Environment Agency
NEC4 professional services contract (PSC)
Modelling Scope

Project / contract Information

Project name	Broadland Futures Initiative (Phase B – Modelling: Coastal Updating)
Project 1B1S reference	ENV0001344C
Contract reference	32731
Date	28 April 2021
Version number	V4
Environment Agency Area	East Anglia
Author	[redacted]
Area Modelling Leads	[redacted]
E&R Modelling Lead	[redacted]

Revision history

Revision date	Summary of changes	Version number
11 Feb 2021	First issue	V1
19 Feb 2021	Second issue updated with technical requirements	V2
27 Apr 2021	Final version pending CSM review	V3
28 Apr 2021	Final version	V4

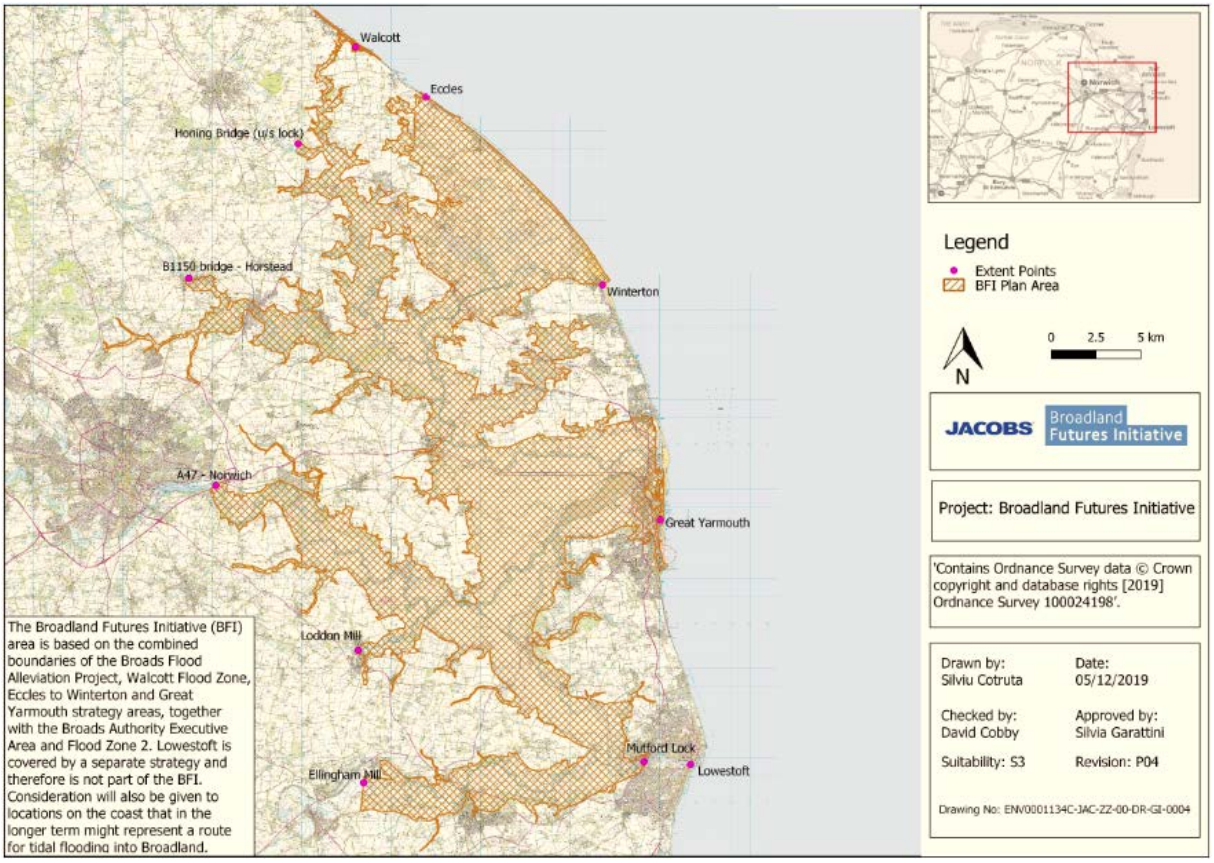
This Scope should be read in conjunction with the versions of the two Minimum Technical Requirement documents current at the Contract Date (see section 2.2 for details of these). In the event of conflict the Scope shall prevail.

Overview

The following section provides an overview of the Broadland Futures Initiative (BFI) to which this NEC4 PSC contributes.

The BFI project will produce a plan defining flood risk management policy and implementation measures across the Norfolk and Suffolk Broadland, the Eccles to Winterton coastal frontage and Great Yarmouth (see Figure 1). The plan will consider the next 100 years and will be for all Risk Management Authorities (RMAs) and stakeholders. The benefits provided by the project are that future flood risk will be managed to an agreed and accepted level; there will be broad agreement on the actions required to achieve this level of risk; and a degree of confidence concerning the likelihood of the actions being funded.

Figure 1: The BFI plan area



Given the 100 year perspective of the plan a key consideration is the impact of anticipated climate change during this time. Of particular importance is climate related sea level rise, but also changes in rainfall affecting fluvial flows, water resources and water quality. Against this background the BFI will seek to realise the ambitions of the national flood and coastal erosion risk management (FCERM) strategy for England of creating 'climate resilient places' where a community or place is able to adapt and be resilient to all sources of flooding or coastal change.

Because of inherent uncertainty concerning the nature and rate of future climate change, especially in the medium to long term, the plan will need to adopt an agile approach. Consequently the detail in the plan for the medium and long term with respect both policy and implementation measures, and the geographical scale of these will be less clear. To deal with such uncertainty the project will use an 'adaptation pathways approach'. Through this we will identify key points in future when certain indicator thresholds are met (but the timing of which

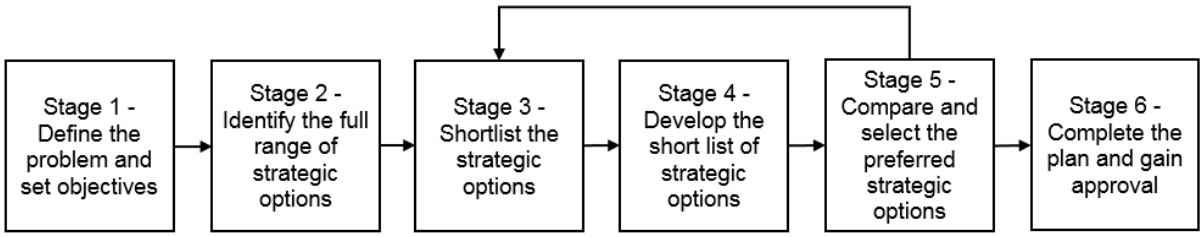
are unsure) where decisions will need to be made concerning the next steps, potentially from a range of alternatives. The BFI will therefore provide a route map from the present situation to the future.

The implementation measures will be those activities intended to deliver the desired policy outcomes. This will consider the full range of conventional flood risk and coastal management techniques together with more novel approaches. These measures may be both structural and non-structural in nature.

The project is being led by the *Client* and Others, principally the Broads Authority. The *Client* is leading on the technical information required in order to produce the plan while the Broads Authority leads on the stakeholder engagement. The remaining Others, comprising members of the Initiative Project Team, include county and district councils, Internal Drainage Boards, Natural England, the National Farmers Union, Water Resources East and RSPB.

The overall process to produce the plan will follow the stages (numbered 1 to 6) shown in Figure 2, based on *Client* guidance for production of flood and coastal risk management strategy plans (OI 84_09).

Figure 2: BFI plan development stages



To date work has been taking place on Stage 1, which is due to complete in autumn 2021. Key to the subsequent stages will be the ability to understand the feasibility, benefits and dis-benefits of the possible strategic flood risk management options. This in turn requires the ability to understand the hydrological behaviour of the plan area, both today in normal and extreme conditions, and in the future with climate change.

Through the Collaborative Delivery Framework (CDF) Lot 1 Jacobs UK Ltd. (Jacobs) have been appointed as consultants to produce a range of products arising from Stage 1. This has included a review of the existing hydraulic modelling covering the plan area. The conclusion of the review was a recommendation that a new hydraulic model is produced to cover the Broadland rivers, updating and replacing the current model developed by Broadland Environmental Services Ltd, plus a number of standalone models for particular tributaries. In addition some updating is required for existing coastal models.

Separate to the BFI the Environment Agency Norfolk and Suffolk Partnerships and Strategic Overview (PSO) team have identified the need in relation to their work for new hydraulic modelling covering Broadland. This new flood risk modelling is required to support the following activities; flood risk planning (e.g. responding to planning applications); strategic flood risk assessments (SFRAs); incident response; permitting and asset planning/function; strategic planning and Outcome Measure delivery; environmental schemes (e.g. saline incursion, restoration).

The BFI model review concluded that both the BFI and PSO requirements can be met by the new hydraulic model for the Broads and the standalone reach models, therefore such an approach is being taken forward.

The Broadland modelling work is being undertaken by consultants Jacobs under CDF Lot 1 as a follow on contract (Phase B) to their initial work. A contract Scope has been produced comprising; a Non-technical Scope; Technical Scope; and the Minimum Technical Requirements for modelling (see Sections 2.2 and 4 for more details).

However, there is an element of the Broadland modelling work comprising the updating of wave transformation and overtopping for existing coastal modelling that will not be done by Jacobs.

1. Objectives

1.1.1 To update the wave transformation and wave overtopping modelling to input into the following coastal models originally produced by Jeremy Benn Associates (JBA) Consulting:

a) Lowestoft
b) Great Yarmouth
c) Thurne, Hickling & Coast
d) Walcott

1.1.2 The update will be with respect to the following elements:

a) updated tidal boundaries considering new coastal flood boundary data and climate change guidance for the 2025 and 2125 epochs
b) updated defence profiles and defence information (crest and toes)

1.1.3 The output of this work will be incorporated into the Broadland modelling work undertaken by Others (Jacobs).

2. Outcome Specification

2.1. *Consultant* technical *services* and outputs

2.1.1 The *Consultant* is required to check a sample of the uplifted tidal data and confirm that this has been updated in line with the latest guidance.

2.1.2 The *Consultant* is required to use uplifted tidal data (to the highest climate change scenario) to update wave transformation modelling. To do this a small sample of model runs (approximately 50) shall be extracted and added to the training data for the emulators. The *Consultant* is required to train the emulators and recalculate the wave data in the nearshore for the 2025, 2125 and other climate change epochs required. Additional epochs beyond 2025 and 2125 shall be considered as a Compensation Event (CE).

2.1.3 The *Consultant* is required to check over the supplied defence information provided by Jacobs our Collaborative Delivery Framework (CDF) Lot 1 supplier to determine if additional updates are required to the wave overtopping modelling beyond those described below.

2.1.4 The *Consultant* shall update defence schematisations based on changes identified by Jacobs. For defended profiles it shall be assumed that the defence toe levels remain the same.

2.1.5 The *Consultant* is also required to schematise ‘without defences’ profiles where required. For these calculations, the *Consultant* is required to assess whether the

inclusion of wave overtopping for these frontages is likely to be significant enough to impact inundation model outputs utilising the previous coastal modelling (additional model runs are not expected for this activity) and identify locations where this might occur. If wave overtopping is likely to be significant, then profiles will need to be schematised for these 'without defences' frontages as required.

2.1.6 The *Consultant* shall update the wave overtopping modelling utilising the updated wave transformation data at the nearshore and updated defence schematisation for defended and 'without defences' profiles for all AEPs required for input into the inundation models.

2.1.7 Outputs shall be provided in accordance with the requirements outlined in the *Client* Minimum Technical Requirements where relevant (see 2.2.1 and 2.2.2).

2.1.8 The *Client* requires several phases of output delivery for review as detailed below:

1. Method Statement – This shall set out the preferred approach by the *Consultant* for agreement with the *Client*. This shall also include the deliverable inventory and data requirements.
2. Technical Note on Tidal Uplifts – This shall include the *Consultant's* checks of the tidal input data for the *Client*.
3. Technical Note on 'Without Defences' wave overtopping – This shall include the *Consultant's* assessment of whether wave overtopping needs to be included in the 'without defences' scenarios and identify the defence schematisations that need to be updated for the 'without defences' scenarios.
4. Final Deliverables – The final deliverables shall include all relevant outputs identified in the Minimum Technical Requirements, including the following key outputs:
    a. Wave overtopping time series data for appropriate AEPs for use in the coastal inundation models, as well as guidance on how to input this into the coastal inundation models appropriately.
    b. Model technical note detailing the methodology, updated tidal inputs, updated defence schematisation, data and limitations, model performance, limitations, recommendations, outputs and conclusions. This shall also include a summary on the previous technical notes provided.
    c. Updated models and input data.
    d. All model outputs (including raw outputs and logs).
    e. Decision Log (a record of key decisions made in the project and justification (if not already included in the technical notes provided).

2.2. Specifications of standards to be used

2.2.1 The services are to be compliant with the following versions of the Minimum Technical Requirement documents:

Document	Document Title	Version No	Issue Date
412_13_SD01	Minimum Technical Requirements	-	22 April 2021
NEC4 Minimum Technical	NEC4 Minimum Technical Requirements for Modelling_v2.1	2.1	20 September 2020

Requirements for Modelling_v2.1			

2.2.2 The NEC4 Minimum Technical Requirements (MTR's) for Modelling outline extensive reporting requirements. For the purpose of this study:

1. All reporting to be provided in PDF and native format.
2. All reports (including drafts) to be fully quality checked for spelling, grammar, formatting, continuity and mapping errors prior to submission to *Client*. If significant numbers of defects of this nature are identified in a report, it will be returned to the *Consultant* for the report to be updated and the review will be put on hold until the report is re-provided.
3. All reports (including drafts) shall be technically correct.
4. All figures (including maps) and tables shall be clear, concise and enhance communication of the study.
5. All recommendations shall be fully explained and justified within the final report.

2.3. *Consultant* project management

2.3.1 The requirements for the management of the work shall include the following:

2.3.2 The *Consultant* is required to work with Jacobs on the project ensuring a collaborative approach.

2.3.3 The Consultant shall attend via Microsoft Teams or similar means, meetings with the Client at:

a) contract start-up
b) mid-contract (following receipt of data from Jacobs)
c) final handover

Assume 3 hours for each meeting.

2.3.4 The *Consultant* shall take minutes from all meetings listed in 2.3.3, record details of all key decisions agreed with the *Client*, and ensure management of actions arising from these meetings inclusive of capturing actions in a log, prioritising the actions, assigning action owners, setting action deadlines, tracking action progress and close out, and highlighting impacts to the project of delays in completing actions. Meeting minutes shall be issued to the *Client* within a week of the meeting taking place.

2.3.5 The *Consultant* shall provide a list of data requirements necessary to enable service delivery. This list shall be provided to the *Client* at the project start-up meetings, if not before, and shall be updated as required thereafter.

2.3.6 The *Consultant* shall provide comprehensive responses to *Client* queries about the project and deliverables, to the *Client's* reasonable satisfaction, until the contract is completed.

2.3.7 The *Consultant* shall provide and respond to contractual communications on FastDraft. Early Warnings to be issued on FastDraft and risk mitigation meetings arranged in accordance with the contract.

2.3.8 For the duration of this contract and unless instructed otherwise by the *Client*, the *Consultant* shall attend fortnightly progress updates for the Broadland modelling work

hosted by Jacobs via Microsoft Teams, or equivalent means. Assume 2 hours for each meeting.

2.3.9 The *Consultant* shall receive data from Jacobs in order to provide the services. The *Consultant* is to communicate directly with Jacobs concerning technical issues. The *Consultant* is to keep a record of any such communications and make the *Client* aware of these and any planned ad hoc technical meetings. Such technical meetings will be at the reasonable request of the *Client*, Jacobs or the *Consultant* and will be attended by the *Consultant*.

2.3.10 The *Consultant* shall own the following identified risks, which have the potential to impact on delivery.

Risk	Effect
Errors in data received from Jacobs, need for review.	Additional time and cost.
Data changes during the contract.	Additional time and cost.
Delays in the *Consultants* completion of the work.	Additional time and cost.
Requirements of the Scope misunderstood.	Additional time and cost.
Consultant staff sickness or changes.	Additional time and cost.
Data not in the right format for Jacobs to use (and vice versa).	Additional time and cost.

2.4. Requirements of the programme

2.4.1 The overall requirements of the programme include the following:

2.4.2 The *Consultant* shall provide a detailed programme in Microsoft Project format, meeting all requirements of NEC4 PSC Clause 31 of the conditions of contract. The programme must show critical path activities, float, and all the activities to be undertaken by the *Consultant* and other members of the project team. Activities requiring *Client* or Jacobs input shall be clearly identified.

2.4.3 The *Consultant* shall provide a baseline version of the programme at the start-up meeting, and this shall be updated monthly in accordance with NEC4 PSC Clause 32 with actual and forecast progress against the baseline. Slippage against baseline shall be clearly indicated.

2.4.4 The programme shall also include alignment and submission of the Business Execution Plan (BEP) and Master Information Delivery Plan (MIDP).

2.4.5 The *Consultant* will allow 15 working days for the *Client* review of deliverables.

2.4.6 The *Consultant* will provide 10 working days' notice of submission for the *Client* review of deliverables.

2.4.7 The final deliverables and reporting must be approved by the *Client* prior to project sign off. Acceptance would not be unreasonably withheld.

3. *Services* and other things provided by the *Client*

3.1.1 The *services* and other things that will be provided to the *Consultant* by the *Client* shall include the following:

3.1.2 The following existing coastal models:
a) Lowestoft
b) Great Yarmouth
c) Thurne, Hickling & Coast
d) Walcott

3.1.3 Any other data relevant to the projects owned by the *Client* which is requested by the *Consultant* will be provided along with a data licence.

3.1.4 All of the data listed as being supplied to the *Consultant* as part of these studies remains the IP of the *Client*.

3.1.5 Asite

3.1.6 FastDraft

4 Drawings, site information or reports already available

4.1.1 East Anglian Coastal Modelling undertaken by JBA Consulting on behalf of the Environment Agency (February 2019).

4.1.2 The *Client* is responsible for the accuracy & sufficiency of existing data owned by the *Client*. The *Client* will only cover costs of sourcing new data, if existing *Client* supplied data is proven to be incomplete or to contain mistakes or errors.

Appendix 1 BIM Protocol – Production and Delivery Table

All Client issued information referenced within the MIDP requires verifying by the *Consultant* unless it is referenced elsewhere within the Scope.

The MIDP is hosted in the BFI project Asite workspace.