depth map	Overtopping	Pre-development	2yr	2132
Figure A6	Maximum depth map	Overtopping	Pre-development	5yr	2032
Figure A7	Maximum depth map	Overtopping	Pre-development	5yr	2132
Figure A8	Maximum depth map	Overtopping	Pre-development	200yr	2032
Figure A9	Maximum depth map	Overtopping	Pre-development	200yr	2132
Figure A10	Maximum depth map	Overtopping	Pre-development	1,000yr	2032
Figure A11	Maximum depth map	Overtopping	Pre-development	1,000yr	2132
Figure A12	Maximum depth map	Breach	Post-development	4.38mAOD	N/A
Figure A13	Maximum depth map	Breach	Post-development	2yr	2032
Figure A14	Maximum depth map	Breach	Post-development	2yr	2132
Figure A15	Maximum depth map	Overtopping	Post-development	2yr	2032
Figure A16	Maximum depth map	Overtopping	Post-development	2yr	2132
Figure A17	Maximum depth map	Overtopping	Post-development	5yr	2032
Figure A18	Maximum depth map	Overtopping	Post-development	5yr	2132
Figure A19	Maximum depth map	Overtopping	Post-development	200yr	2032
Figure A20	Maximum depth map	Overtopping	Post-development	200yr	2132
Figure A21	Maximum depth map	Overtopping	Post-development	1,000yr	2032
Figure A22	Maximum depth map	Overtopping	Post-development	1,000yr	2132
Figure A23	Maximum depth map	Structure failure	Post-development	2yr	2032
Figure A24	Maximum depth map	Structure failure	Post-development	2yr	2132
Figure A25	Maximum depth map	Structure failure	Post-development	4.38mAOD	N/A
Figure A26	Maximum velocity map	Breach	Pre-development	4.38mAOD	N/A
Figure A27	Maximum velocity map	Breach	Pre-development	2yr	2032
Figure A28	Maximum velocity map	Breach	Pre-development	2yr	2132
Figure A29	Maximum velocity map	Overtopping	Pre-development	2yr	2032
Figure A30	Maximum velocity map	Overtopping	Pre-development	2yr	2132
Figure A31	Maximum velocity map	Overtopping	Pre-development	5yr	2032
Figure A32	Maximum velocity map	Overtopping	Pre-development	5yr	2132
Figure A33	Maximum velocity map	Overtopping	Pre-development	200yr	2032
Figure A34	Maximum velocity map	Overtopping	Pre-development	200yr	2132
Figure A35	Maximum velocity map	Overtopping	Pre-development	1,000yr	2032
Figure A36	Maximum velocity map	Overtopping	Pre-development	1,000yr	2132
Figure A37	Maximum velocity map	Breach	Post-development	4.38mAOD	N/A
Figure A38	Maximum velocity map	Breach	Post-development	2yr	2032
Figure A39	Maximum velocity map	Breach	Post-development	2yr	2132
Figure A40	Maximum velocity map	Overtopping	Post-development	2yr	2032
Figure A41	Maximum velocity map	Overtopping	Post-development	2yr	2132
Figure A42	Maximum velocity map	Overtopping	Post-development	5yr	2032
Figure A43	Maximum velocity map	Overtopping	Post-development	5yr	2132
Figure A44	Maximum velocity map	Overtopping	Post-development	200yr	2032
Figure A45	Maximum velocity map	Overtopping	Post-development	200yr	2132
Figure A46	Maximum velocity map	Overtopping	Post-development	1,000yr	2032
Figure A47	Maximum velocity map	Overtopping	Post-development	1,000yr	2132
Figure A48	Maximum velocity map	Structure failure	Post-development	2yr	2032
Figure A49	Maximum velocity map	Structure failure	Post-development	2yr	2132
Figure A50	Maximum velocity map	Structure failure	Post-development	4.38mAOD	N/A
Figure A51	Maximum hazard map	Breach	Pre-development	4.38mAOD	N/A

Figure number	Type	Scenario	Development stage	Tidal design event	Epoch
Figure A52	Maximum hazard map	Breach	Pre-development	2yr	2032
Figure A53	Maximum hazard map	Breach	Pre-development	2yr	2132
Figure A54	Maximum hazard map	Overtopping	Pre-development	2yr	2032
Figure A55	Maximum hazard map	Overtopping	Pre-development	2yr	2132
Figure A56	Maximum hazard map	Overtopping	Pre-development	5yr	2032
Figure A57	Maximum hazard map	Overtopping	Pre-development	5yr	2132
Figure A58	Maximum hazard map	Overtopping	Pre-development	200yr	2032
Figure A59	Maximum hazard map	Overtopping	Pre-development	200yr	2132
Figure A60	Maximum hazard map	Overtopping	Pre-development	1,000yr	2032
Figure A61	Maximum hazard map	Overtopping	Pre-development	1,000yr	2132
Figure A62	Maximum hazard map	Breach	Post-development	4.38mAOD	N/A
Figure A63	Maximum hazard map	Breach	Post-development	2yr	2032
Figure A64	Maximum hazard map	Breach	Post-development	2yr	2132
Figure A65	Maximum hazard map	Overtopping	Post-development	2yr	2032
Figure A66	Maximum hazard map	Overtopping	Post-development	2yr	2132
Figure A67	Maximum hazard map	Overtopping	Post-development	5yr	2032
Figure A68	Maximum hazard map	Overtopping	Post-development	5yr	2132
Figure A69	Maximum hazard map	Overtopping	Post-development	200yr	2032
Figure A70	Maximum hazard map	Overtopping	Post-development	200yr	2132
Figure A71	Maximum hazard map	Overtopping	Post-development	1,000yr	2032
Figure A72	Maximum hazard map	Overtopping	Post-development	1,000yr	2132
Figure A73	Maximum hazard map	Structure failure	Post-development	2yr	2032
Figure A74	Maximum hazard map	Structure failure	Post-development	2yr	2132
Figure A75	Maximum hazard map	Structure failure	Post-development	4.38mAOD	N/A
Figure A76	Depth difference map	Breach	Post-(with mitigation) minus pre-development	4.38mAOD	N/A
Figure A77	Depth difference map	Breach	Post-(with mitigation) minus pre-development	2yr	2032
Figure A78	Depth difference map	Breach	Post-(with mitigation) minus pre-development	2yr	2132
Figure A79	Depth difference map	Overtopping	Post-(with mitigation) minus pre-development	2yr	2032
Figure A80	Depth difference map	Overtopping	Post-(with mitigation) minus pre-development	2yr	2132
Figure A81	Depth difference map	Overtopping	Post-(with mitigation) minus pre-development	5yr	2032
Figure A82	Depth difference map	Overtopping	Post-(with mitigation) minus pre-development	5yr	2132
Figure A83	Depth difference map	Overtopping	Post-(with mitigation) minus pre-development	200yr	2032
Figure A84	Depth difference map	Overtopping	Post-(with mitigation) minus pre-development	200yr	2132
Figure A85	Velocity difference map	Breach	Post-(with mitigation) minus pre-development	4.38mAOD	N/A
Figure A86	Velocity difference map	Breach	Post-(with mitigation) minus pre-development	2yr	2032
Figure A87	Velocity difference map	Breach	Post-(with mitigation) minus pre-development	2yr	2132
Figure A88	Velocity difference map	Overtopping	Post-(with mitigation) minus pre-development	2yr	2032
Figure A89	Velocity difference map	Overtopping	Post-(with mitigation) minus pre-development	2yr	2132
Figure A90	Velocity difference map	Overtopping	Post-(with mitigation) minus pre-development	5yr	2032
Figure A91	Velocity difference map	Overtopping	Post-(with mitigation) minus pre-development	5yr	2132
Figure A92	Velocity difference map	Overtopping	Post-(with mitigation) minus pre-development	200yr	2032
Figure A93	Velocity difference map	Overtopping	Post-(with mitigation) minus pre-development	200yr	2132
Figure A94	Hazard category difference map	Breach	Post-(with mitigation) minus pre-development	4.38mAOD	N/A
Figure A95	Hazard category difference map	Breach	Post-(with mitigation) minus pre-development	2yr	2032
Figure A96	Hazard category difference map	Breach	Post-(with mitigation) minus pre-development	2yr	2132
Figure A97	Hazard category difference map	Overtopping	Post-(with mitigation) minus pre-development	2yr	2032
Figure A98	Hazard category difference map	Overtopping	Post-(with mitigation) minus pre-development	2yr	2132
Figure A99	Hazard category difference map	Overtopping	Post-(with mitigation) minus pre-development	5yr	2032
Figure A100	Hazard category difference map	Overtopping	Post-(with mitigation) minus pre-development	5yr	2132
Figure A101	Hazard category difference map	Overtopping	Post-(with mitigation) minus pre-development	200yr	2032
Figure A102	Hazard category difference map	Overtopping	Post-(with mitigation) minus pre-development	200yr	2132



Scenario / Flood Estimation Point	Breach
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

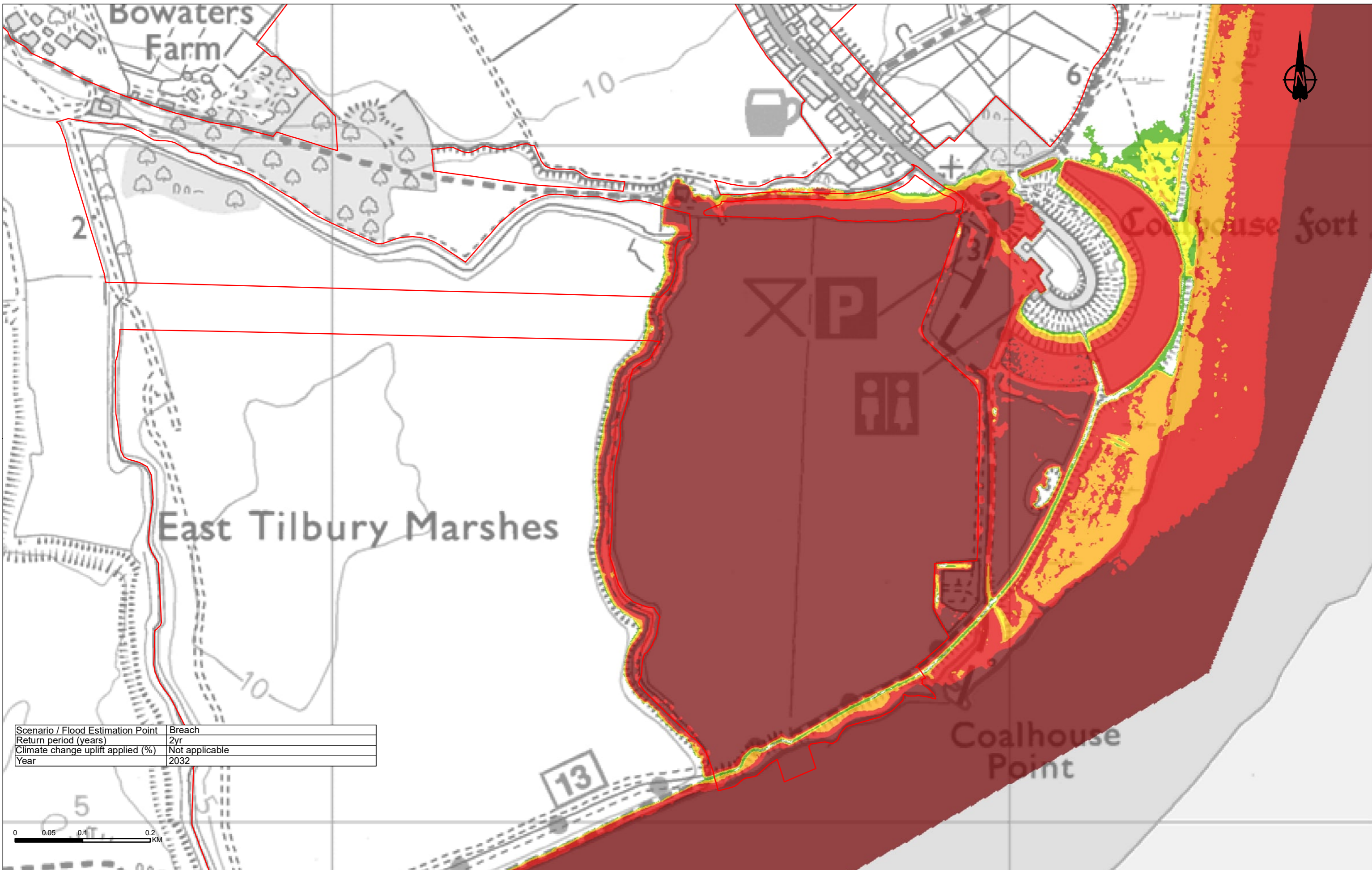
	Order Limits
	Maximum flood depth (m)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



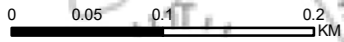
Client:

Project: **LOWER THAMES CROSSING**

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 1 out of 25 - Figure A1				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

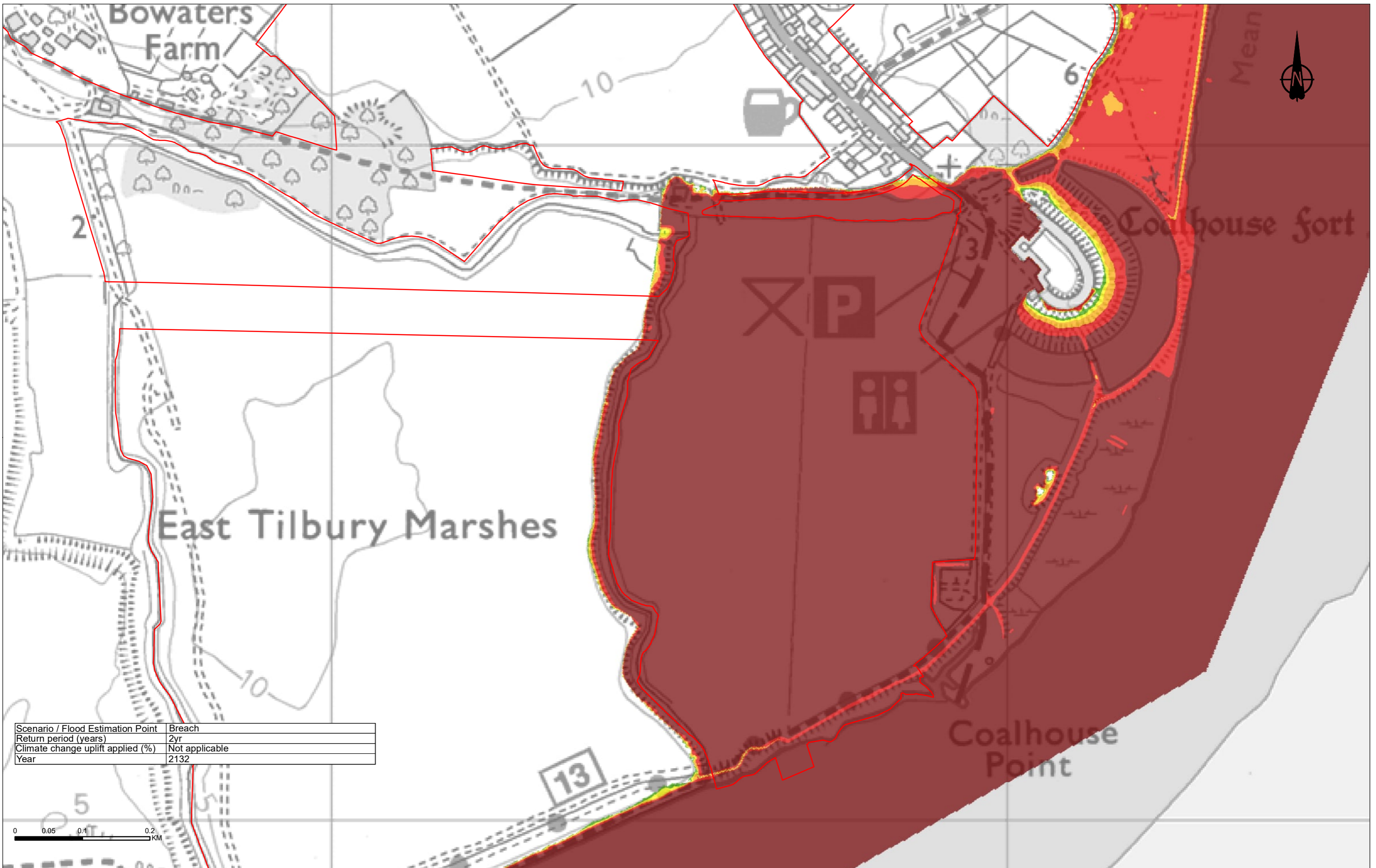
Order Limits	Maximum flood depth (m)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



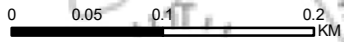
Client:

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 2 out of 25 - Figure A2				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood depth (m)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

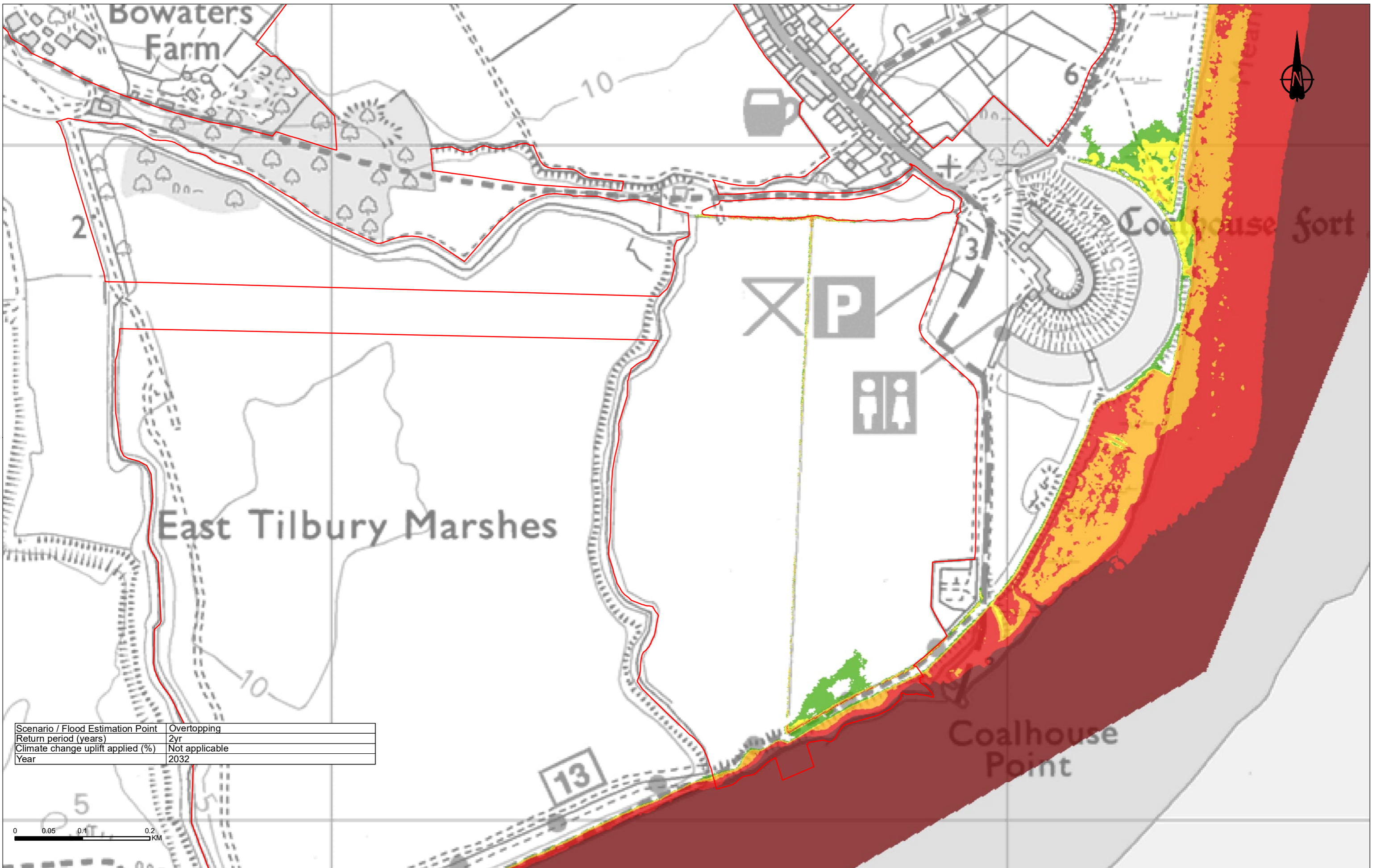


Client

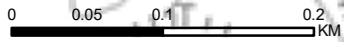
Project

LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 3 out of 25 - Figure A3				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood depth (m)

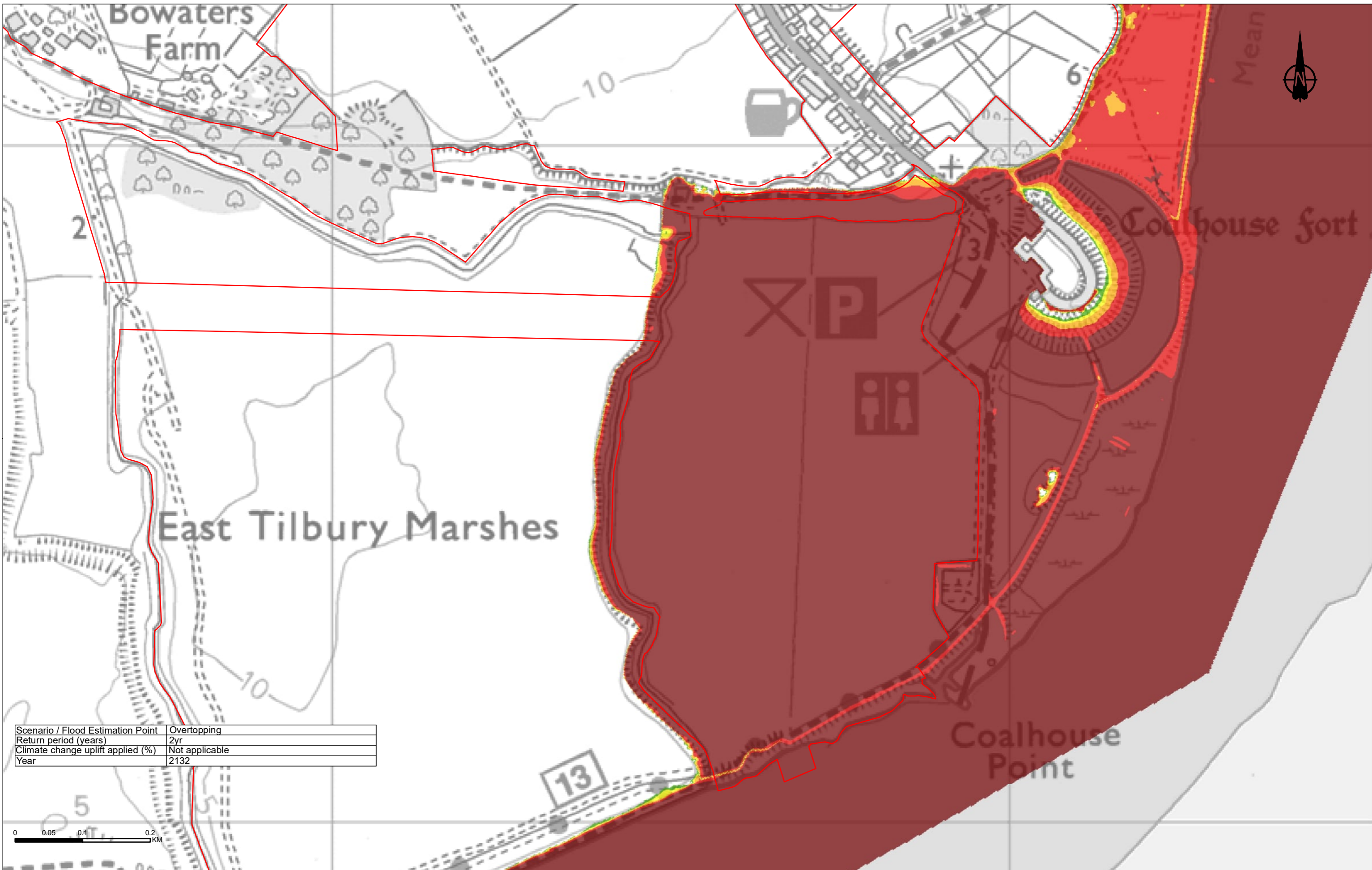
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



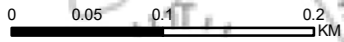
Client
national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 4 out of 25 - Figure A4				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

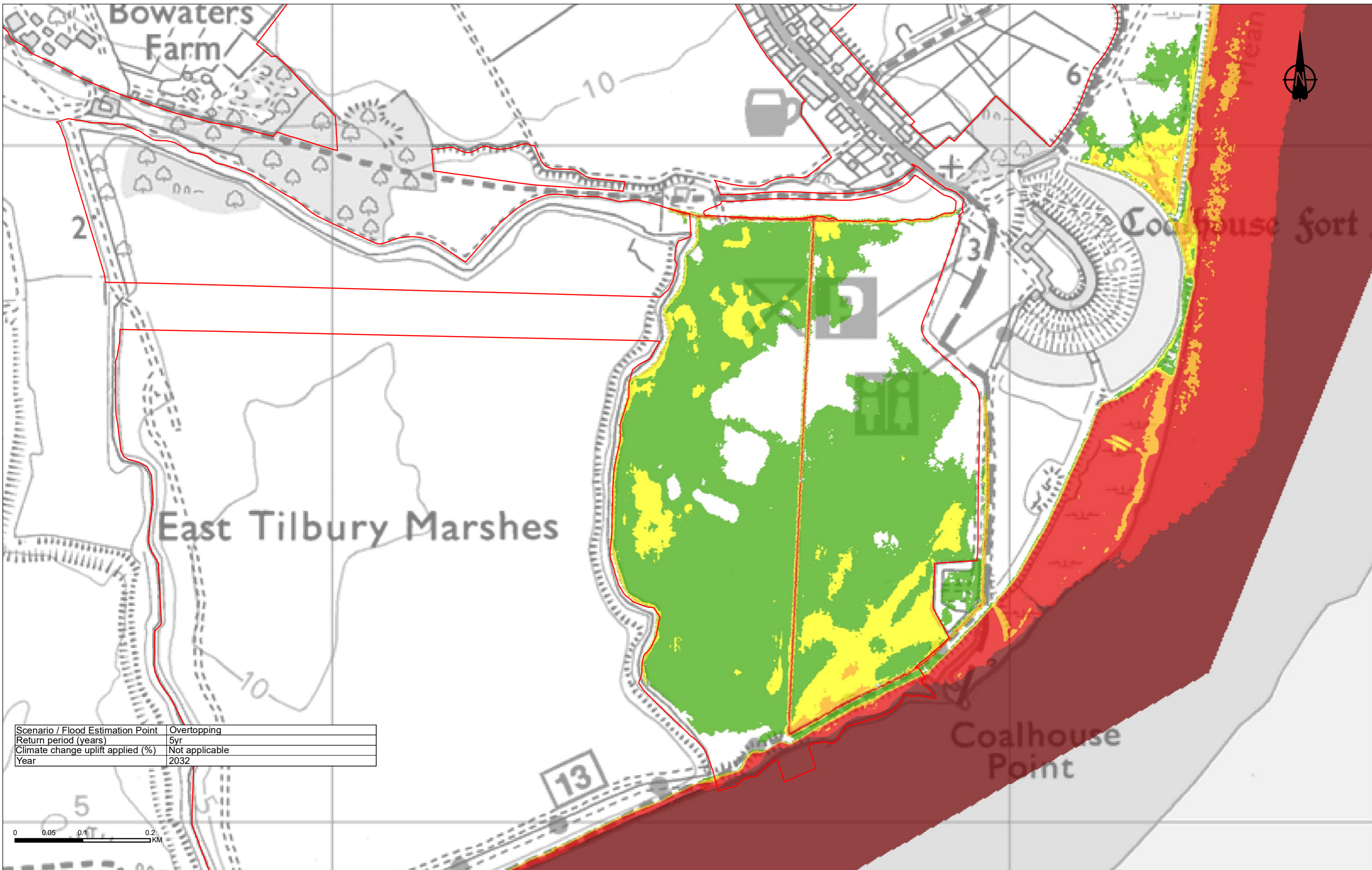
	Order Limits
	Maximum flood depth (m)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



Client:

Project: **LOWER THAMES CROSSING**

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 5 out of 25 - Figure A5				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032

P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood depth (m)

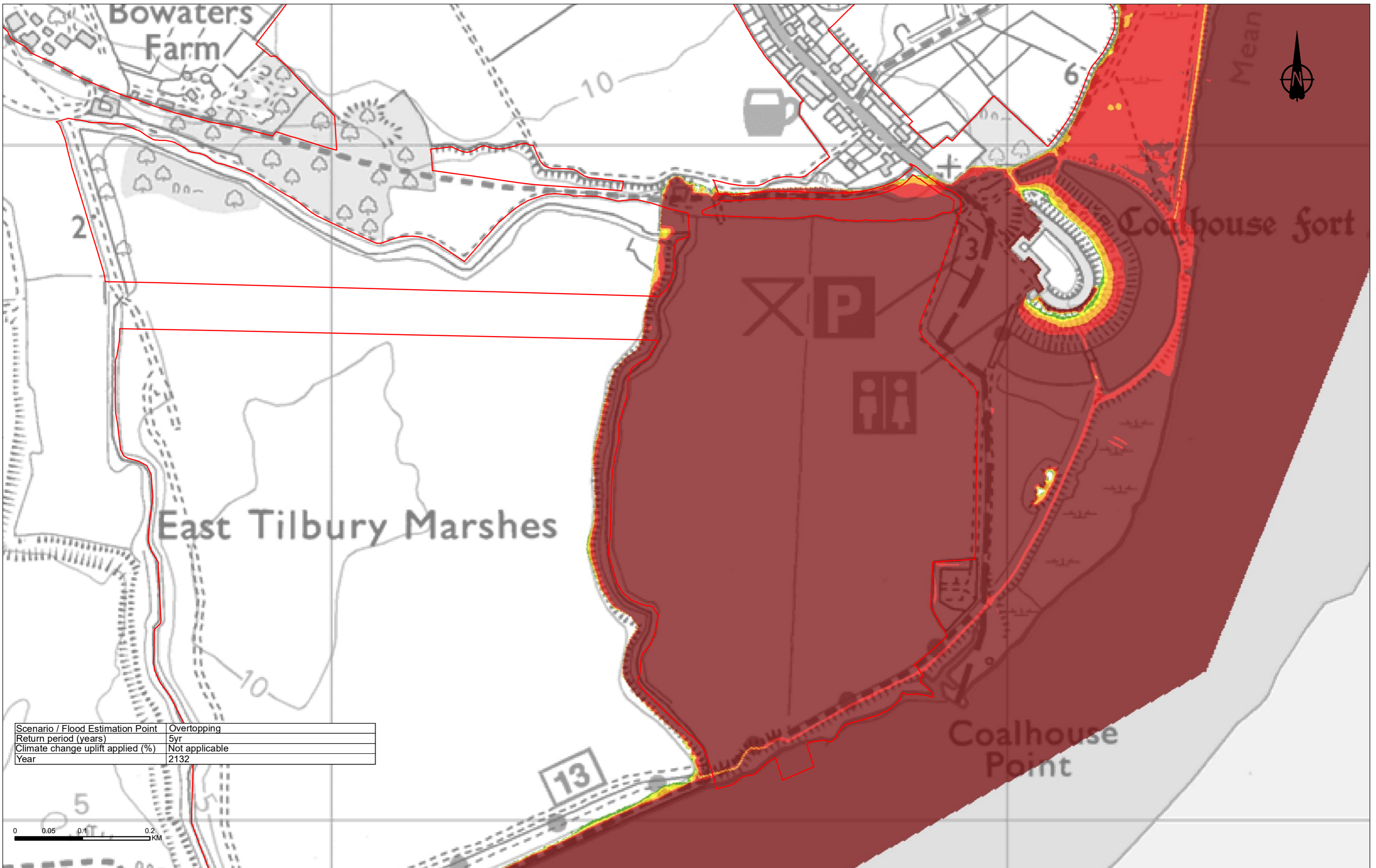
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



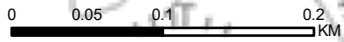
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 6 out of 25 - Figure A6				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

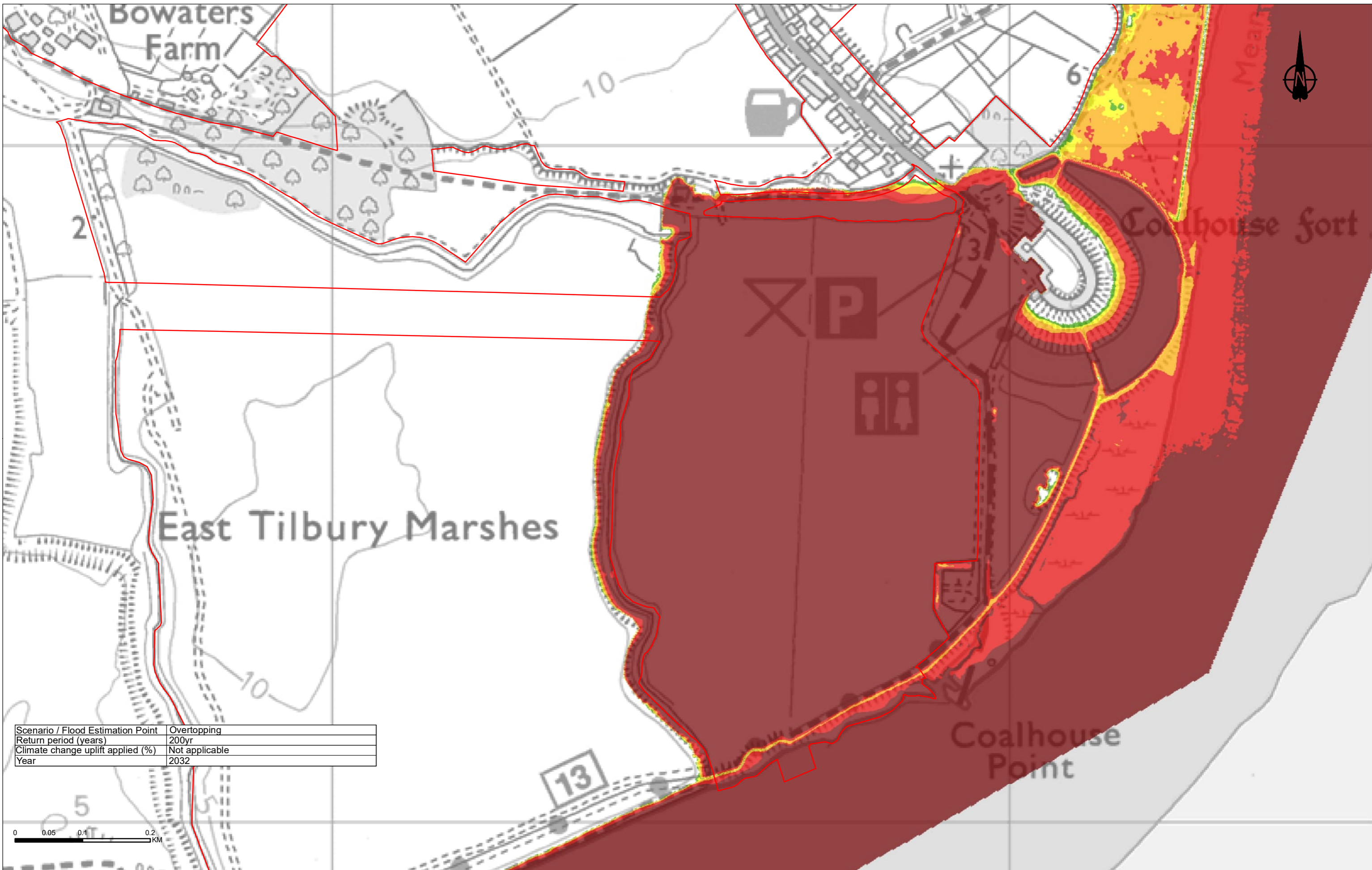
Order Limits	Maximum flood depth (m)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



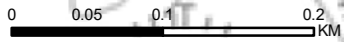
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 7 out of 25 - Figure A7				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

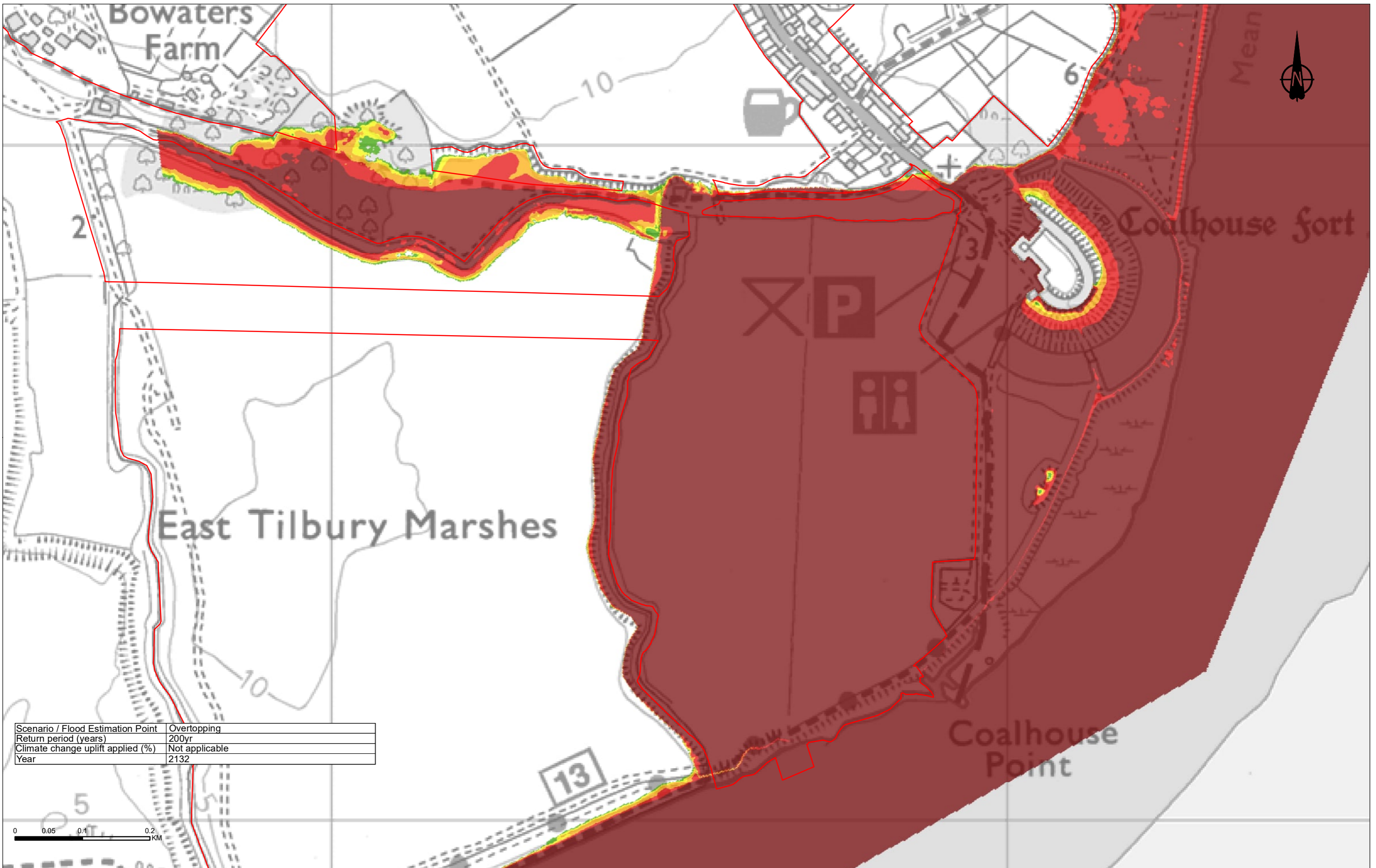
	Order Limits
	Maximum flood depth (m)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



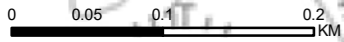
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 8 out of 25 - Figure A8				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood depth (m)

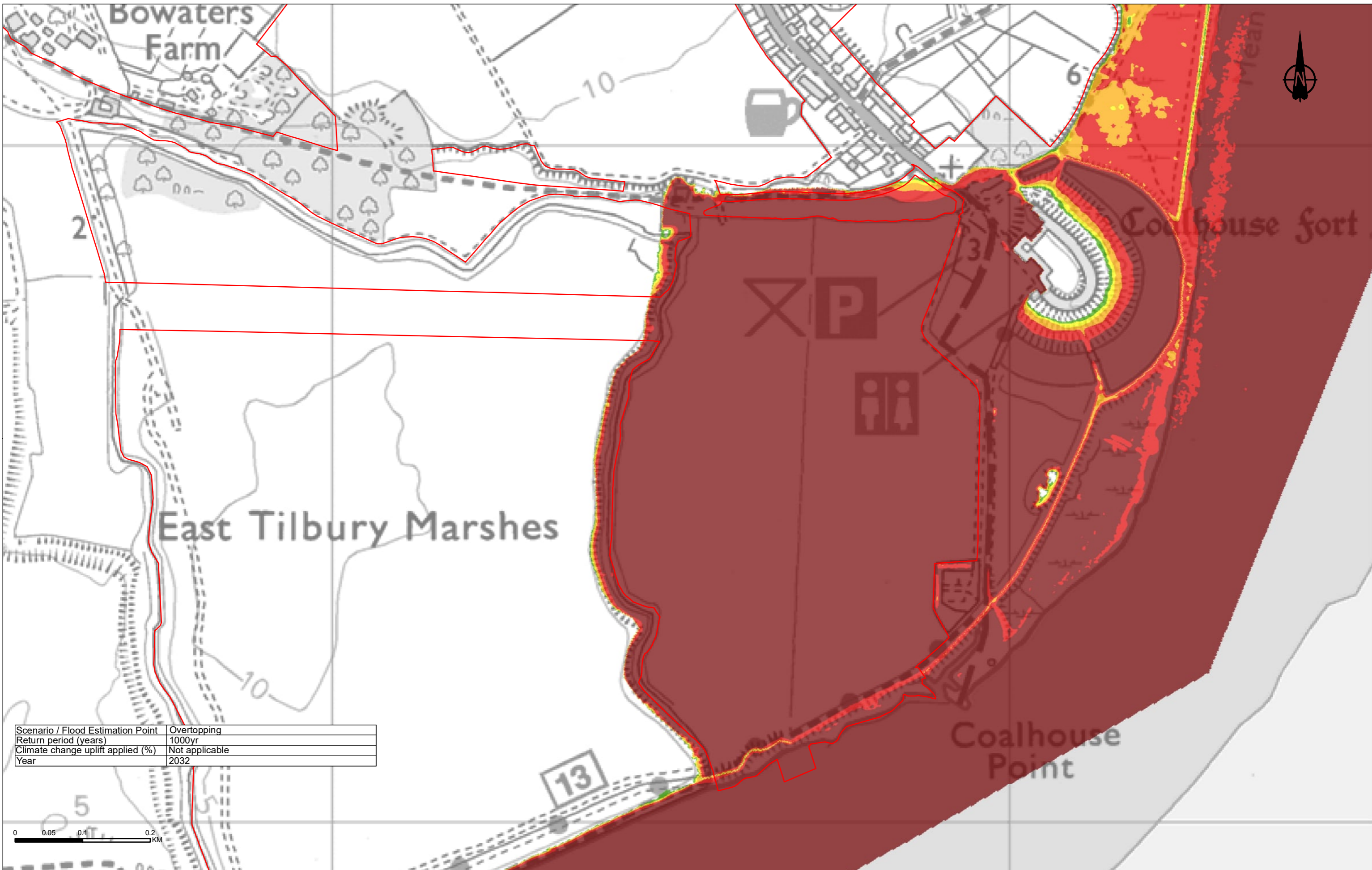
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 9 out of 25 - Figure A9				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2032

P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood depth (m)

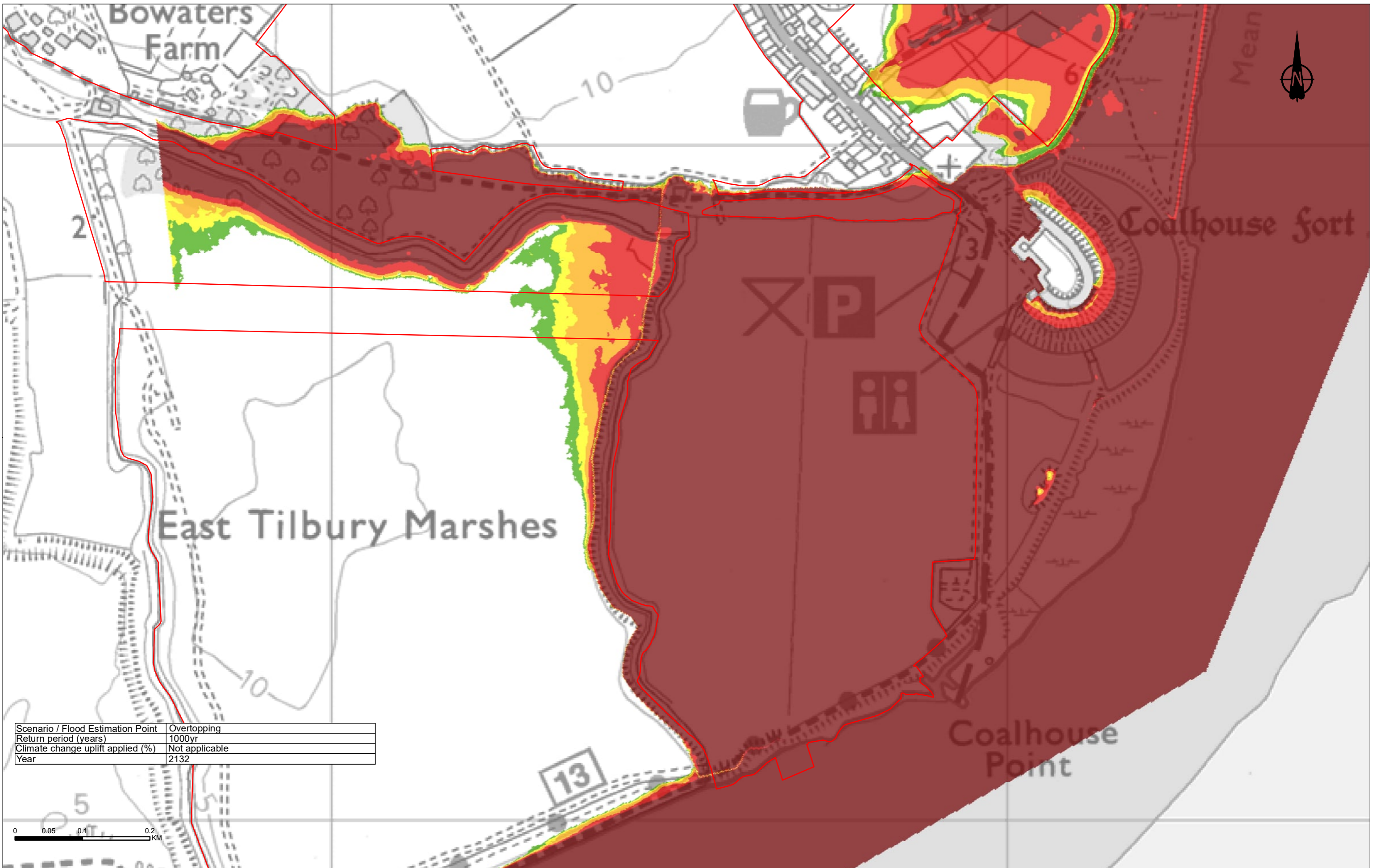
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



Client: **national highways**

Project: **LOWER THAMES CROSSING**

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 10 out of 25 - Figure A10				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2132

P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood depth (m)

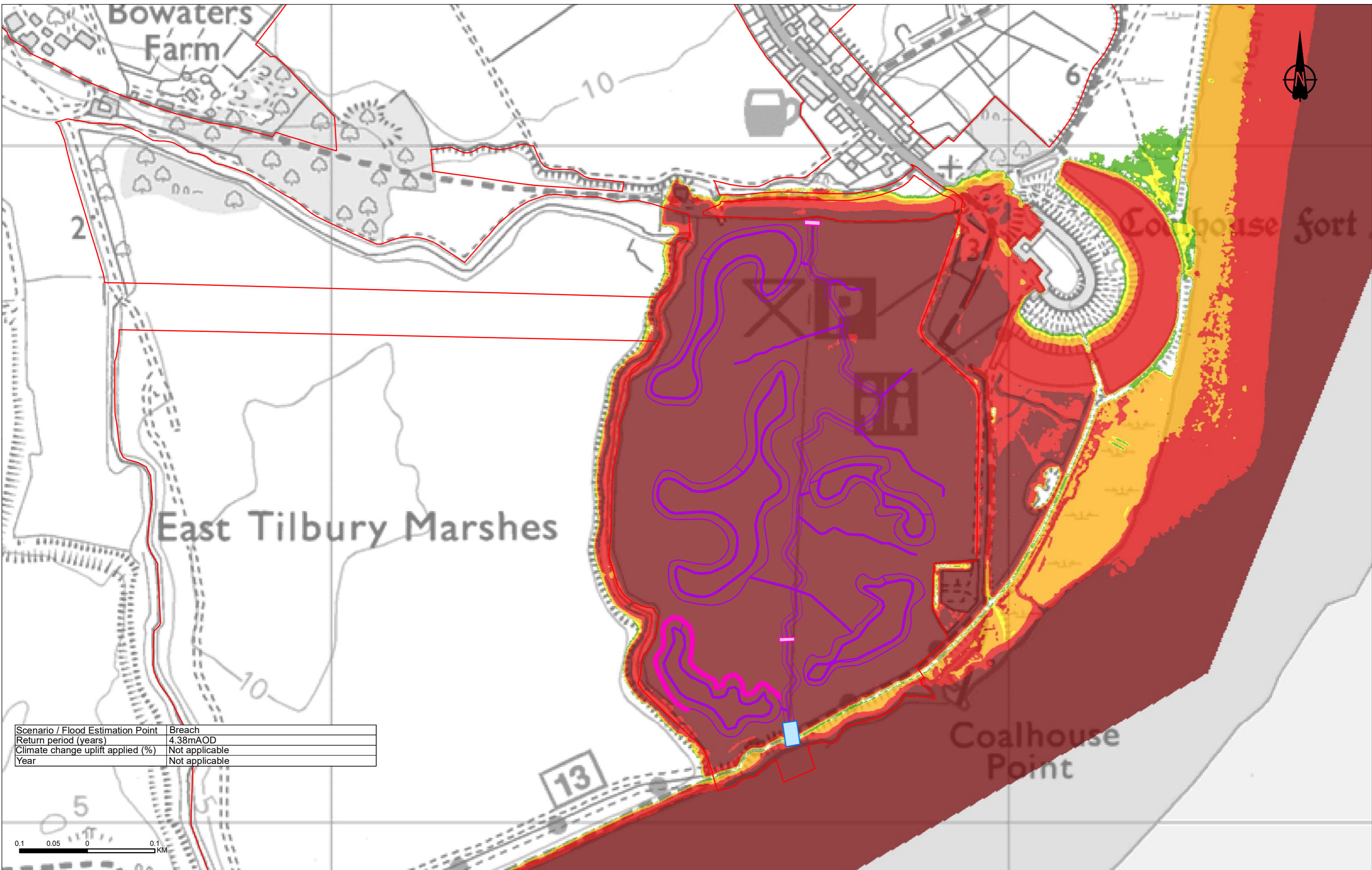
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



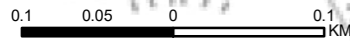
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Pre-development 11 out of 25 - Figure A11				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Breach
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

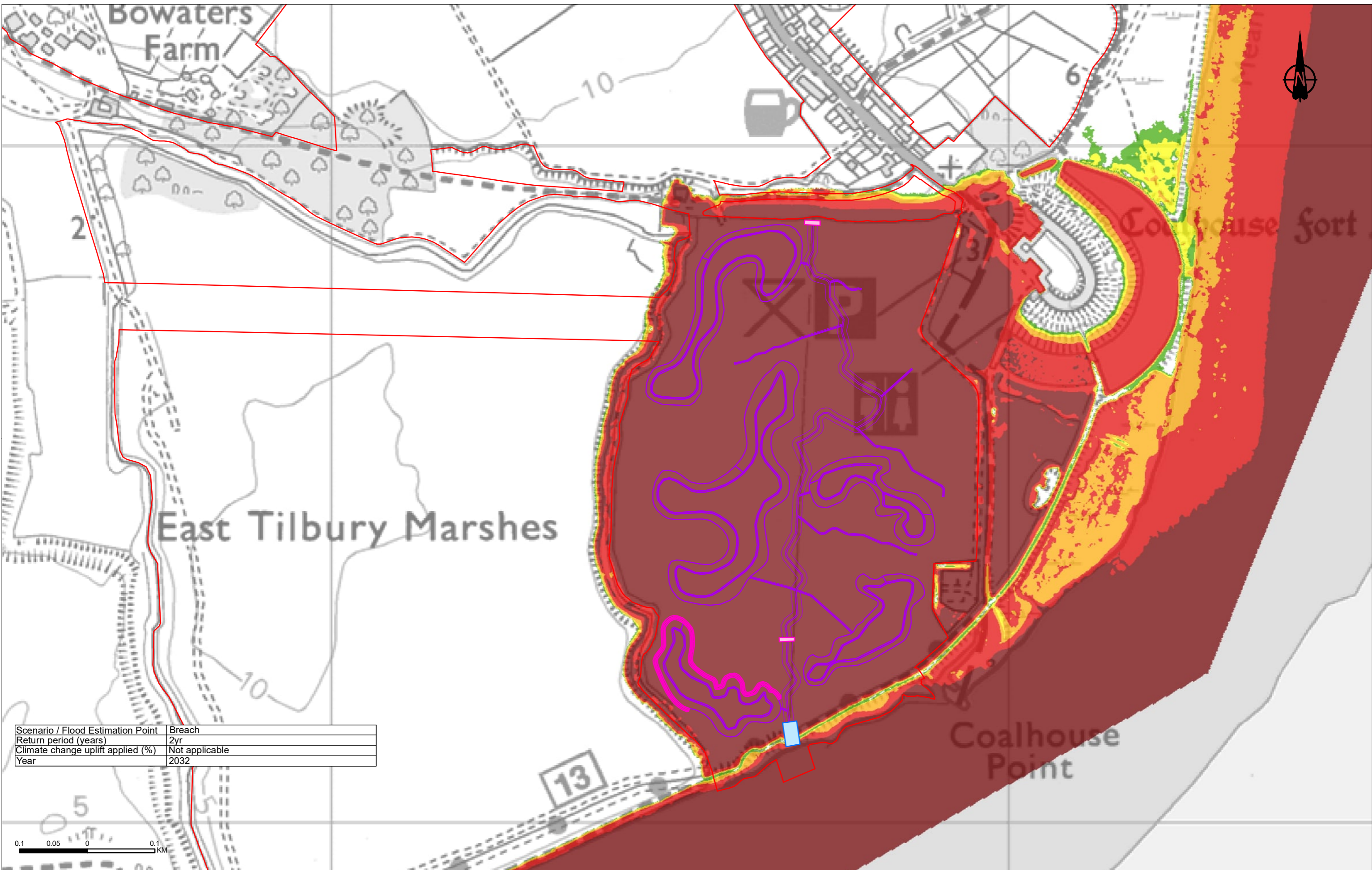
Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
Maximum flood depth (m)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



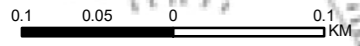
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 12 out of 25 - Figure A12				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



Original Size	A3	Revision	P01
Application Document Number	N/A		
Scale	1:5,000		

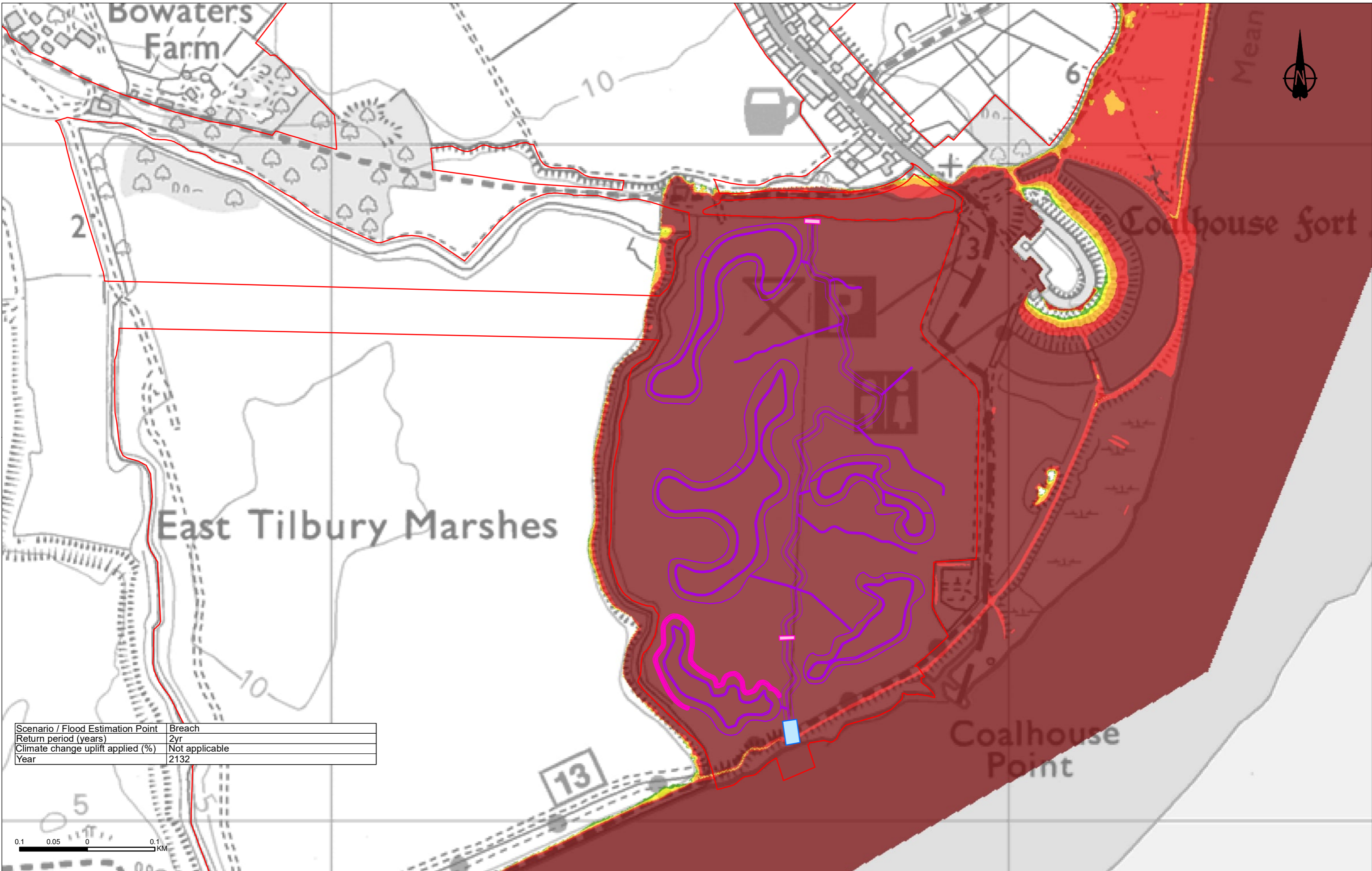
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



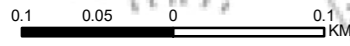
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9
Application Document Number	N/A
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 13 out of 25 - Figure A13
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

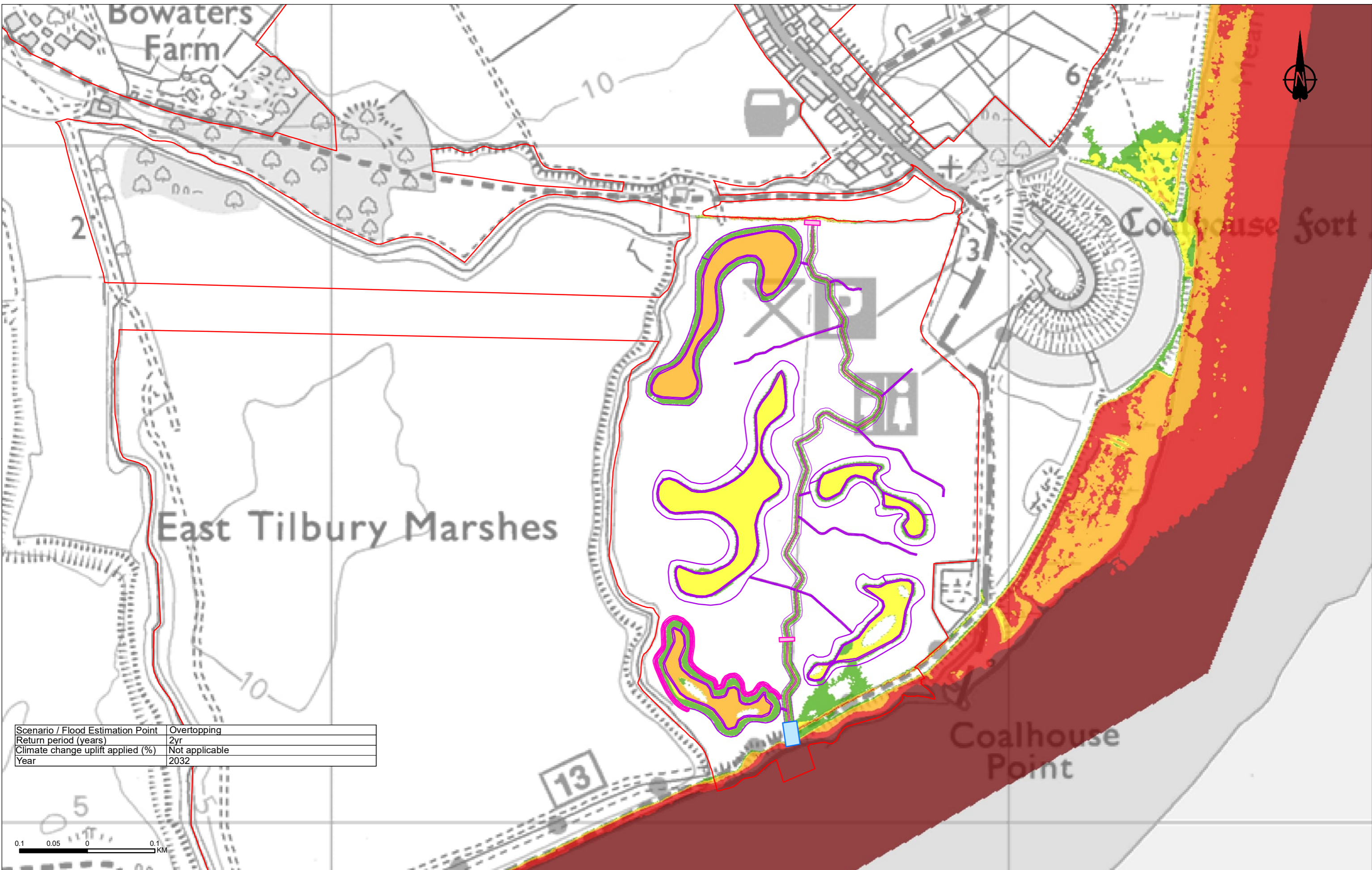
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



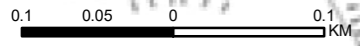
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 14 out of 25 - Figure A14				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

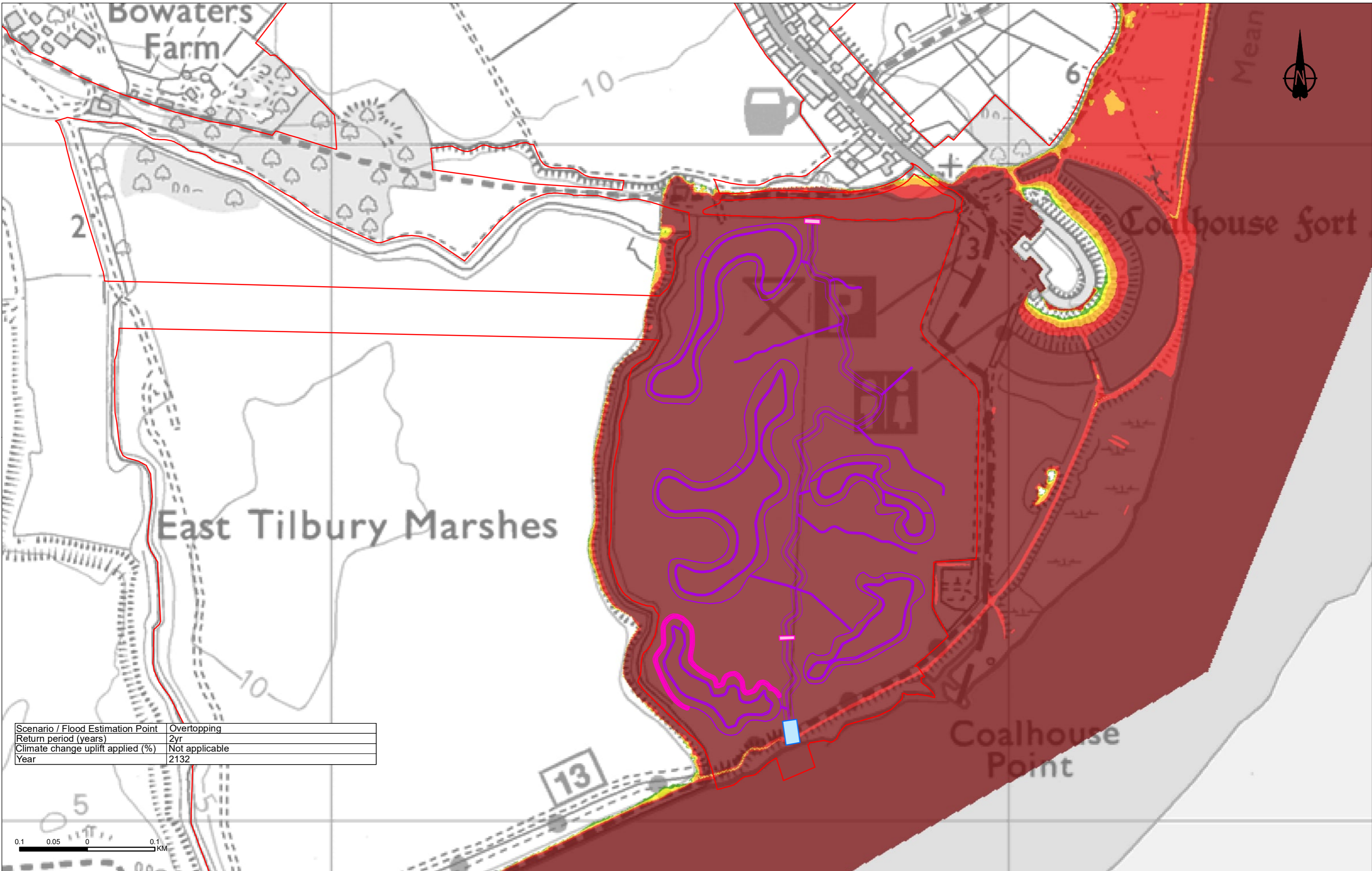
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



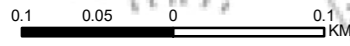
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 15 out of 25 - Figure A15				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

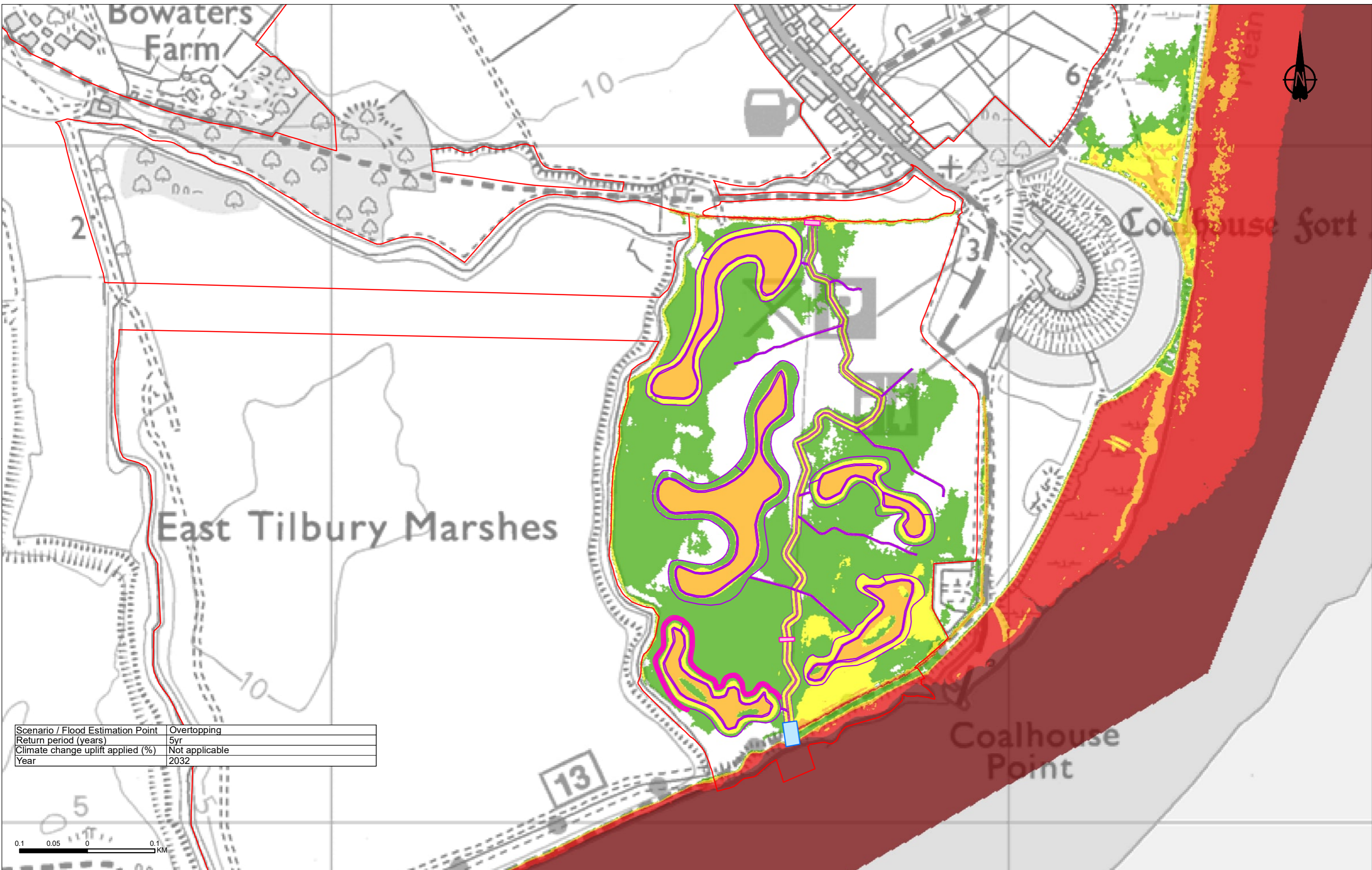
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



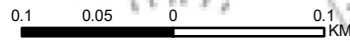
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 16 out of 25 - Figure A16				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

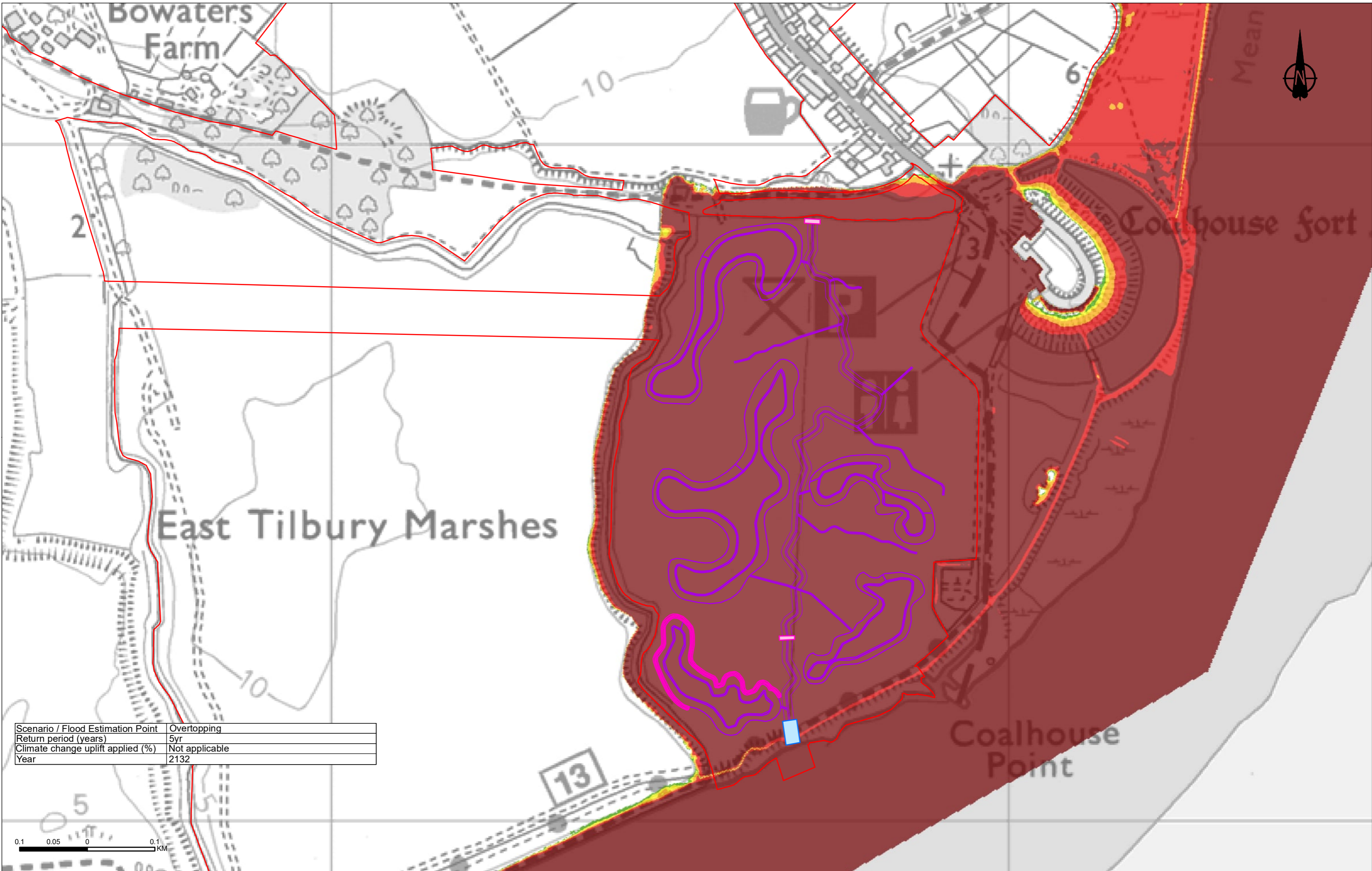
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



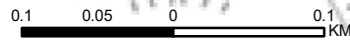
Client:

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 17 out of 25 - Figure A17				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd
P01	S9	21/08/2023	Deadline 6	KK	RB	BF

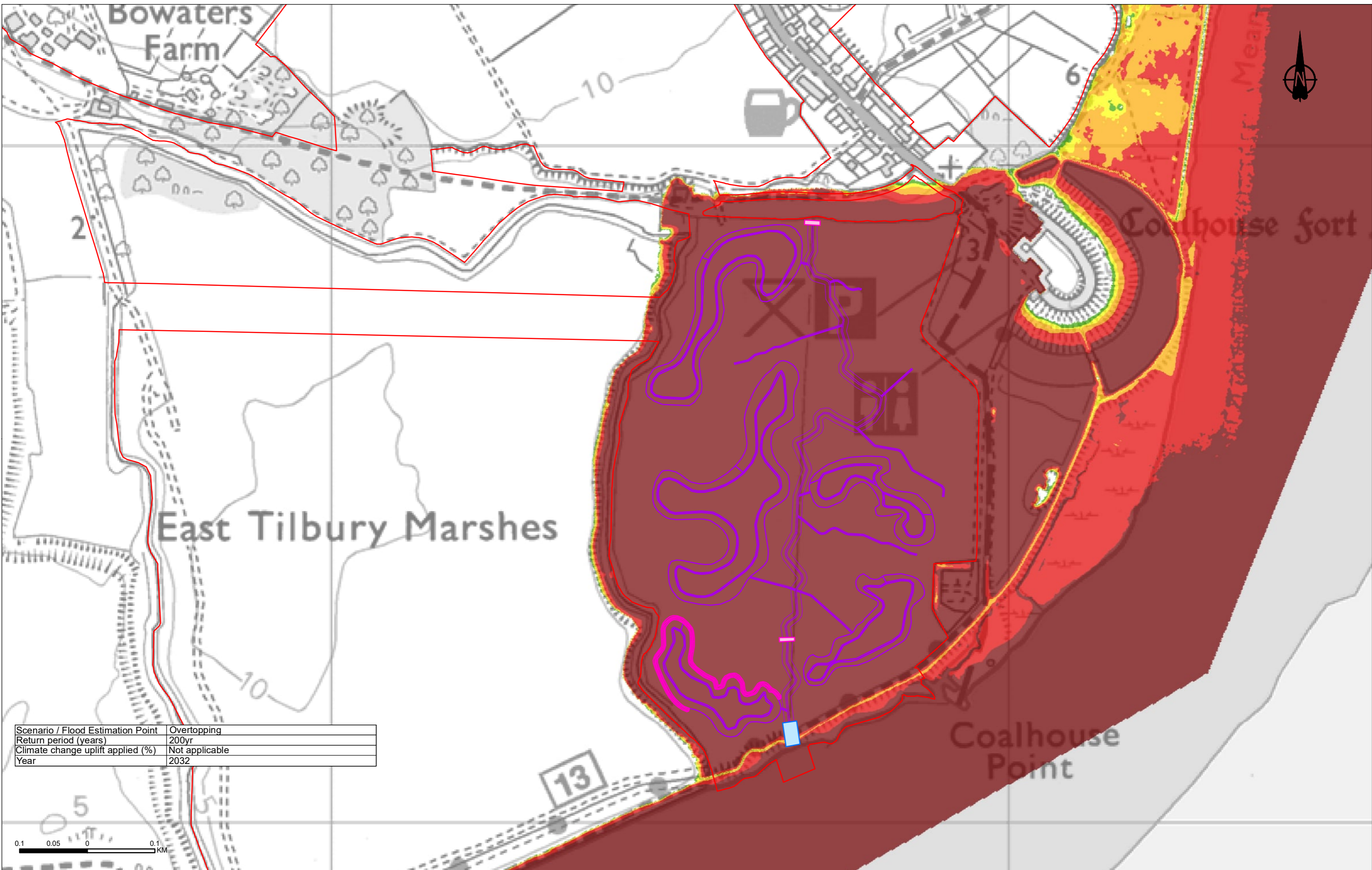
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



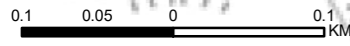
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 18 out of 25 - Figure A18				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

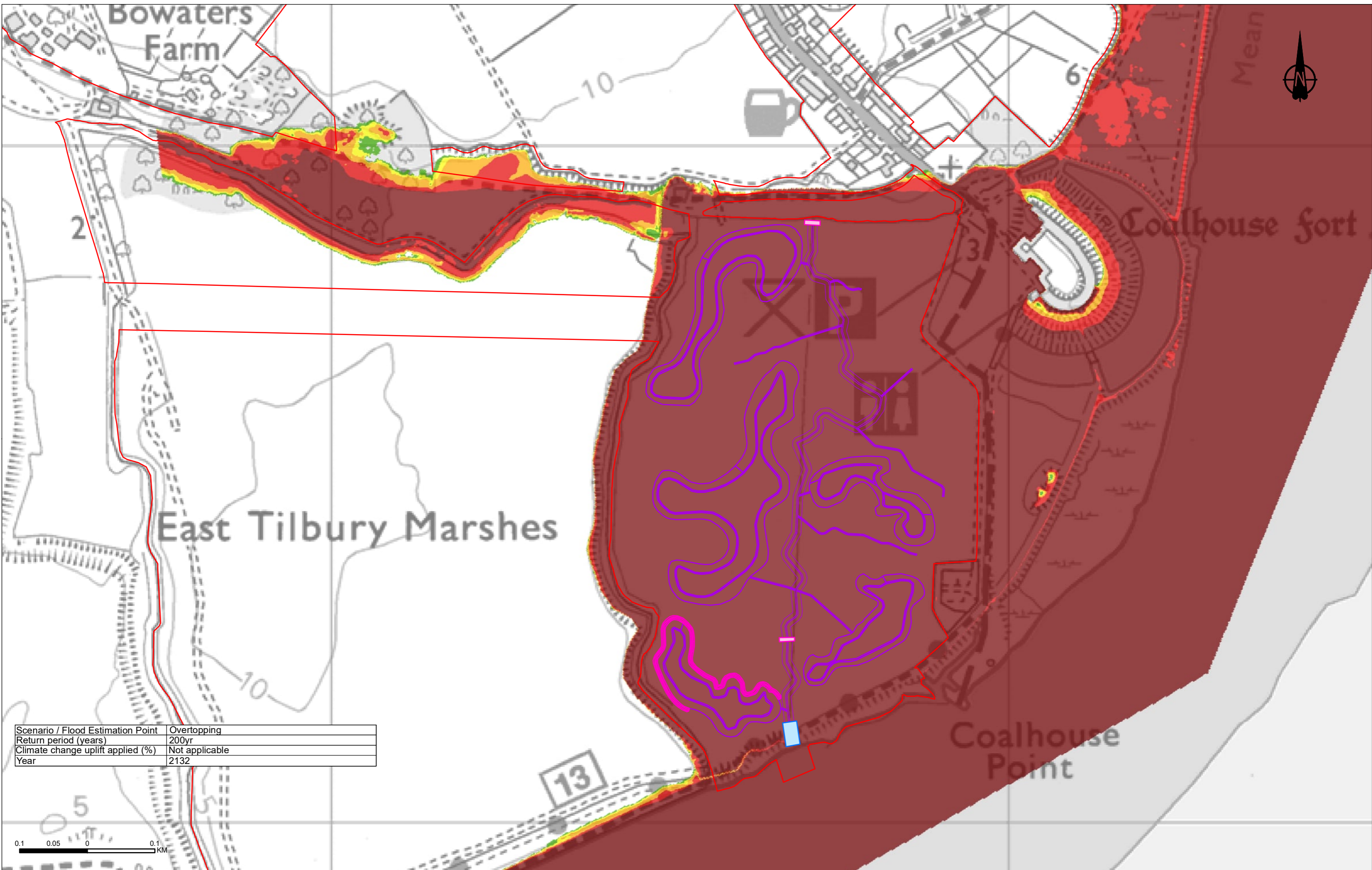
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



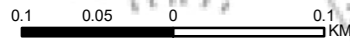
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 19 out of 25 - Figure A19				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

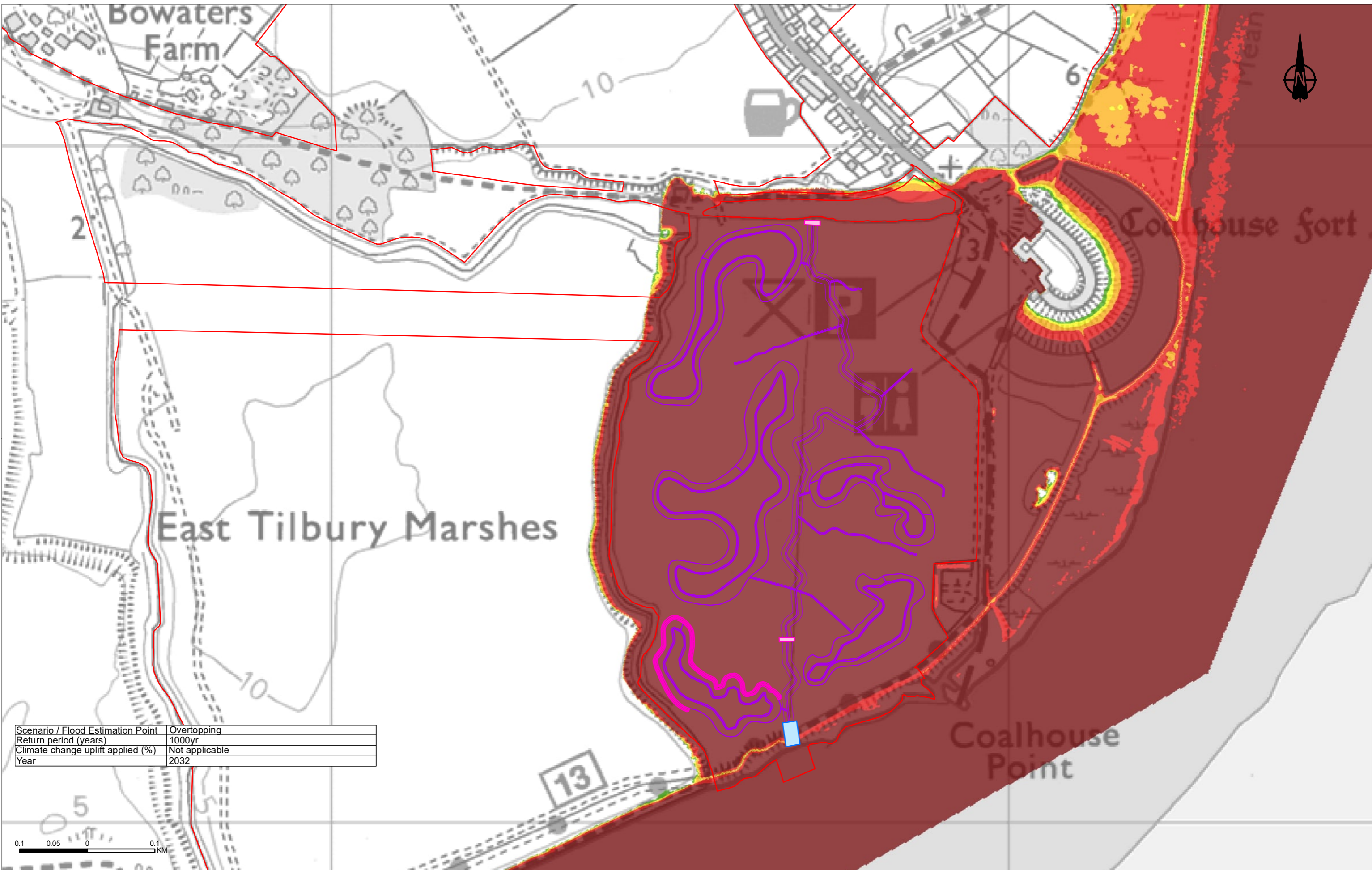
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



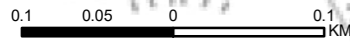
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 20 out of 25 - Figure A20				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

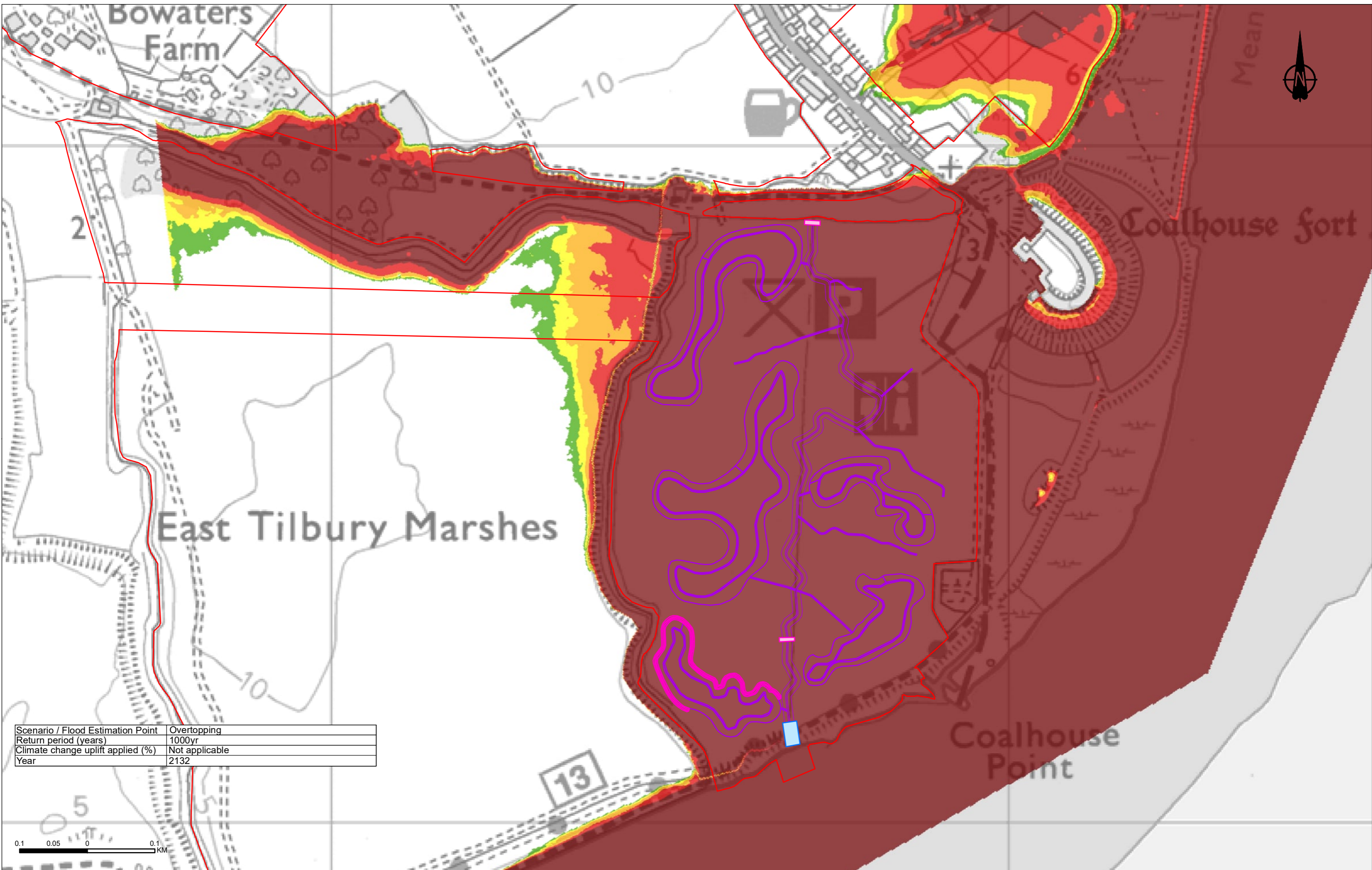
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



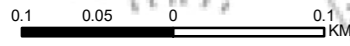
Client:

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 21 out of 25 - Figure A21				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

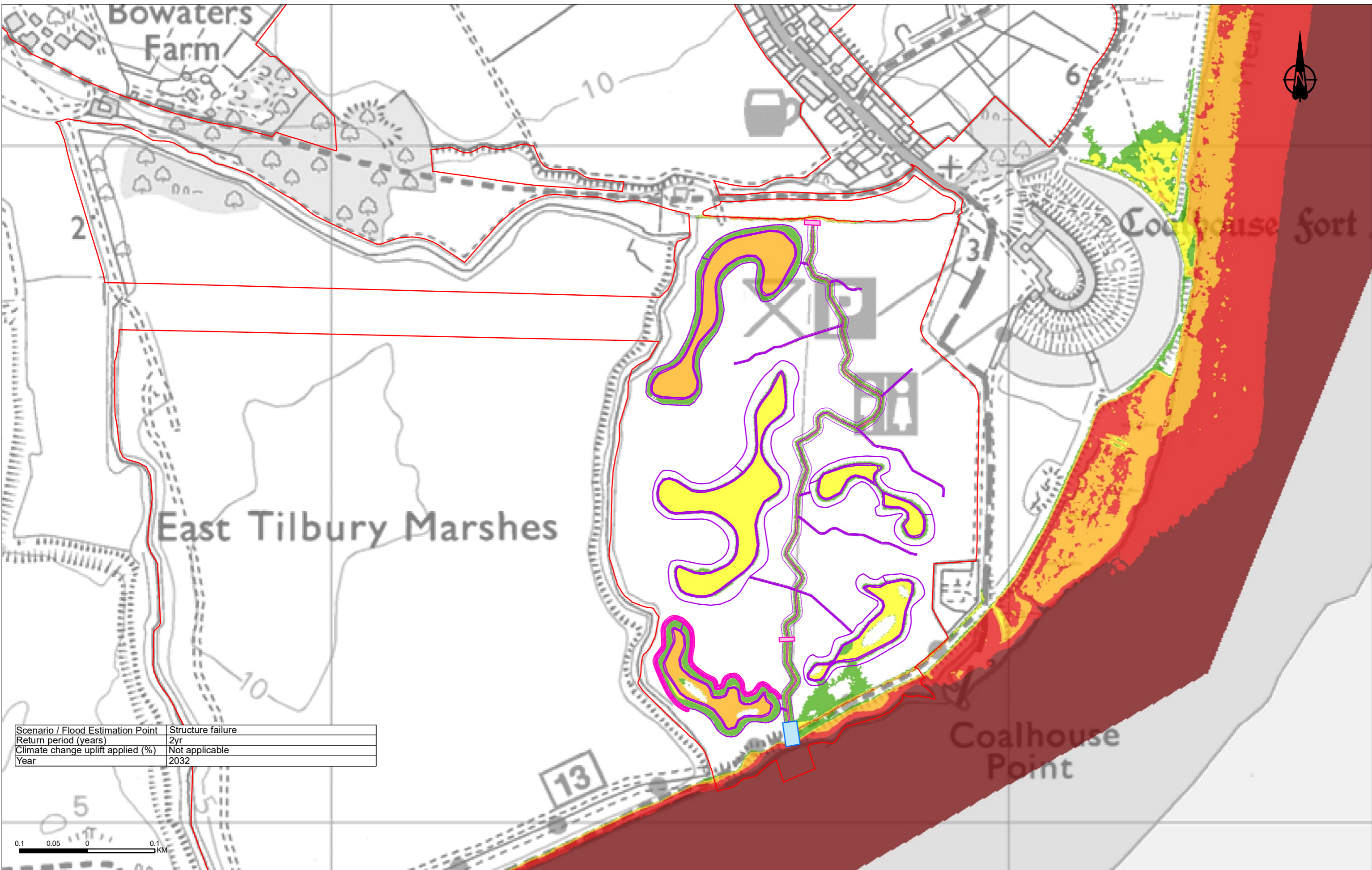
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



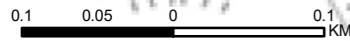
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 22 out of 25 - Figure A22				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Structure failure
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

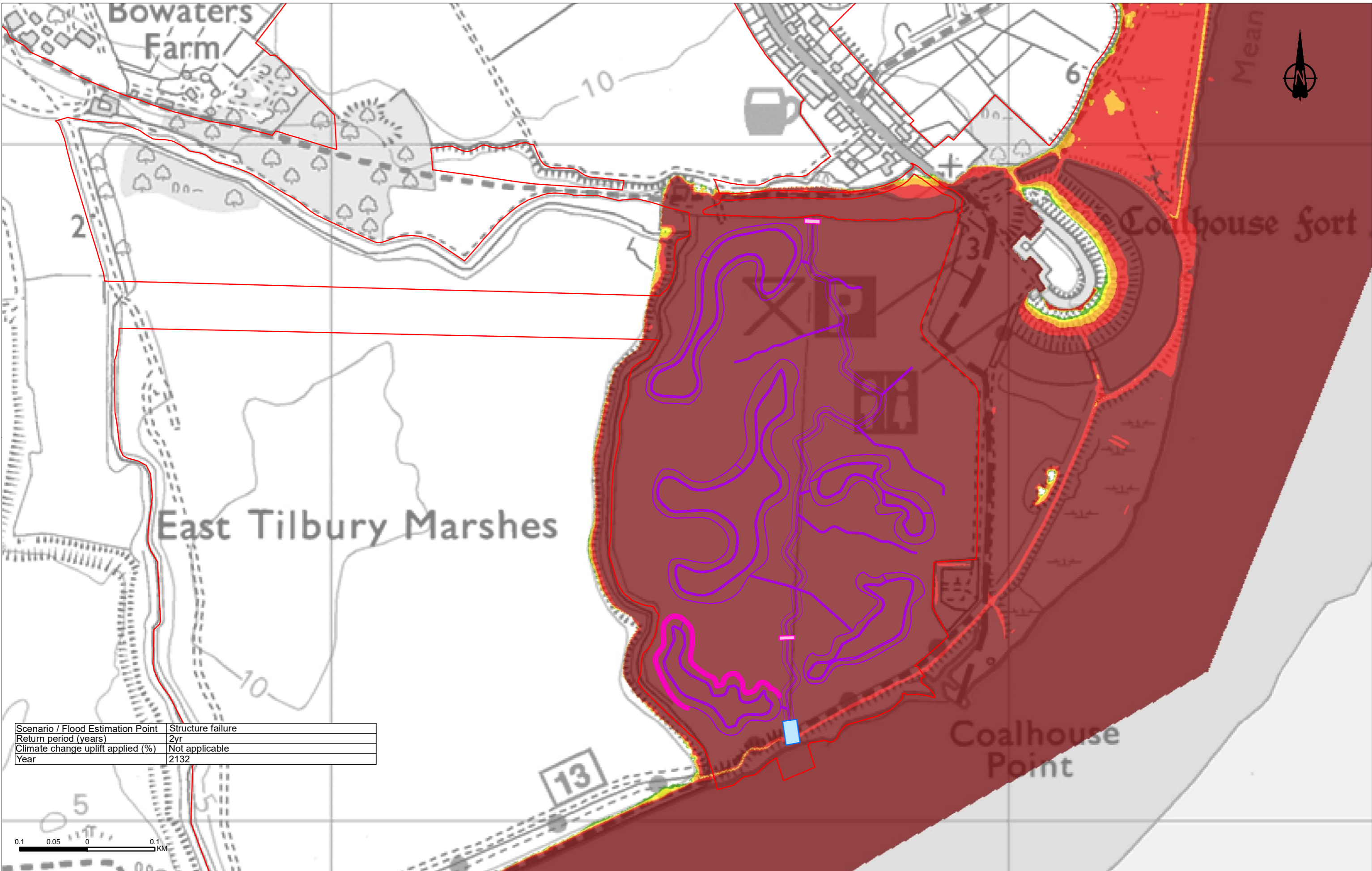
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



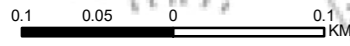
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 23 out of 25 - Figure A23				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Structure failure
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

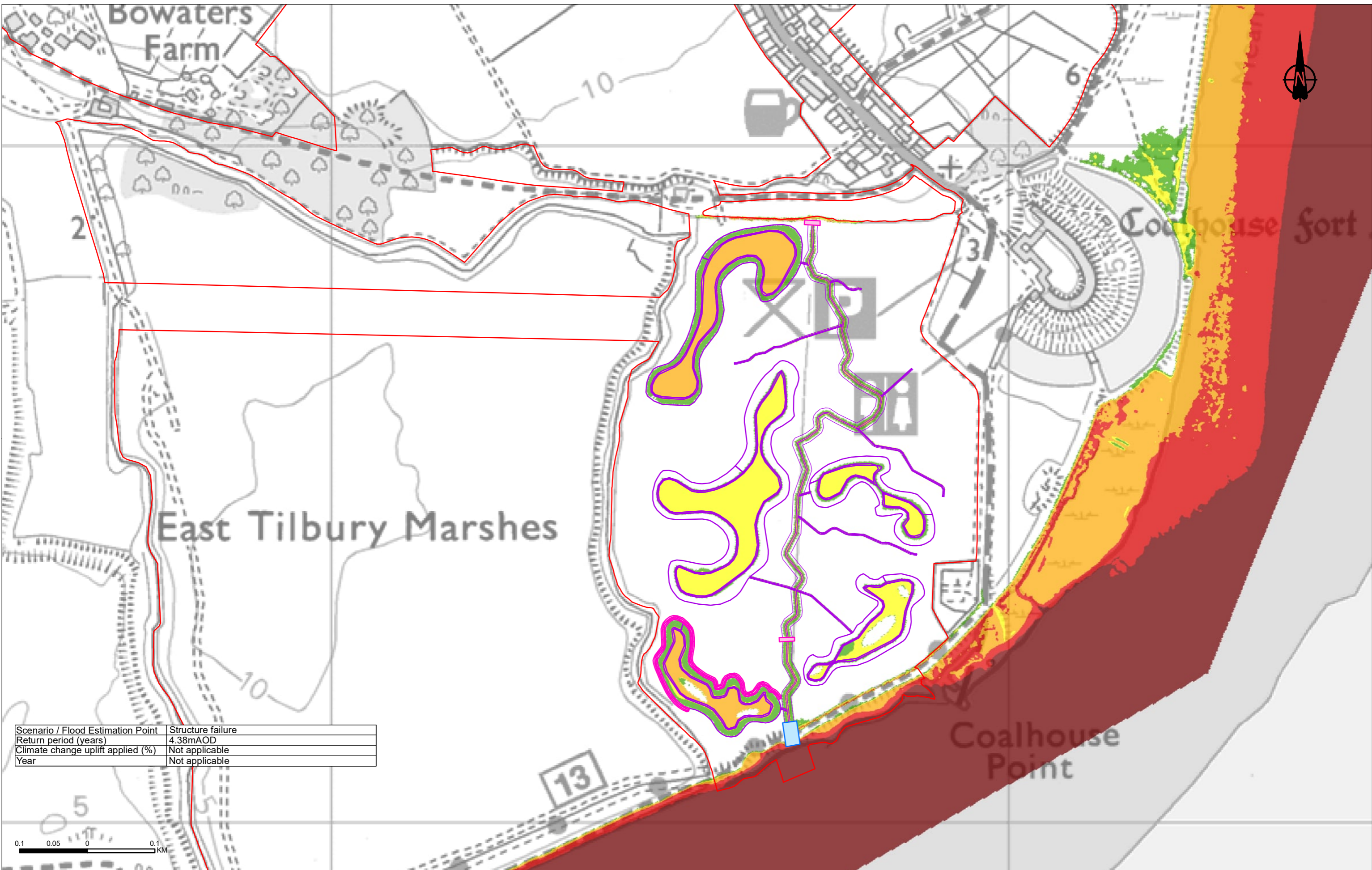
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



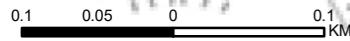
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A		Scale	1:5,000	
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 24 out of 25 - Figure A24				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Structure failure
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

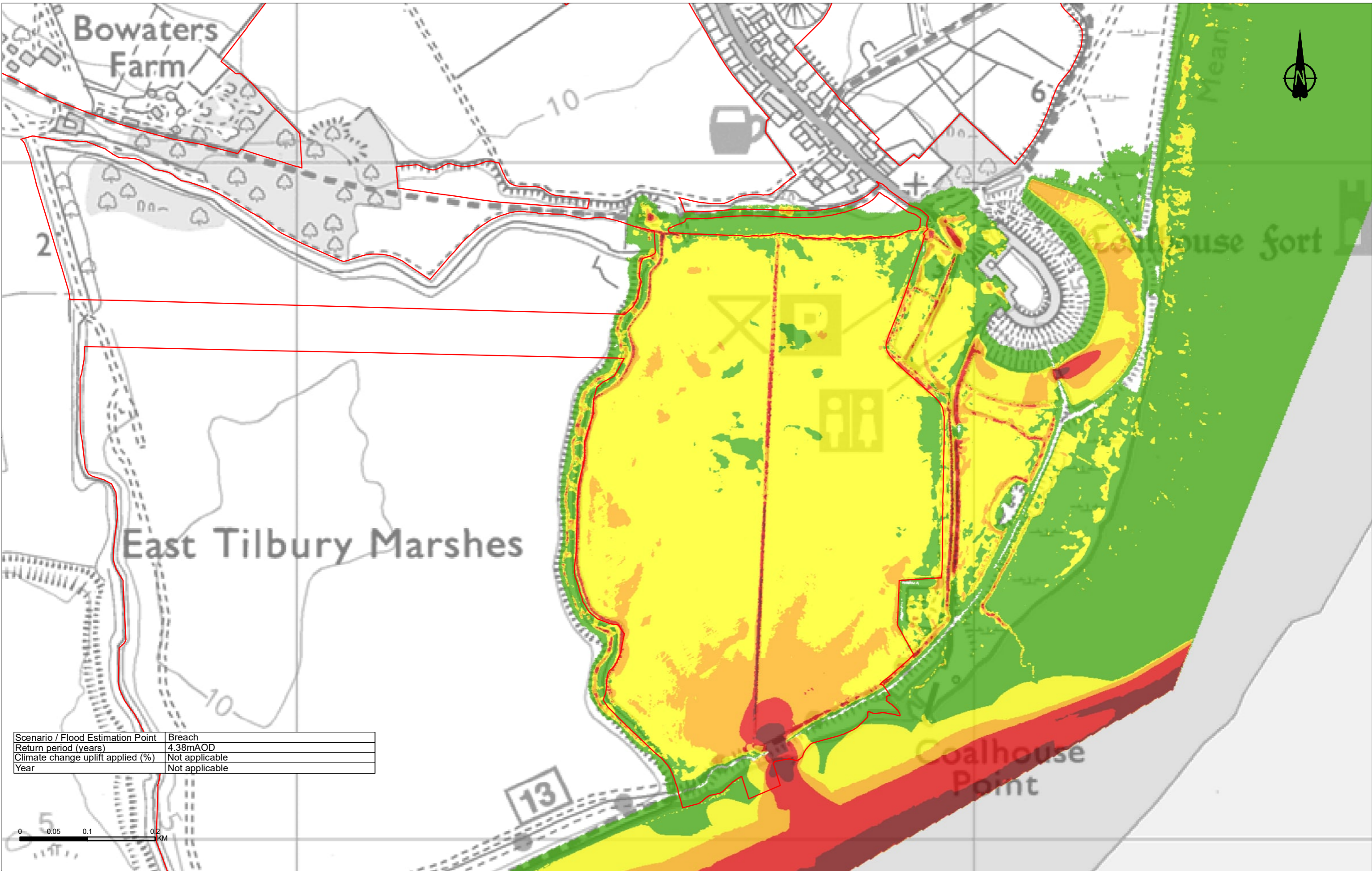
Legend		Maximum flood depth (m)
	Shallow scrapes and ditches	0 - 0.25
	Embankments	0.25 - 0.5
	Water level control inlet	0.5 - 1.0
	Water level control structures	1.0 - 2.0
	Order Limits	> 2.0



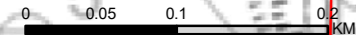
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood depth Post-development 25 out of 25 - Figure A25				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91015				



Scenario / Flood Estimation Point	Breach
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable



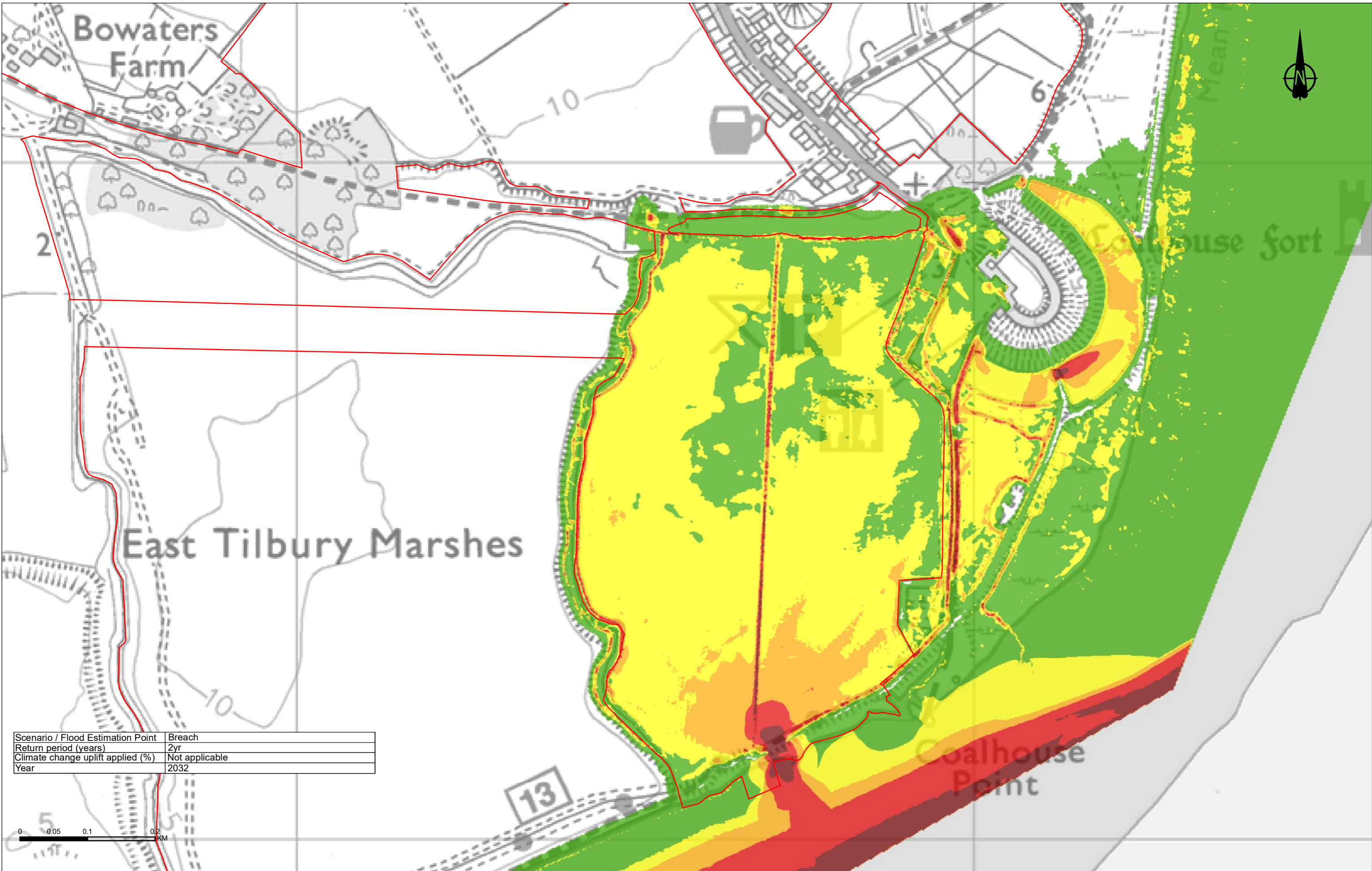
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Order Limits	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 1 out of 25 - Figure A26				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032

0 0.05 0.1 0.2 KM

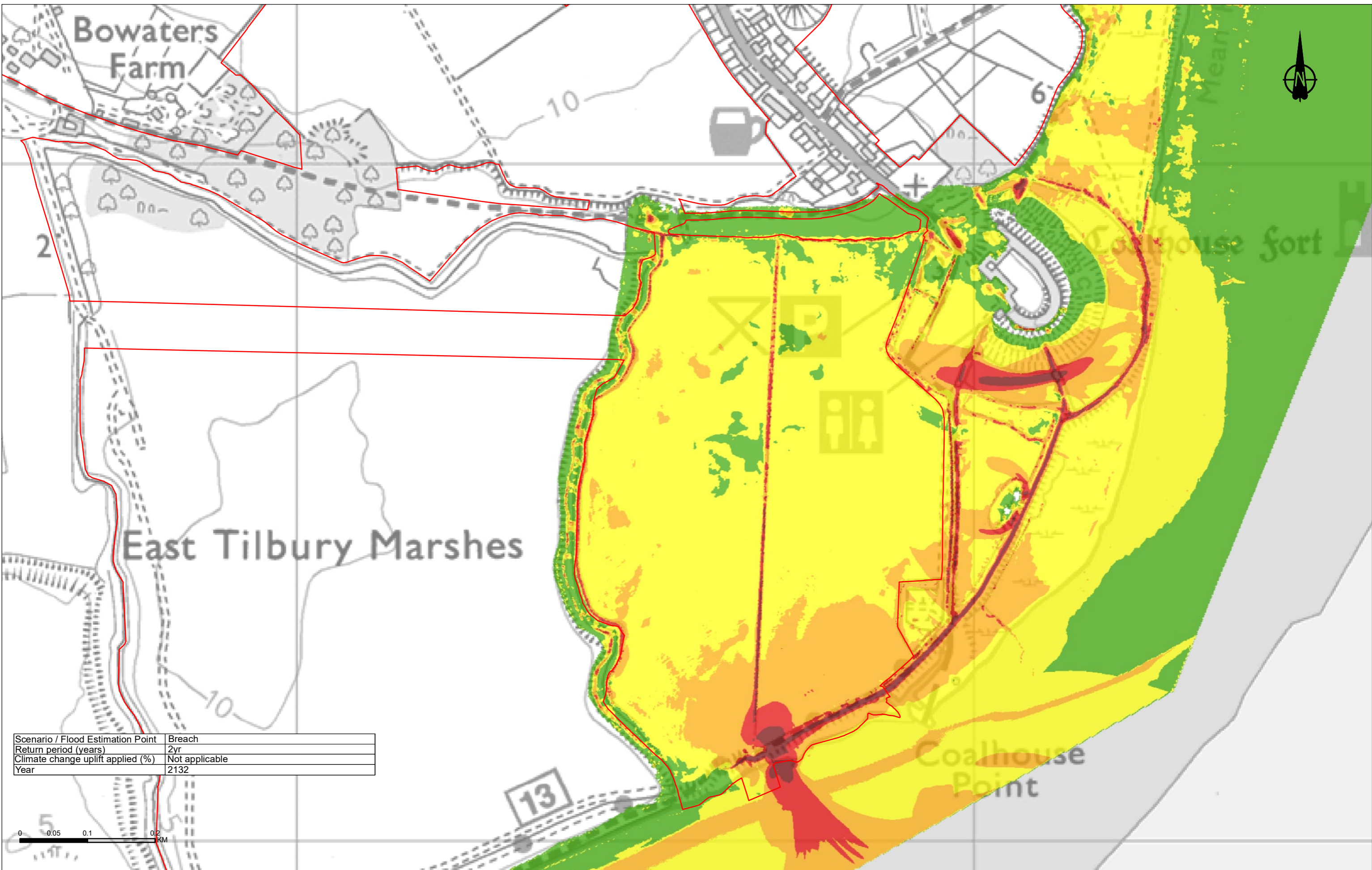
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Order Limits	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 2 out of 25 - Figure A27				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

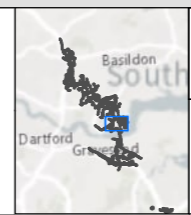


Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Order Limits	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



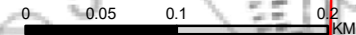
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 3 out of 25 - Figure A28				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

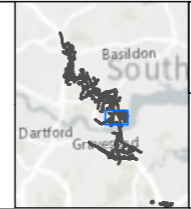


Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

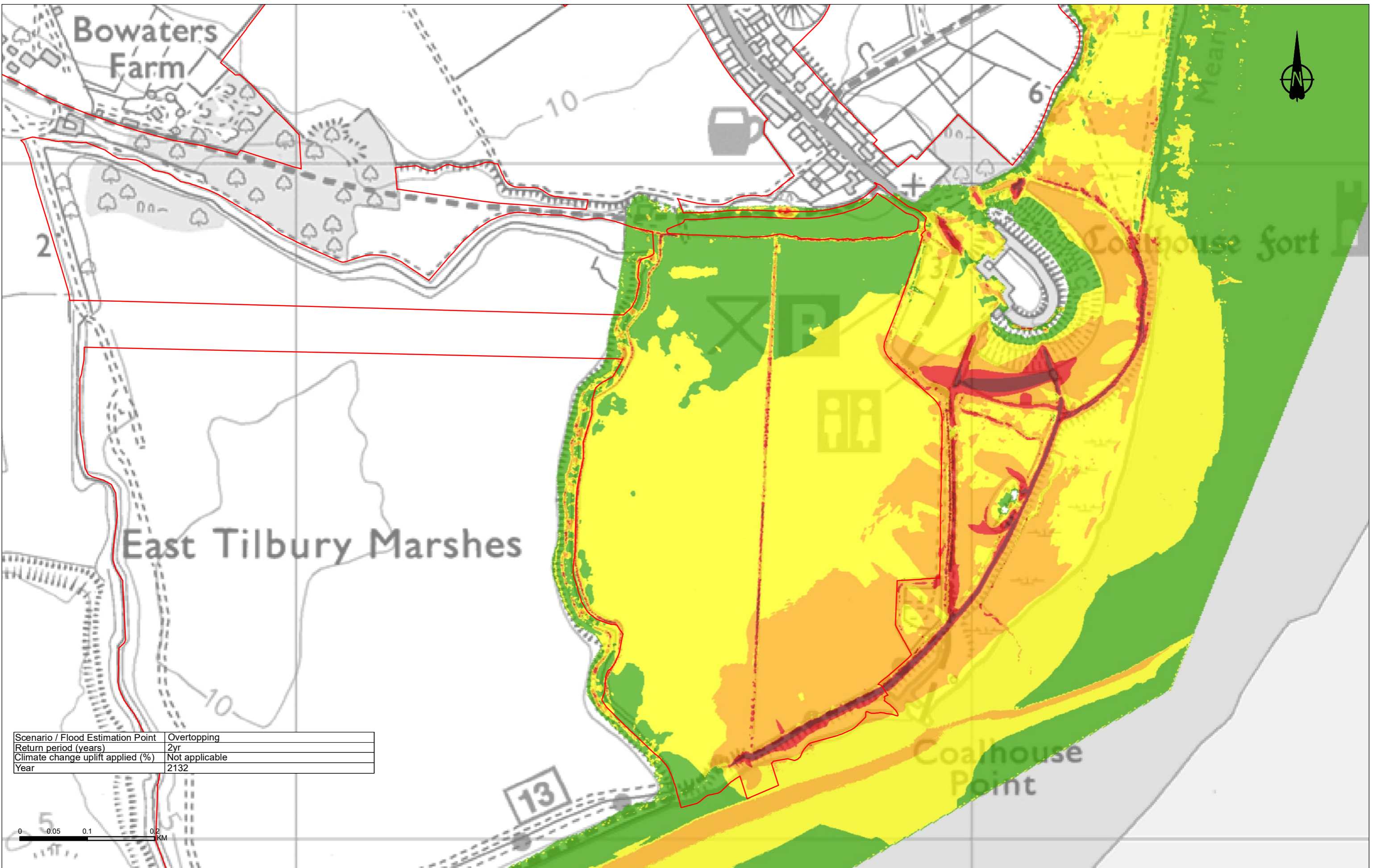
Order Limits	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



Client: national highways

Project: LOWER THAMES CROSSING

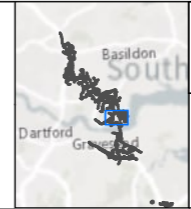
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 4 out of 25 - Figure A29				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

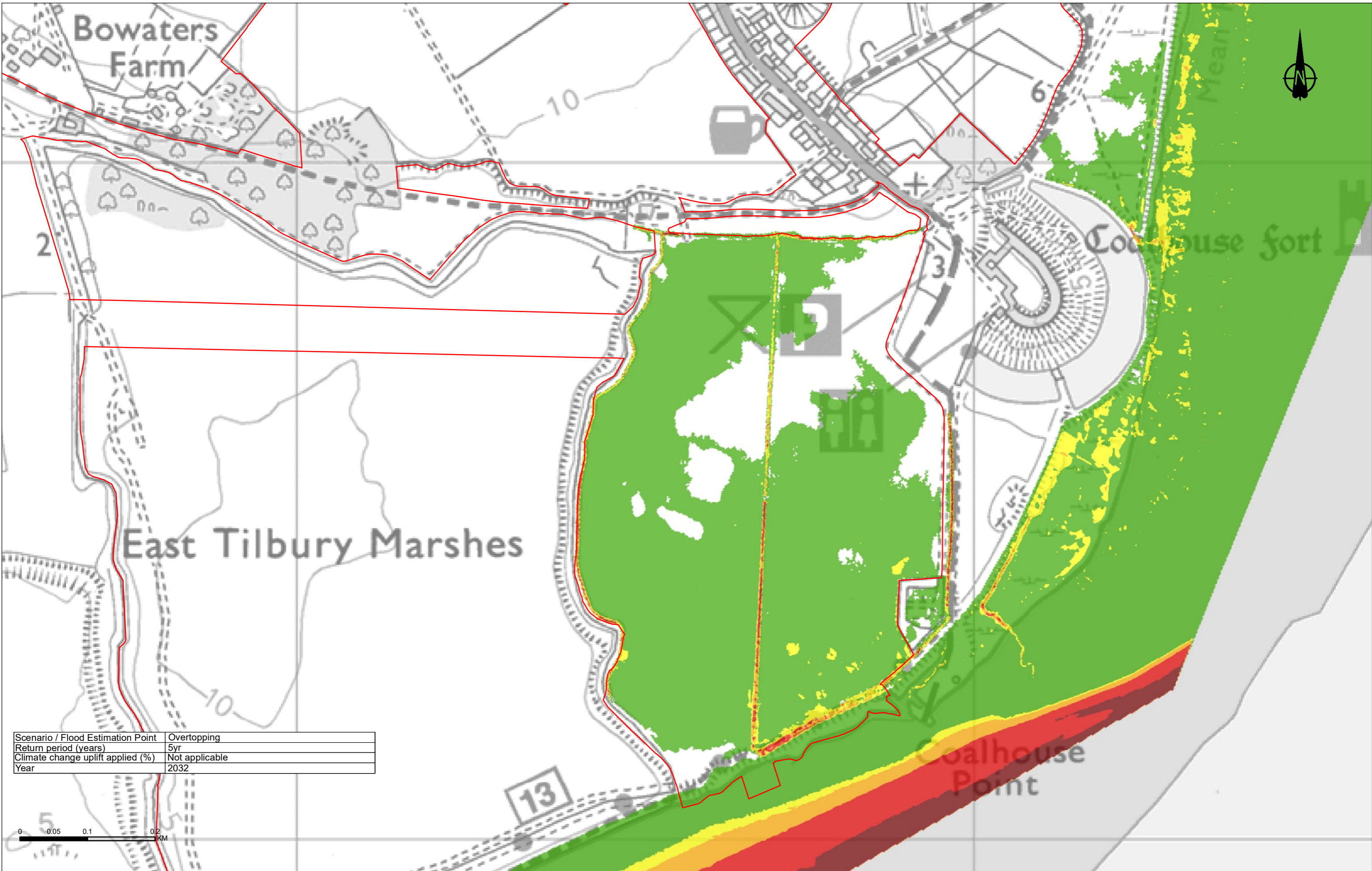
Legend	
	Order Limits
	Maximum flood velocity (m/s) 0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



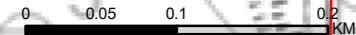
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 5 out of 25 - Figure A30				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

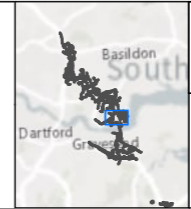


Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

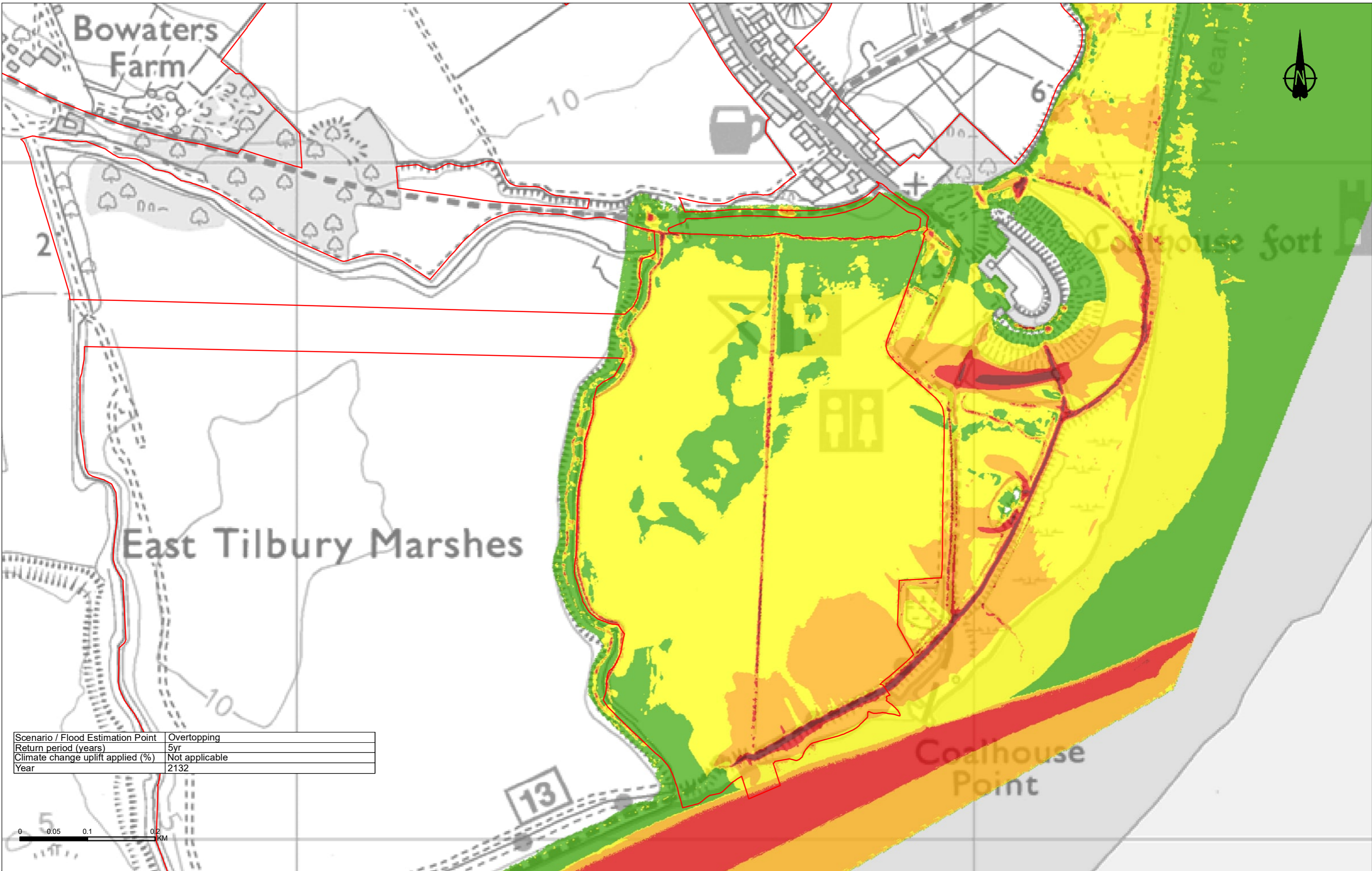
Legend	
	Order Limits
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 6 out of 25 - Figure A31				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132

0 0.05 0.1 0.2 KM

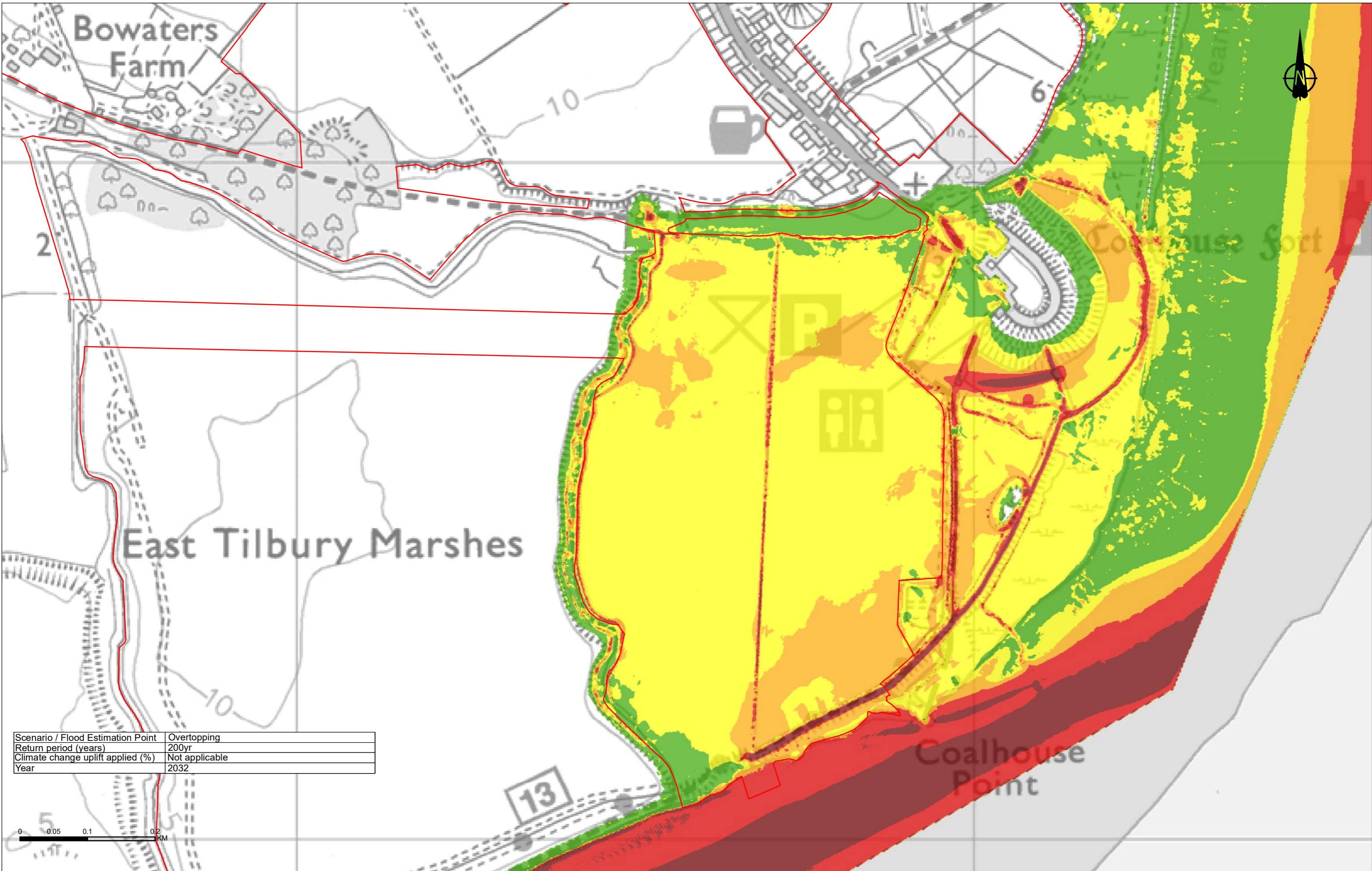
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Order Limits	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 7 out of 25 - Figure A32				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

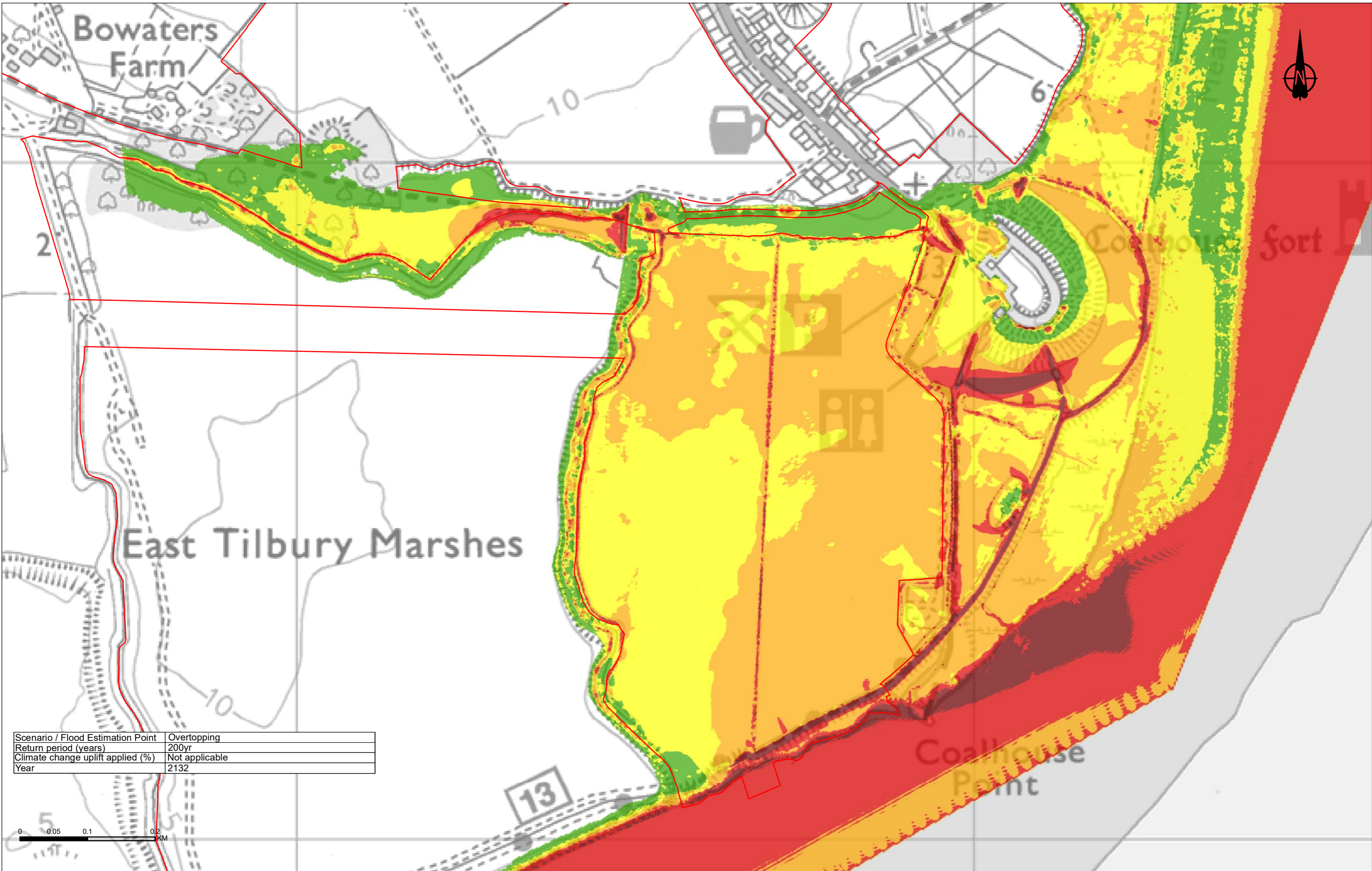
Order Limits	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 8 out of 25 - Figure A33				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132

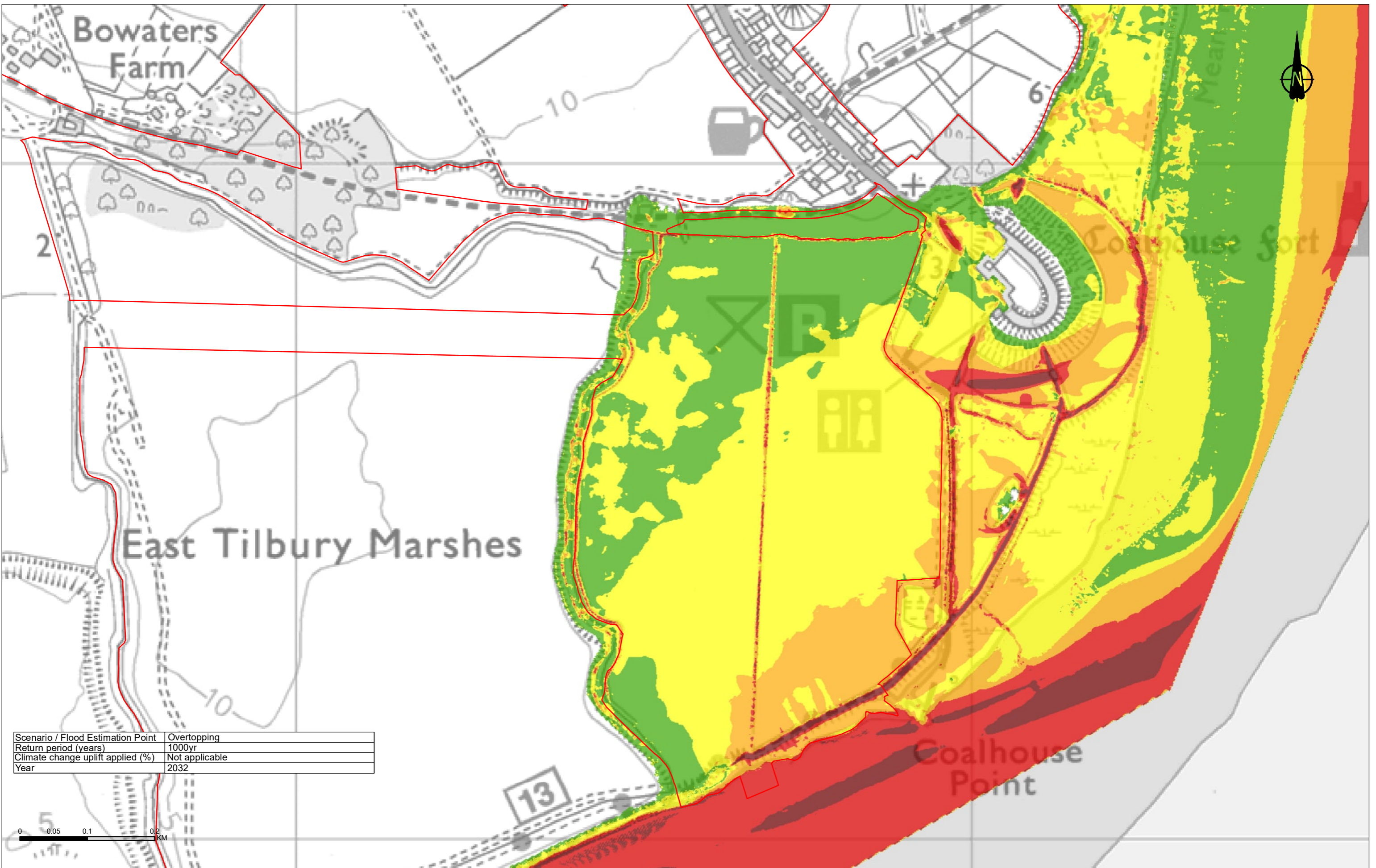
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Order Limits	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 9 out of 25 - Figure A34				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

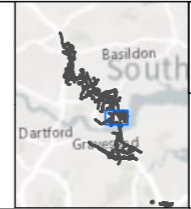


Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2032

0 0.05 0.1 0.2 KM

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

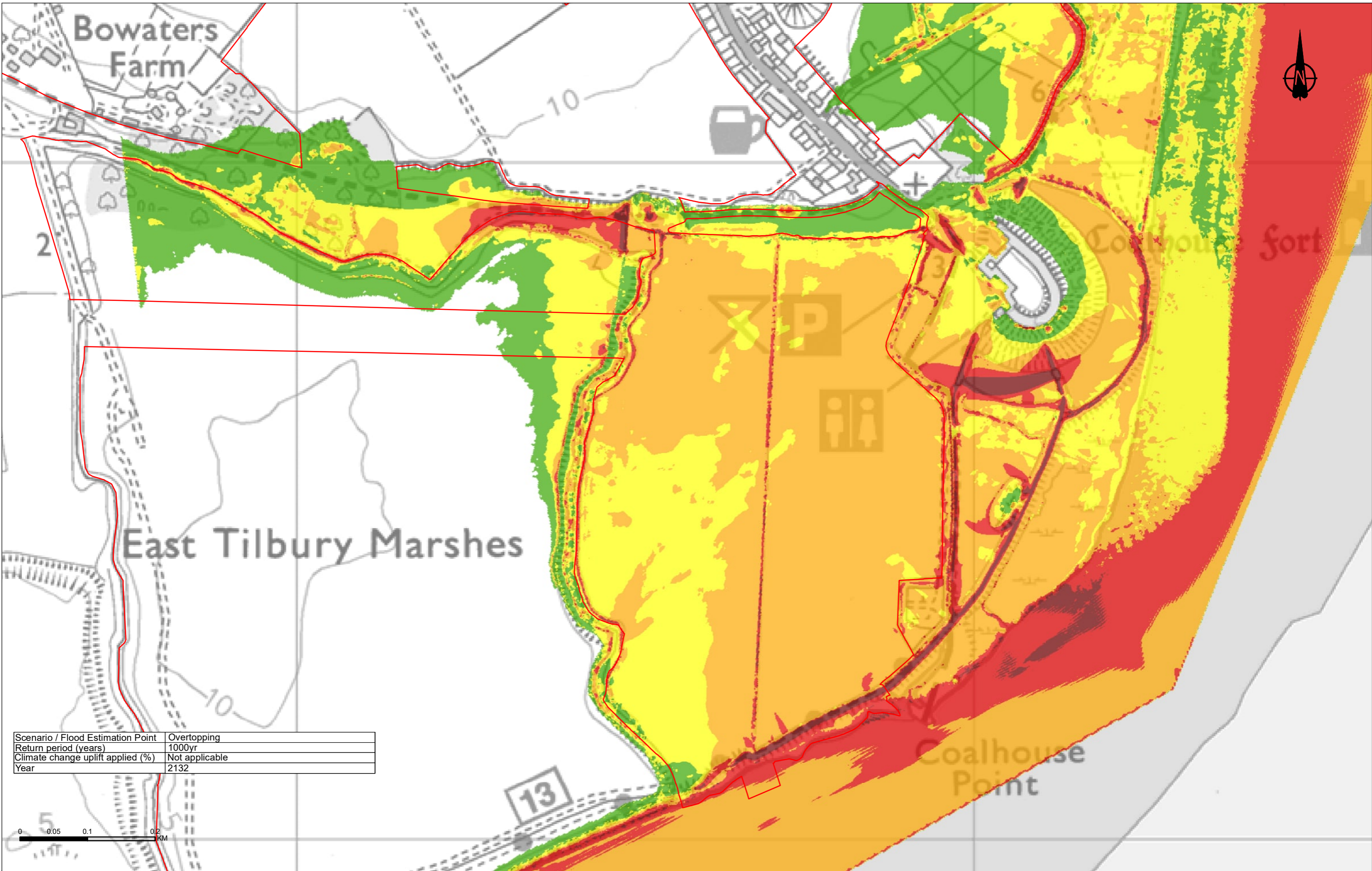
Legend	
	Order Limits
	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2.0
	> 2.0



Client
 national highways

Project
LOWER THAMES CROSSING

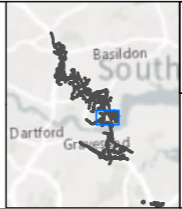
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 10 out of 25 - Figure A35				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2132

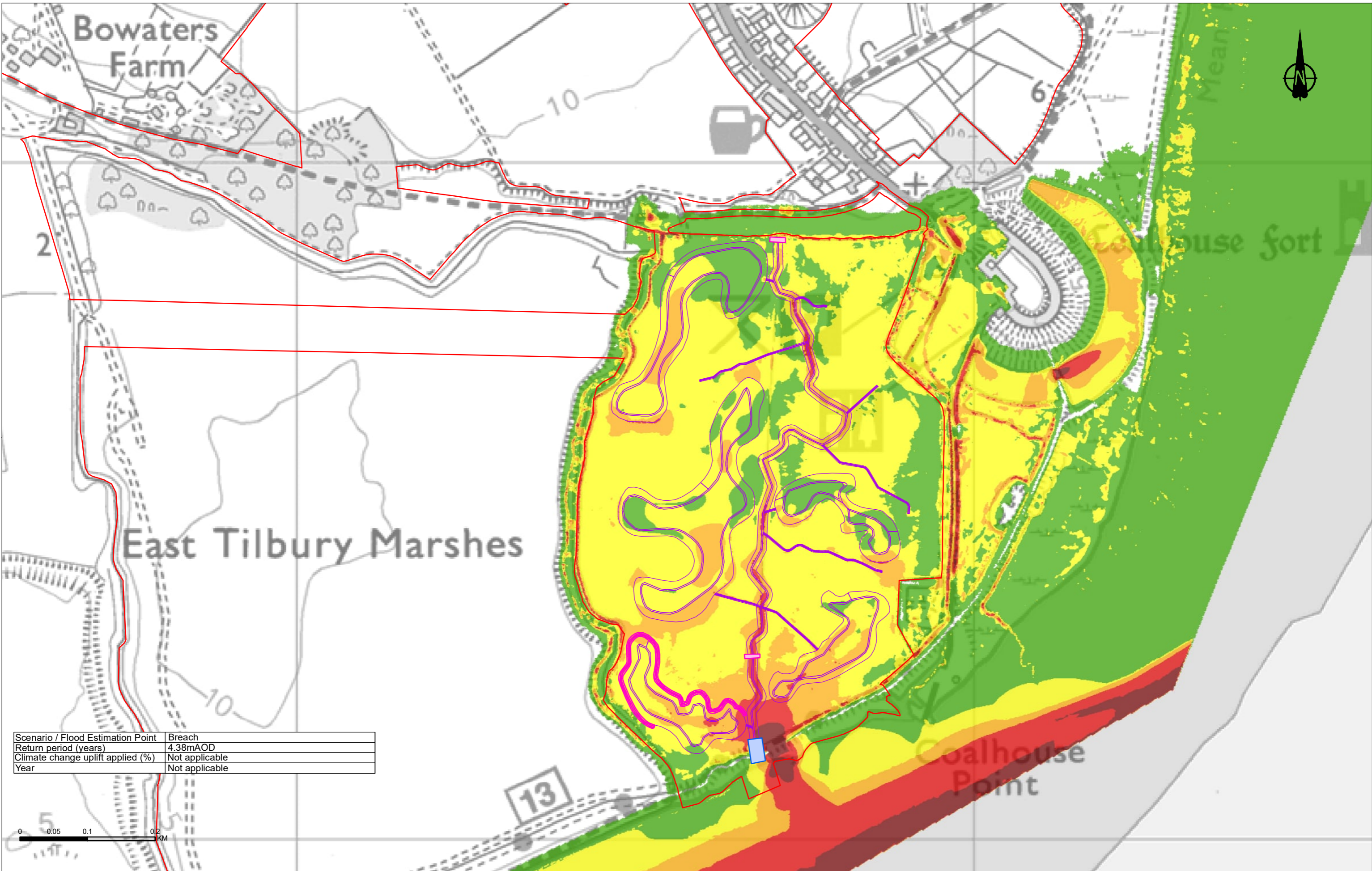
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Order Limits	Maximum flood velocity (m/s)
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



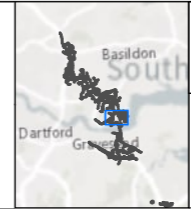
Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Pre-development 11 out of 25 - Figure A36				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd
P01	S9	21/08/2023	Deadline 6	KK	RB	BF

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0

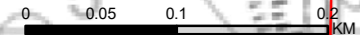


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 12 out of 25 - Figure A37				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

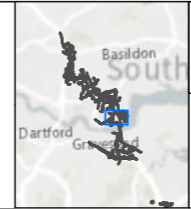


Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

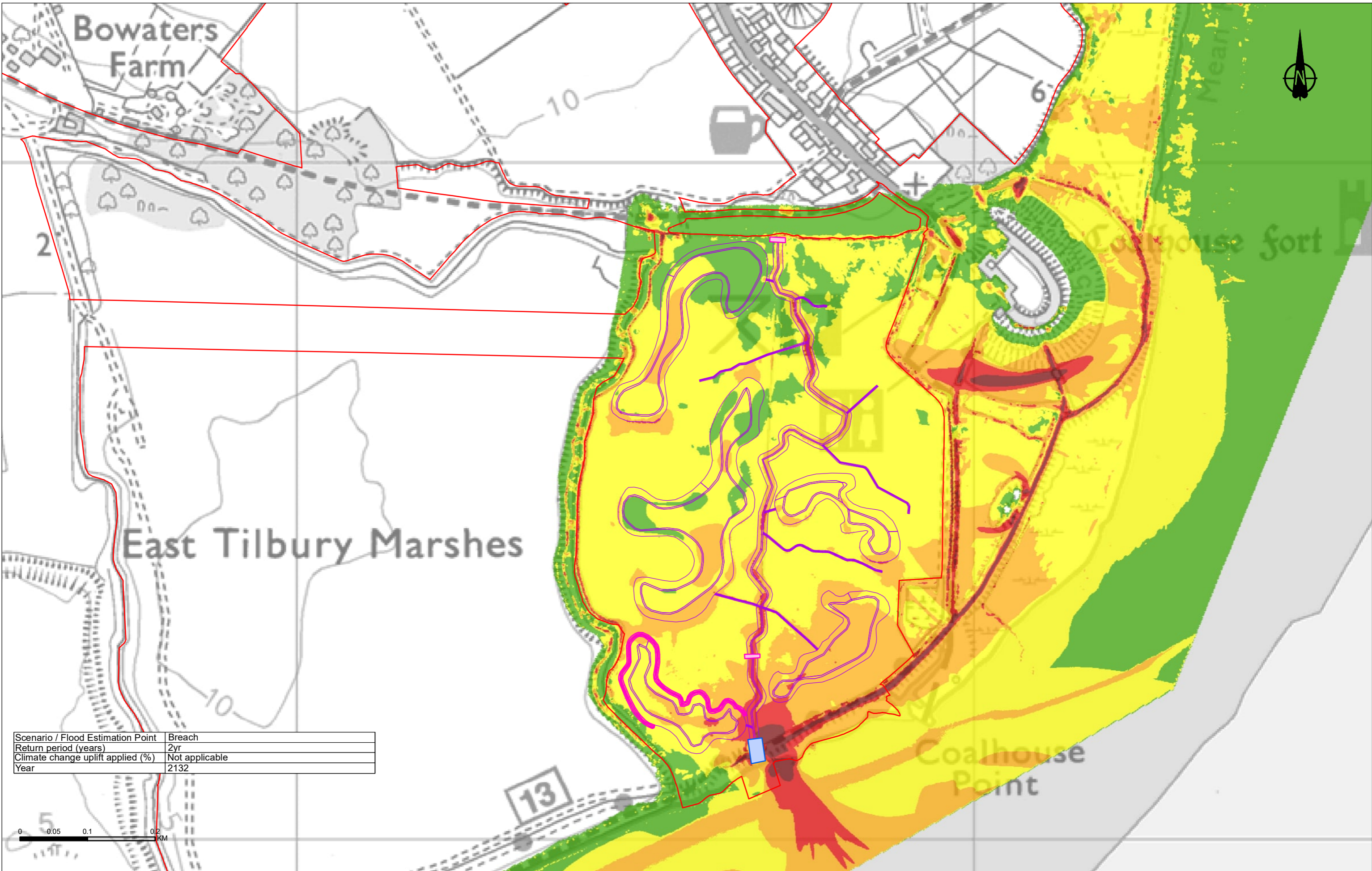
Order Limits	0 - 0.25
Shallow scrapes and ditches	0.25 - 0.5
Embankments	0.5 - 1.0
Water level control inlet	1.0 - 2
Water level control structures	> 2.0



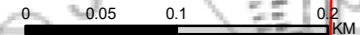
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 13 out of 25 - Figure A38				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Order Limits	0 - 0.25
Shallow scrapes and ditches	0.25 - 0.5
Embankments	0.5 - 1.0
Water level control inlet	1.0 - 2
Water level control structures	> 2.0

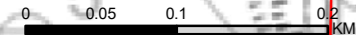


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 14 out of 25 - Figure A39				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

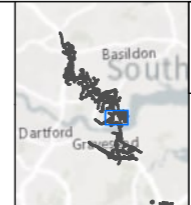


Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

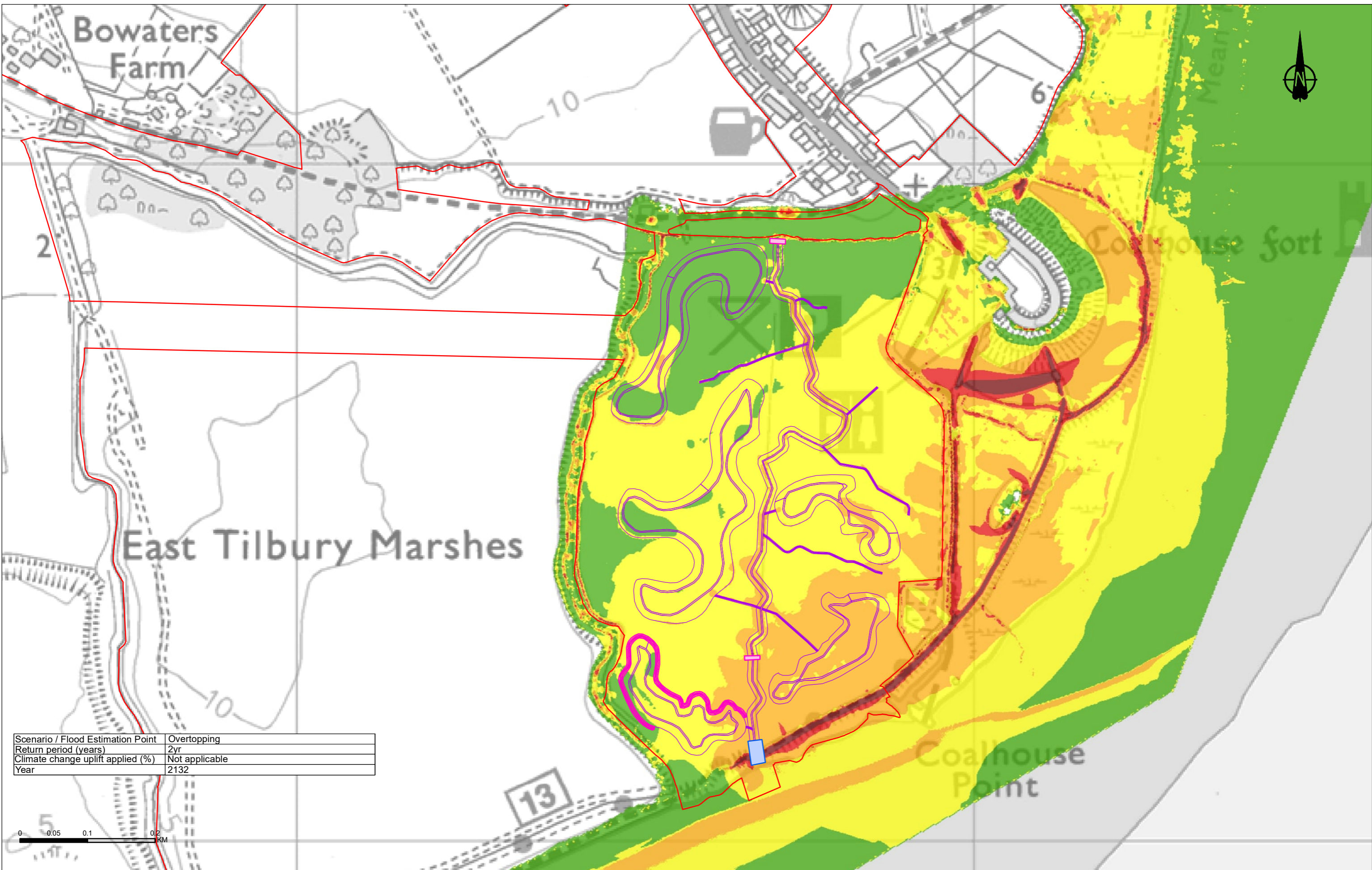
Order Limits	0 - 0.25
Shallow scrapes and ditches	0.25 - 0.5
Embankments	0.5 - 1.0
Water level control inlet	1.0 - 2
Water level control structures	> 2.0



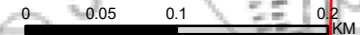
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 15 out of 25 - Figure A40				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

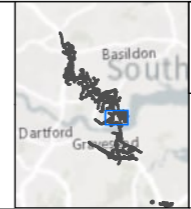


Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

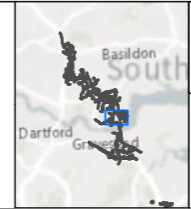
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 16 out of 25 - Figure A41				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032

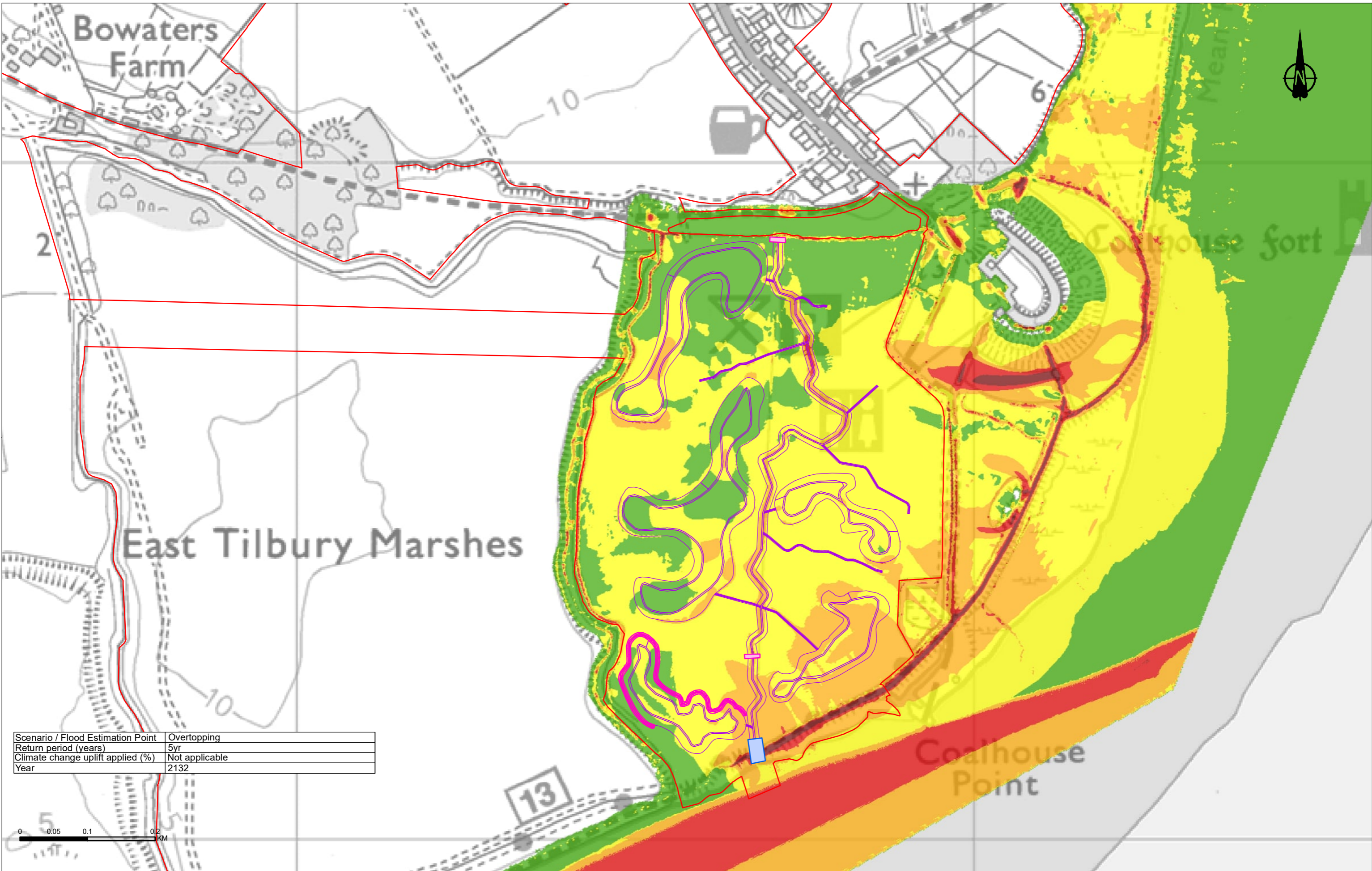
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 17 out of 25 - Figure A42				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

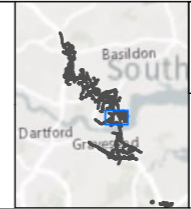


Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132

0 0.05 0.1 0.2 KM

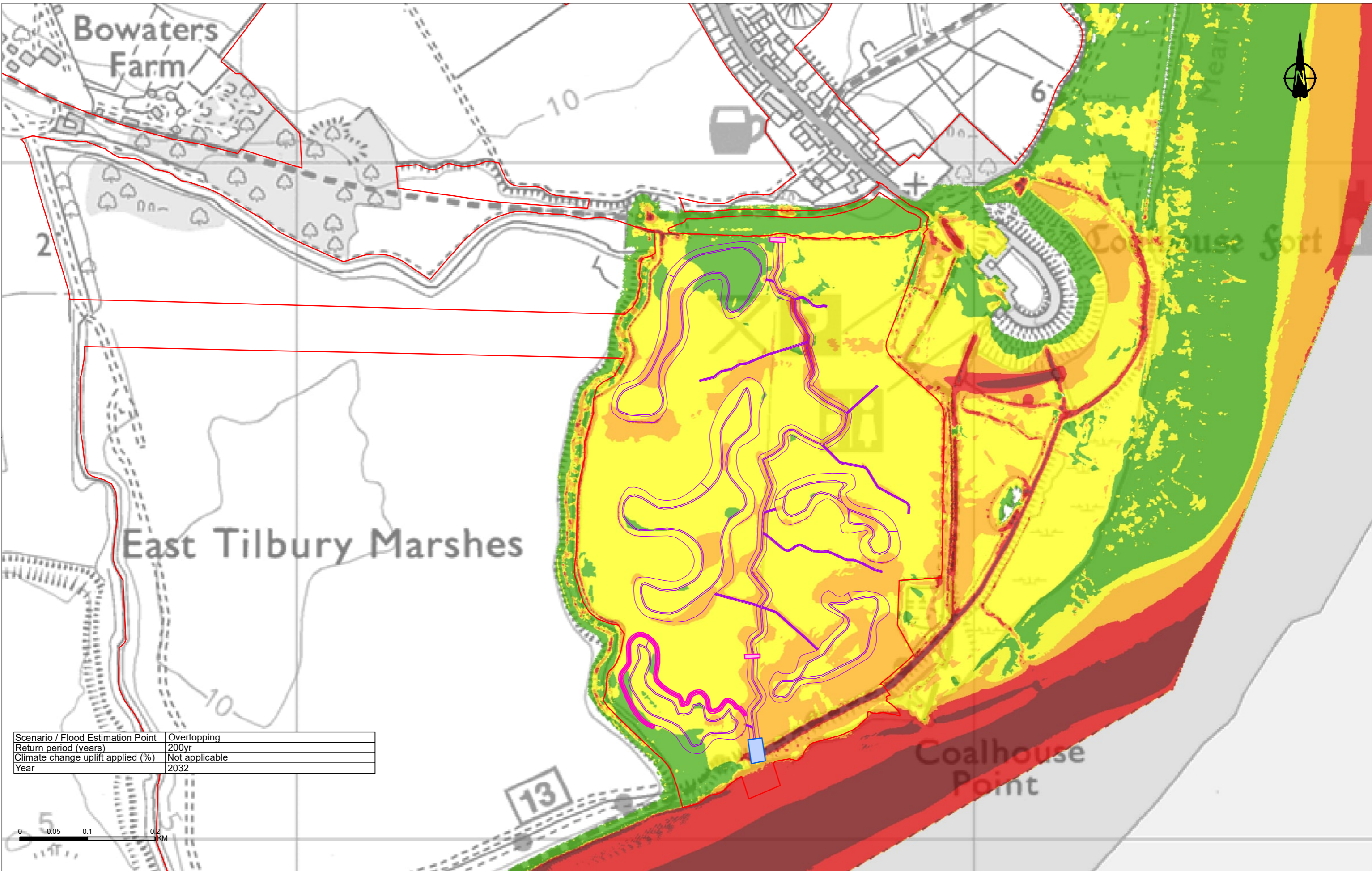
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0

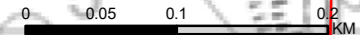


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 18 out of 25 - Figure A43				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

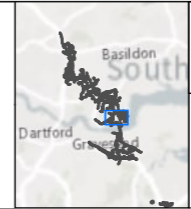


Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032



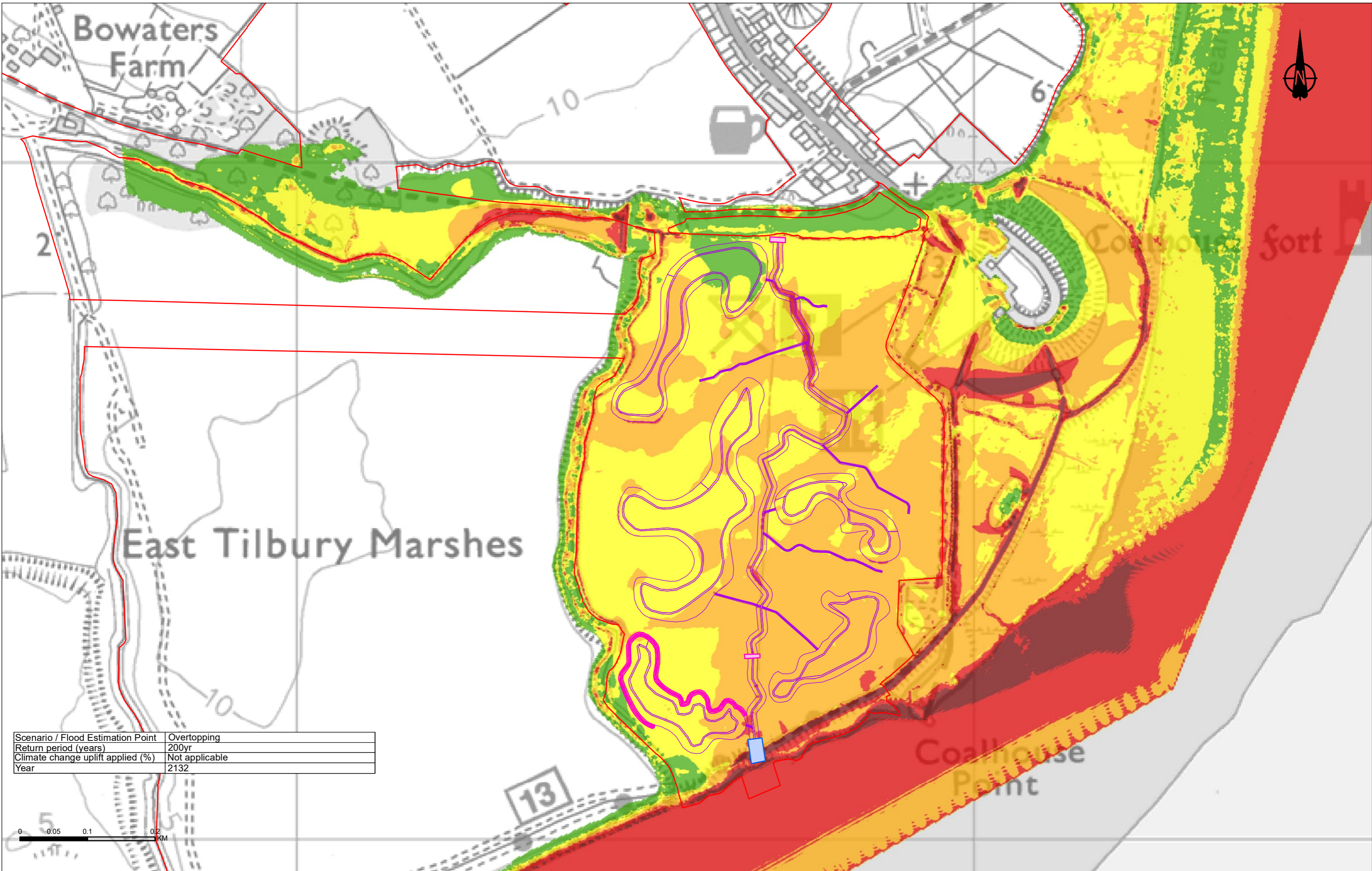
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Order Limits	0 - 0.25
Shallow scrapes and ditches	0.25 - 0.5
Embankments	0.5 - 1.0
Water level control inlet	1.0 - 2
Water level control structures	> 2.0

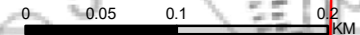


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 19 out of 25 - Figure A44				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

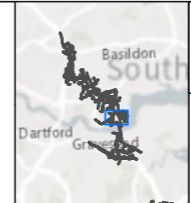


Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0

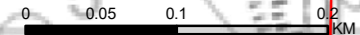


Client	
Project	LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 20 out of 25 - Figure A45				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

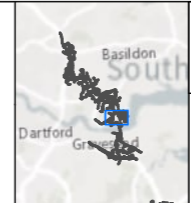


Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2032



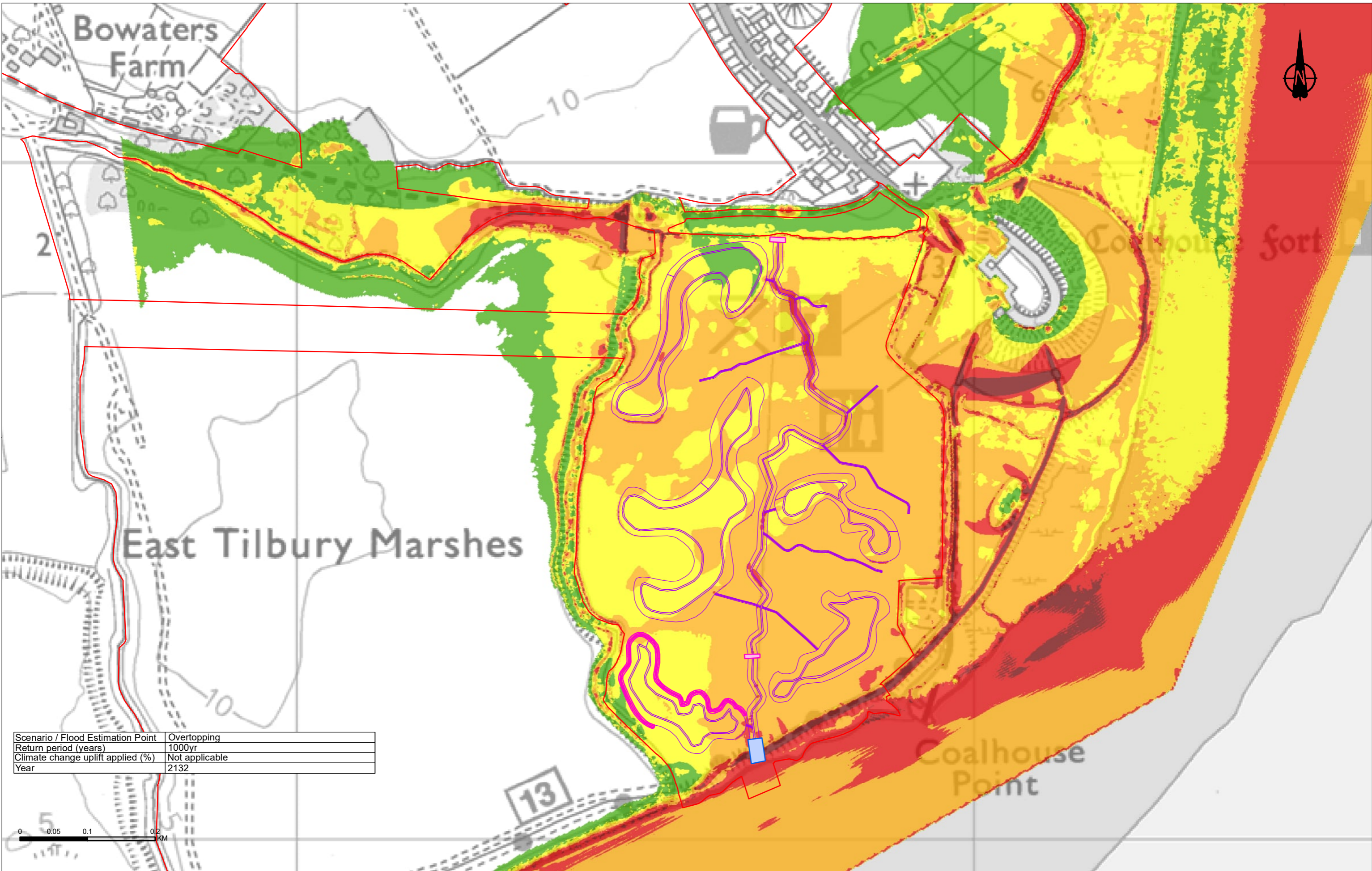
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 21 out of 25 - Figure A46				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

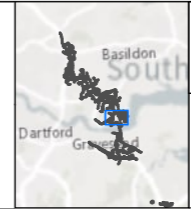


Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2132

0 0.05 0.1 0.2 KM

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client: national highways

Project: LOWER THAMES CROSSING

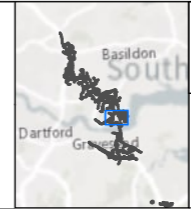
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 22 out of 25 - Figure A47				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Structure failure
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

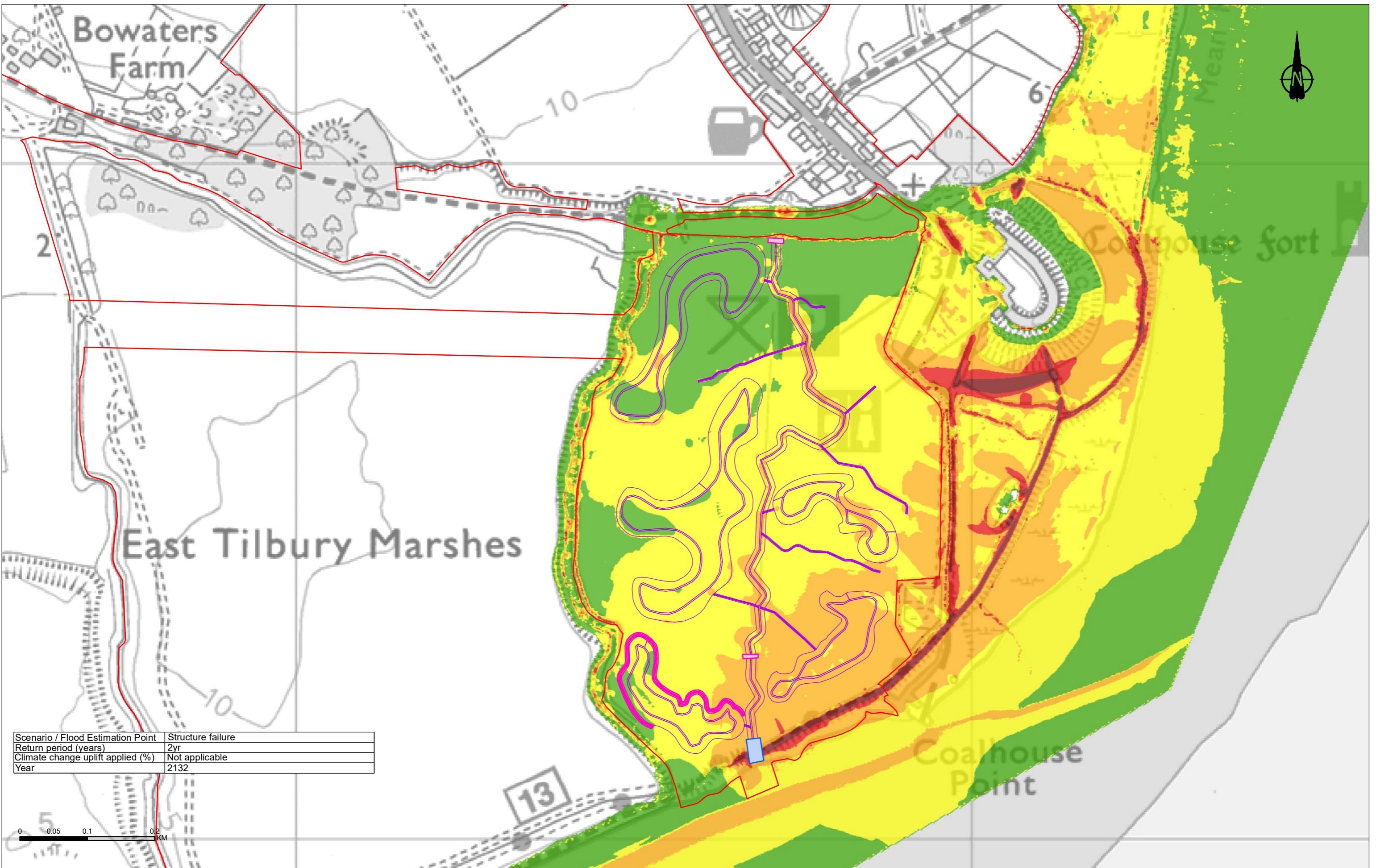
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Maximum flood velocity (m/s)	
	0 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 23 out of 25 - Figure A48				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				

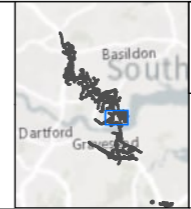


Scenario / Flood Estimation Point	Structure failure
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132

0 0.05 0.1 0.2 KM

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Order Limits	0 - 0.25
Shallow scrapes and ditches	0.25 - 0.5
Embankments	0.5 - 1.0
Water level control inlet	1.0 - 2
Water level control structures	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

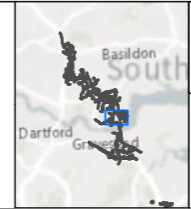
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 24 out of 25 - Figure A49				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Structure failure
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

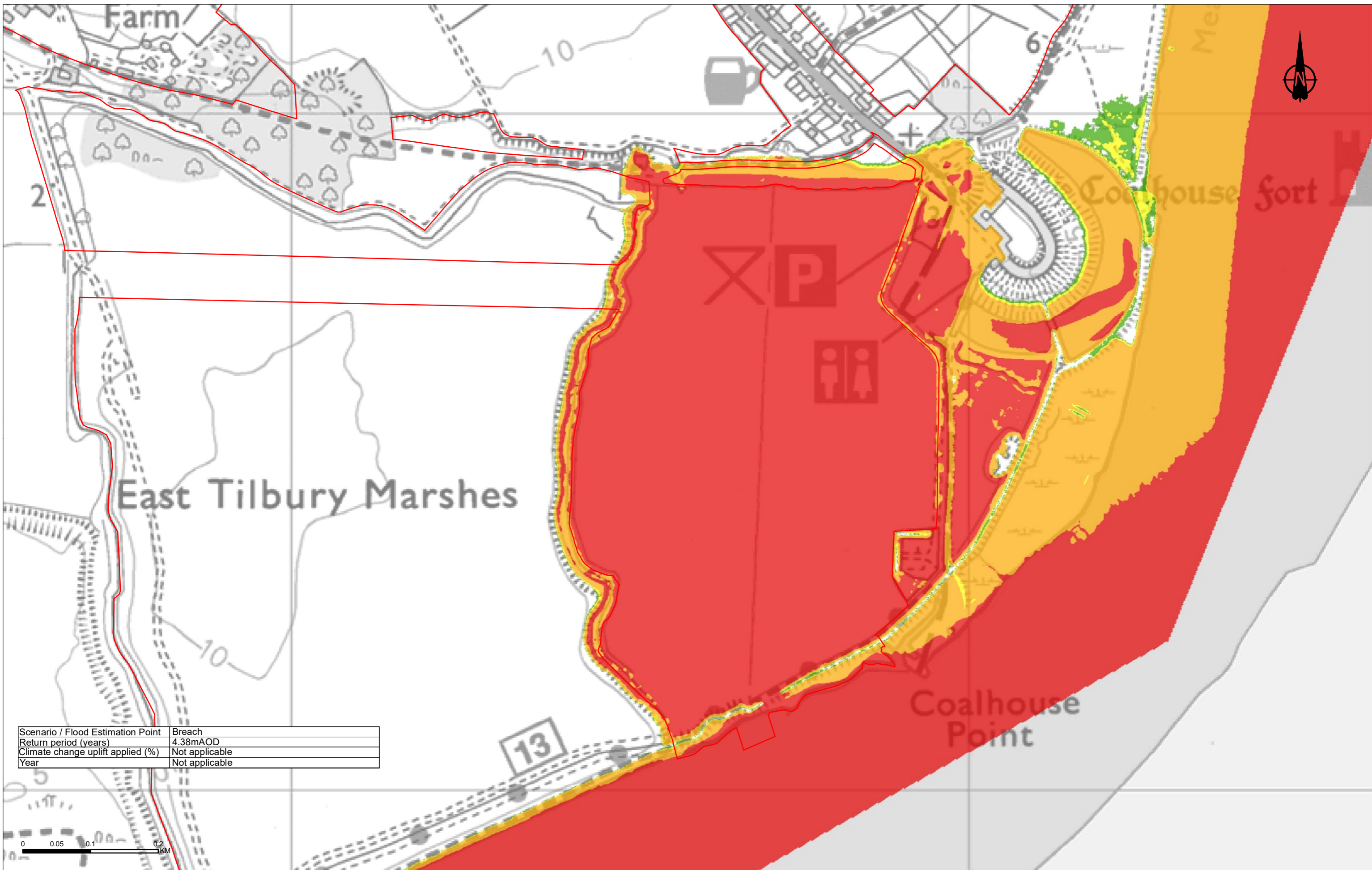
Order Limits	0 - 0.25
Shallow scrapes and ditches	0.25 - 0.5
Embankments	0.5 - 1.0
Water level control inlet	1.0 - 2
Water level control structures	> 2.0



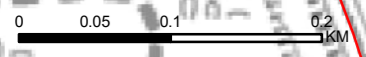
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Maximum flood velocity Post-development 25 out of 25 - Figure A50				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91016				



Scenario / Flood Estimation Point	Breach
Return period (years)	4.38mAO
Climate change uplift applied (%)	Not applicable
Year	Not applicable



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

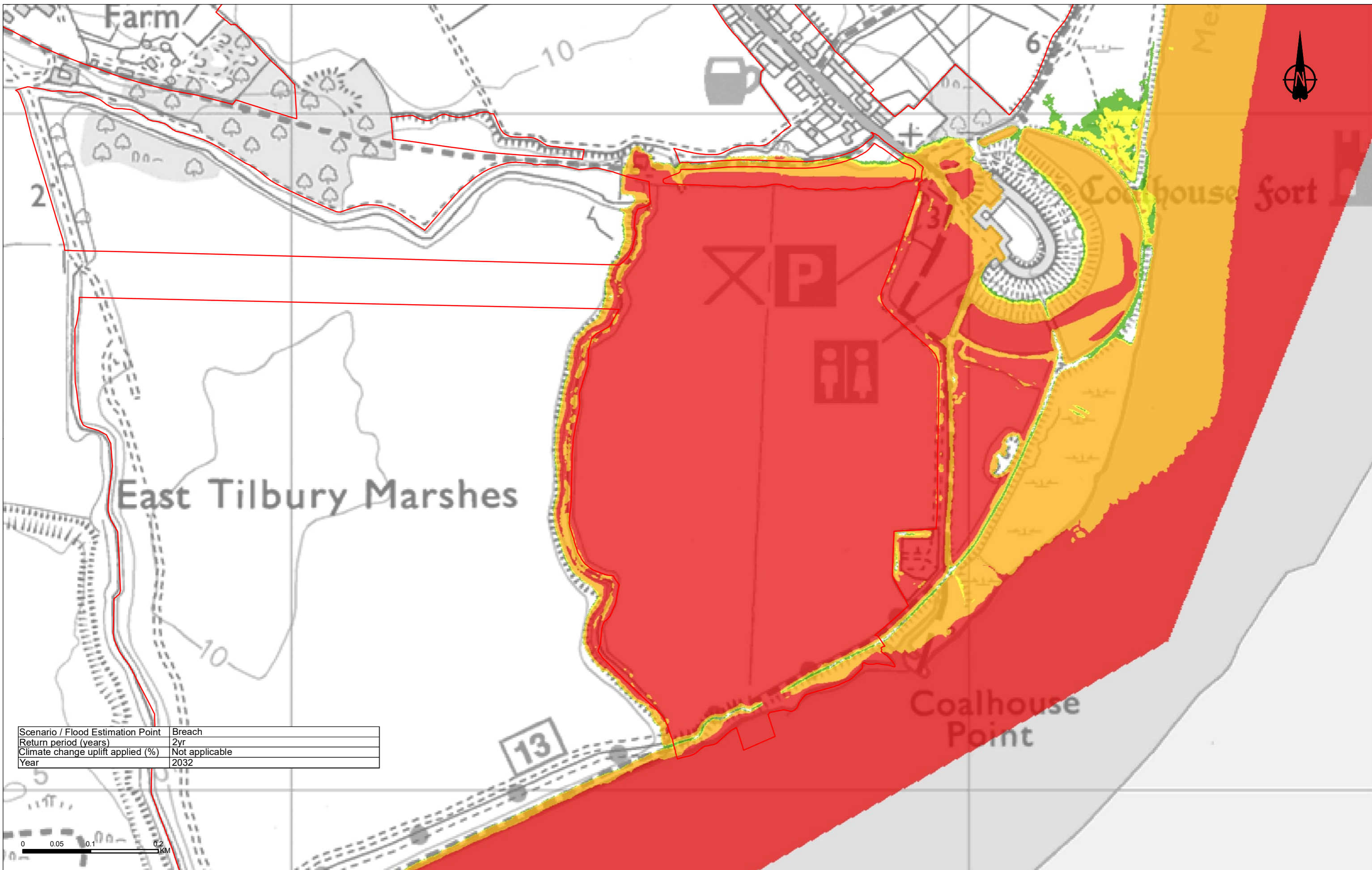
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



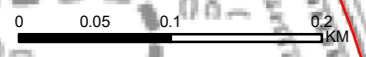
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 1 out of 25 - Figure A51				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

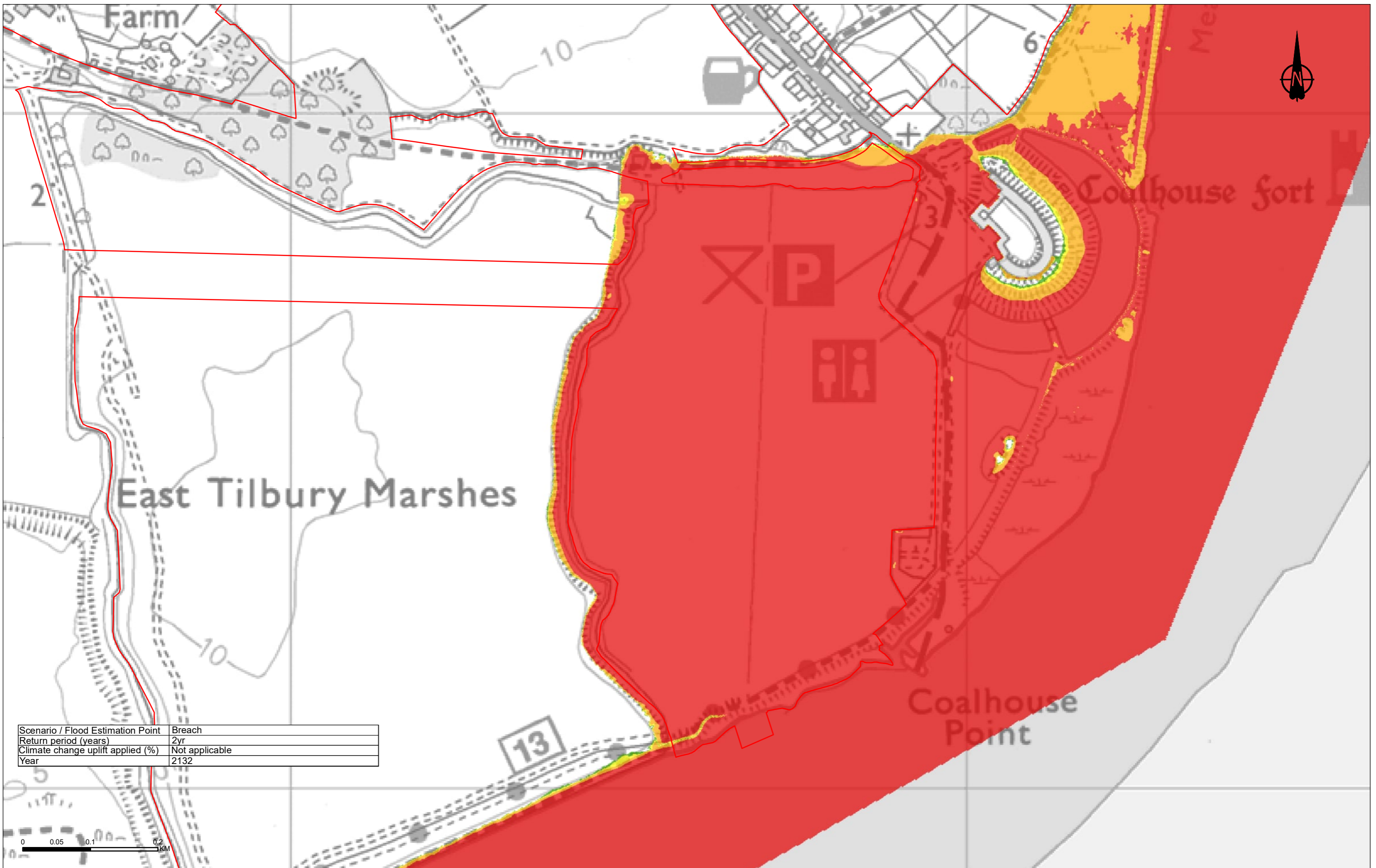
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



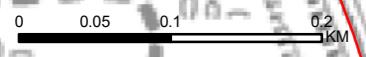
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 2 out of 25 - Figure A52				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

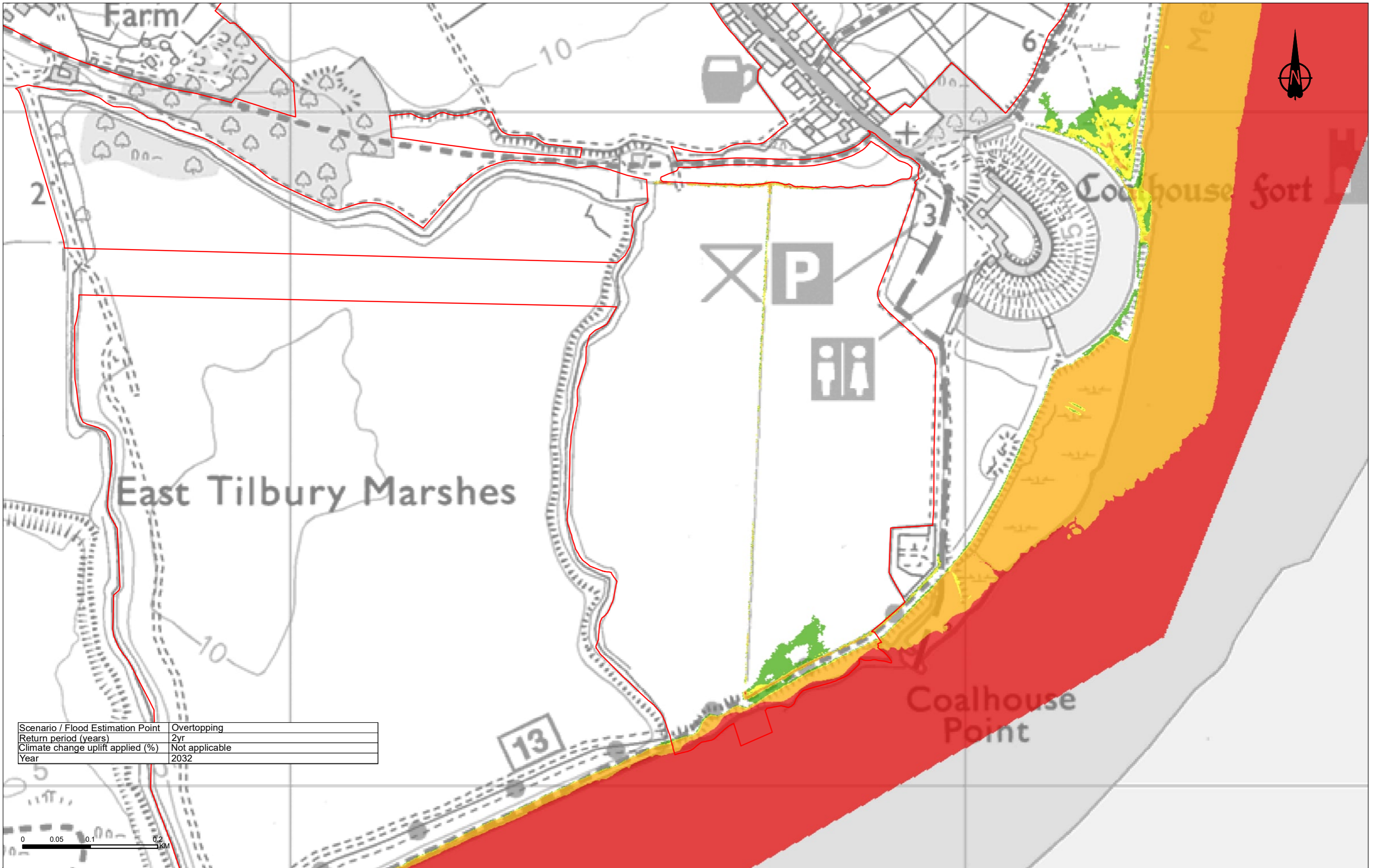
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



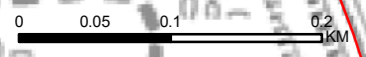
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 3 out of 25 - Figure A53				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

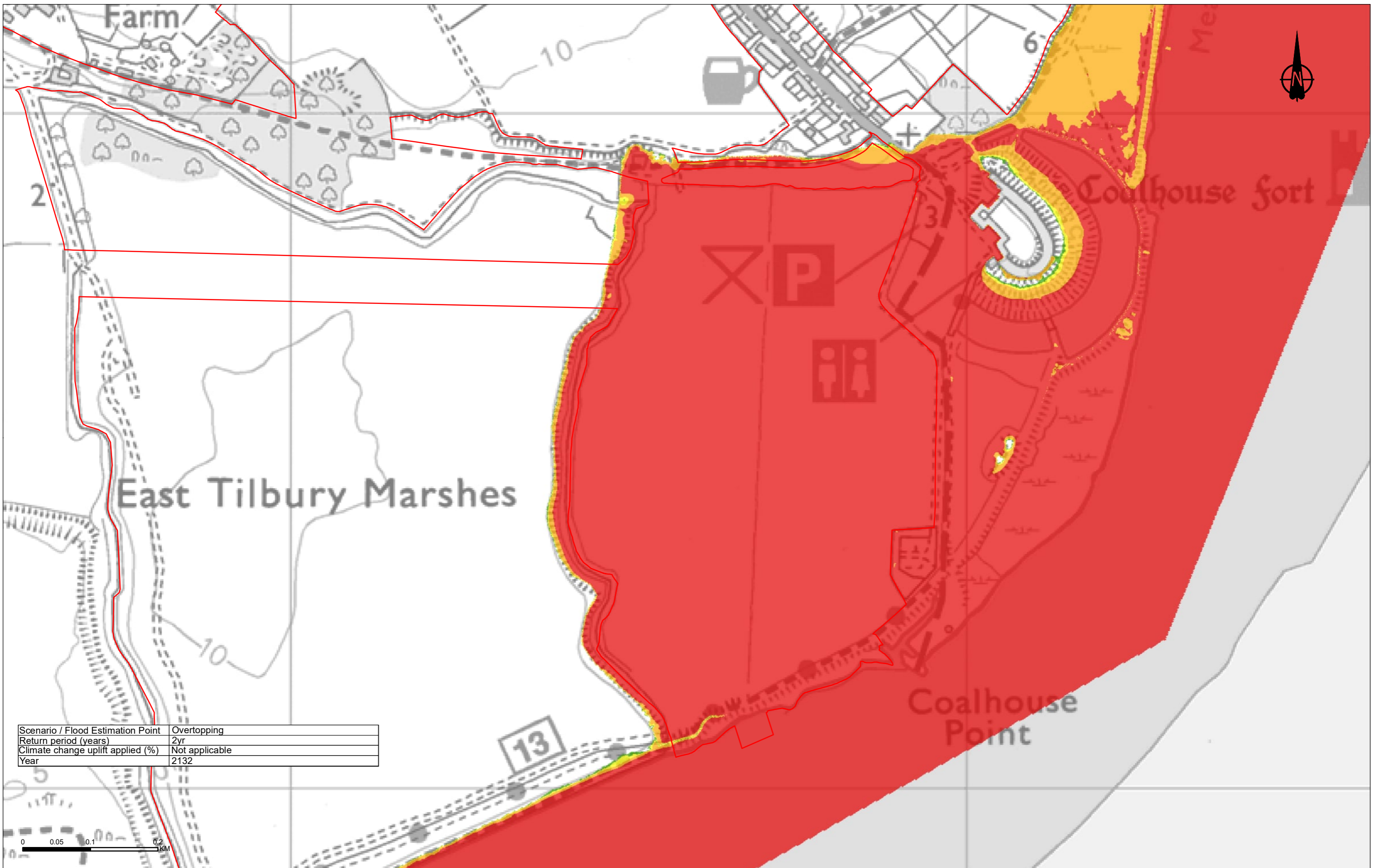
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



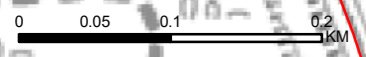
Client

 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 4 out of 25 - Figure A54				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

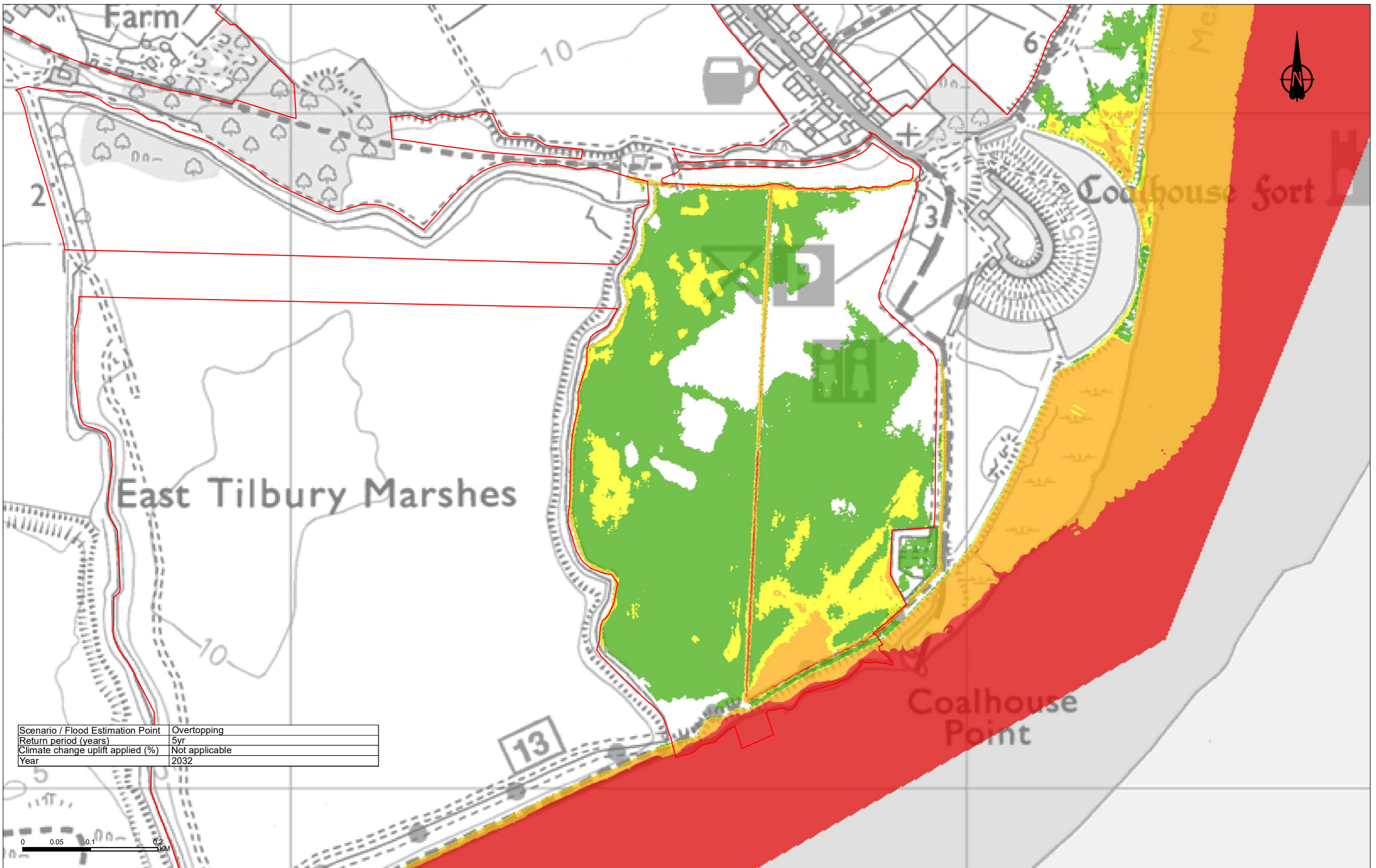
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



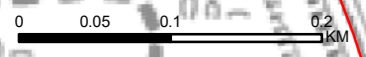
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 5 out of 25 - Figure A55				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

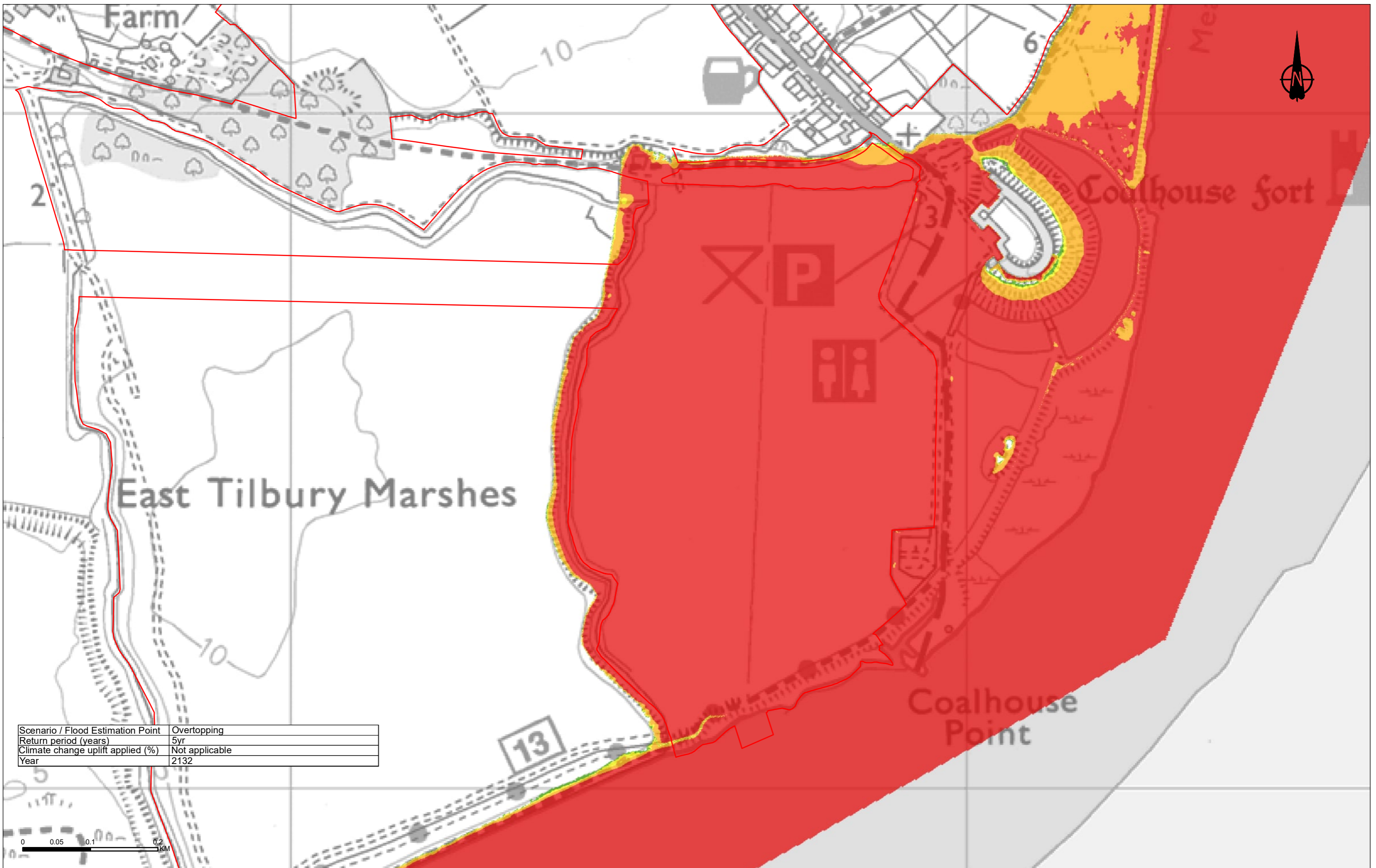
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



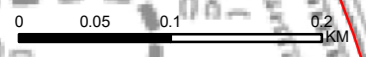
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 6 out of 25 - Figure A56				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

- Very low hazard
- Danger for some
- Danger for most
- Danger for all

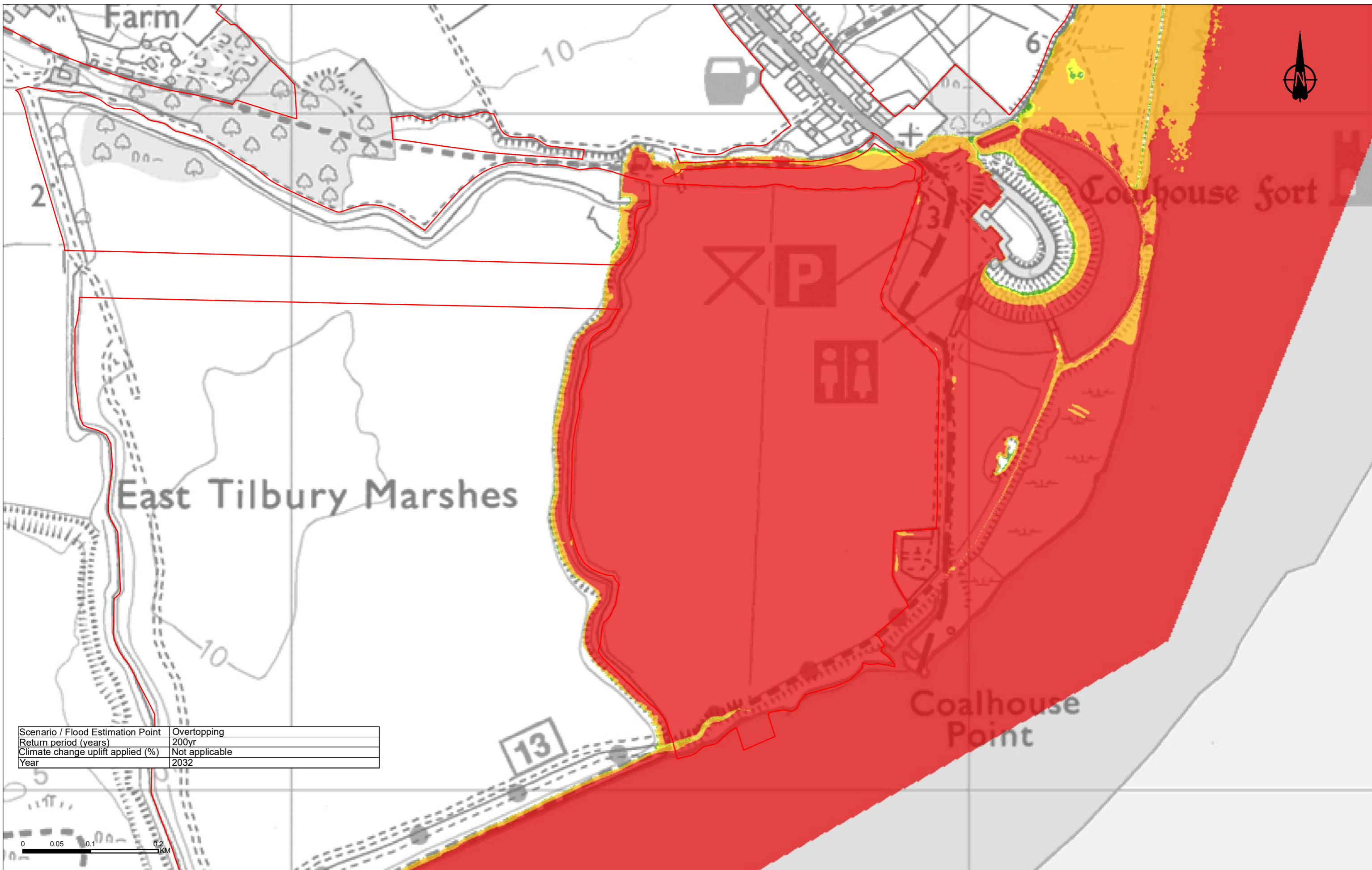


Client

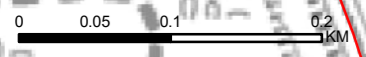
Project

LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 7 out of 25 - Figure A57				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

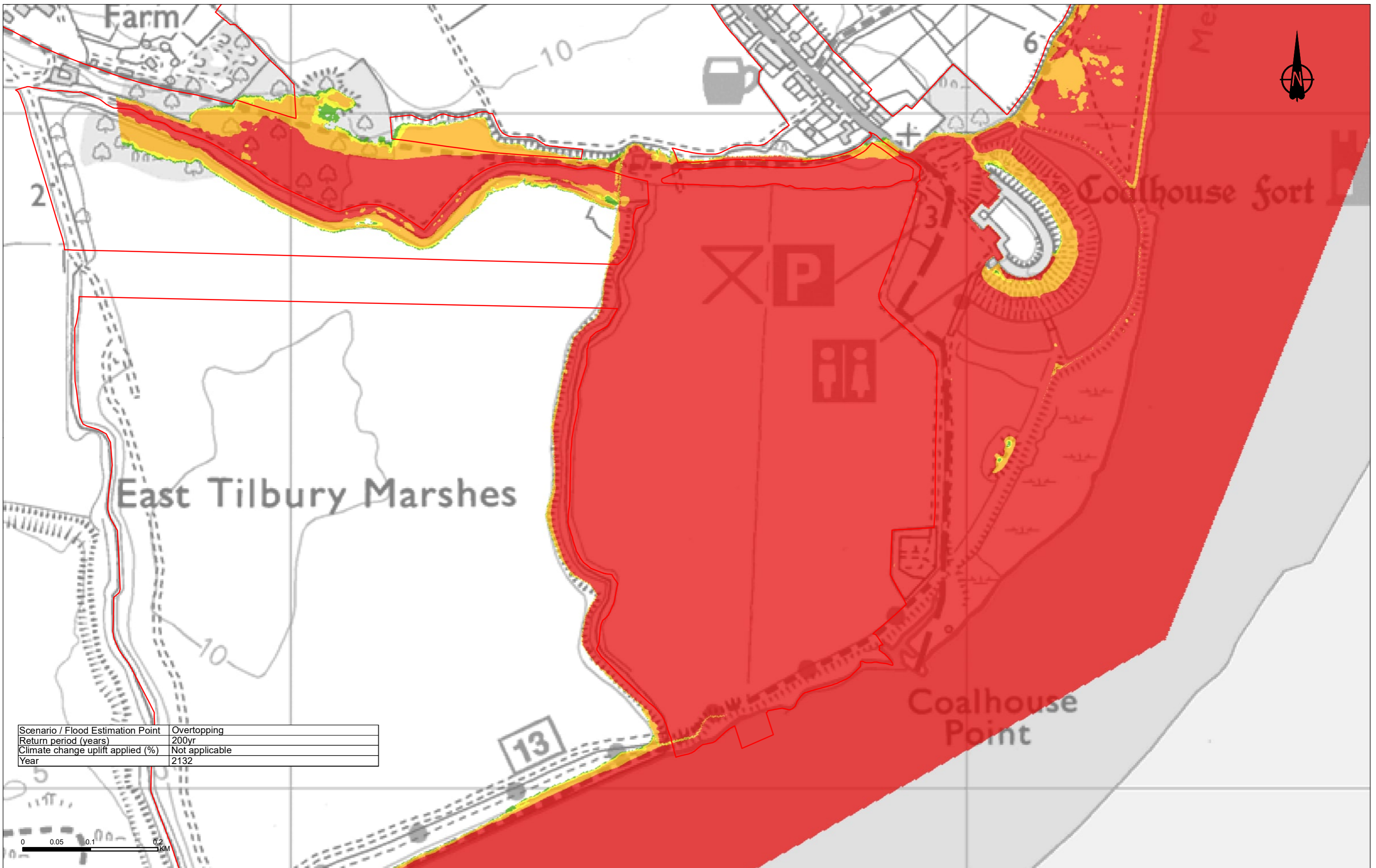
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 8 out of 25 - Figure A58				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

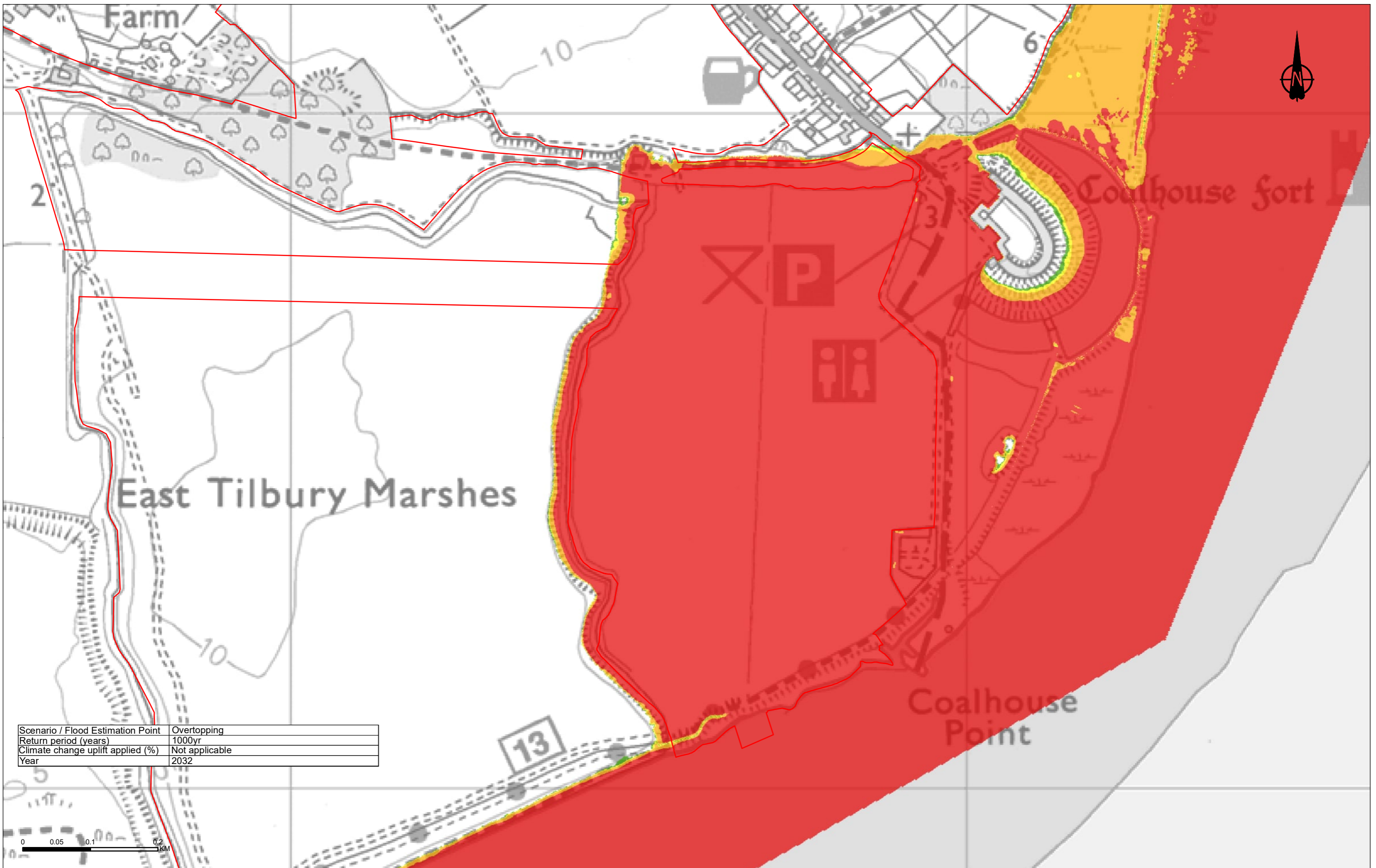
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



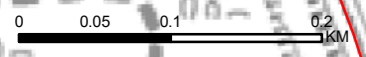
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 9 out of 25 - Figure A59				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

- Very low hazard
- Danger for some
- Danger for most
- Danger for all

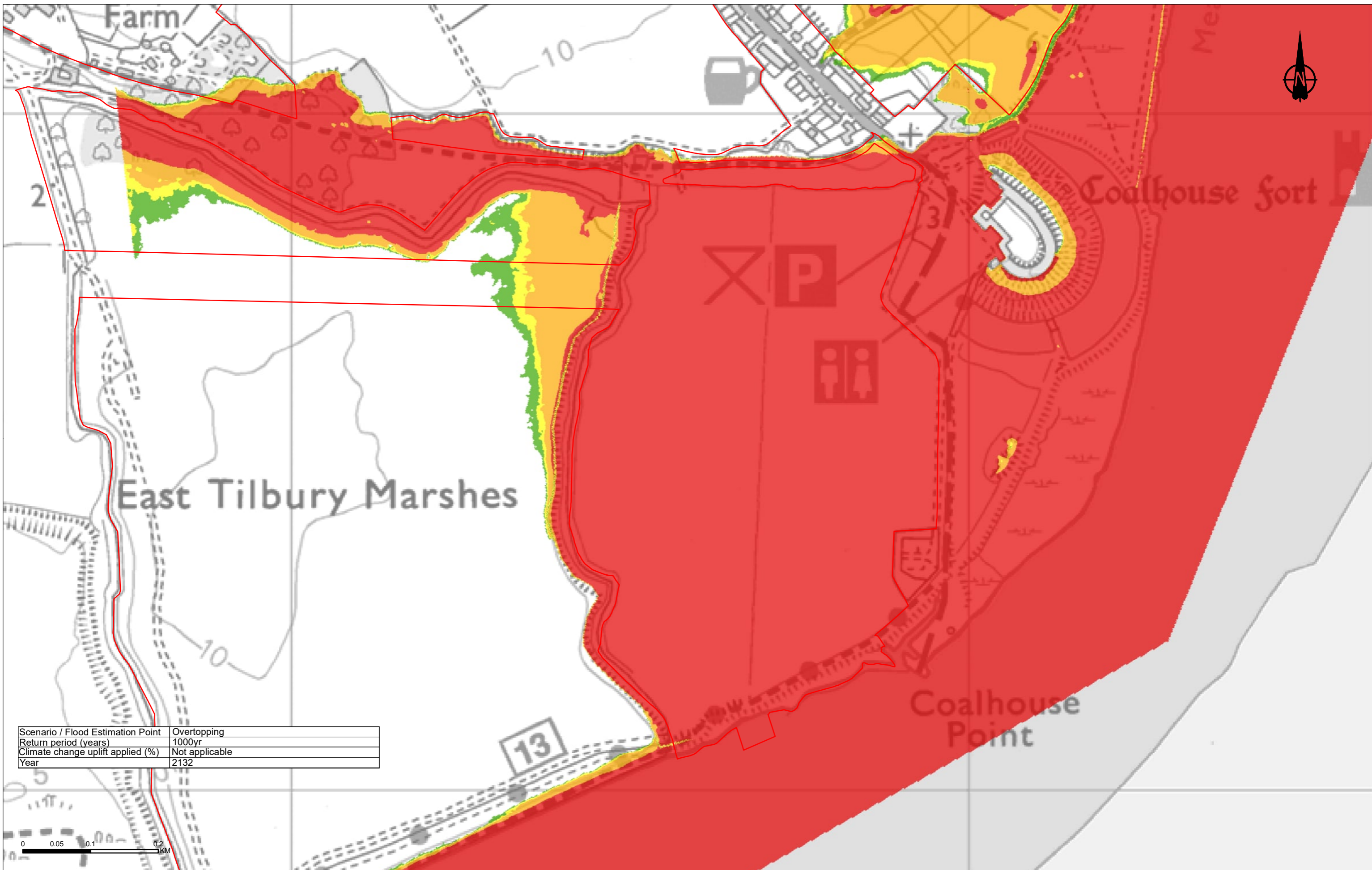


Client

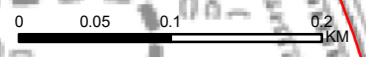
Project

LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 10 out of 25 - Figure A60				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

Order Limits

Maximum flood hazard category

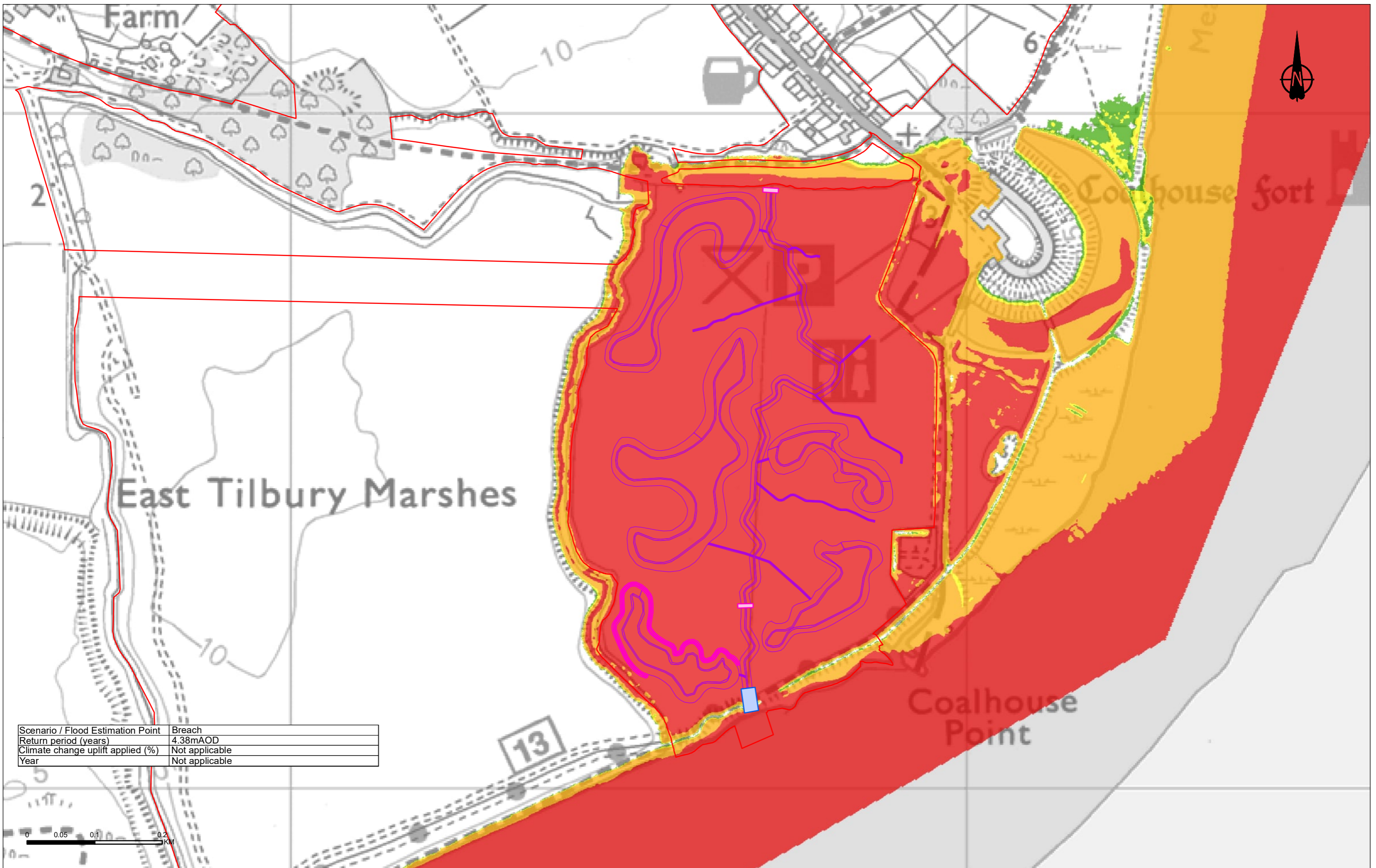
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



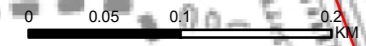
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Pre-development 11 out of 25 - Figure A61				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Breach
Return period (years)	4.38mAO
Climate change uplift applied (%)	Not applicable
Year	Not applicable



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

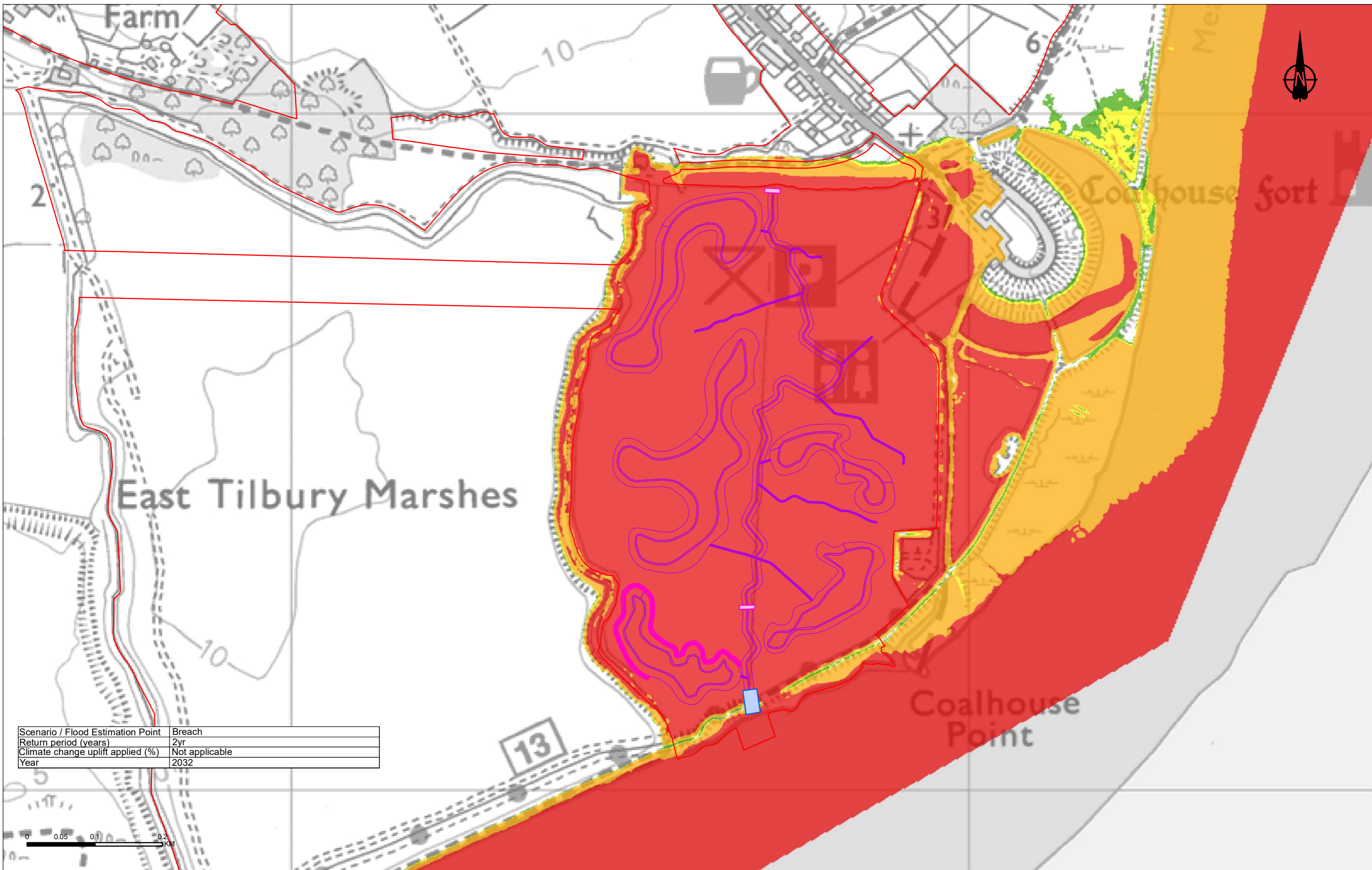
Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
	Very low hazard
	Danger for some
	Danger for most
	Danger for all



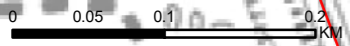
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 12 out of 25 - Figure A62				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

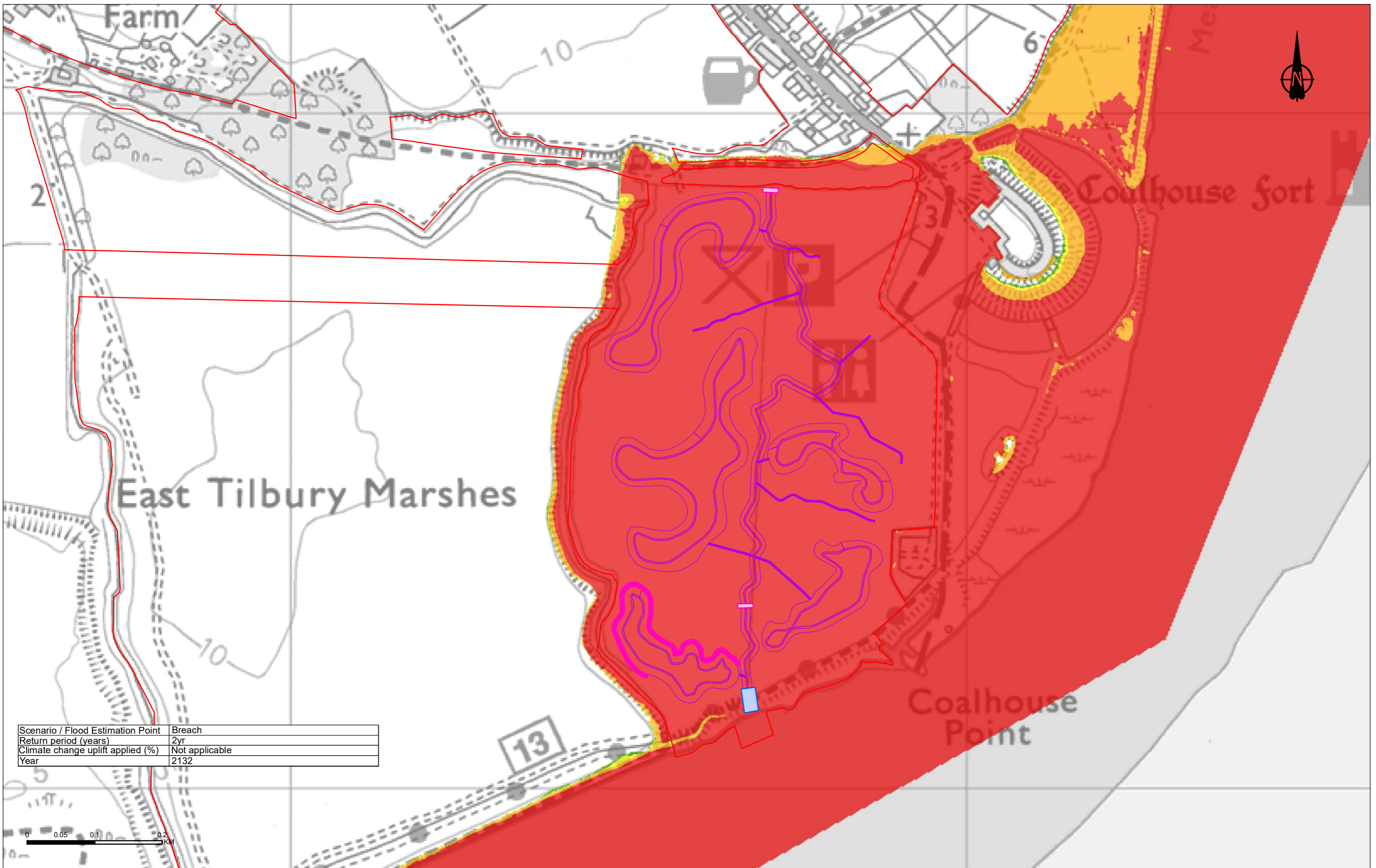
Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
	Very low hazard
	Danger for some
	Danger for most
	Danger for all



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 13 out of 25 - Figure A63				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132

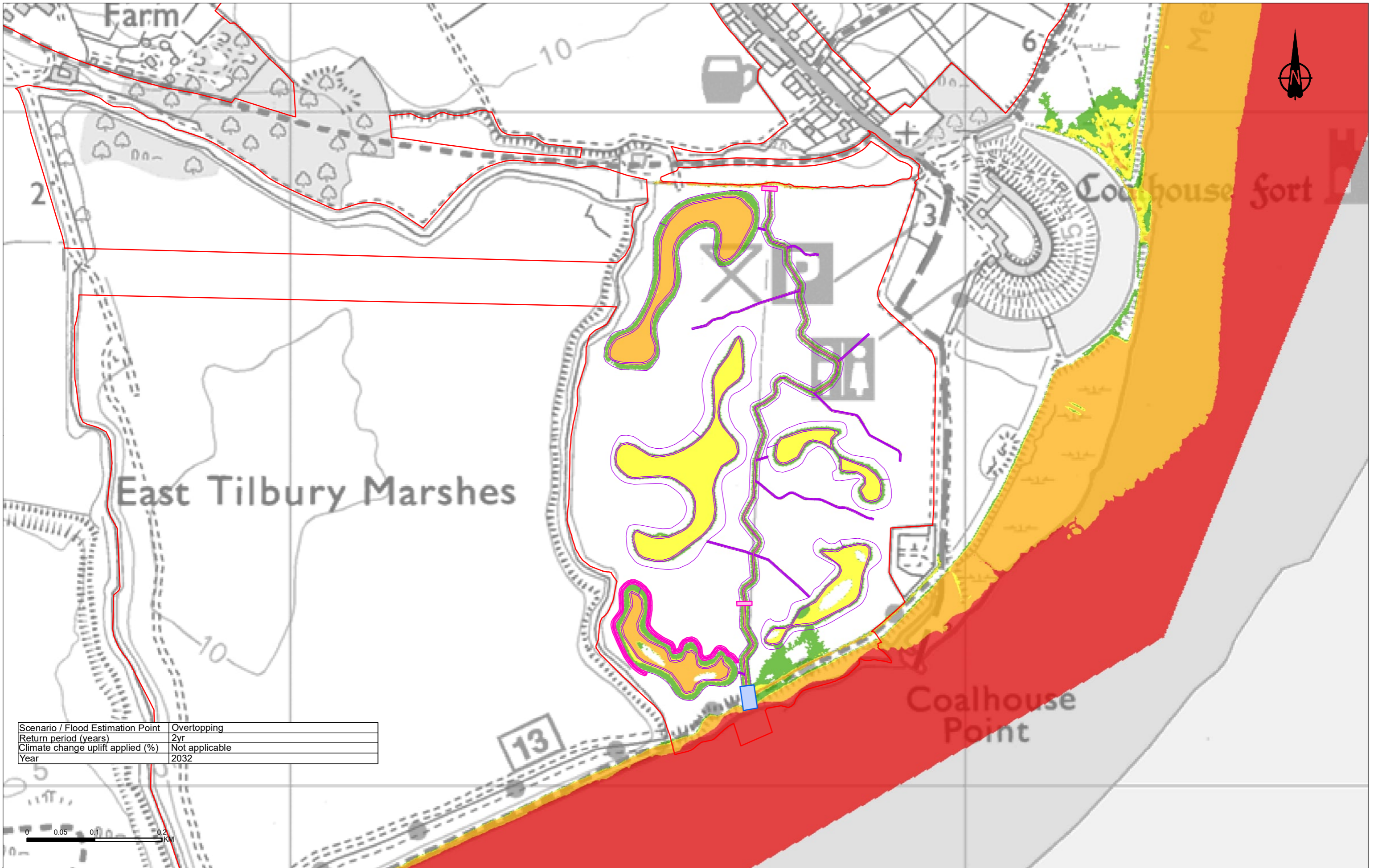
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
	Very low hazard
	Danger for some
	Danger for most
	Danger for all

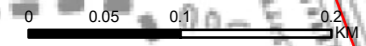


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 14 out of 25 - Figure A64				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

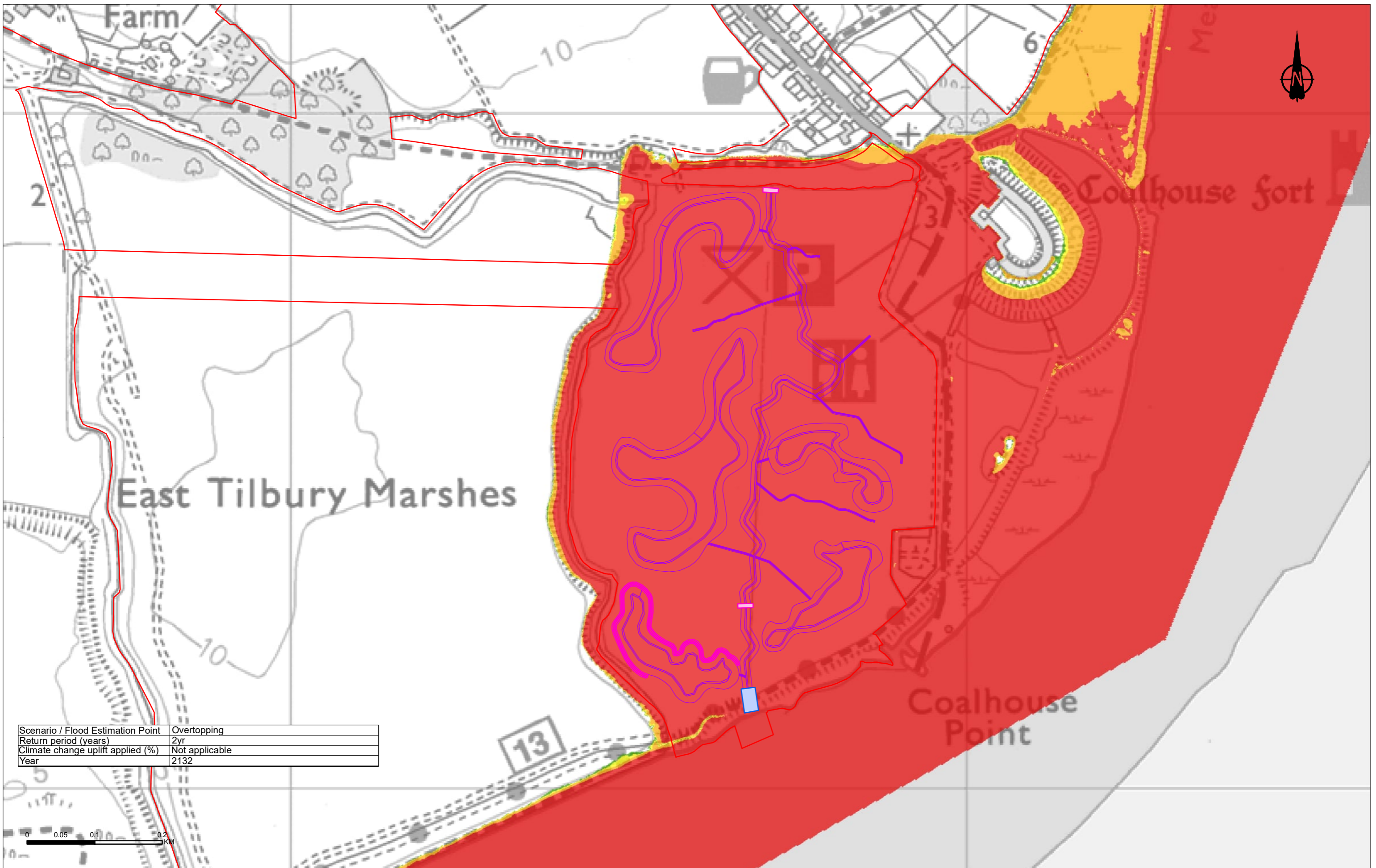
Legend		Maximum flood hazard category	
	Shallow scrapes and ditches		Very low hazard
	Embankments		Danger for some
	Water level control inlet		Danger for most
	Water level control structures		Danger for all
	Order Limits		



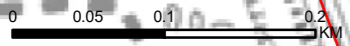
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 15 out of 25 - Figure A65				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
Maximum flood hazard category	
	Very low hazard
	Danger for some
	Danger for most
	Danger for all



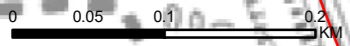
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 16 out of 25 - Figure A66				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

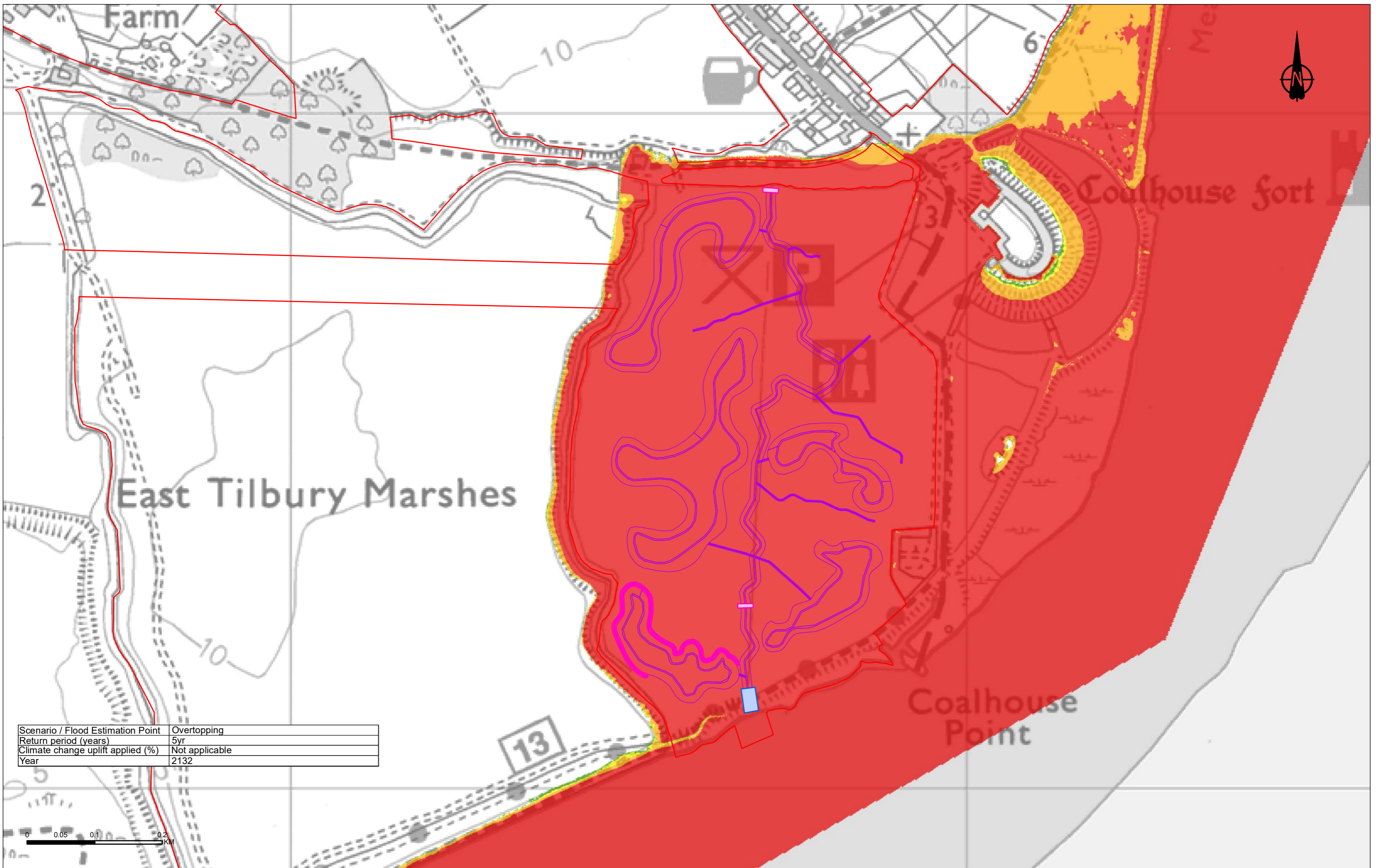
Legend		Maximum flood hazard category	
	Shallow scrapes and ditches		Very low hazard
	Embankments		Danger for some
	Water level control inlet		Danger for most
	Water level control structures		Danger for all
	Order Limits		



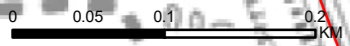
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 17 out of 25 - Figure A67				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend

- Shallow scrapes and ditches
- Embankments
- Water level control inlet
- Water level control structures
- Order Limits

Maximum flood hazard category

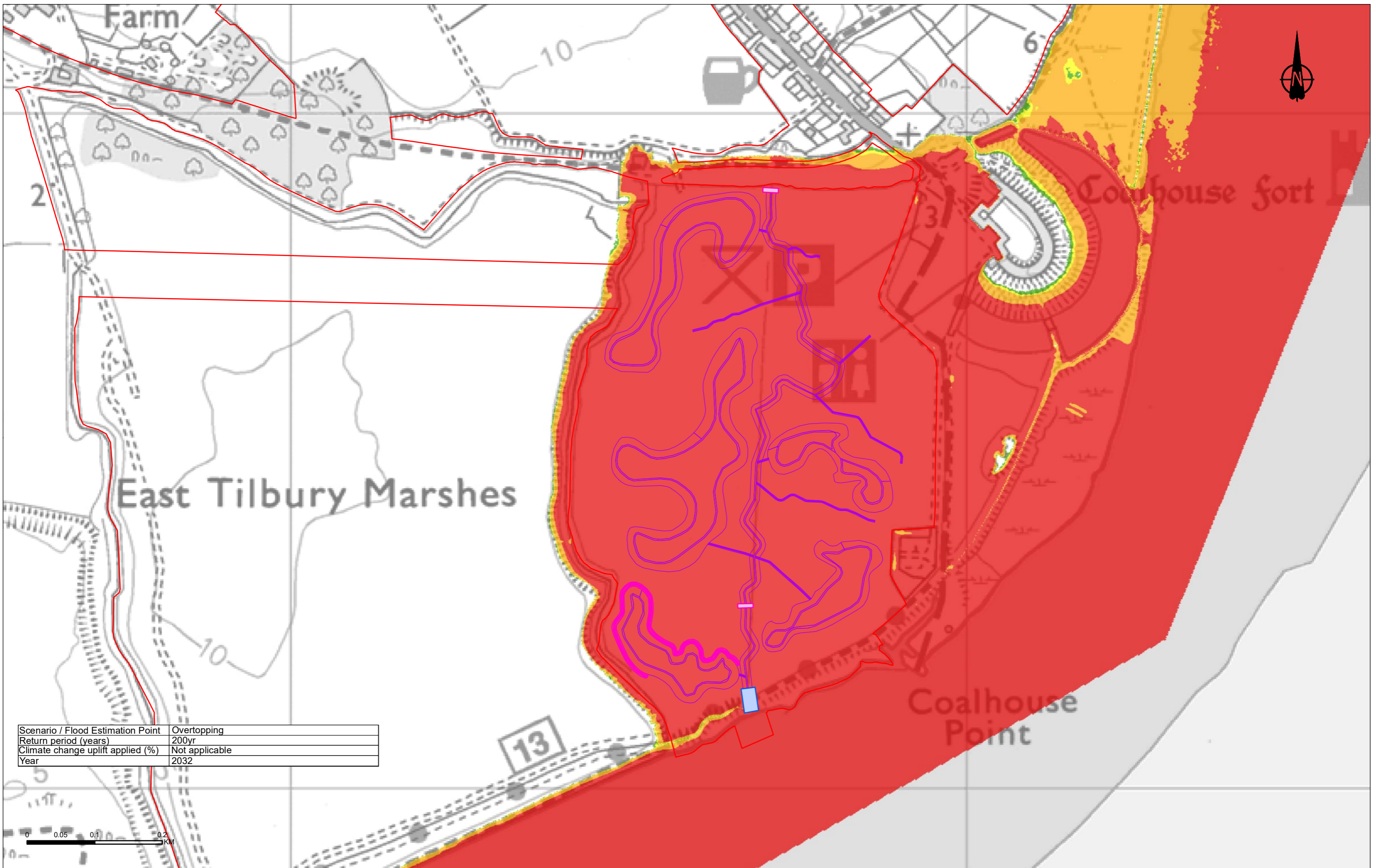
- Very low hazard
- Danger for some
- Danger for most
- Danger for all



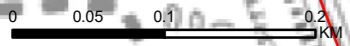
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 18 out of 25 - Figure A68				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

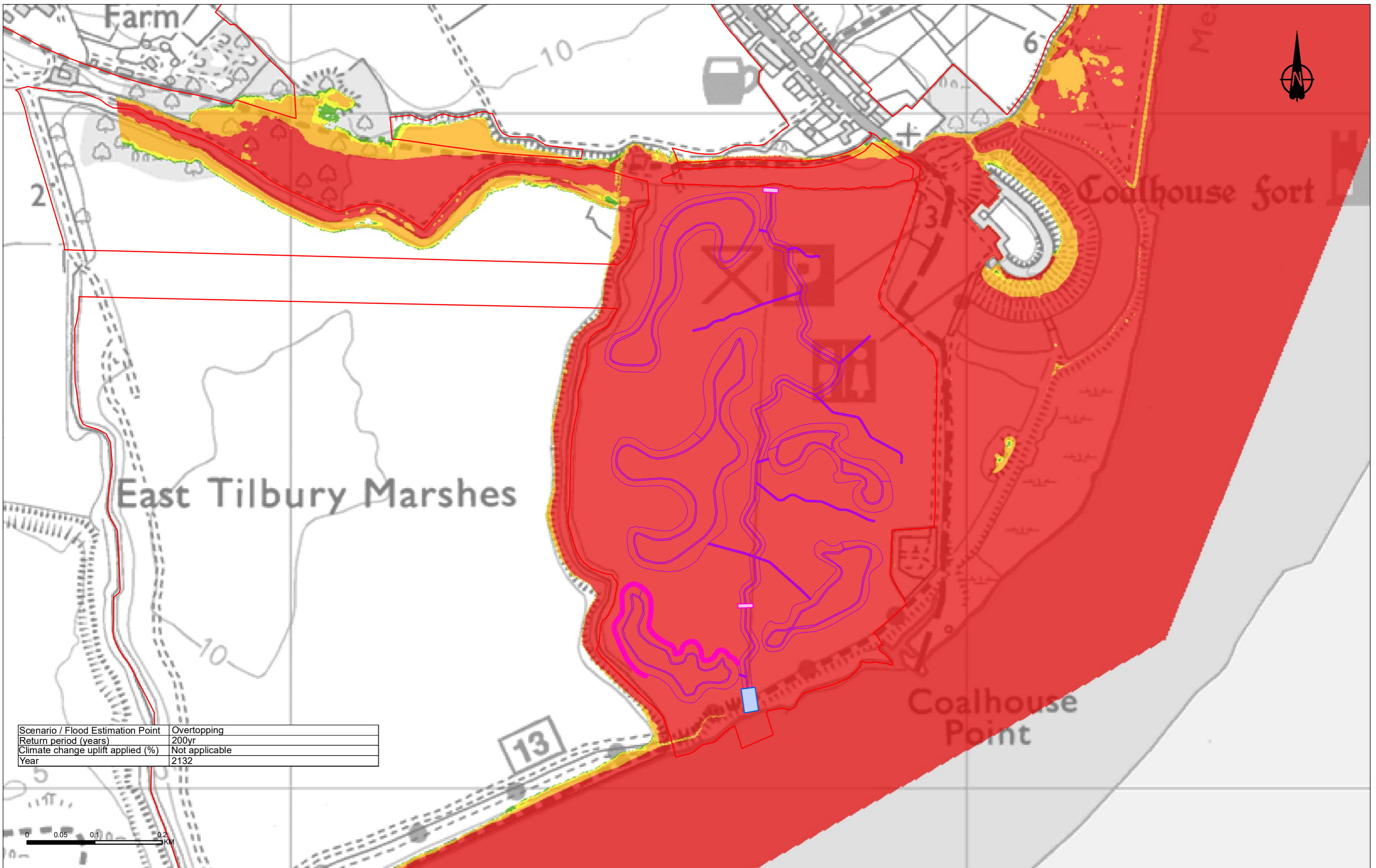
Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
	Very low hazard
	Danger for some
	Danger for most
	Danger for all



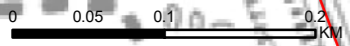
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 19 out of 25 - Figure A69				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

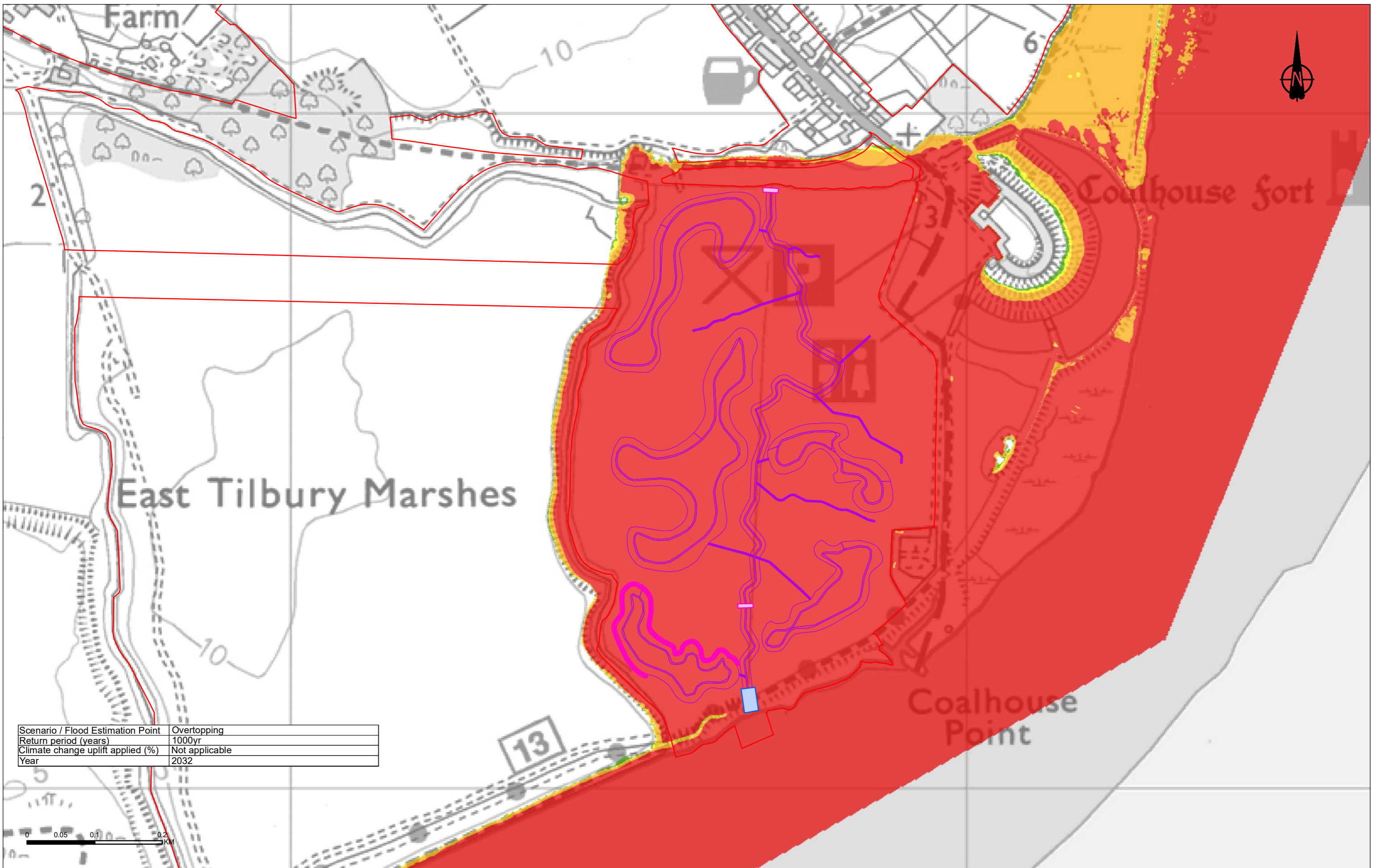
Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
	Very low hazard
	Danger for some
	Danger for most
	Danger for all



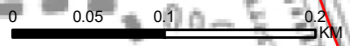
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 20 out of 25 - Figure A70				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

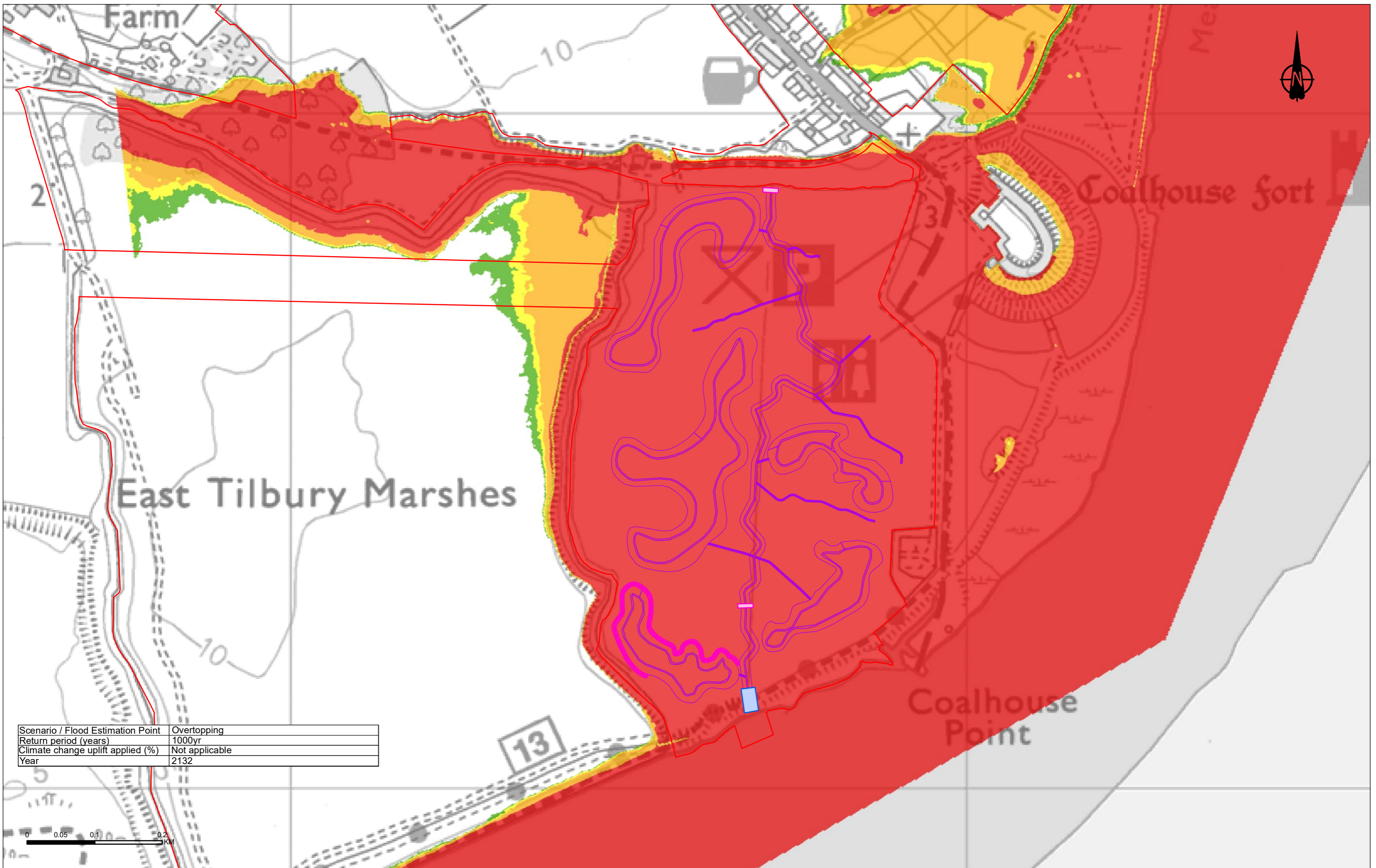
Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
	Very low hazard
	Danger for some
	Danger for most
	Danger for all



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 21 out of 25 - Figure A71				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	1000yr
Climate change uplift applied (%)	Not applicable
Year	2132

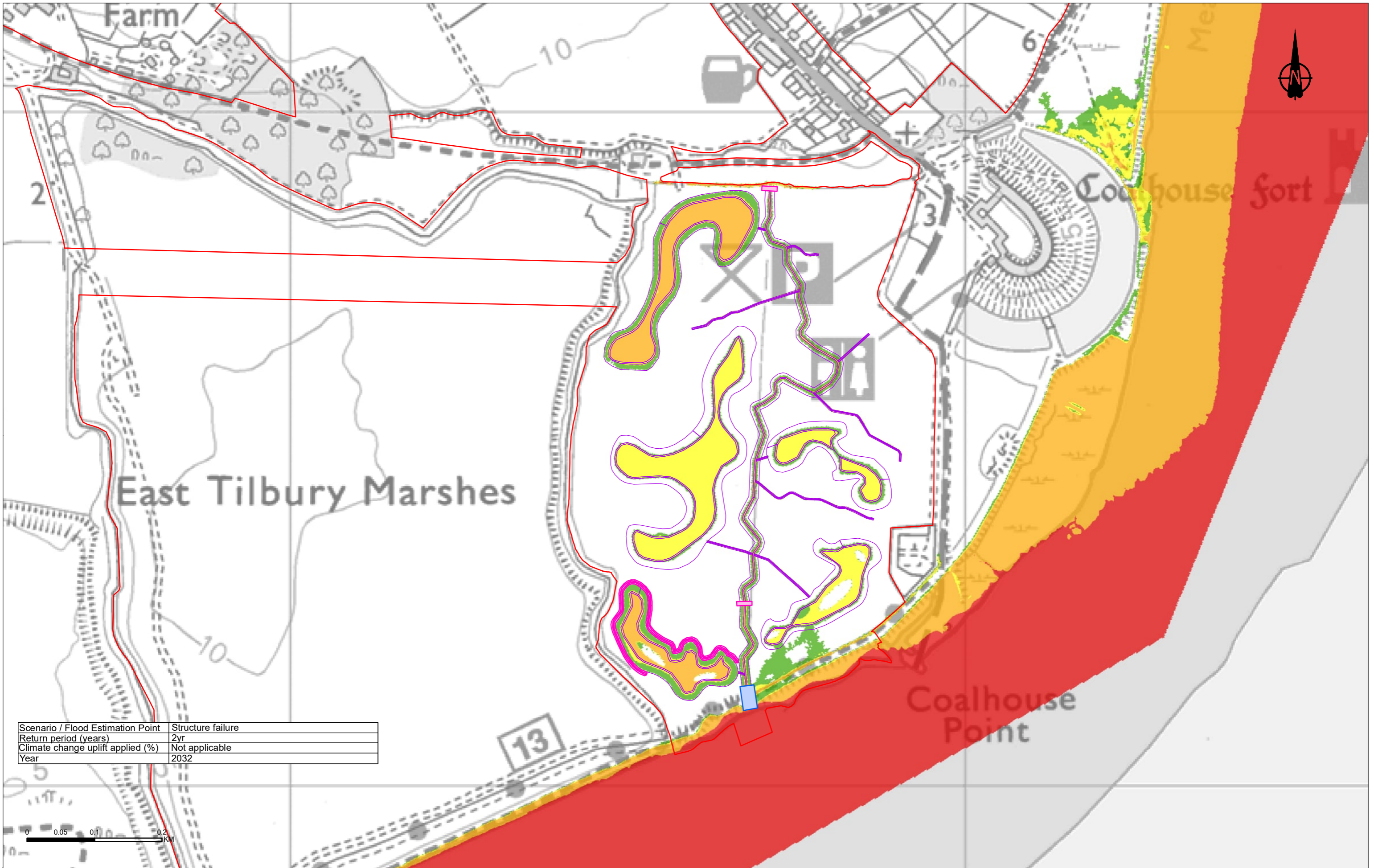
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
	Very low hazard
	Danger for some
	Danger for most
	Danger for all

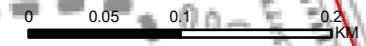


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 22 out of 25 - Figure A72				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Structure failure
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



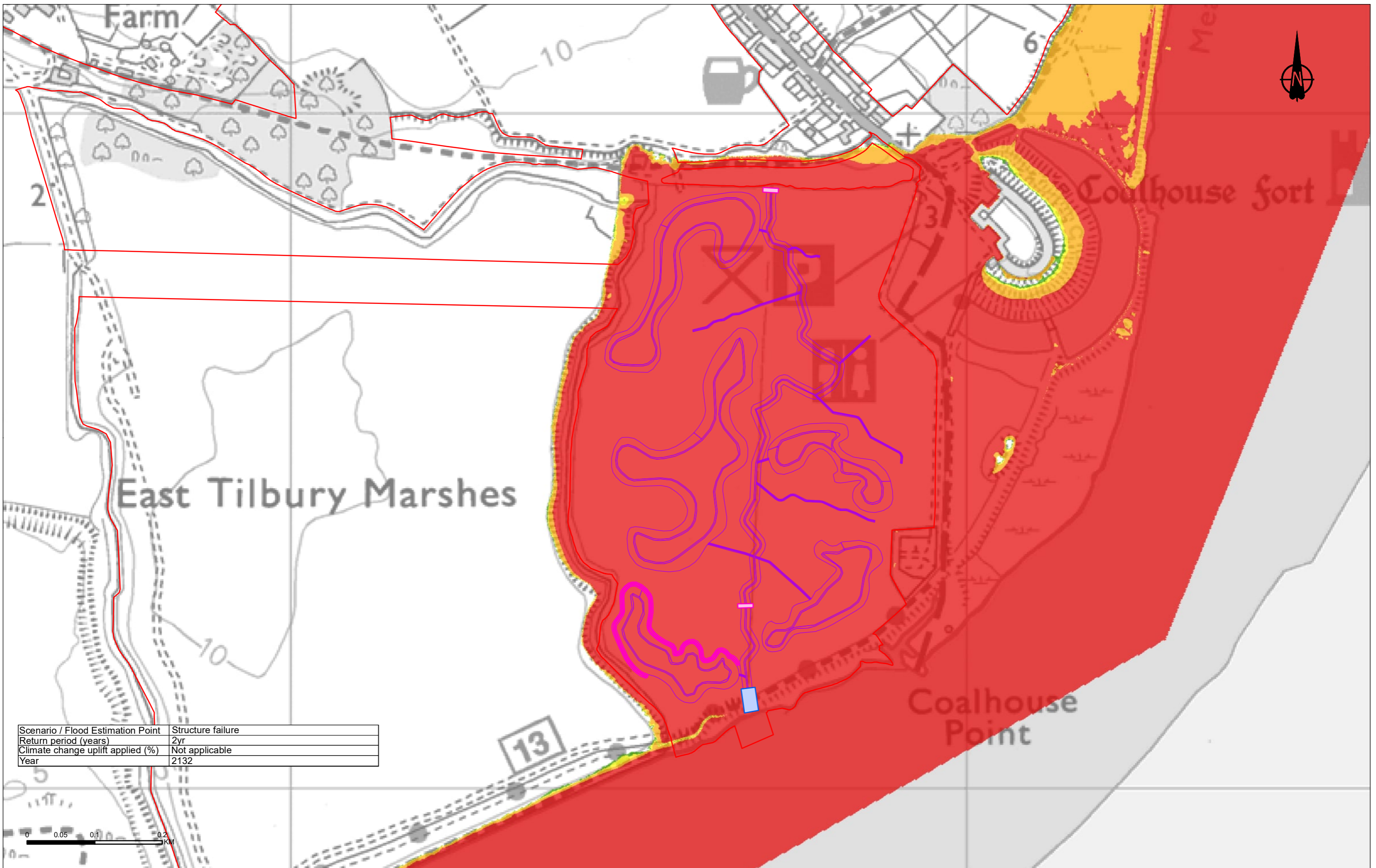
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	Order Limits
Maximum flood hazard category	
	Very low hazard
	Danger for some
	Danger for most
	Danger for all

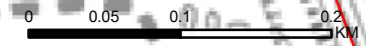


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 23 out of 25 - Figure A73				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Structure failure
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

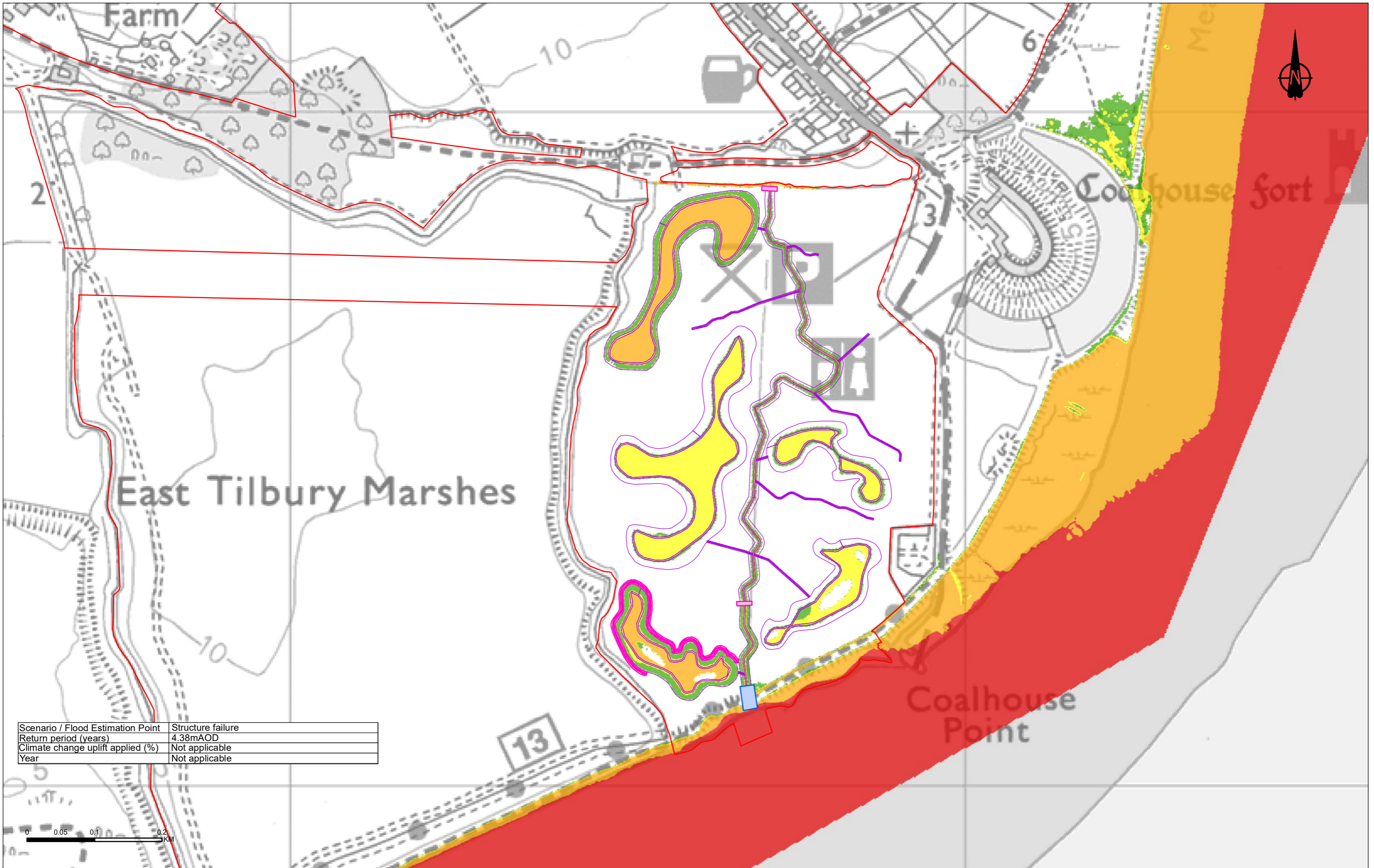
Legend		Maximum flood hazard category	
	Shallow scrapes and ditches		Very low hazard
	Embankments		Danger for some
	Water level control inlet		Danger for most
	Water level control structures		Danger for all
	Order Limits		



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 24 out of 25 - Figure A74				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Structure failure
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030649						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

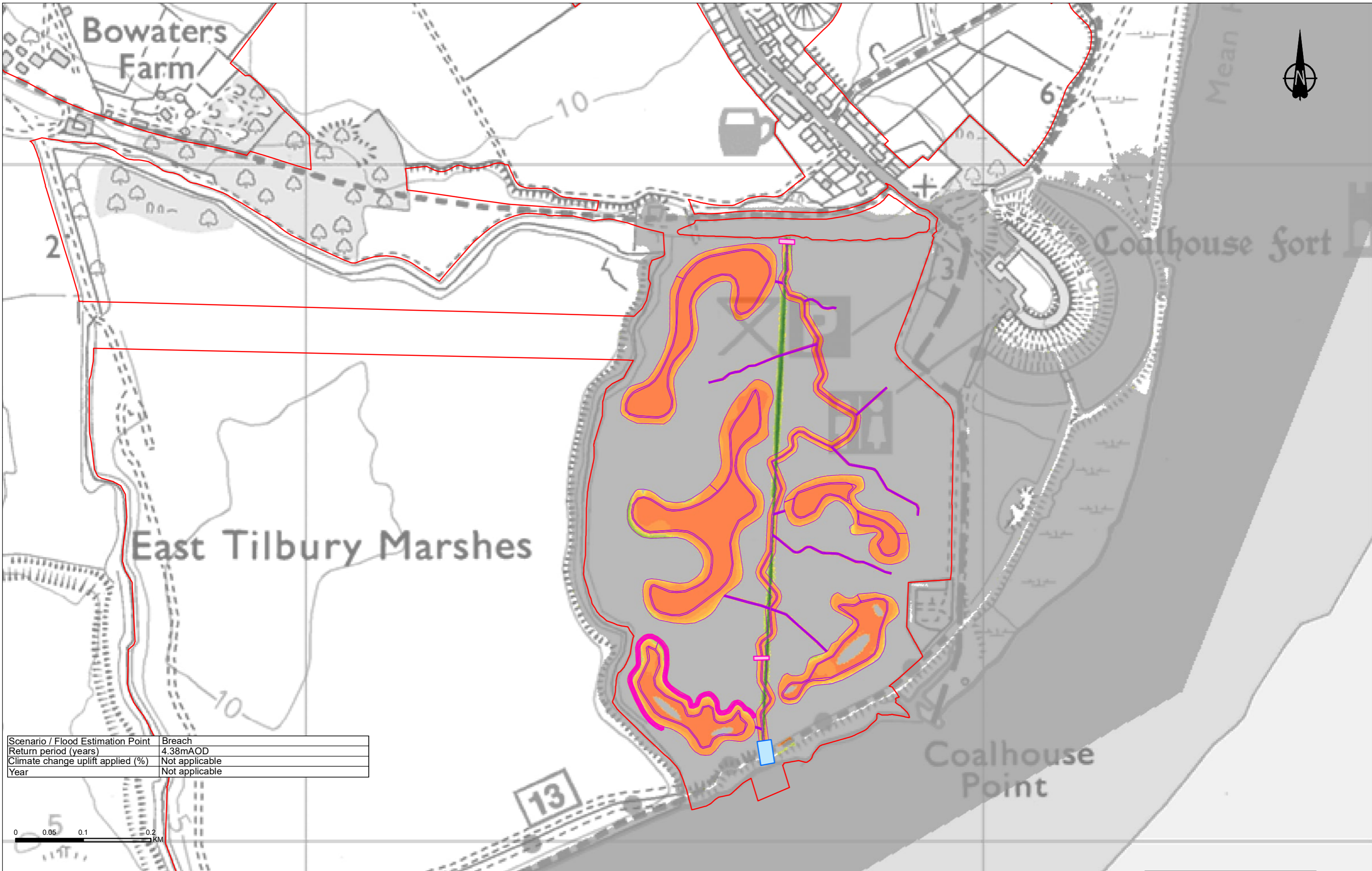
Legend		Maximum flood hazard category	
	Shallow scrapes and ditches		Very low hazard
	Embankments		Danger for some
	Water level control inlet		Danger for most
	Water level control structures		Danger for all
	Order Limits		



Client: national highways

Project: LOWER THAMES CROSSING

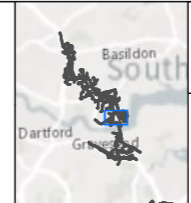
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Maximum flood hazard category Post-development 25 out of 25 - Figure A75				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91017				



Scenario / Flood Estimation Point	Breach
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

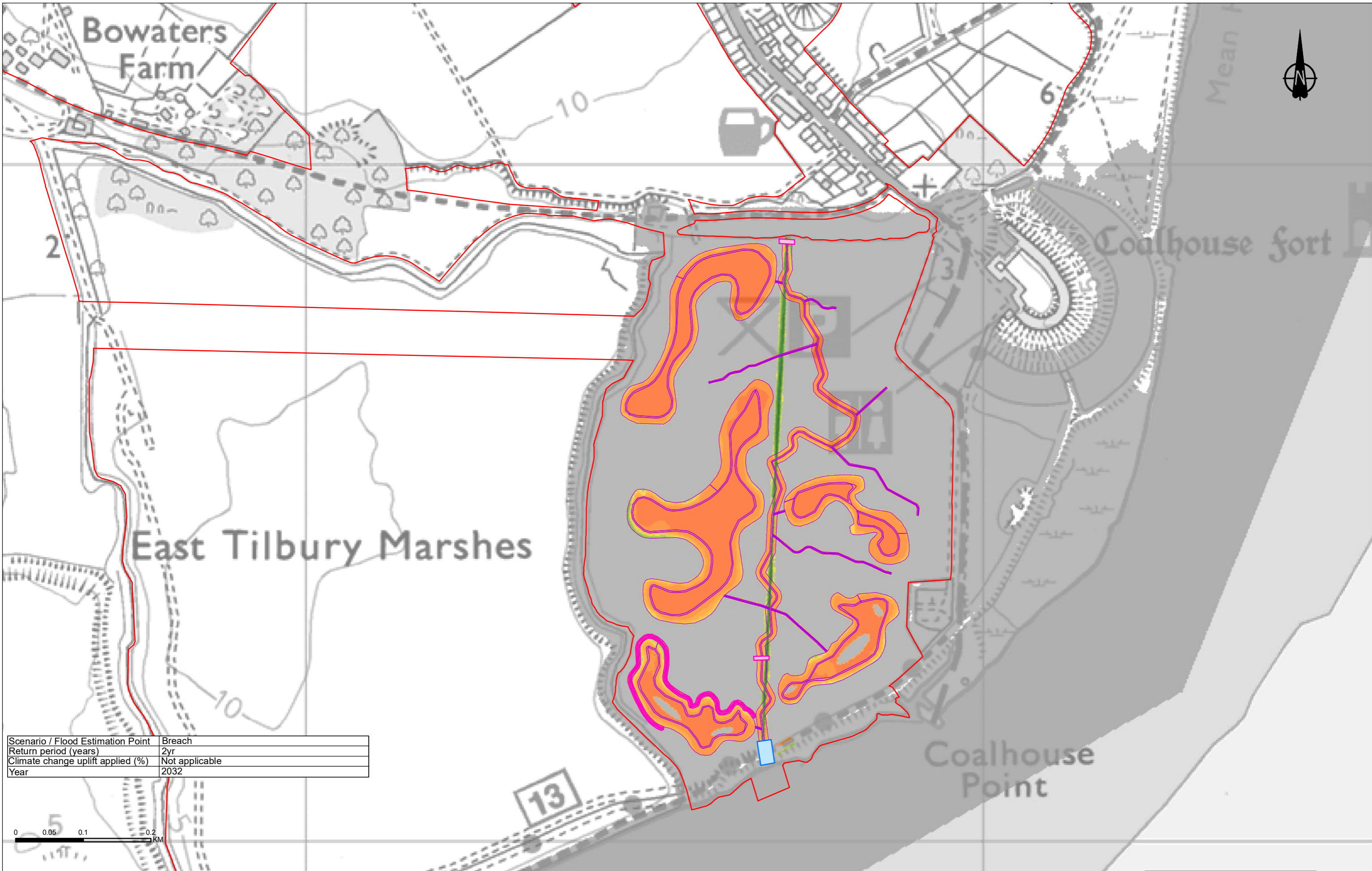
Legend		Flood depth difference (m)	
	Order Limits		< -1.0
	Shallow scrapes and ditches		-1.0 - -0.5
	Embankments		-0.5 - -0.2
	Water level control inlet		-0.2 - -0.1
	Water level control structures		-0.1 - -0.05
			0.05 - 0.1
			0.1 - 0.2
			0.2 - 0.5
			0.5 - 1
			> 1.0



Client: national highways

Project: LOWER THAMES CROSSING

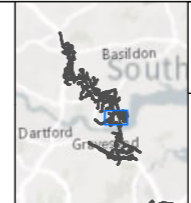
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 1 of 9 - Figure A76				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

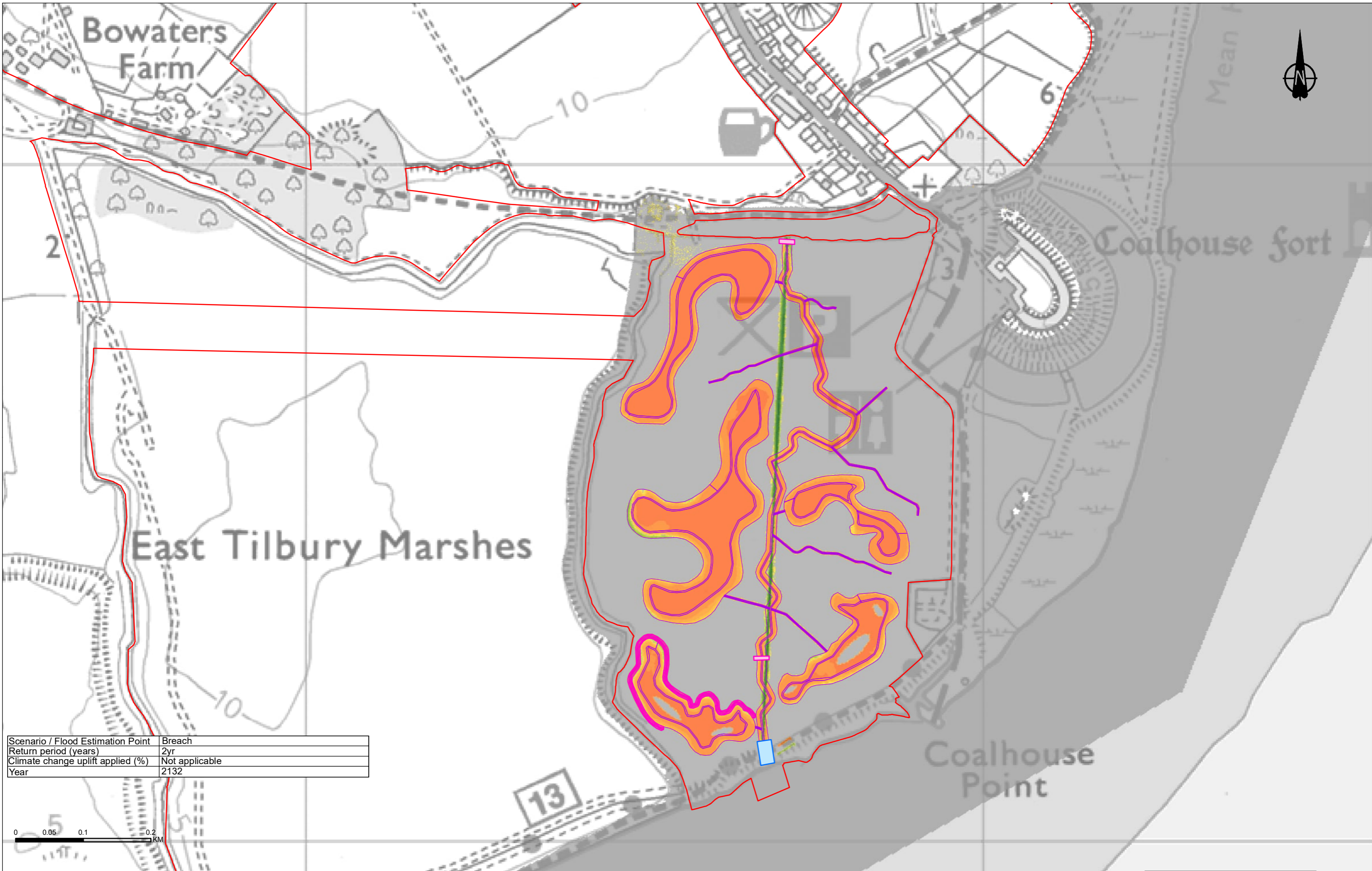
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Flood depth difference (m)	
	< -1.0
	-1.0 - -0.5
	-0.5 - -0.2
	-0.2 - -0.1
	-0.1 - -0.05
	0.1 - 0.2
	0.2 - 0.5
	0.5 - 1
	> 1.0
	-0.05 - -0.02
	-0.02 - -0.01
	-0.01 - 0.01
	0.01 - 0.02
	0.02 - 0.05
	0.05 - 0.1



Client
 national highways

Project
LOWER THAMES CROSSING

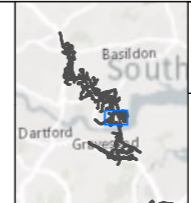
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 2 of 9 - Figure A77				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

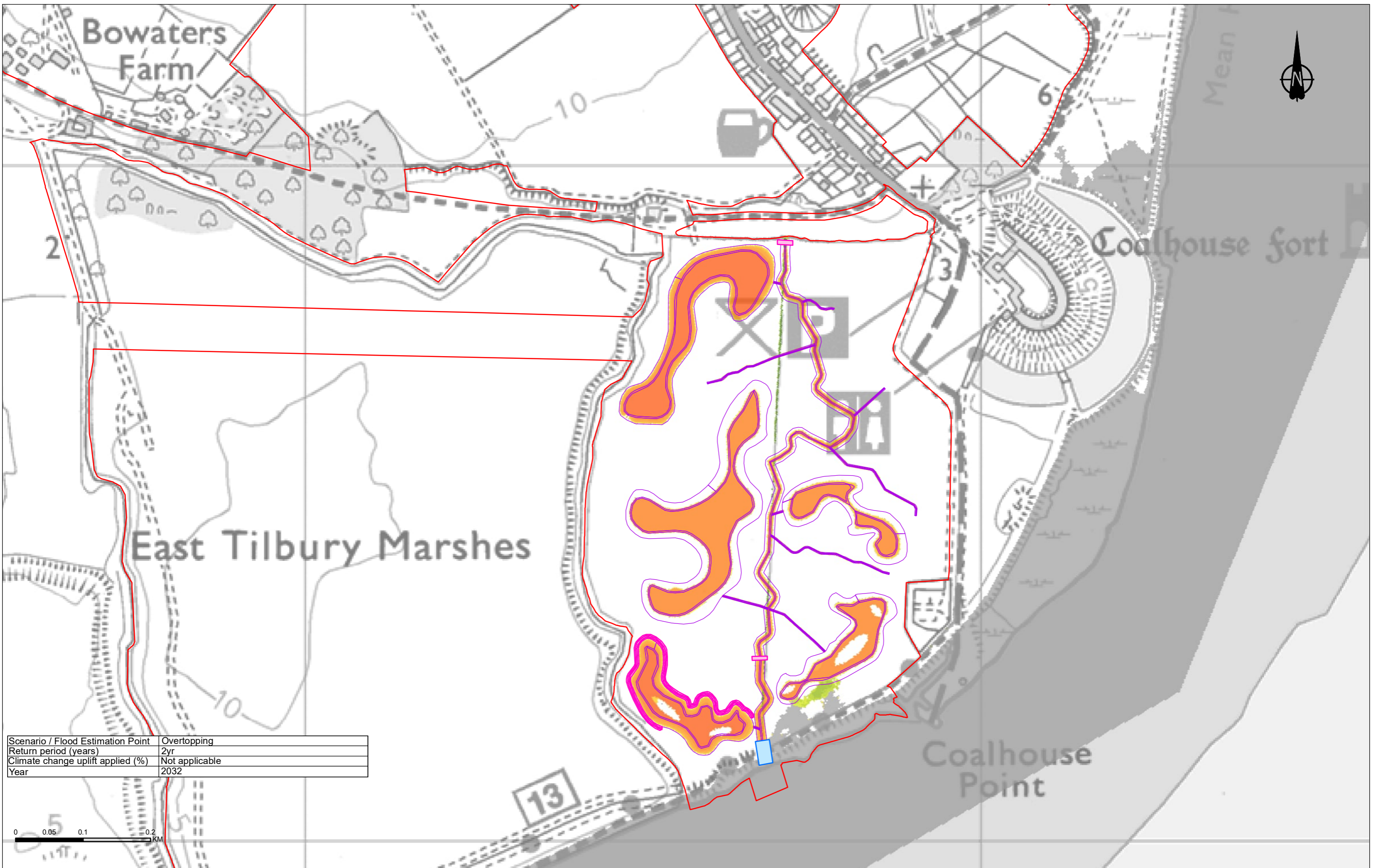
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Flood depth difference (m)	
	< -1.0
	-1.0 - -0.5
	-0.5 - -0.2
	-0.2 - -0.1
	-0.1 - -0.05
	-0.05 - -0.02
	-0.02 - -0.01
	-0.01 - 0.01
	0.01 - 0.02
	0.02 - 0.05
	0.05 - 0.1
	0.1 - 0.2
	0.2 - 0.5
	0.5 - 1
	> 1.0



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 3 of 9 - Figure A78				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				

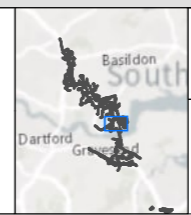


Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640

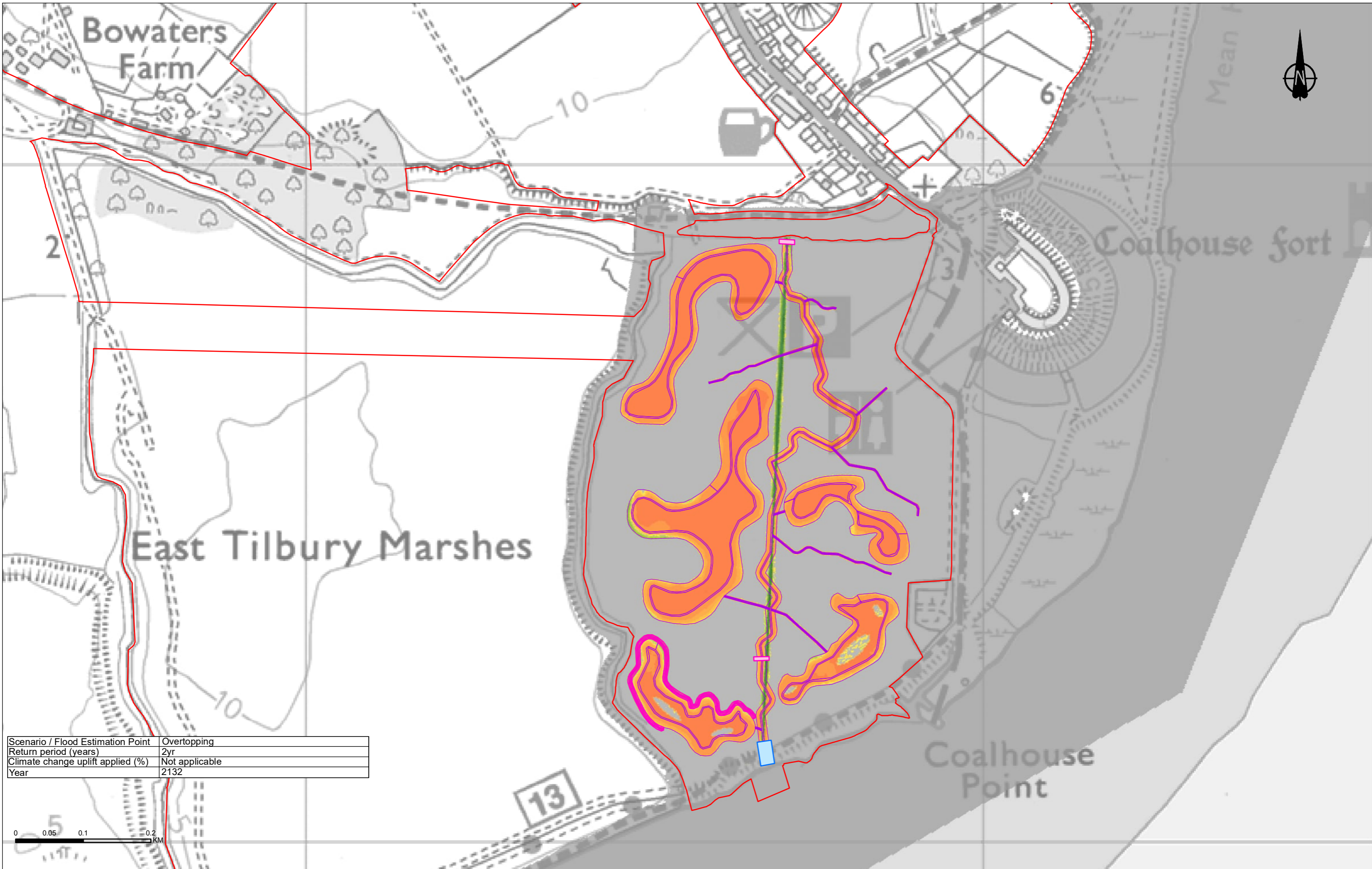
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

Legend		Flood depth difference (m)	
	Order Limits		-0.05 - -0.02
	Shallow scrapes and ditches		0.1 - 0.2
	Embankments		0.2 - 0.5
	Water level control inlet		0.5 - 1
	Water level control structures		> 1.0
			< -1.0
			-1.0 - -0.5
			-0.5 - -0.2
			-0.2 - -0.1
			-0.1 - -0.05
			-0.02 - -0.01
			0.01 - 0.02
			0.02 - 0.05
			0.05 - 0.1



Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 4 of 9 - Figure A79				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				

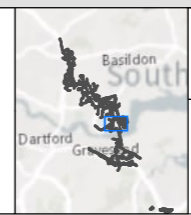


Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640

P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Flood depth difference (m)	
	< -1.0
	-1.0 - -0.5
	-0.5 - -0.2
	-0.2 - -0.1
	-0.1 - -0.05
	-0.05 - -0.02
	-0.02 - -0.01
	-0.01 - 0.01
	0.01 - 0.02
	0.02 - 0.05
	0.05 - 0.1
	0.1 - 0.2
	0.2 - 0.5
	0.5 - 1
	> 1.0

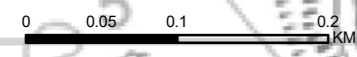


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 5 of 9 - Figure A80				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				



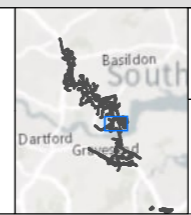
Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640

P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

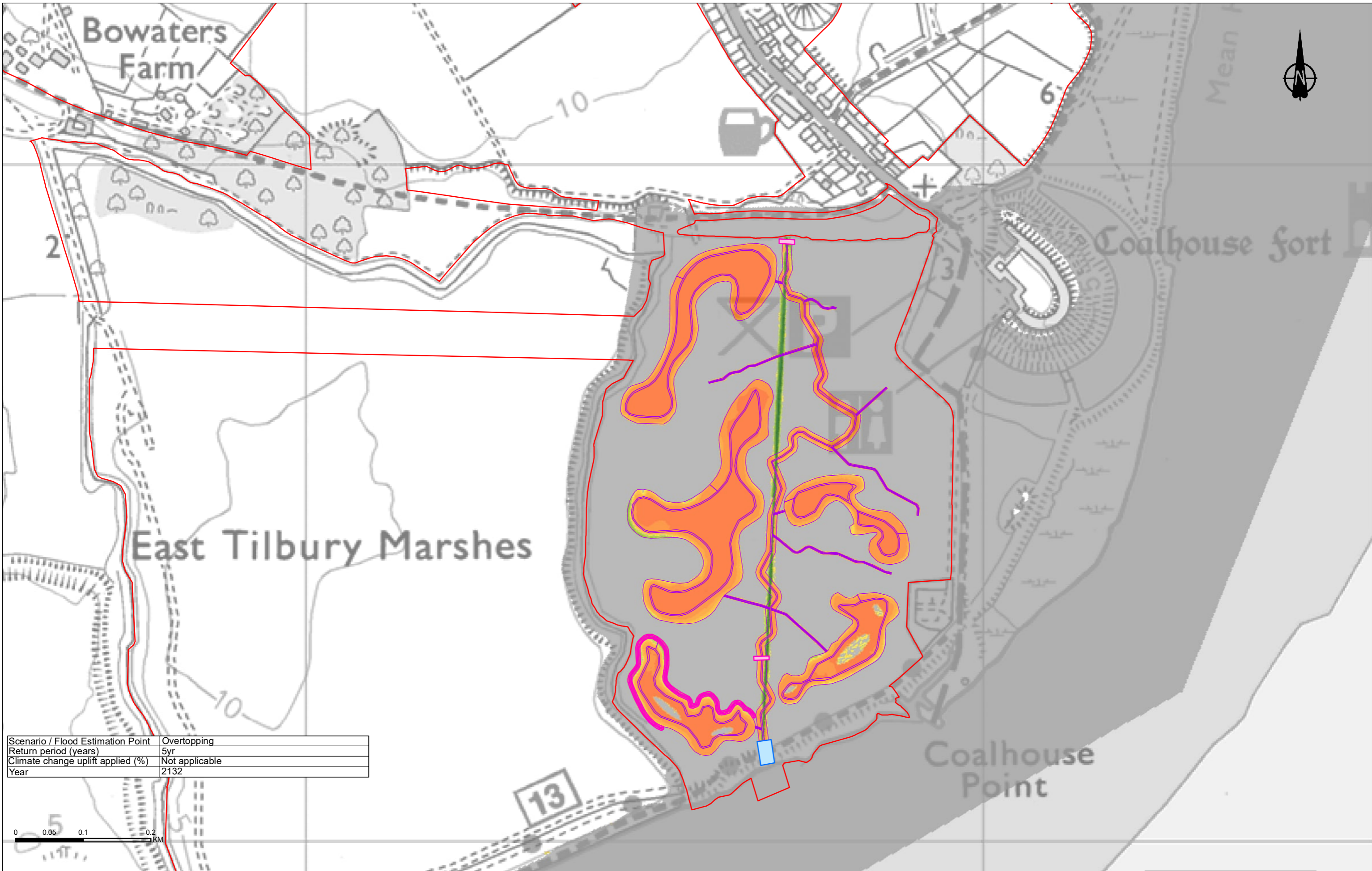
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Flood depth difference (m)	
	< -1.0
	-1.0 - -0.5
	-0.5 - -0.2
	-0.2 - -0.1
	-0.1 - -0.05
	-0.05 - -0.02
	-0.02 - -0.01
	-0.01 - 0.01
	0.01 - 0.02
	0.02 - 0.05
	0.05 - 0.1
	0.1 - 0.2
	0.2 - 0.5
	0.5 - 1
	> 1.0



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 6 of 9 - Figure A81				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				

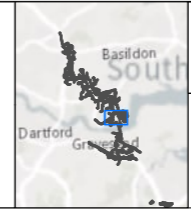


Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640

P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

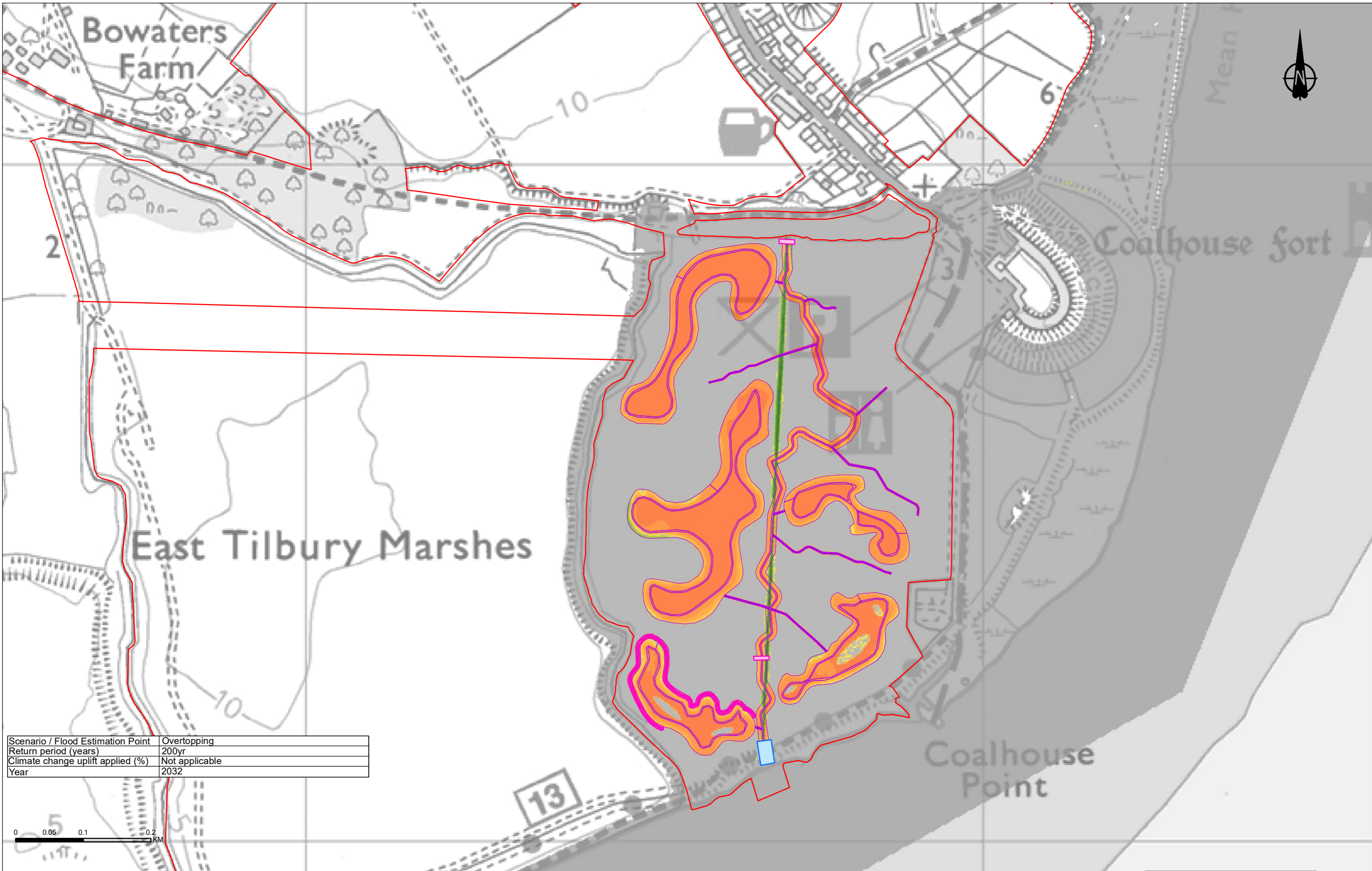
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Flood depth difference (m)	
	< -1.0
	-1.0 - -0.5
	-0.5 - -0.2
	-0.2 - -0.1
	-0.1 - -0.05
	-0.05 - -0.02
	-0.02 - -0.01
	-0.01 - 0.01
	0.01 - 0.02
	0.02 - 0.05
	0.05 - 0.1
	0.1 - 0.2
	0.2 - 0.5
	0.5 - 1
	> 1.0



Client: national highways

Project: LOWER THAMES CROSSING

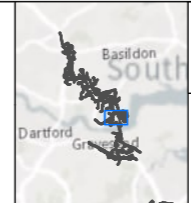
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 7 of 9 - Figure A82				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Appr'd

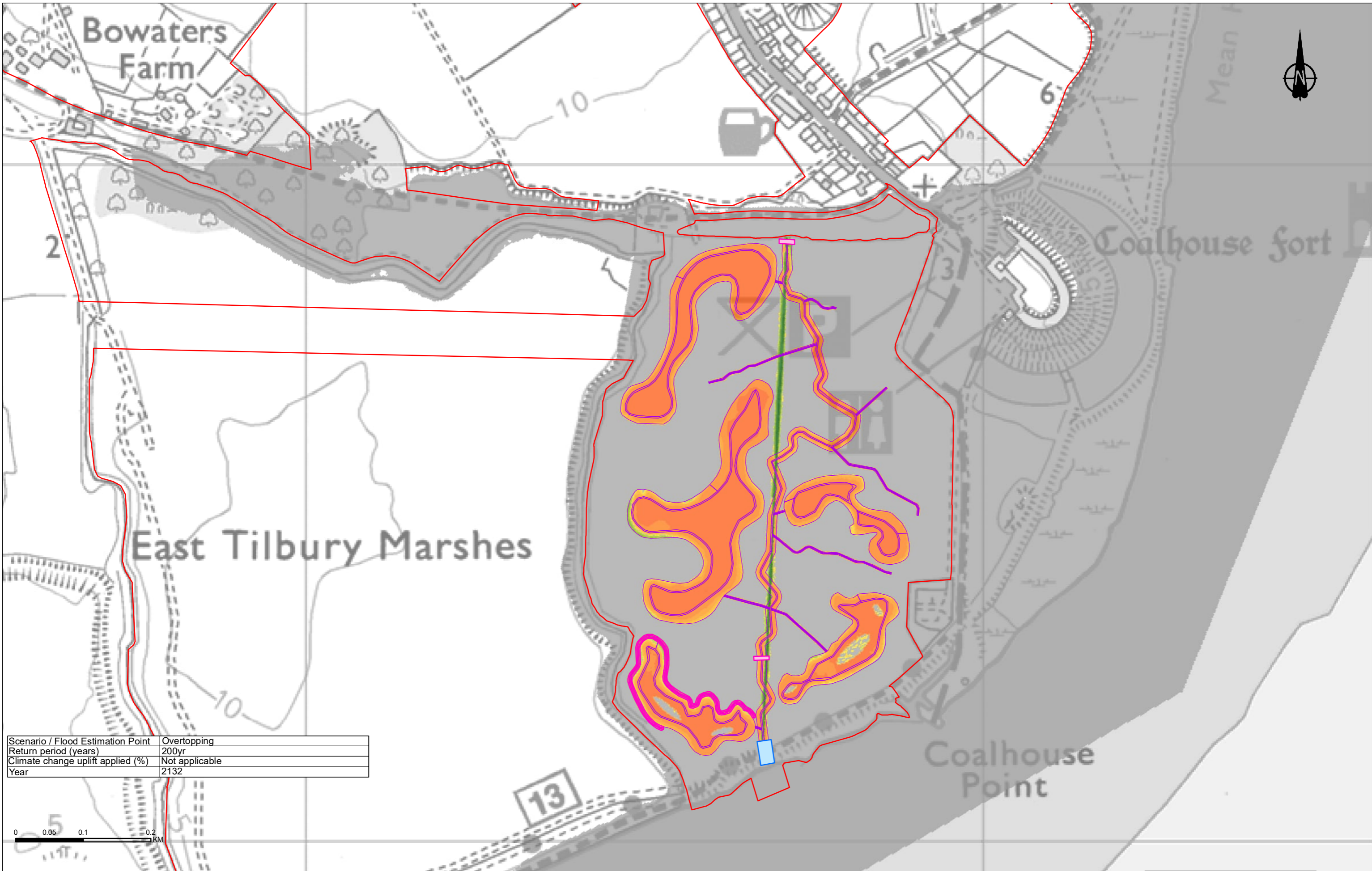
Legend		Flood depth difference (m)	
	Order Limits		< -1.0
	Shallow scrapes and ditches		-1.0 - -0.5
	Embankments		-0.5 - -0.2
	Water level control inlet		-0.2 - -0.1
	Water level control structures		-0.1 - -0.05
			0.05 - 0.1
			0.1 - 0.2
			0.2 - 0.5
			0.5 - 1
			> 1.0



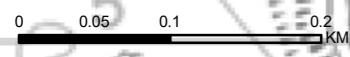
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 8 of 9 - Figure A83				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				



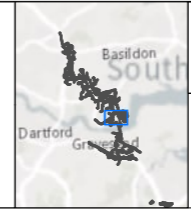
Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640

P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

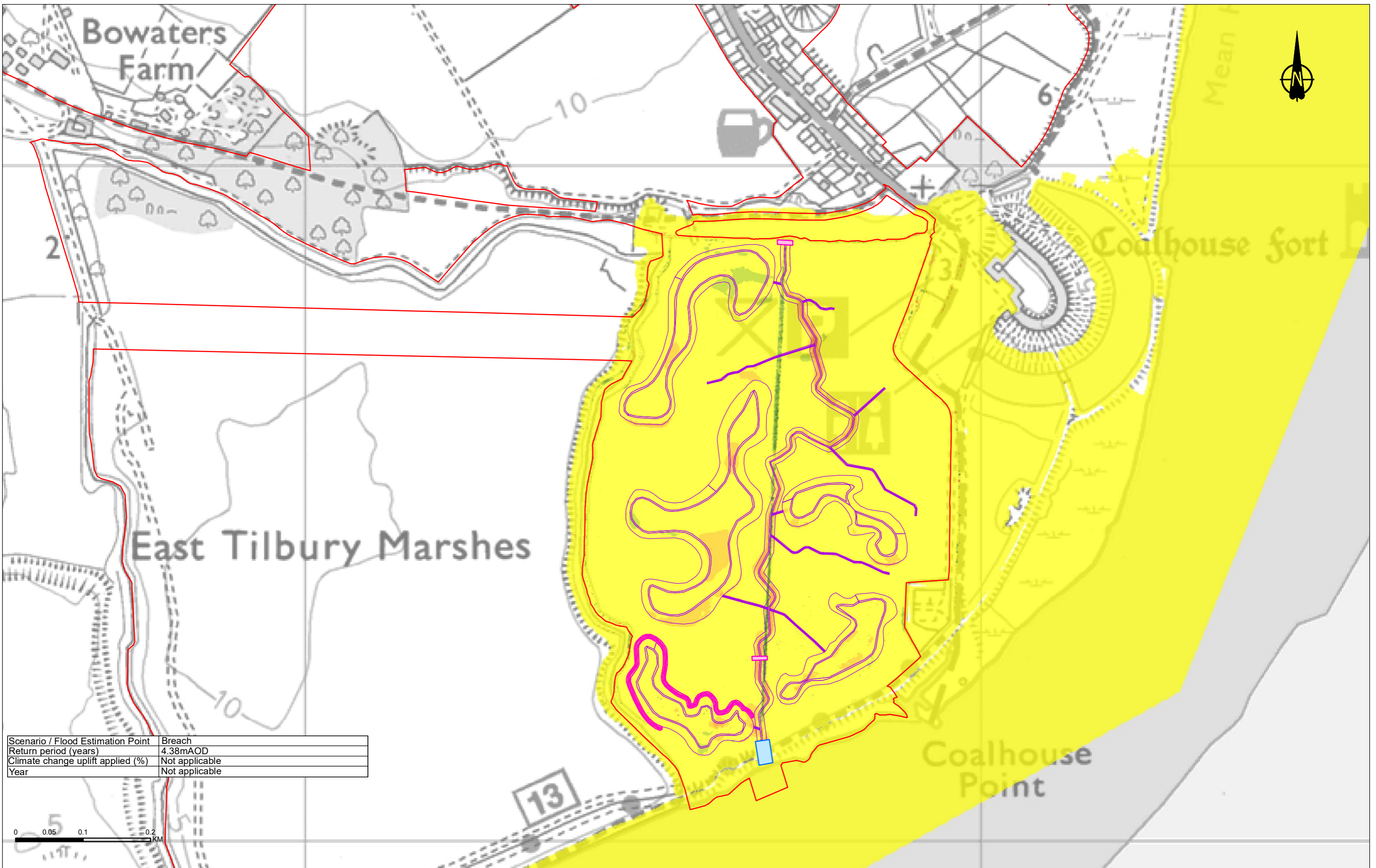
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
Flood depth difference (m)	
	< -1.0
	-1.0 - -0.5
	-0.5 - -0.2
	-0.2 - -0.1
	-0.1 - -0.05
	-0.05 - -0.02
	-0.02 - -0.01
	-0.01 - 0.01
	0.01 - 0.02
	0.02 - 0.05
	0.05 - 0.1
	0.1 - 0.2
	0.2 - 0.5
	0.5 - 1
	> 1.0



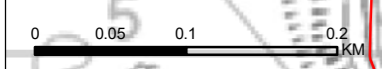
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood depth Post-(with mitigation) minus pre-development Sheet 9 of 9 - Figure A84				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91018				

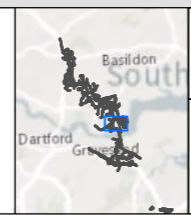


Scenario / Flood Estimation Point	Breach
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable



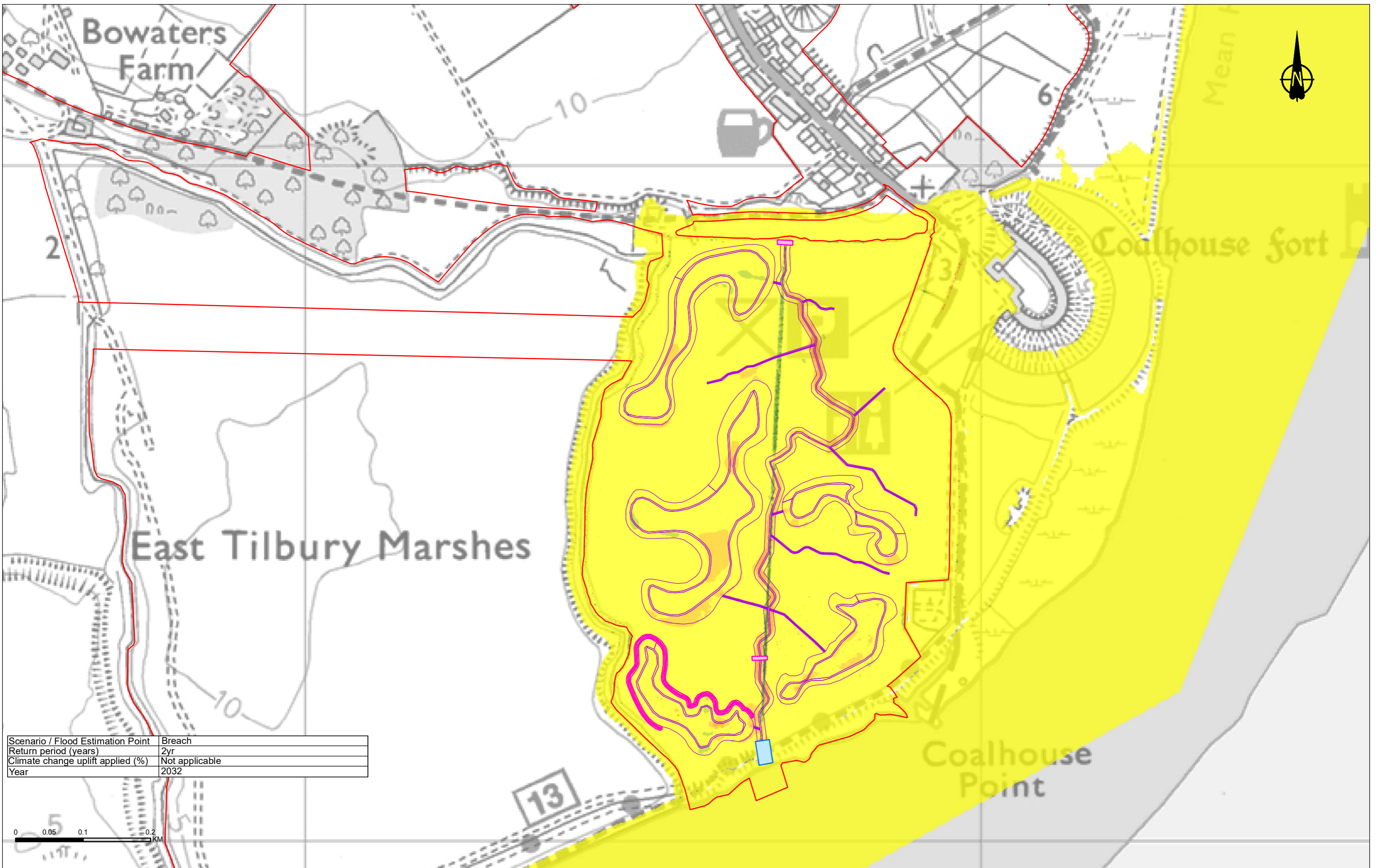
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd
P01	S9	21/08/2023	Deadline 6	KK	RB	BF

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
<VALUE>	
	< -2.0
	-2.0 - -1.0
	-1.0 - -0.5
	-0.5 - -0.25
	-0.25 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways
 Project
LOWER THAMES CROSSING

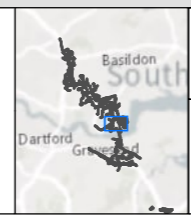
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 1 of 9 - Figure A85				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032

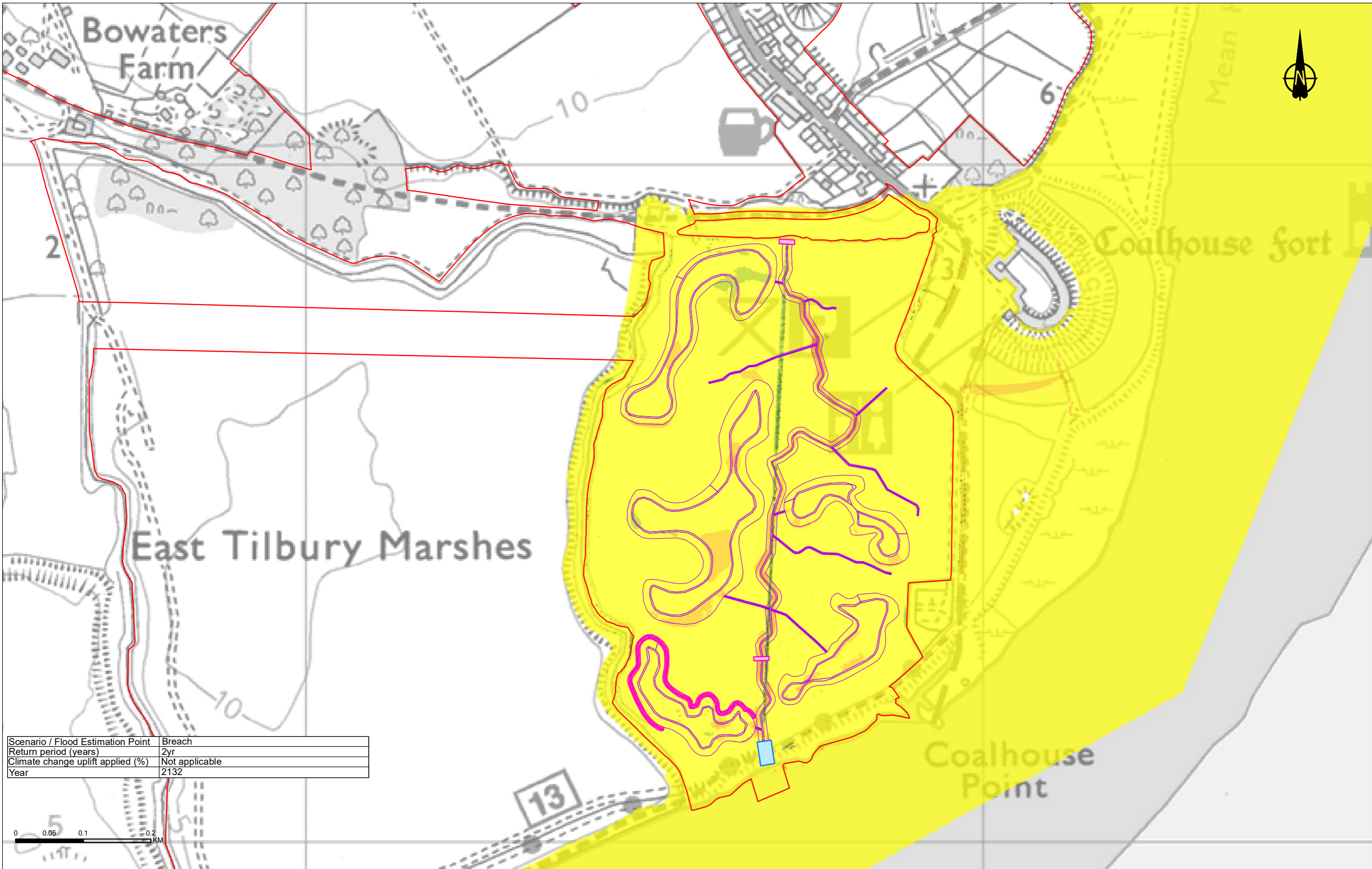
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd
P01	S9	21/08/2023	Deadline 6	KK	RB	BF

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	<VALUE> <-2.0
	-2.0 - -1.0
	-1.0 - -0.5
	-0.5 - -0.25
	-0.25 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0

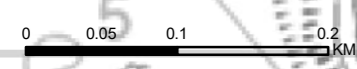


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 2 of 9 - Figure A86				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				

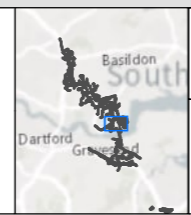


Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



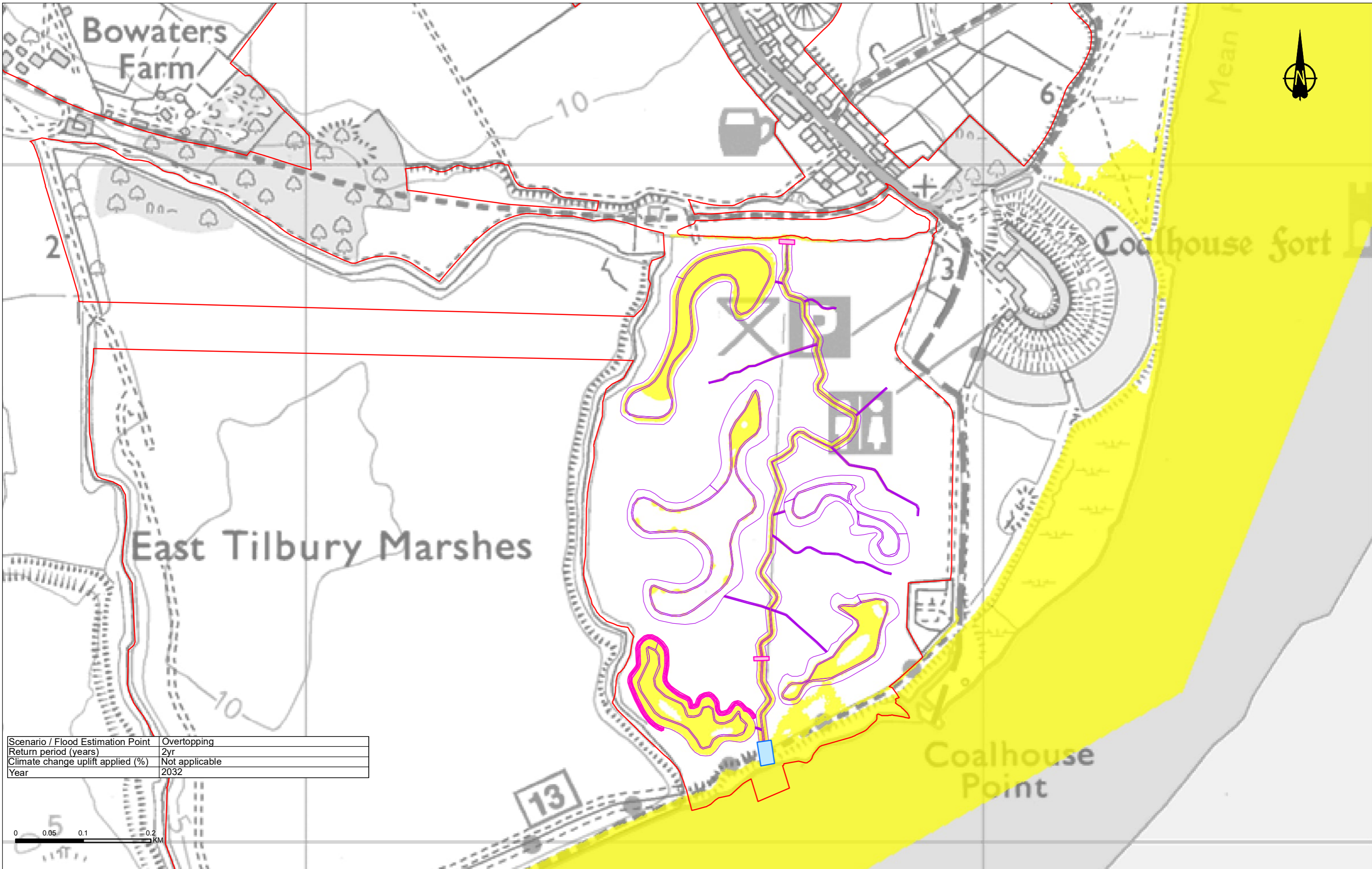
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd
P01	S9	21/08/2023	Deadline 6	KK	RB	BF

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	<VALUE> <-2.0
	<-2.0 - -1.0
	<-1.0 - -0.5
	<-0.5 - -0.25
	<-0.25 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0

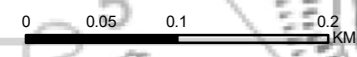


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 3 of 9 - Figure A87				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

	<VALUE>	

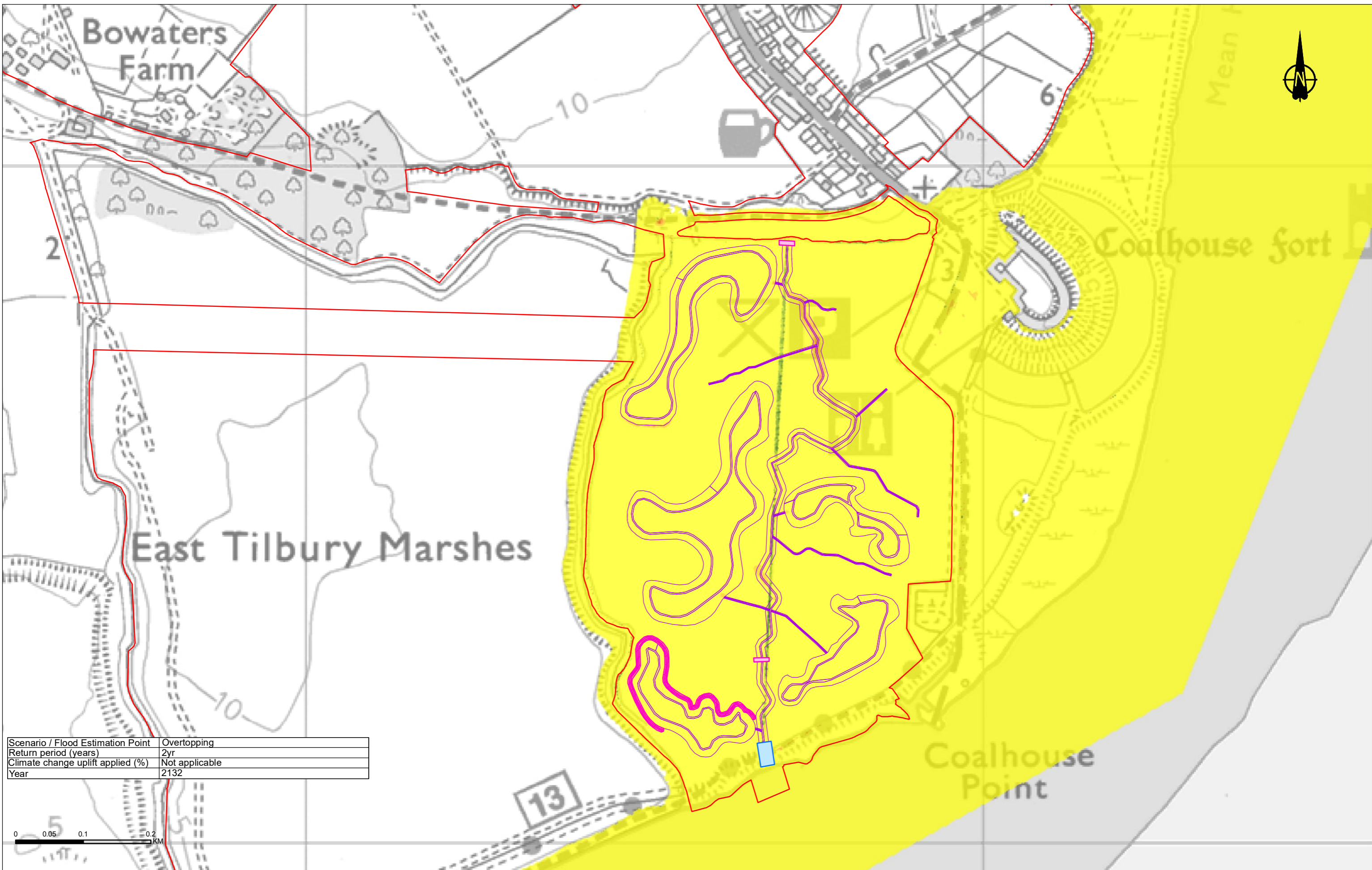
	Order Limits
	Shallow scrapes and ditches
	Water level control inlet
	Water level control structures
	<-2.0
	-2.0 - -1.0
	-1.0 - -0.5
	-0.5 - -0.25
	-0.25 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 4 of 9 - Figure A88				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				

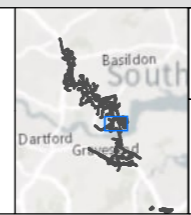


Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132

Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd
P01	S9	21/08/2023	Deadline 6	KK	RB	BF

Legend

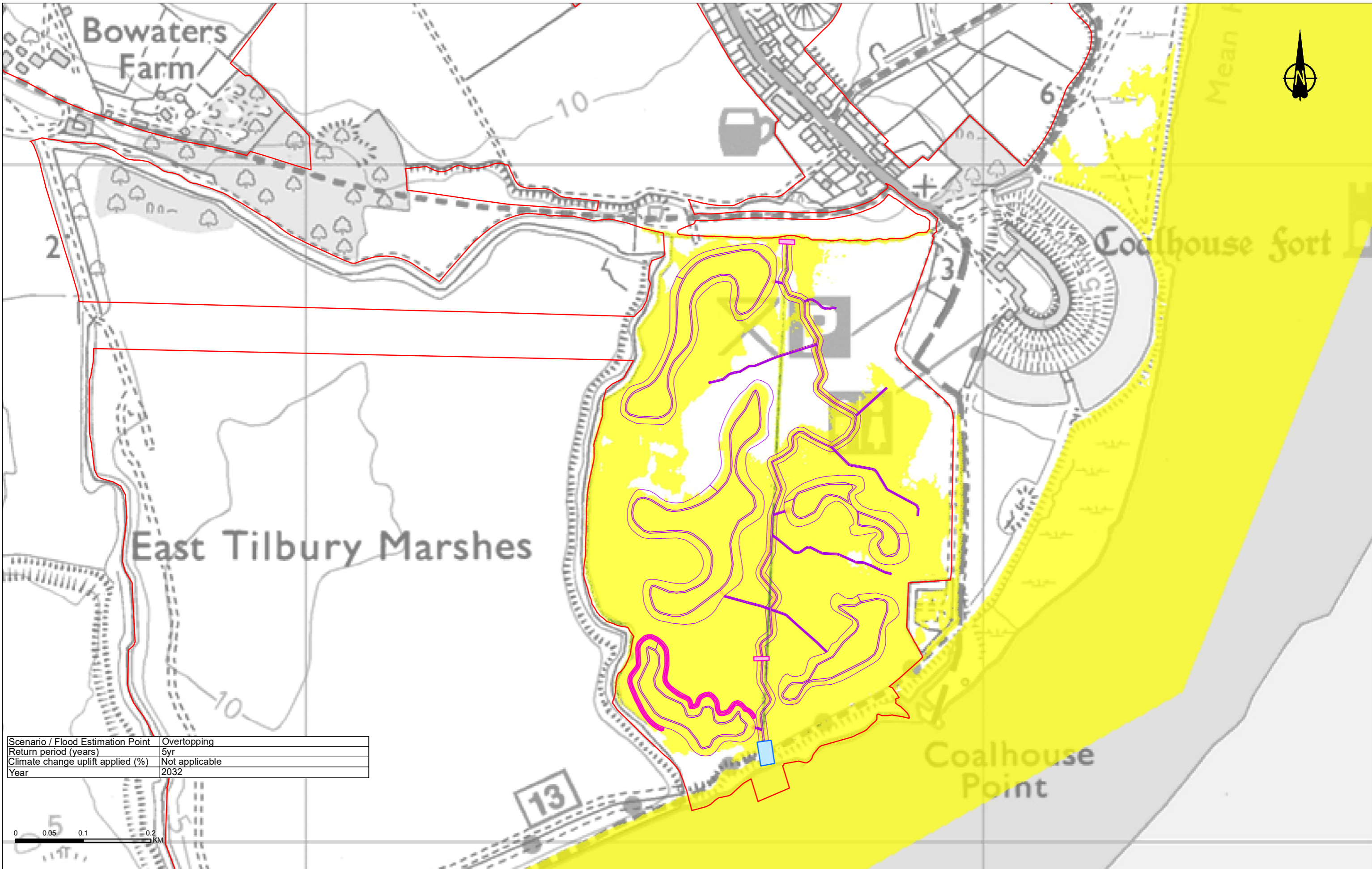
Order Limits	<VALUE>	0.25 - 0.5
Shallow scrapes and ditches	<-2.0	0.5 - 1.0
Embankments	-2.0 - -1.0	1.0 - 2
Water level control inlet	-1.0 - -0.5	> 2.0
Water level control structures	-0.5 - -0.25	
	-0.25 - 0.25	



Client: national highways

Project: LOWER THAMES CROSSING

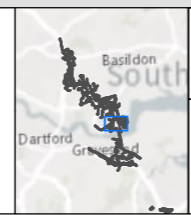
Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 5 of 9 - Figure A89				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032

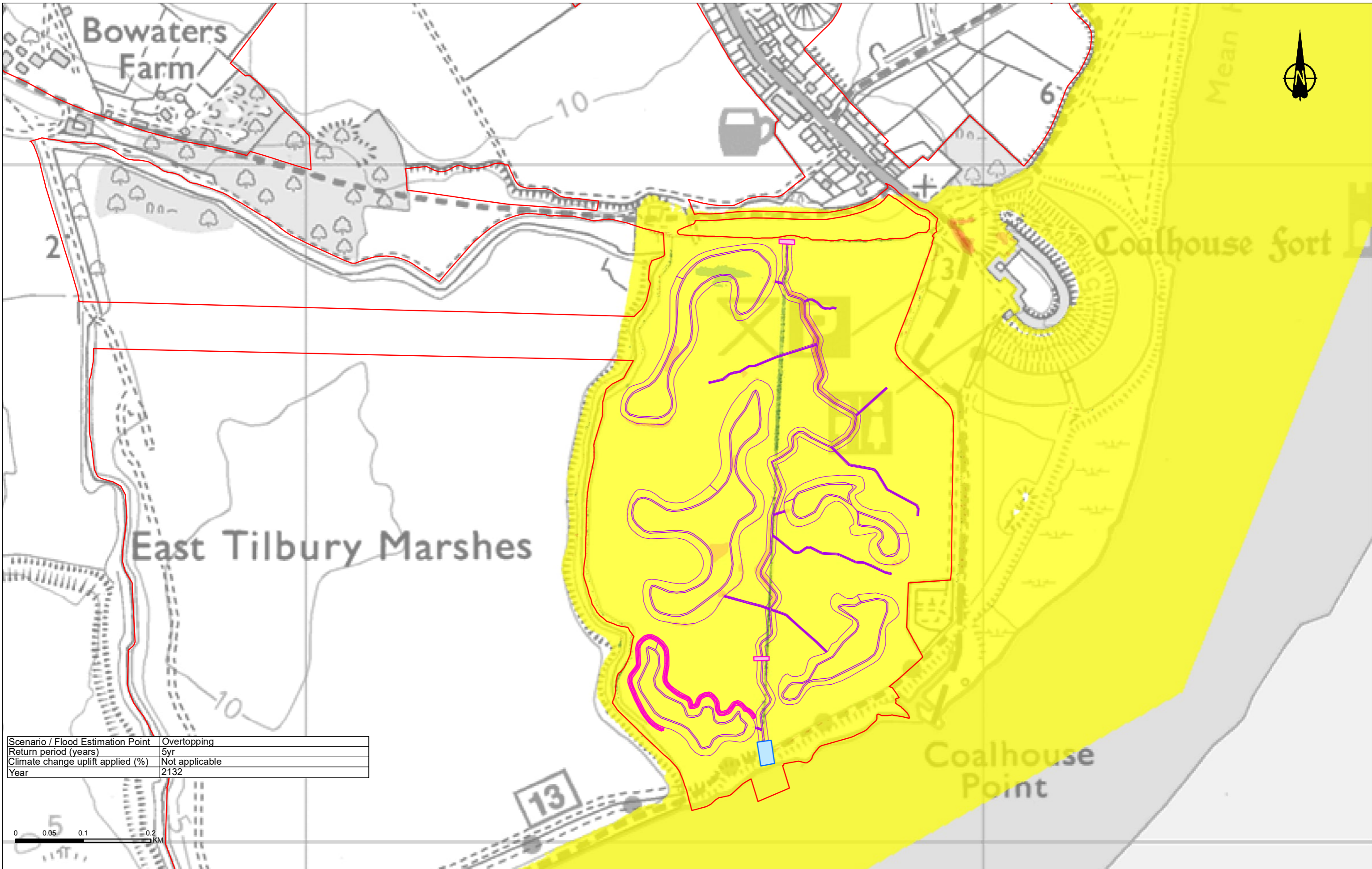
Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	<VALUE> <-2.0
	<-2.0 - -1.0
	<-1.0 - -0.5
	<-0.5 - -0.25
	<-0.25 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0

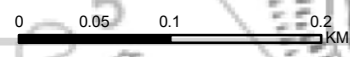


Client
 national highways
 Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 6 of 9 - Figure A90				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				

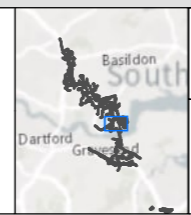


Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

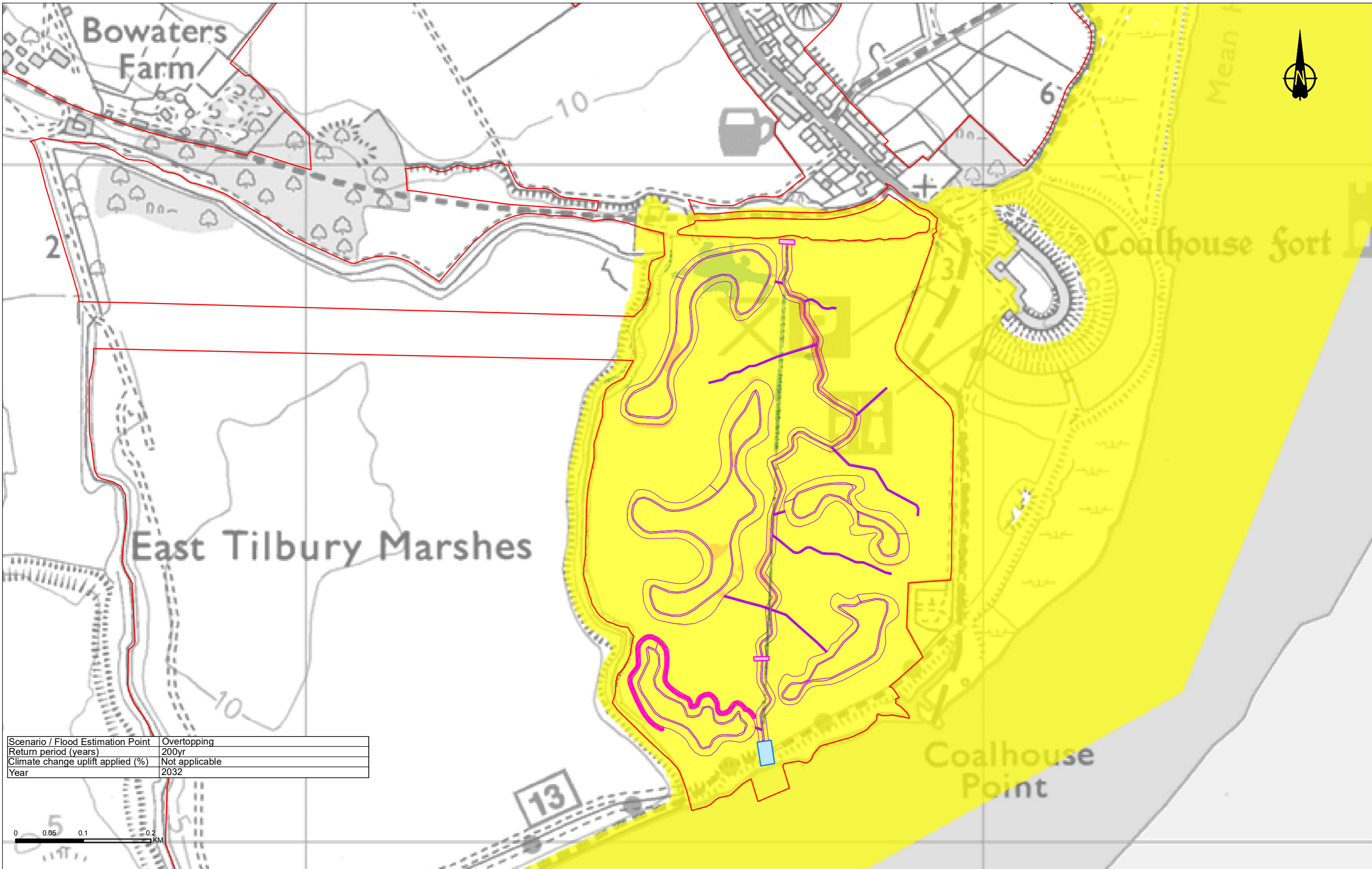
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	<VALUE>
	<-2.0
	-2.0 - -1.0
	-1.0 - -0.5
	-0.5 - -0.25
	-0.25 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



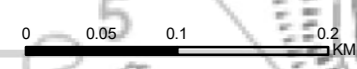
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 7 of 9 - Figure A91				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				

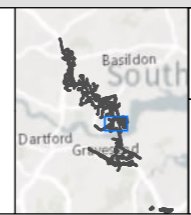


Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

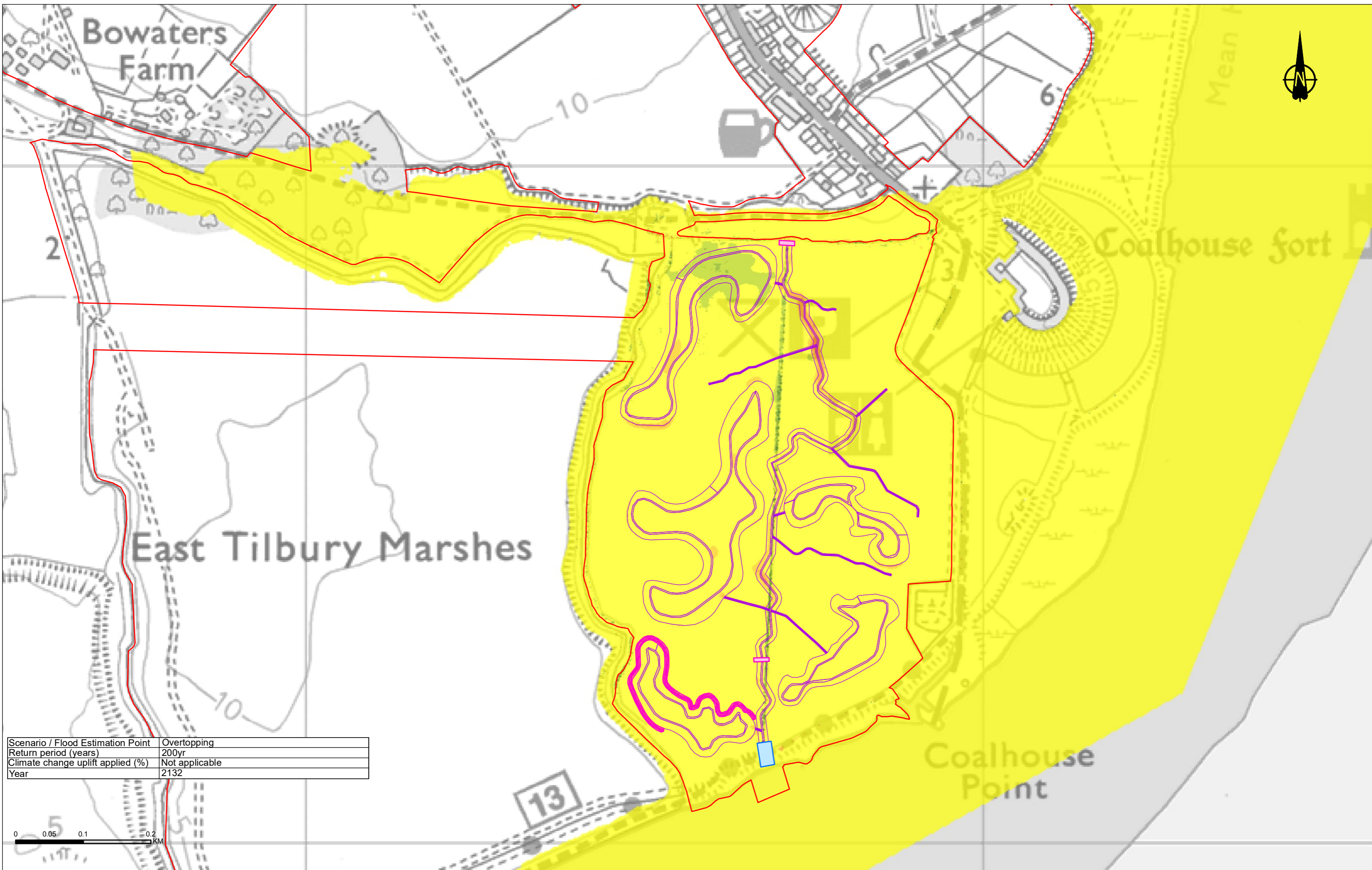
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	<VALUE>
	< -2.0
	-2.0 - -1.0
	-1.0 - -0.5
	-0.5 - -0.25
	-0.25 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 8 of 9 - Figure A92				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	21/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

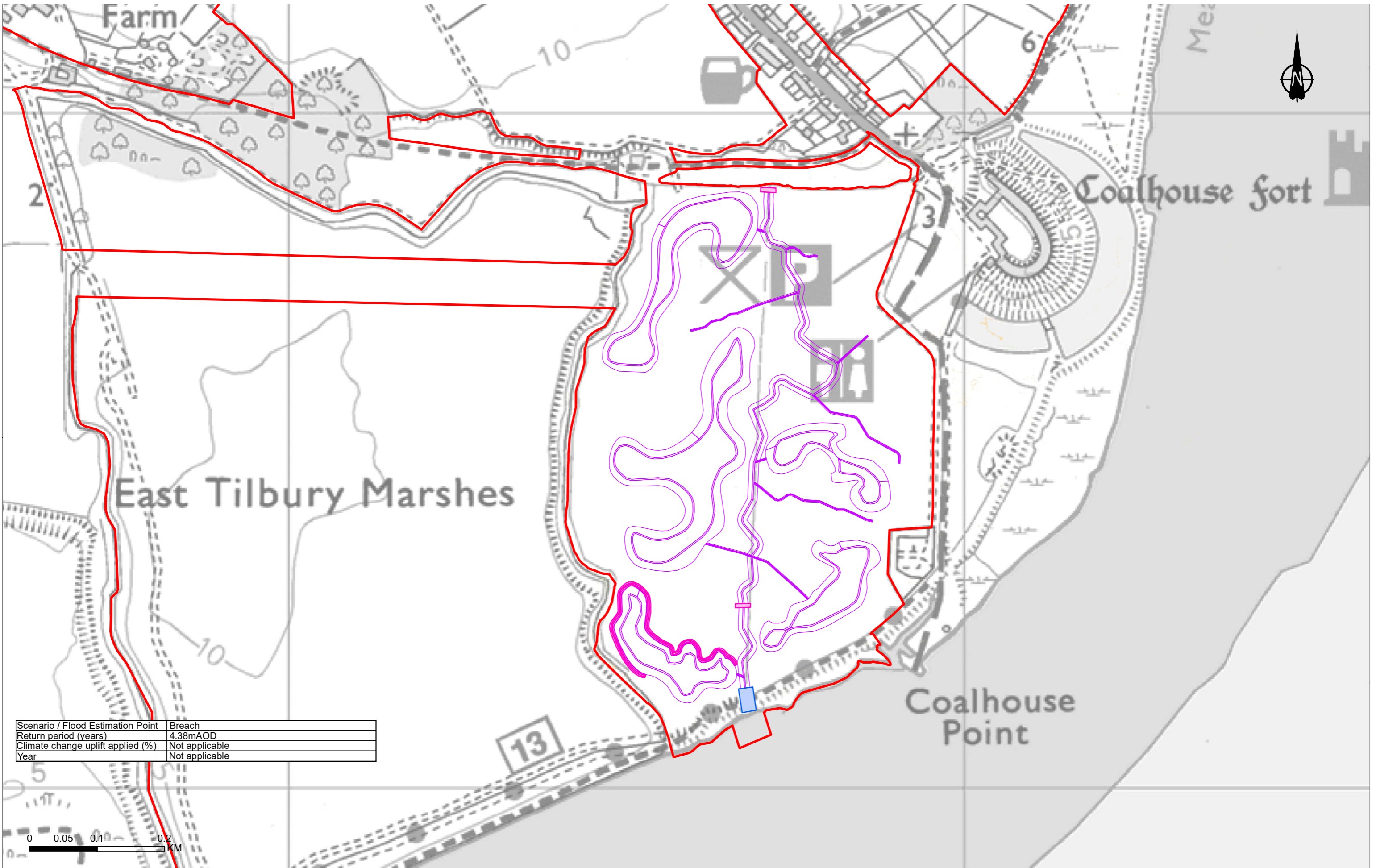
Legend	
	Order Limits
	Shallow scrapes and ditches
	Embankments
	Water level control inlet
	Water level control structures
	<VALUE> <-2.0
	<-2.0 - -1.0
	<-1.0 - -0.5
	<-0.5 - -0.25
	<-0.25 - 0.25
	0.25 - 0.5
	0.5 - 1.0
	1.0 - 2
	> 2.0



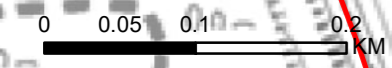
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Coalhouse Point Modelling Results Difference in maximum flood velocity Post-(with mitigation) minus pre-development Sheet 9 of 9 - Figure A93				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91019				



Scenario / Flood Estimation Point	Breach
Return period (years)	4.38mAOD
Climate change uplift applied (%)	Not applicable
Year	Not applicable



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

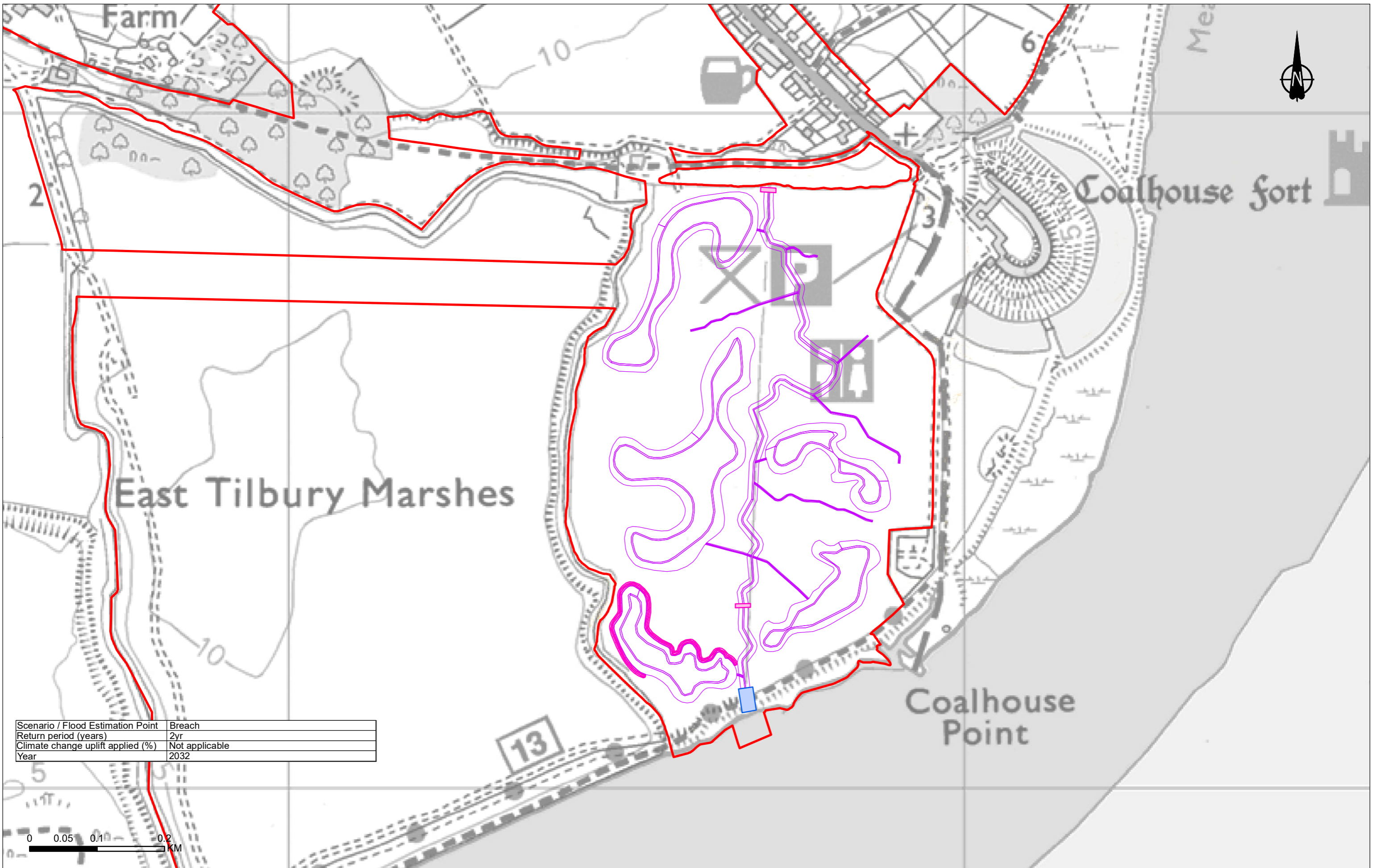
Order Limits	Degree of hazard increased by 4 category	No change on degree of hazard
Shallow scrapes and ditches	Degree of hazard increased by 3 category	Degree of hazard decreased by 1 category
Embankments	Degree of hazard increased by 2 category	Degree of hazard decreased by 2 category
Water level control inlet	Degree of hazard increased by 1 category	Degree of hazard decreased by 3 category
Water level control structures		Degree of hazard decreased by 4 category



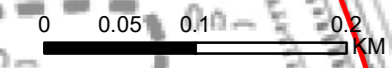
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 1 of 9 - Figure A94				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640

P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

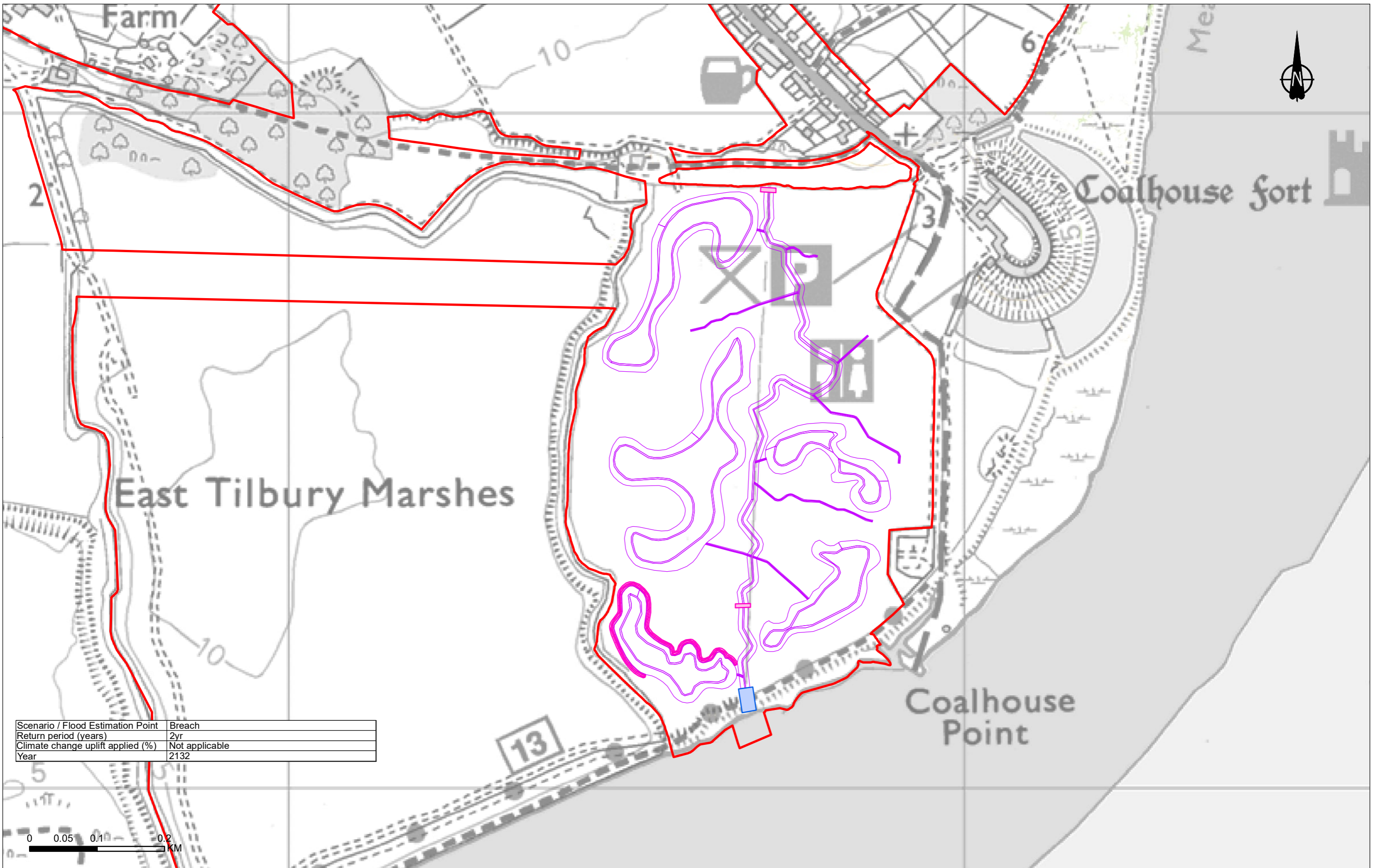
Order Limits	Degree of hazard increased by 4 category	No change on degree of hazard
Shallow scrapes and ditches	Degree of hazard increased by 3 category	Degree of hazard decreased by 1 category
Embankments	Degree of hazard increased by 2 category	Degree of hazard decreased by 2 category
Water level control inlet	Degree of hazard increased by 1 category	Degree of hazard decreased by 3 category
Water level control structures		Degree of hazard decreased by 4 category



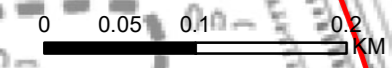
Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 2 of 9 - Figure A95				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				



Scenario / Flood Estimation Point	Breach
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132



Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

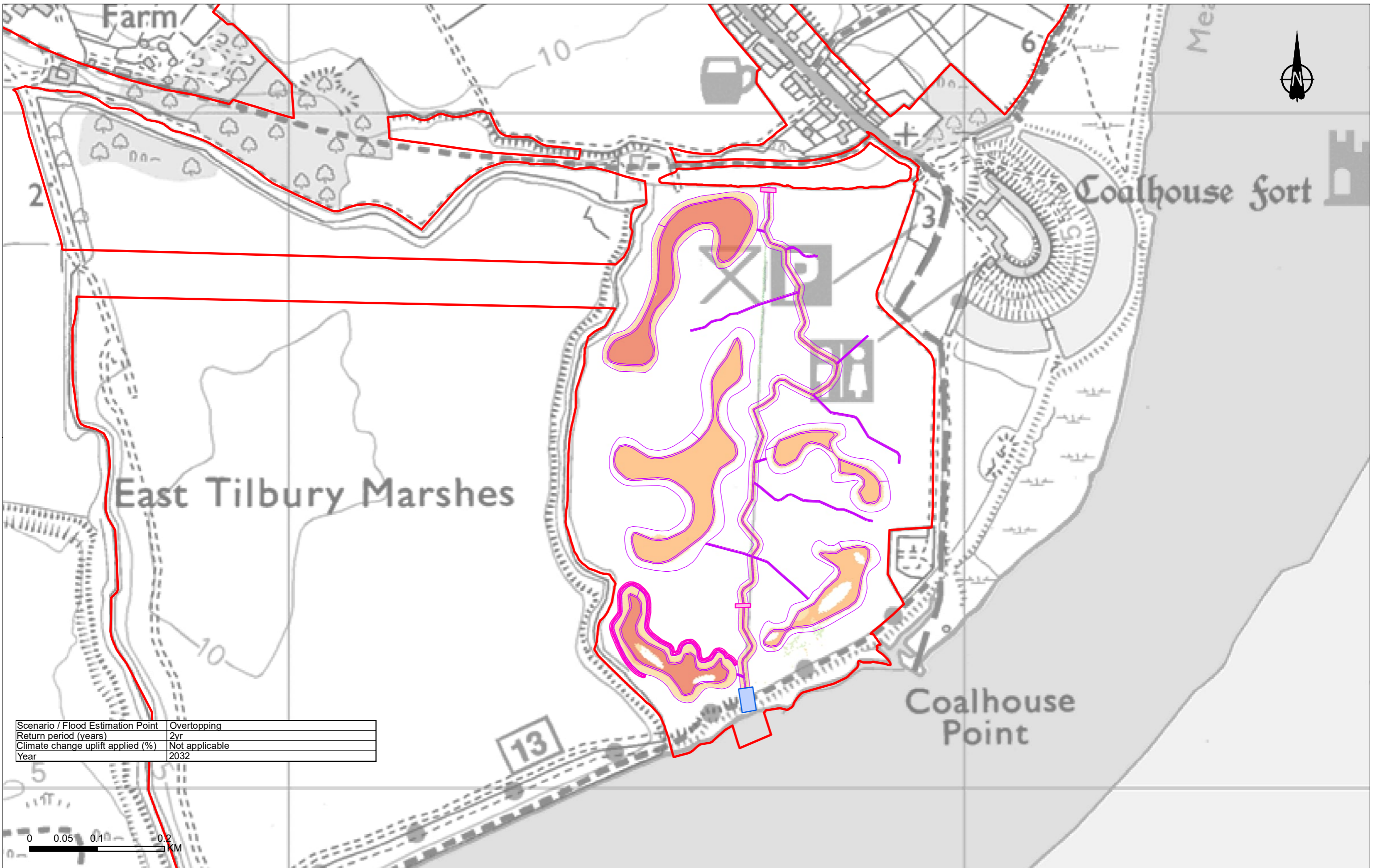
Order Limits	Degree of hazard increased by 4 category	No change on degree of hazard
Shallow scrapes and ditches	Degree of hazard increased by 3 category	Degree of hazard decreased by 1 category
Embankments	Degree of hazard increased by 2 category	Degree of hazard decreased by 2 category
Water level control inlet	Degree of hazard increased by 1 category	Degree of hazard decreased by 3 category
Water level control structures		Degree of hazard decreased by 4 category



Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 3 of 9 - Figure A96				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2032

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

- Order Limits
- Shallow scrapes and ditches
- Embankments
- Water level control inlet
- Water level control structures

Difference in maximum flood hazard category

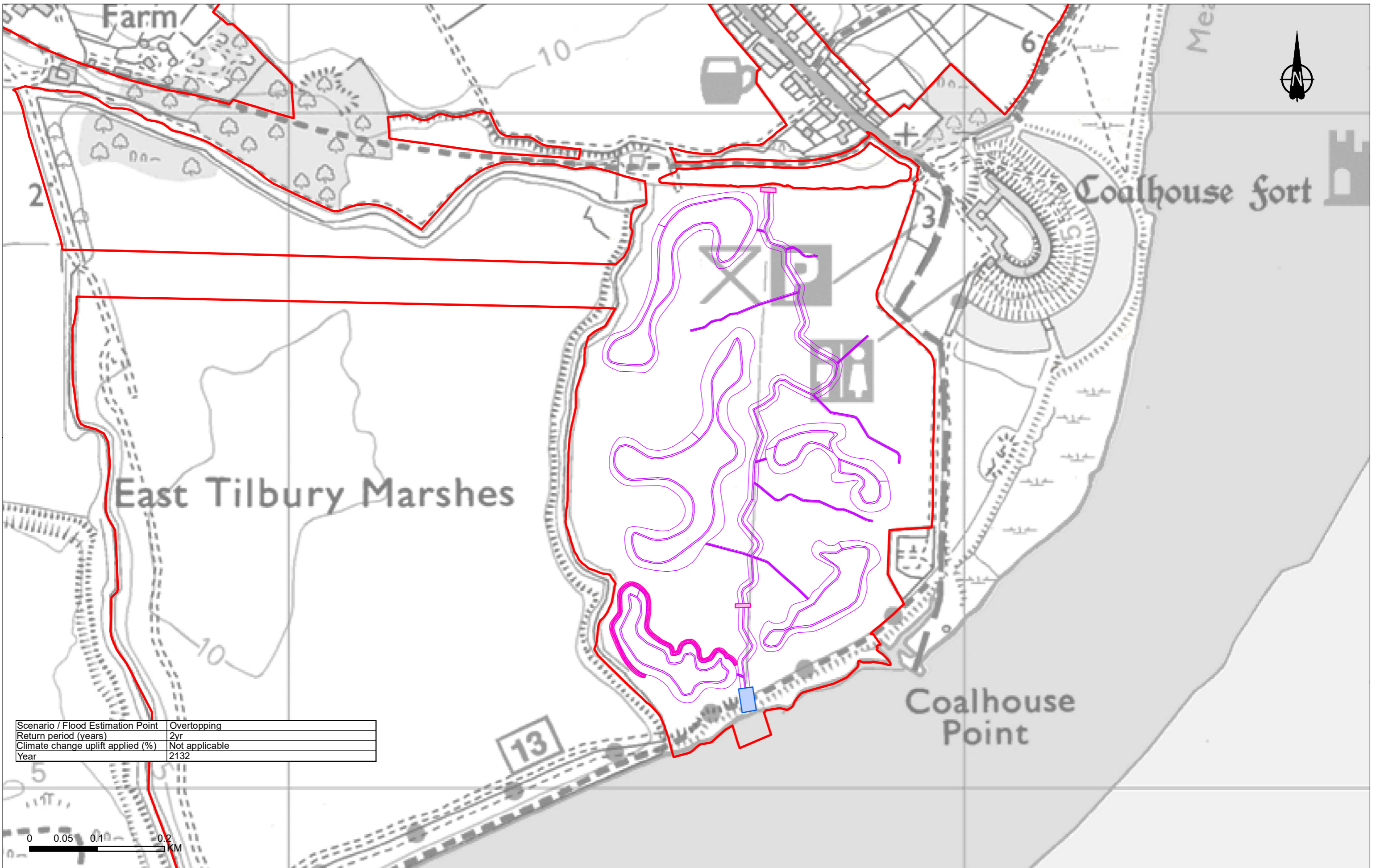
- Degree of hazard increased by 4 category
- Degree of hazard increased by 3 category
- Degree of hazard increased by 2 category
- Degree of hazard increased by 1 category
- No change on degree of hazard
- Degree of hazard decreased by 1 category
- Degree of hazard decreased by 2 category
- Degree of hazard decreased by 3 category
- Degree of hazard decreased by 4 category



Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 4 of 9 - Figure A97				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	2yr
Climate change uplift applied (%)	Not applicable
Year	2132

P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

- Order Limits
- Shallow scrapes and ditches
- Embankments
- Water level control inlet
- Water level control structures

Difference in maximum flood hazard category

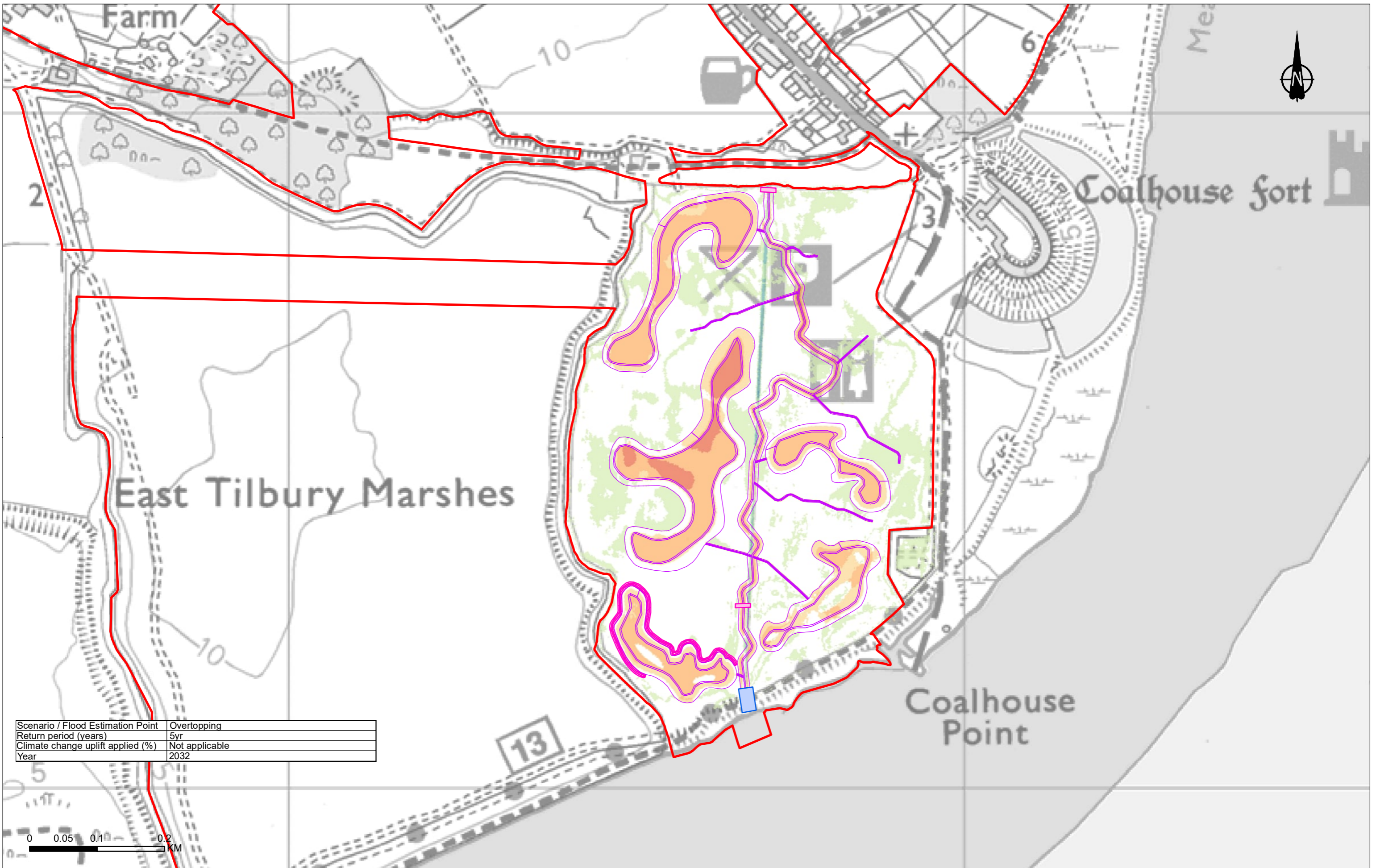
- Degree of hazard increased by 4 category
- Degree of hazard increased by 3 category
- Degree of hazard increased by 2 category
- Degree of hazard increased by 1 category
- No change on degree of hazard
- Degree of hazard decreased by 1 category
- Degree of hazard decreased by 2 category
- Degree of hazard decreased by 3 category
- Degree of hazard decreased by 4 category



Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 5 of 9 - Figure A98				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2032

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend

- Order Limits
- Shallow scrapes and ditches
- Embankments
- Water level control inlet
- Water level control structures

Difference in maximum flood hazard category

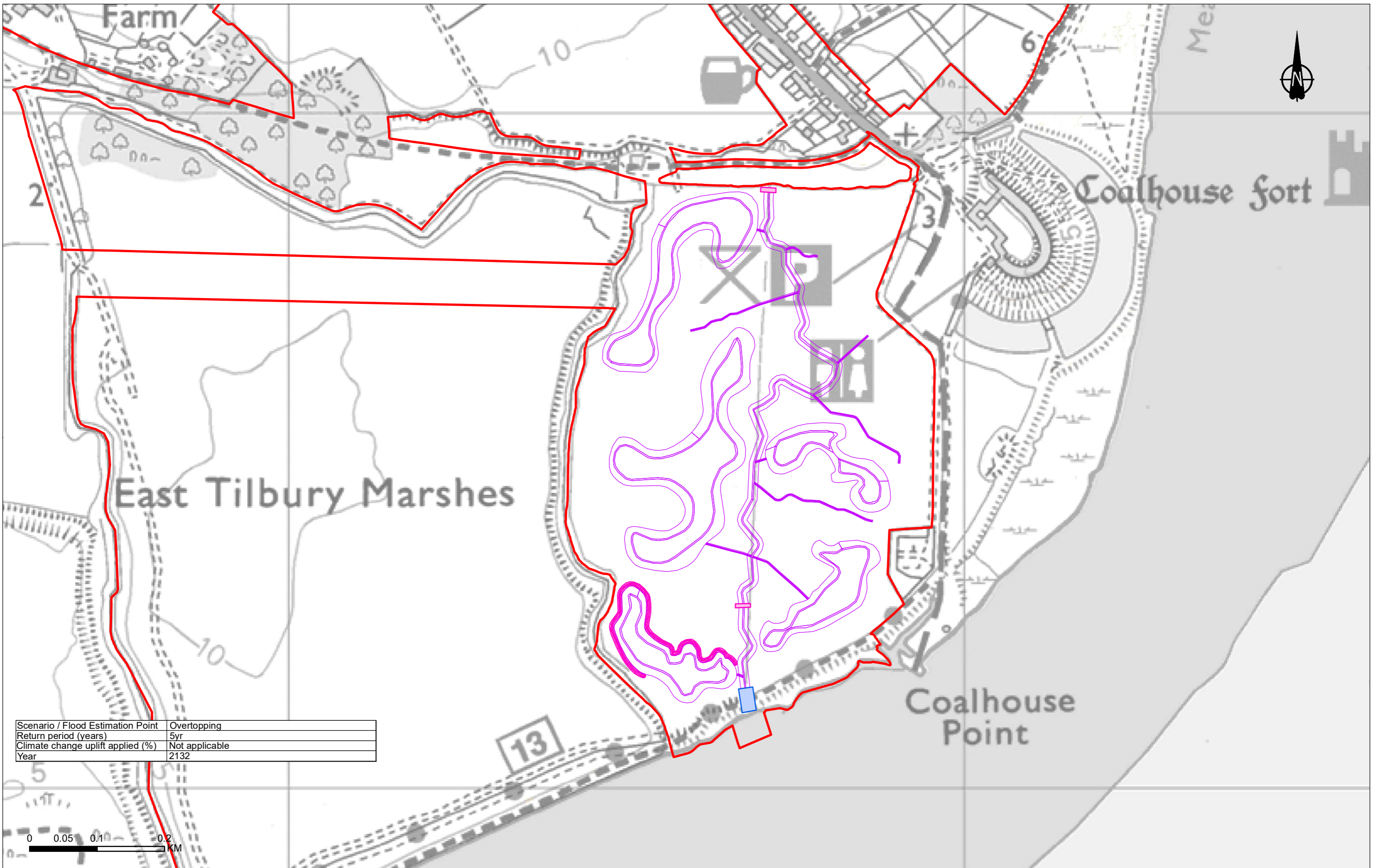
- Degree of hazard increased by 4 category
- Degree of hazard increased by 3 category
- Degree of hazard increased by 2 category
- Degree of hazard increased by 1 category
- No change on degree of hazard
- Degree of hazard decreased by 1 category
- Degree of hazard decreased by 2 category
- Degree of hazard decreased by 3 category
- Degree of hazard decreased by 4 category



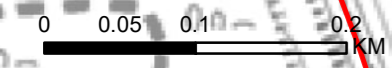
Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 6 of 9 - Figure A99				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	5yr
Climate change uplift applied (%)	Not applicable
Year	2132



P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

- Order Limits
- Shallow scrapes and ditches
- Embankments
- Water level control inlet
- Water level control structures

Difference in maximum flood hazard category

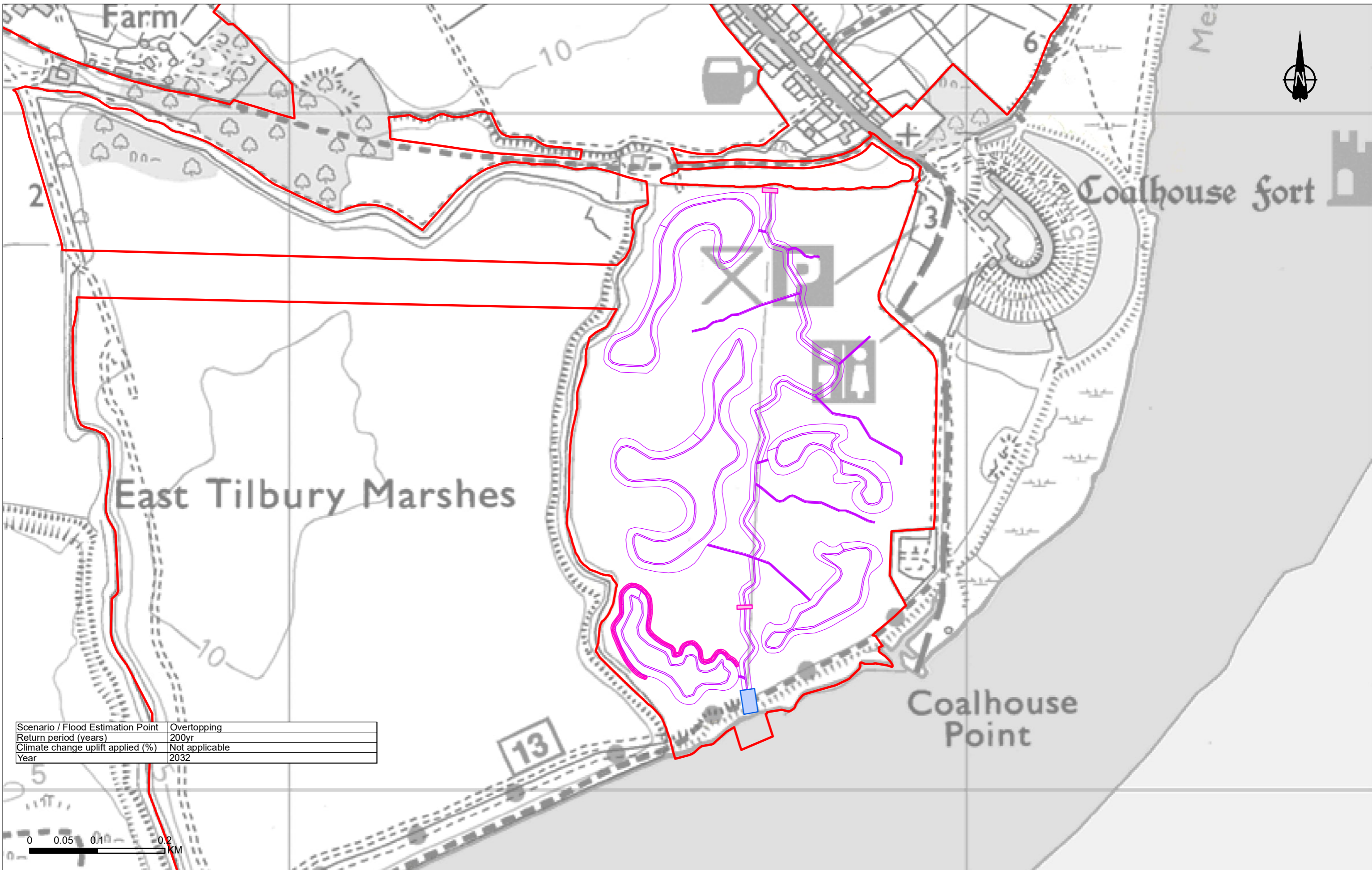
- Degree of hazard increased by 4 category
- Degree of hazard increased by 3 category
- Degree of hazard increased by 2 category
- Degree of hazard increased by 1 category
- No change on degree of hazard
- Degree of hazard decreased by 1 category
- Degree of hazard decreased by 2 category
- Degree of hazard decreased by 3 category
- Degree of hazard decreased by 4 category



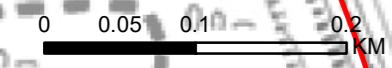
Client
national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 7 of 9 - Figure A100				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2032



P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chck'd	Apprv'd

Legend

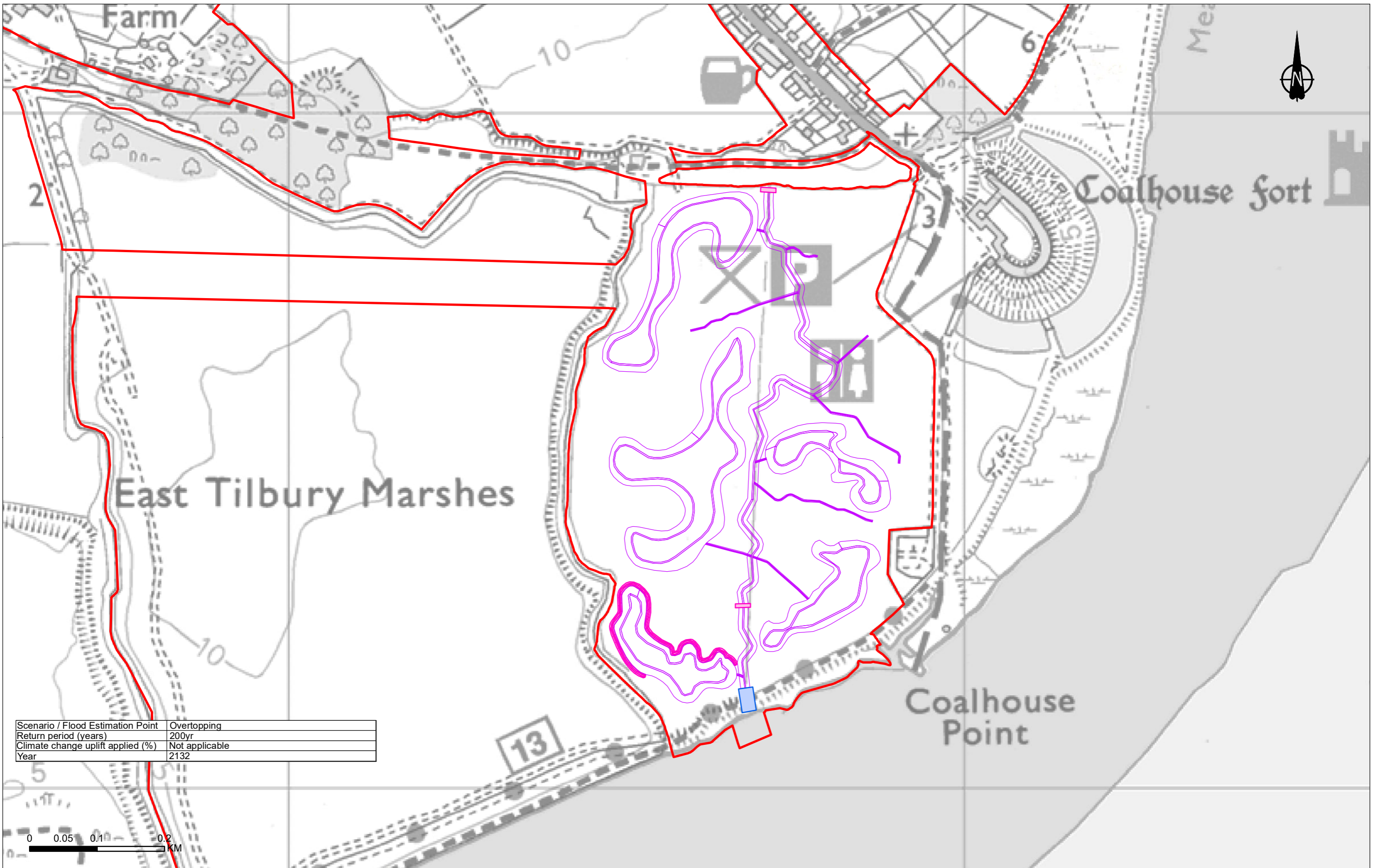
Order Limits	Degree of hazard increased by 4 category	No change on degree of hazard
Shallow scrapes and ditches	Degree of hazard increased by 3 category	Degree of hazard decreased by 1 category
Embankments	Degree of hazard increased by 2 category	Degree of hazard decreased by 2 category
Water level control inlet	Degree of hazard increased by 1 category	Degree of hazard decreased by 3 category
Water level control structures		Degree of hazard decreased by 4 category



Client: national highways

Project: LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 8 of 9 - Figure A101				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				



Scenario / Flood Estimation Point	Overtopping
Return period (years)	200yr
Climate change uplift applied (%)	Not applicable
Year	2132

Contains Ordnance Survey data. © Crown copyright and database rights 2022. Ordnance Survey 100030640						
P01	S9	22/08/2023	Deadline 6	KK	RB	BF
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk'd	Apprv'd

Legend

Order Limits	Degree of hazard increased by 4 category	No change on degree of hazard
Shallow scrapes and ditches	Degree of hazard increased by 3 category	Degree of hazard decreased by 1 category
Embankments	Degree of hazard increased by 2 category	Degree of hazard decreased by 2 category
Water level control inlet	Degree of hazard increased by 1 category	Degree of hazard decreased by 3 category
Water level control structures		Degree of hazard decreased by 4 category



Client
 national highways

Project
LOWER THAMES CROSSING

Status	S9	Original Size	A3	Revision	P01
Application Document Number	N/A	Scale	1:5,000		
Drawing title	FRA - Tilbury Modelling Results Difference in maximum flood hazard category Post-(with mitigation) minus pre-development Sheet 9 of 9 - Figure A102				
Drawing number	HE540039-CJV-EFR-SZP_GNZZZZZZZ-DR-LF-91020				

Annex B

- B.1.1 Plate B.1 shows the location of third-party stakeholder assets with potential for a change in flood risk as a result of the proposed Coalhouse Point wetland mitigation works.
- B.1.2 At the request of the Environment Agency, pre- and post-development flood risk at these locations is compared in Table B.1 to Table B.7, which demonstrate that the proposed wetland mitigation works would not adversely impact flood risk at these sites. There are no significant increases in maximum flood depth (i.e. with an increase in flood depth greater than 10mm) at any of the receptors in Table B.1 to Table B.7 and there are no increases in maximum hazard category at any of the receptors.

Plate B.1 The locations of third-party stakeholder assets assessed in Table B.1 to Table B.5

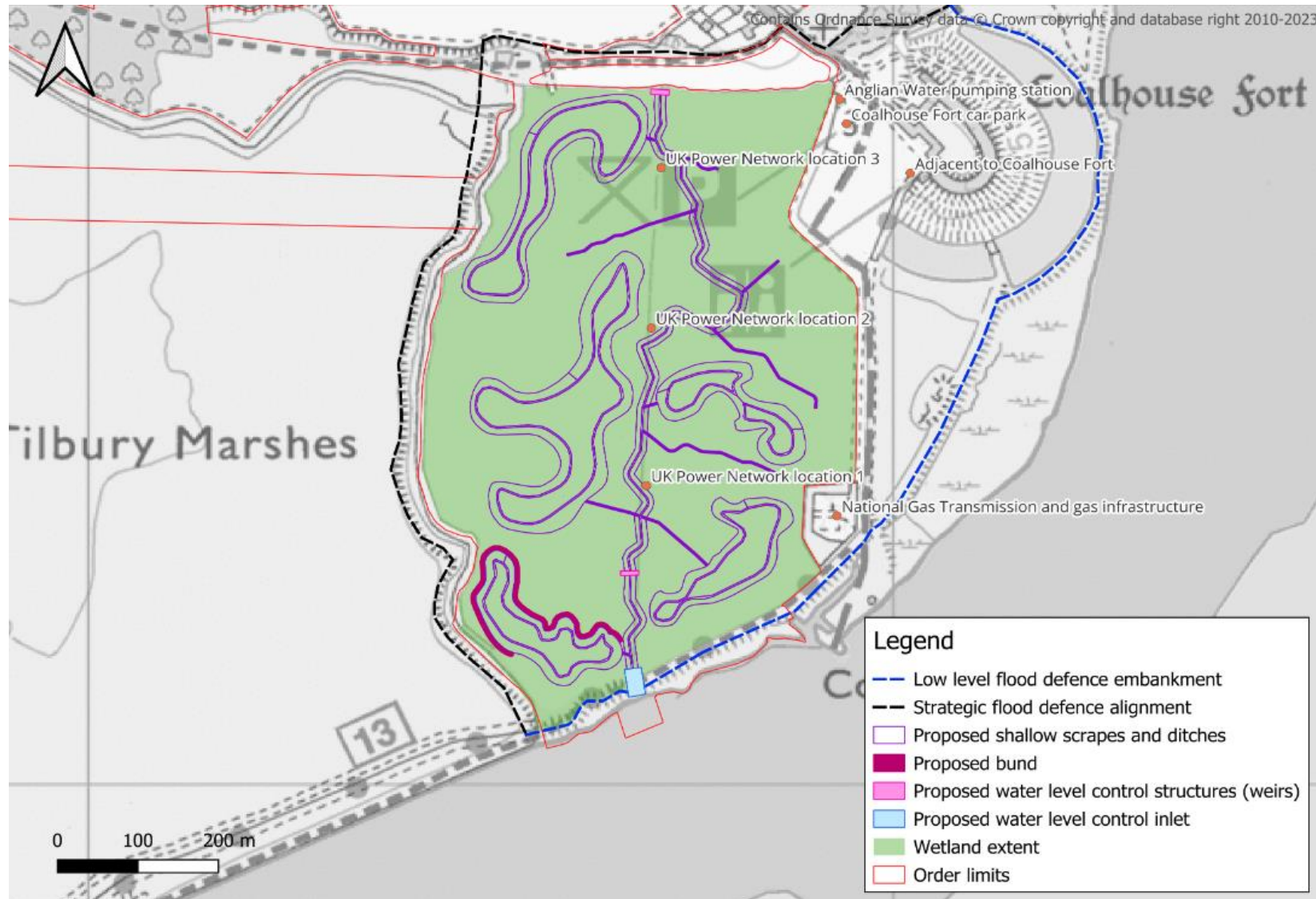


Table B.1 Pre- and post-development maximum flood depth and hazard category at the National Gas Transmission receptor

Simulated Event			Maximum Flood Depth (m)			Maximum Hazard Category		
Scenario	Tidal Design Event	Epoch	Pre-Development	Post-Development	Difference	Pre-Development	Post-Development	Difference
Breach	4.38mAOD	Not applicable	2.216	2.211	-0.005	4	4	0
Breach	2yr	2032	2.37	2.37	0	4	4	0
Breach	2yr	2132	3.828	3.83	0.002	4	4	0
Overtopping	2yr	2032	0	0	0	0	0	0
Overtopping	2yr	2132	3.826	3.826	0	4	4	0
Overtopping	5yr	2032	0.049	0	-0.049	1	0	-1
Overtopping	5yr	2132	3.973	3.974	0.001	4	4	0
Overtopping	200yr	2032	3.222	3.222	0	4	4	0
Overtopping	200yr	2132	4.522	4.522	0	4	4	0
Overtopping	1,000yr	2032	3.522	3.521	-0.001	4	4	0
Overtopping	1,000yr	2132	4.812	4.811	-0.001	4	4	0
Structure failure	2yr	2032	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable
Structure failure	2yr	2132	Post-dev only	3.826	Not applicable	Post-dev only	4	Not applicable
Structure failure	4.38mAOD	Not applicable	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable

Table B.2 Pre- and post-development maximum flood depth and hazard category at the Anglian Water receptor

Simulated Event			Maximum Flood Depth (m)			Maximum Hazard Category		
Scenario	Tidal Design Event	Epoch	Pre-Development	Post-Development	Difference	Pre-Development	Post-Development	Difference
Breach	4.38mAOD	Not applicable	1.912	1.906	-0.006	3	3	0
Breach	2yr	2032	2.064	2.064	0	4	4	0
Breach	2yr	2132	3.532	3.536	0.004	4	4	0
Overtopping	2yr	2032	0	0	0	0	0	0
Overtopping	2yr	2132	3.529	3.529	0	4	4	0
Overtopping	5yr	2032	0	0	0	0	0	0
Overtopping	5yr	2132	3.671	3.671	0	4	4	0
Overtopping	200yr	2032	2.97	2.969	-0.001	4	4	0
Overtopping	200yr	2132	4.219	4.219	0	4	4	0
Overtopping	1,000yr	2032	3.227	3.227	0	4	4	0
Overtopping	1,000yr	2132	4.505	4.505	0	4	4	0
Structure failure	2yr	2032	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable
Structure failure	2yr	2132	Post-dev only	3.529	Not applicable	Post-dev only	4	Not applicable
Structure failure	4.38mAOD	Not applicable	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable

Table B.3 Pre- and post-development maximum flood depth and hazard category at the UK Power Network location 1

Simulated Event			Maximum Flood Depth (m)			Maximum Hazard Category		
Scenario	Tidal Design Event	Epoch	Pre-Development	Post-Development	Difference	Pre-Development	Post-Development	Difference
Breach	4.38mAOD	Not applicable	2.394	2.391	-0.003	4	4	0
Breach	2yr	2032	2.549	2.551	0.002	4	4	0
Breach	2yr	2132	4.015	4.02	0.005	4	4	0
Overtopping	2yr	2032	0	0	0	0	0	0
Overtopping	2yr	2132	4.011	4.014	0.003	4	4	0
Overtopping	5yr	2032	0.175	0.12	-0.055	1	1	0
Overtopping	5yr	2132	4.157	4.159	0.002	4	4	0
Overtopping	200yr	2032	3.426	3.43	0.004	4	4	0
Overtopping	200yr	2132	4.705	4.707	0.002	4	4	0
Overtopping	1,000yr	2032	3.71	3.713	0.003	4	4	0
Overtopping	1,000yr	2132	4.994	4.995	0.001	4	4	0
Structure failure	2yr	2032	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable
Structure failure	2yr	2132	Post-dev only	4.013	Not applicable	Post-dev only	4	Not applicable
Structure failure	4.38mAOD	Not applicable	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable

Table B.4 Pre- and post-development maximum flood depth and hazard category at the UK Power Network location 2

Simulated Event			Maximum Flood Depth (m)			Maximum Hazard Category		
Scenario	Tidal Design Event	Epoch	Pre-Development	Post-Development	Difference	Pre-Development	Post-Development	Difference
Breach	4.38mAOD	Not applicable	2.388	2.369	-0.019	4	4	0
Breach	2yr	2032	2.542	2.528	-0.014	4	4	0
Breach	2yr	2132	4.01	4.001	-0.009	4	4	0
Overtopping	2yr	2032	0	0	0	0	0	0
Overtopping	2yr	2132	4.008	3.994	-0.014	4	4	0
Overtopping	5yr	2032	0.014	0	-0.014	1	0	-1
Overtopping	5yr	2132	4.15	4.138	-0.012	4	4	0
Overtopping	200yr	2032	3.436	3.423	-0.013	4	4	0
Overtopping	200yr	2132	4.698	4.685	-0.013	4	4	0
Overtopping	1,000yr	2032	3.706	3.693	-0.013	4	4	0
Overtopping	1,000yr	2132	4.985	4.972	-0.013	4	4	0
Structure failure	2yr	2032	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable
Structure failure	2yr	2132	Post-dev only	3.994	Not applicable	Post-dev only	4	Not applicable
Structure failure	4.38mAOD	Not applicable	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable

Table B.5 Pre- and post-development maximum flood depth and hazard category at the UK Power Network location 3

Simulated Event			Maximum Flood Depth (m)			Maximum Hazard Category		
Scenario	Tidal Design Event	Epoch	Pre-Development	Post-Development	Difference	Pre-Development	Post-Development	Difference
Breach	4.38mAOD	Not applicable	2.41	2.404	-0.006	4	4	0
Breach	2yr	2032	2.563	2.563	0	4	4	0
Breach	2yr	2132	4.032	4.04	0.008	4	4	0
Overtopping	2yr	2032	0	0	0	0	0	0
Overtopping	2yr	2132	4.032	4.032	0	4	4	0
Overtopping	5yr	2032	0.037	0	-0.037	1	0	-1
Overtopping	5yr	2132	4.173	4.173	0	4	4	0
Overtopping	200yr	2032	3.471	3.47	-0.001	4	4	0
Overtopping	200yr	2132	4.72	4.72	0	4	4	0
Overtopping	1,000yr	2032	3.729	3.729	0	4	4	0
Overtopping	1,000yr	2132	5.004	5.005	0.001	4	4	0
Structure failure	2yr	2032	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable
Structure failure	2yr	2132	Post-dev only	4.032	Not applicable	Post-dev only	4	Not applicable
Structure failure	4.38mAOD	Not applicable	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable

Table B.6 Pre- and post-development maximum flood depth and hazard category at the Coalhouse Fort car park

Simulated Event			Maximum Flood Depth (m)			Maximum Hazard Category		
Scenario	Tidal Design Event	Epoch	Pre-Development	Post-Development	Difference	Pre-Development	Post-Development	Difference
Breach	4.38mAOD	Not applicable	1.916	1.91	-0.006	3	3	0
Breach	2yr	2032	2.069	2.069	0	4	4	0
Breach	2yr	2132	3.537	3.541	0.004	4	4	0
Overtopping	2yr	2032	0	0	0	0	0	0
Overtopping	2yr	2132	3.534	3.533	-0.001	4	4	0
Overtopping	5yr	2032	0	0	0	0	0	0
Overtopping	5yr	2132	3.676	3.676	0	4	4	0
Overtopping	200yr	2032	2.972	2.972	0	4	4	0
Overtopping	200yr	2132	4.223	4.223	0	4	4	0
Overtopping	1,000yr	2032	3.232	3.232	0	4	4	0
Overtopping	1,000yr	2132	4.509	4.509	0	4	4	0
Structure failure	2yr	2032	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable
Structure failure	2yr	2132	Post-dev only	3.533	Not applicable	Post-dev only	4	Not applicable
Structure failure	4.38mAOD	Not applicable	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable

Table B.7 Pre- and post-development maximum flood depth and hazard category adjacent to Coalhouse Fort

Simulated Event			Maximum Flood Depth (m)			Maximum Hazard Category		
Scenario	Tidal Design Event	Epoch	Pre-Development	Post-Development	Difference	Pre-Development	Post-Development	Difference
Breach	4.38mAOD	Not applicable	1.207	1.201	-0.006	3	3	0
Breach	2yr	2032	1.36	1.359	-0.001	3	3	0
Breach	2yr	2132	2.826	2.829	0.003	4	4	0
Overtopping	2yr	2032	0	0	0	0	0	0
Overtopping	2yr	2132	2.823	2.823	0	4	4	0
Overtopping	5yr	2032	0	0	0	0	0	0
Overtopping	5yr	2132	2.965	2.965	0	4	4	0
Overtopping	200yr	2032	2.257	2.259	0.002	4	4	0
Overtopping	200yr	2132	3.513	3.513	0	4	4	0
Overtopping	1,000yr	2032	2.521	2.521	0	4	4	0
Overtopping	1,000yr	2132	3.801	3.8	-0.001	4	4	0
Structure failure	2yr	2032	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable
Structure failure	2yr	2132	Post-dev only	2.823	Not applicable	Post-dev only	4	Not applicable
Structure failure	4.38mAOD	Not applicable	Post-dev only	0	Not applicable	Post-dev only	0	Not applicable

If you need help accessing this or any other National Highways information, please call **0300 123 5000** and we will help you.

© Crown copyright 2023.

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence:

visit www.nationalarchives.gov.uk/doc/open-government-licence/

write to the **Information Policy Team, The National Archives, Kew, London TW9 4DU**, or email psi@nationalarchives.gsi.gov.uk.

Mapping (where present): © Crown copyright and database rights 2023 OS 100030649. You are permitted to use this data solely to enable you to respond to, or interact with, the organisation that provided you with the data. You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form.

If you have any enquiries about this publication email info@nationalhighways.co.uk or call **0300 123 5000***.

*Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls.

These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone. Calls may be recorded or monitored.

Printed on paper from well-managed forests and other controlled sources when issued directly by National Highways.

Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ

National Highways Limited registered in England and Wales number 09346363