

This document is executed as an Underhand and is delivered and takes effect at the date written at the beginning of it



Framework: Collaborative Delivery Framework
Supplier: Ove Arup & Partners Ltd
Company Number: 01312453

Geographical Area: North East
Contract Name: Back Waterloo Remediation
Project Number: [REDACTED]

Contract Type: Professional Service Contract
Option: Option C

Contract Number:

Stage: SOC_to_OBC

Revision	Status	Originator	Reviewer	Date

**PROFESSIONAL SERVICE CONTRACT under the Collaborative Delivery Framework
CONTRACT DATA**

Project Name Back Waterloo Remediat on

Project Number [REDACTED]

This contract is made on
between the *Client* and the *Consultant*

- This contract is made pursuant to the Framework Agreement (the "Agreement") dated 01st day of April 2019 and Framework Agreement Extension dated 1st April 2023 between the *Client* and the *Consultant* in relation to the Collaborative Delivery Framework. The entire agreement and the following Schedules are incorporated into this Contract by reference
- Schedules 1 to 23 inclusive of the Framework schedules are relied upon within this contract.
- The following documents are incorporated into this contract by reference
Arup OBC Scope Backwaterloo v.03a

Part One - Data provided by the *Client*

**Statements given in
all Contracts**

1 General

The *conditions of contract* are the core clauses and the clauses for the following main Option, the Opt on for resolving and avoiding disputes and secondary Options of the NEC4 Professional Service Contract June 2017.

Main
Opt on

Opt on C

Option for resolving and
avoiding disputes

W2

Secondary Options

X2: Changes in the law

X7: Delay damages

X9: Transfer of rights

X10: Information on modelling

X11: Termination by the *Client*

X18: Limitation of liability

X20: Key Performance Indicators

Y(UK)2: The Housing Grants, Construction and Regeneration Act 1996

Y(UK)3: The Contracts (Rights of Third Parties) Act 1999

Z: *Additional conditions of contract*

The *service* is

Delivery of Outline Business Case

The *Client* is

Environment Agency

Address for communications

Horizon House
Deanery Road
Bristol
BS15AH

Address for electronic communications

[REDACTED]

The *Service Manager* is
Address for communications

[REDACTED]
Environment Agency
8 City Walk
Leeds
LS11 9AT

Address for electronic communications [REDACTED]

The Scope is in
Arup OBC Scope Backwaterloo v.03a

The *language of the contract* is English

The *law of the contract* is
the law of England and Wales, subject to the jurisdiction of the courts of England and Wales

The period for reply is 2 weeks

The *period for retention* is 6 years following Completion or earlier termination

The following matters will be included in the Early Warning Register

Early warning meetings are to be held at intervals no longer than 2 weeks

2 The Consultant's main responsibilities

The *key dates and conditions* to be met are
conditions to be met *key date*

'none set' 'none set'

'none set' 'none set'

'none set' 'none set'

The *Consultant* prepares forecasts of the total Defined Cost plus Fee and *expenses* at intervals no longer than 4 weeks

3 Time

The *starting date* is 14 August 2023

The *Client* provides access to the following persons, places and things
access *access date*

The *Consultant* submits revised programmes at intervals no longer than 4 weeks

The *completion date* for the whole of the *service* is 14 August 2024

The period after the Contract Date within which the *Consultant* is to submit a first programme for acceptance is 4 weeks

4 Quality management

The period after the Contract Date within which the *Consultant* is to submit a quality policy statement and quality plan is 4 weeks

The period between Completion of the whole of the *service* and the *defects date* is 26 weeks

5 Payment

The *currency of the contract* is the £ sterling

The *assessment interval* is Monthly

The *Client* set total of the *Pr ces* is [REDACTED]

The *expenses* stated by the *Client* are as stated in Schedule 9

The *interest rate* is 2.00% per annum (not less than 2) above the
Base rate of the Bank of England

The locations for which the *Consultant* provides a charge
for the cost of support people and office overhead are All UK Offices

If Option C is used

The *Consultant's share percentages* and the *share ranges* are:

	<i>share range</i>		<i>Consultant's share percentage</i>
less than		80 %	0 %
from	80 %	to 120 %	as set out in Schedule 17
greater than		120 %	as set out in Schedule 17

6 Compensation events

These are additional compensation events

1. Carbon Methodology - Adherence to and compliance with the Carbon Methodology V3 dated 08 June 2023
2. 'not used'
3. 'not used'
4. 'not used'
5. 'not used'

8 Liabilities and insurance

These are additional *Client's* liabilities

1. 'not used'
2. 'not used'
3. 'not used'

The minimum amount of cover and the periods for which the *Consultant* maintains insurance are

EVENT	MINIMUM AMOUNT OF COVER	PERIOD FOLLOWING COMPLETION OF THE WHOLE OF THE <i>SERVICE</i> OR TERMINATION
The <i>Consultant's</i> failure to use the skill and care normally used by professionals providing services similar to the <i>service</i>	[REDACTED]	[REDACTED]
Loss of or damage to property and liability for bodily injury to or death of a person (not an employee of the <i>Consultant</i>) arising from or in connection with the <i>Consultant</i> providing the <i>Service</i>	[REDACTED]	[REDACTED]
Death of or bodily injury to the employees of the <i>Consultant</i> arising out of and in the course of their employment in connection with the contract	[REDACTED]	[REDACTED]
The <i>Consultant's</i> total liability to the <i>Client</i> for all matters arising under or in connection with the contract, other than the excluded matters is limited to	[REDACTED]	

Resolving and avoiding disputes

The *tribunal* is litigation in the courts

The *Adjudicator* is
Address for communications

'to be confirmed'
'to be confirmed'

Address for electronic communications

['to be confirmed'](#)

The *Adjudicator nominating body* is

The Institution of Civil Engineers

Z Clauses

Z1 Disputes

Delete existing clause W2.1

Z2 Prevention

The text of clause 18 Prevention is deleted.

Delete the text of clause 60.1(12) and replaced by:

The *service* is affected by any of the following events

- War, civil war, rebellion, revolution, insurrection, military or usurped power;
- Strikes, riots and civil commotion not confined to the employees of the *Consultant* and sub consultants,
- Ionising radiation or radioactive contamination from nuclear fuel or nuclear waste resulting from the combustion of nuclear fuel,
- Radioactive, toxic, explosive or other hazardous properties of an explosive nuclear device,
- Natural disaster,
- Fire and explosion,
- Impact by aircraft or other aerial device or thing dropped from them.

Z3 Disallowed Costs

Add the following in second bullet of 11.2 (18) add:

(including compensation events with the Subcontractor, i.e. payment for work that should not have been undertaken).

Add the following additional bullets after 'and the cost of ' :

- Mistakes or delays caused by the *Consultant's* failure to follow standards in Scopes/quality plans
- Reorganisation of the *Consultant's* project team
- Additional costs or delays incurred due to *Consultant's* failure to comply with published and known guidance or document formats
- Exceeding the Scope without prior instruction that leads to abortive cost
- Re-working of documents due to inadequate QA prior to submission, i.e. grammatical, factual or arithmetical or design errors
- Production or preparation of self-promotional material
- Excessive charges for project management time on a commission for secondments or full time appointments (greater than 5% of commission value)
- Any hours exceeding 8 per day unless with prior written agreement of the *Service Manager*
- Any hours for travel beyond the location of the nearest consultant office to the project unless previously agreed with the *Service Manager*
- Attendance of additional individuals to meetings/ workshops etc who have not been previously invited by the *Service Manager*
- Costs associated with the attendance at additional meetings after programmed Completion, if delay is due to *Consultant* performance
- Costs associated with rectifications that are due to *Consultant* error or omission
- Costs associated with the identification of opportunities to improve our processes and procedures for project delivery through the *Consultant's* involvement
- Was incurred due to a breach of safety requirements, or due to additional work to comply with safety requirements
- Was incurred as a result of the *Client* issuing a Yellow or Red Card to prepare a Performance Improvement Plan
- Was incurred as a result of rectifying a non-compliance with the Framework Agreement and/or any call off contracts following an audit

Z4 Share on termination

Delete existing clause 93.3 and 93.4 and replace with:

93.3 In the event of termination in respect of a contract relating to services there is no *Consultant's* share'

Z6 The Schedule of Cost Components

The Schedule of Cost Components are as detailed in the Framework Schedule 9.

Z7 Consultant's share

54.1 The *Service Manager* assess the *Consultant's* share of the difference between the Aggregated Total of the Prices and the Aggregated Price for Service Provided to Date.

The difference is divided into increments falling within each of the share ranges. The limits of a share range are the Aggregated Price for Service Provided to Date divided by the Aggregated Total of the Prices, expressed as a percentage. The *Consultant's* share equals the sum of the products of the increment within each share range and the corresponding *Consultant's* share percentage.

54.2 If the Aggregated Price for Service Provided to Date is less than the Aggregated Total of the Prices, the *Consultant* is paid its share of the saving. If the Aggregated Price for Service Provided to Date is greater than the Aggregated Total of the Prices, the *Consultant* pays its share of the excess.

54.2A If, prior to Completion of the whole of the service, the Price for Service Done to Date exceeds 111% of the total of the Prices, the amount in excess of 111% of the total of the Prices is retained from the *Consultant*.

54.3 If, prior to the Completion Date, the Price for Service Provided to Date exceeds 110% of the total of the Prices, the amount in excess of 110% of the total of the Prices is retained from the *Consultant*.

54.4 The *Service Manager* makes a preliminary assessment of the *Consultant's* share at Completion of the Whole of the service using forecasts of the final Aggregated Price for Service Provided to Date and the final Aggregated Total of Prices. This share is included in the amount due following Completion of the whole of the services.

54.5 The *Service Manager* makes a final assessment of the *Consultant's* share, using the final Aggregated Price for Service Provided to Date and the final Aggregated Total of the Prices. This share is included in the final amount due.

93.3 If there is a termination except if Z4 applies, the *Service Manager* assesses the *Consultant's* share after certifying termination. The assessment uses as the Aggregated Price for Service Provided to Date the sum of

- the total of
 - the Defined Cost which the *Consultant* has paid and
 - which it is committed to pay for work done before termination

and

- the total of
 - the Defined Cost which the *Consultant* or *Contractor* has paid and
 - which it is committed to pay

in the *partner contract* before the date the termination certificate is issued under this contract.

The assessment uses as the Aggregated Total of the Prices the sum of

- the total of
 - the lump sum price for each activity which has been completed and
 - a proportion of the lump sum price for each incomplete activity which is the proportion of the work in the activity which has been completed

and

- the total of
 - the lump sum price for each activity which has been completed and
 - a proportion of the lump sum price for each incomplete activity which is the proportion of the work in the activity which has been completed

Add:

11.2(25) The Aggregated Total of the Prices is sum of

- the total of the Prices and
- the total of the Prices in the *partner contract*

11.2(26) The Aggregated Price for Service Provided to Date is the sum of

- the Price for Service Provided to Date and
- the Price for Service Provided to Date or the Price for Work Done to Date in the *partner contract*.

Z23 Linked contracts

Issues requiring redesign or rework on this contract due to a fault or error of the *Consultant* will neither be an allowable cost under this contract or any subsequent contract, nor will it be a Compensation event under this contract or any subsequent contract under this project or programme.

Z24 Requirement for Invoice

Add the following sentence to the end of clause 51.1:

The Party to which payment is due submits an invoice to the other Party for the amount to be paid within one week of the *Service Manager's* certificate.

Delete existing clause 51.2 and replace with:

51.2 Each certified payment is made by the later of

- one week after the paying Party receives an invoice from the other Party and
 - three weeks after the assessment date, or, if a different period is stated in the Contract Data, within the period stated.
- If a certified payment is late, or if a payment is late because the *Service Manager* has not issued a certificate which should be issued, interest is paid on the late payment. Interest is assessed from the date by which the late payment should have been made until the date when the late payment is made, and is included in the first assessment after the late payment is made

Z25 Risks and insurance

The *Consultant* is required to submit insurances annually as Clause Z4 of the Framework Agreement

Z 29 Payment for Service Provided to Date

Delete existing clause 11.2 (21) and replace with:

"11.2 (21) The Price for Service Provided to Date is the total Defined Cost which the *Service Manager* forecasts will have been paid by the *Consultant* before the next assessment date plus the Fee. The Price for Service Provided to Date shall not exceed the forecast for the same as provided under clause 20.5"

Z111 PSC - Fee adjustment for non compliance with Scope

Delete existing 11.2 (8) and replace with the following clause

The Fee is the amount calculated by applying the fee percentage to the amount of the Defined Cost excluding the cost of Subcontractors that have not complied with procurement by best value processes as defined in the Scope. 80% of the fee percentage is applied to the amount of the Defined Cost for Subcontractors that have not complied with procurement by best value processes as defined in the Scope.

Z120 PSC – Carbon reduction

Ref. (Clause No.)	Clause words

11.2 Definitions	Add as Clause 11.2(36) (36) The Performance Table states the targets the <i>Consultant</i> is to achieve in Providing the Service and sets out the adjustment to payment if a measured performance is higher, the same or lower than its target. The Performance Table is the <i>performance table</i> unless later changed in accordance with the contract.
15.1 Early Warning	In Clause 15.1 add as a new bullet between the second and third bullet: "• result in a target in the Performance Table not being met.
42.2 Accepting Defects	Delete Clause 42.2 and replace with: 'If the <i>Consultant</i> and the <i>Service Manager</i> are prepared to consider the change, the <i>Consultant</i> submits a quotation to the <i>Service Manager</i> for acceptance including any combination of: •reduced Prices •an earlier Complet on Date •a revised programme •changes to the Performance Table If the quotation is accepted, the <i>Service Manager</i> changes the Scope, the Prices, the Complet on Date and the Performance Table accordingly and accepts the revised programme.
Performance Measurements	
57	Add as Clause 57:
57.1	From the starting date until the Complet on Date, the <i>Consultant</i> reports to the <i>Service Manager</i> its performance against the targets in the Performance Table. Reports are provided at the intervals stated in the Performance Table.
57.2	If the <i>Consultant's</i> performance against a target in the Performance Table is not achieving or is forecast not to achieve the performance target stated, it submits to the <i>Service Manager</i> for acceptance its proposals for improving performance. A reason for not accepting the proposals is that they will not provide the improvement in performance needed to achieve the target in the Performance Table.
57.3	At the dates stated in the Performance Table, • if the relevant performance does not meet the target stated in the Performance Table, the <i>Consultant</i> pays the amount stated in the Performance Table, • if the relevant performance exceeds or meets the target stated in the Performance Table, the <i>Consultant</i> is paid the amount stated in the Performance Table.
57.4	Information in the Performance Table is not Scope.

The *performance table* is [PSC-carbon-performance-table](#)

the Performance Table for this contract type [form, Partner, Stage] as set out in the Carbon Methodology dated 08 June 2023

Secondary Options

OPTION X2: Changes in the law

The *law of the project* is the law of England and Wales, subject to the jurisdiction of the courts of England and Wales

OPTION X7: Delay damages

X7 only

Delay damages for Completion of the whole of the *service* are

██████████ ██████████

OPTION X10: Information modelling

The period after the Contract Date within which the *Consultant* is to submit a first Information Execution Plan for acceptance is 2 weeks

OPTION X18: Limitation of liability

The *Consultant's* liability to the *Client* for indirect or consequential loss is limited to

██████████

The *Consultant's* liability to the *Client* for Defects that are not found until after the *defects date* is limited to

██████████

The *end of liability* date is 6 years after the Completion of the whole of the *service*

OPTION X20: Key Performance Indicators (not used with Option X12)

The *incentive schedule* for Key Performance Indicators is in Schedule 17

A report of performance against each Key Performance Indicator is provided at intervals of 3 months

Y(UK)2: The Housing Grants, Construction and Regeneration Act 1996

The period for payment is 14 days after the date on which payment becomes due

Y(UK)3: The Contracts (Rights of Third Parties Act) 1999

term *beneficiary*

Part Two - Data provided by the *Consultant*

Completion of the data in full, according to the Options chosen, is essential to create a complete contract.

1 General

The *Consultant* is
Name

Ove Arup & Partners Ltd

Address for communications

8 Fitzroy Street
London
W1T 4BQ

Address for electronic communications

[REDACTED]

The *fee percentage* is

[REDACTED]

[REDACTED]

The *key persons* are

Name (1)

[REDACTED]

Job

[REDACTED]

Responsibilities

[REDACTED]

Qualifications

[REDACTED]

Experience

[REDACTED]

Name (2)

[REDACTED]

Job

[REDACTED]

Responsibilities

[REDACTED]

Qualifications

[REDACTED]

Experience

Name (3)

Job

Responsibilities

Qualifications

Experience

Name (4)

[REDACTED]

Job

Responsibilities

Qualifications

Experience

Name (5)

Job

Responsibilities

Qualifications

Experience

Name (6)

Job

Responsibilities

Qualifications

Experience

Name (7)

Job

Responsibilities

Qualifications

Experience

The following matters will be included in the Early Warning Register

3 Time

The programme identified in the Contract Data is

5 Payment

The *activity schedule* is
to be provided within 2 weeks of contract award

Resolving and avoiding disputes

The *Senior Representatives* of the *Consultant* are

Name (1) [REDACTED]
Address for communications
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Address for electronic communications
[REDACTED]

Name (2)
Address for communications

Address for electronic communications

X10: Information Modelling

The *information execution plan* identified
in the Contract Data is
To be provided within 2 weeks of contract award

Contract Execution

Client execution

Signed as a Underhand by [PRINT NAME]

for and on behalf of the Environment Agency

04/09/2023
Signature Date

Role

In the presence of:

Signature Date

Role

Address

Name [Print]

Consultant execution

Signed as a Underhand by [PRINT NAME]

for and on behalf of Ove Arup & Partners Ltd

Signature Date

Role

In the presence of:

Signature Date

Role

Address

Name [Print]

Environment Agency

NEC4 Professional Service Contract (PSC)

Scope

Project / contract information

Project name	Back Waterloo Remediation
Project SOP code	[REDACTED]
Contract number	
Date	

Assurance

Author	[REDACTED]	Date:
Consulted	[REDACTED]	Date:
Reviewed	[REDACTED]	Date:
Checked prior to issue	[REDACTED]	Date:
Consulted	[REDACTED]	Date: [REDACTED]

Revision History

Revision date	Summary of changes	Version number
	[REDACTED]	[REDACTED]

This Scope shall be read in conjunction with the version of the Minimum Technical Requirements current at the Contract Date. In the event of conflict, this Scope shall prevail. The *service* is to be compliant with the following version of the Minimum Technical Requirements:

Document	Document Title	Version No	Issue date
412_13_SD01	Minimum Technical Requirements	12.0	30/12/2021
LIT 65150	Minimum Technical Requirements - Environment and Sustainability	2.0	30/03/2023

1. Overview

1.1. Background

This project has been initiated to design and implement a long-term solution to the issue of erosion and scour within Walsden Water at Back Waterloo, Todmorden, thereby safeguarding the riverside properties and ensuring the ongoing safety and performance of Environment Agency (EA) assets and third-party riparian structures. The solutions must also enable the EA to better manage its ongoing maintenance and liability issues at the site. Previous works in this location have been based around rock armour, which provides some protection to the left bank river wall, but has not successfully provided a long-term solution. Other issues with the rock armour are that it effectively narrows the channel, which does not help the issue of the increased flow velocities, and that the watercourse is pushed away from the left bank (especially in high flows) and the right bank retaining wall is also at risk of failure. The project will therefore look at a suite of options to successfully remediate the problem.

The increased flow velocities have also caused a significant reduction in bed level for some distance upstream of the Back Waterloo cottages. A bed reduction of 0.5 metres is recorded 200 metres upstream of Back Waterloo, and this bed reduction together with increased flow velocity is having impacts on structures throughout the river reach. The EA spent nearly [REDACTED] on urgent repairs to prevent rotation and collapse of 70 metres of flood wall in Todmorden in December 2021 (Walsden Water Remediation). This was directly attributable to the erosion of the river bed and flow velocity undermining the foundations of flood walls built under the Todmorden scheme of 2012. Whilst these repairs have removed the immediate threat to the wall, a long term solution to the scour issue is necessary to prevent further undermining in the medium term.

The EA is also aware of a culvert at [REDACTED] which is showing evidence of differential settling, again likely due to the erosion of the river bed and walls. This culvert carries the playground of [REDACTED], and cracks have been observed in the [REDACTED]. Without mitigating the flow velocities through interventions at Back Waterloo, it is likely that further upstream and downstream problems will come to light leading potentially to expensive repairs.

This scheme aims to provide a planned, structured solution to the issues at Back Waterloo and the surrounding areas, to prevent the need for urgent interventions in the future, which cumulatively is likely to represent an overall cost saving to the EA.

1.2. Previous Studies

In undertaking the service, the Consultant shall take account of the previous studies detailed in the table below and produce a short technical summary explaining how best use will be made of historical data. The previous studies have been undertaken by or for the Client using reasonable skill and care and have been accepted. The Consultant shall review the information provided and notify the Client of any deficiencies in its adequacy. Following this review, and completion of any work required to rectify the deficiencies identified, the Consultant shall take the risk of any deficiencies in existing data quality and quantity which have not been notified to the Client.

Report	Date	Format	Outcomes of study
Lower Todmorden & Walsden FAS – Back Waterloo ‘baffle weirs’ modelling documents	January 2015	Digital format (to be shared separately by EA)	Modelling outputs, sketches and notes relating to proposed baffle weirs explored as a remediation option in 2015.
Asset Recovery Programme – Final Technical Memo, [REDACTED]	March 2017	Digital format (enclosed)	Referenced in Back Waterloo Scour Assessment Report
Shade Chapel - Downstream Channel Condition Assessment, [REDACTED]	May 2020	Digital format (enclosed)	Referenced in Back Waterloo Scour Assessment Report
Back Waterloo Hydrology File Note, [REDACTED]	October 2020	Digital format (enclosed)	Referenced in Back Waterloo Scour Assessment Report

Report	Date	Format	Outcomes of study
Back Waterloo Topographic Survey Return, [REDACTED]	December 2020	Digital format (enclosed)	Referenced in Back Waterloo Scour Assessment Report
Back Waterloo Scour Assessment [REDACTED]	January 2021	Digital format (enclosed)	Outlined likely cause and extent of scour issue
Shade Chapel - concluding recovery works [REDACTED]	March 2021	Digital format (enclosed)	Arup recommendations for concluding recovery works & future modelling
Back Waterloo Briefing Note	July 2021	Digital format (enclosed)	Outlined a long list of potential options
[REDACTED] Utilities Information	July 2021	Digital format (enclosed)	Summary report on affected services, with specific reports attached from each utility
WFD Screening Outcomes Form	August 2021	Digital format (enclosed)	Initial WFD advice
Back Waterloo Urgent Works WFD Screening Outcomes Form - [REDACTED]	August 2021	Digital format (enclosed)	Produced for the Back Waterloo Urgent Works 2021 but sections may be relevant to future work
Back Waterloo Urgent Works Preliminary Ecological Appraisal Report (PEAR)	August 2021	Digital format (enclosed)	Produced for the Back Waterloo Urgent Works 2021 but sections may be relevant to future work
EA – Back Waterloo – Shade Chapel School Culvert	September 2021	Digital format (enclosed)	Possible solutions and monitoring options for the culvert
Sewer Pipe Options File Note [REDACTED]	September 2021	Digital format (enclosed)	Outlines options for mitigating short-term risks to sewer pipe at Shade School culvert
Back Waterloo Urgent Works Otter Survey Document [REDACTED]	September 2021	Digital format (enclosed)	Produced for the Back Waterloo Urgent Works 2021 but sections may be relevant to future work
Back Waterloo Urgent Works Environmental Action Plan Rev P02	October 2021	Digital format (enclosed)	Produced for the Back Waterloo Urgent Works 2021 but sections may be relevant to future work
[REDACTED] Back Waterloo Remediation Works SOC	August 2022	Digital format (enclosed)	SOC accepted September 2022

1.3. Objective

The purpose of this contract is to enable delivery of the Outline Business Case (OBC). This scope will be supported by an NEC4 PSC Option C contract that will be issued to the Consultant for pricing of the OBC. This is to undertake a review of the Strategic Outline Case, all associated documentation and data to facilitate delivery of the OBC for the Back Waterloo Remediation project.

The objective of the project is to secure the long-term protection of flood defence assets affected by scour at Back Waterloo cottages and within the upstream channel up to and including Shade School culvert. The do-nothing scenario will lead to the eventual total failure of the rock armour protection to the left bank wall. Whilst the timescales for this are difficult to predict, it is noticeable that each storm event creates significant further damage to the remaining rock armour, and eventually it will be displaced to the extent that the retaining wall is exposed to the river itself. In this situation, the ability of retaining wall to withstand these high flows is unknown but a failure is likely, which in turn could lead to property damage. Due to their proximity to the retaining wall, there is a risk of damage or collapse to the cottages in the event of retaining wall damage. Failure of river walls would also compromise the standard of protection provided by the Todmorden scheme; the flood defence walls offer protection to over 200 properties.

2. Service

2.1. Outcome Specification

The Consultant shall deliver the service such that it meets the outcomes listed in this section.

The Consultant shall demonstrate sustainability leadership through fully considering and contributing to achieving the Client's environment and sustainability ambitions and targets. These are set out in the EA2025 Action Plan, Mission 2030 Strategy, the Defra 25 Year Environment Plan, and are in line with the principles of sustainability as described by the United Nation's Sustainable Development Goals.

The Consultant shall design the scheme considering the environmental sensitivities and opportunities of the sites and involving key environmental specialists as appropriate within the Consultant and the Client's organisation.

The Consultant shall ensure the optioneering process fully considers and addresses sustainability including carbon reduction as strategic outcomes. The EA business case template further requires separate option appraisals of sustainability benefits and whole-life carbon to compare with the economic appraisal and promotes a preference for the most sustainable option.

The Consultant shall ensure the optioneering process fully considers environmental mitigation and opportunities to further conserve and enhance as per our legal and policy obligations but to also contribute to the Environment Agency's ambitions. This includes delivery against OM4, to achieve biodiversity net gain but must also consider wider sustainability opportunities. The Consultant shall ensure the optioneering process avoids where possible, minimises and compensates or offsets any adverse environmental effects.

The Consultant shall produce an outline design which seeks to provide the optimum economic, technical, social and environmental/sustainability/carbon outcomes, supported by evidence that will enable the production of an Outline Business Case.

The Consultant shall produce an appraisal report and outline design that enables the Client to achieve efficiency targets set for this commission and future stages of the project using the Combined Efficiency Reporting Tool (CERT).

The Consultant shall ensure that the options and final solution take into consideration all relevant guidance and legislation and seek to minimise long-term asset/land management and maintenance costs and carbon.

The options will also demonstrate that the Consultant has learnt from best practice and demonstrate how optimum flood risk reduction, natural processes, carbon reduction, recreation, good ecological water quality and visual amenity can be combined.

This commission must consider planning permission and all other necessary permissions/licences being obtained at detailed design stage. The outline design shall feasibly be able to obtain planning permission.

The Consultant shall demonstrate that consideration has been given to a long list of potential options, identified an appropriate shortlist, appraised these to identify a preferred option and developed this option, its impacts, planning and Environmental Impact Assessment (EIA) requirements scoped to a level that it can be priced. The Consultant shall develop a series of options to meet the above objectives.

The Consultant shall assume that the options shortlisted in the OBC will be aligned with the strategy identified in the SOC. However, the Consultant shall not assume that the preferred option will necessarily be the same as that identified at the SOC stage.

The Consultant shall compile the supporting technical documentation required for the Client to obtain a screening opinion from the local planning authority.

AD: The Consultant must make a suitably experienced person available to attend preliminary meetings/calls with the local planning authority.

AD: In supporting the Client with production of the OBC, the Consultant will have regard to the 'cost-effectiveness analysis' approach proposed in the SOC. The Consultant's economic appraisal of the shortlist of options and the preferred option should support this approach.

AD: The Consultant must make adequate time and resources available to coordinate effectively with the Walsden Flood Alleviation Scheme project team.

2.2. Constraints

AD: Site Visits: The Consultant shall inform and agree any site visits with the Client's Project Manager. The Client will arrange access, based on Consultant-supplied information and requirements. The Consultant shall inform the Client at least 10 working days before any planned site visits.

AD: The Consultant shall work closely with the Walsden Flood Alleviation Scheme project team to determine the upstream extent of the modelling study area.

AD: The Consultant shall provide adequate resources to enable a suitable person to attend meetings with the local authority to ensure the preferred option is acceptable to them in principle in terms of temporary works, traffic management and other impacts during construction. The Consultant shall work collaboratively with the Contractor to minimise these impacts in the design development.

2.3. Consultant Project Management

In managing the service, the Consultant shall follow all the requirements as set out in the Collaborative Delivery Framework schedules and the relevant content of the Minimum Technical Requirements.

In managing the service, the Consultant shall (strike through any of the following that are not required for the project):

- Contribute monthly to the updates to the project risk register.
- Provide input to project efficiency CERT Form.
- Attend progress meetings and prepare record minutes within a week for the Client to issue.
- Produce monthly financial updates and forecasts meeting the Client's project reporting timetable together with progress reports. Monthly financial updates and forecasts to meet EA deadlines provided by no later than the 10th day of each month, or otherwise agreed at the project start up meeting.
- Deliver a monthly progress report in the Client's standard template (Link) giving progress against programme, deliverables received and expected and financial and carbon summary against programme.
- Attend project board meetings as required.
- Ensure quarterly input into framework performance assessment/environmental Performance Measures.
- Ensure the Consultant's environmental lead provides monthly progress and risk reviews to the Client and attends progress meetings, as invited.
- Maintain and show how accurate and up to date information on the whole-life cost and carbon of options is driving optimum solutions at all stages of design development.
- Capture lessons learnt relevant to scheme delivery for the EA PM to include in the scheme lessons learnt log to be appended to the OBC.

The contract will be administered using FastDraft.

2.4. Outputs and Deliverables

The Consultant shall provide input to product descriptions for key outputs and deliverables that the Consultant shall produce during the appraisal stage. The Consultant shall agree the list of products with the Client and submit the product description for the Client's approval before commencing work on the product.

The Consultant shall produce the following key documents for this commission:

- Modelling report.
- Economics report, AD: to be high-level in line with the cost effectiveness approach being taken by the project, in accordance with the modelling scope in appendix 2.
- Options appraisal report, AD: showing cost effectiveness (minimum cost solution to achieve the required outcomes).
- Documentation of the environmental process and considerations including risks and opportunities (e.g. Scoping Report).
- Outline Design(s) AD: for the preferred option.
- Carbon Optimisation Report.
- Programme showing milestones to construction completion for the preferred option including funding and environmental constraints and opportunities. The Programme shall take account of the timeframe required for all approvals necessary for mitigation and enabling works to be carried out in advance of main construction.
- Draft text within relevant sections of OBC.

3. Tasks

3.1. Project Management

In managing the service, the Consultant shall perform the following tasks:

- Attend a virtual kick-off meeting, to be organized by client.
- Contribute monthly to the updates to the project risk register.
- Provide input to project efficiency CERT Form.
- Attend progress meetings.
- Produce monthly financial updates and forecasts meeting the Client's project reporting timetable together with progress reports.
- Deliver a monthly progress report giving progress against programme, deliverables received and expected and financial and carbon summary against programme.
- Attend project board meetings as required.
- Ensure quarterly input into framework performance assessment/environmental Performance Measures.
- Ensure the Consultant's environmental lead provides monthly progress and risk reviews to the Client and attends progress meetings, as invited.
- Maintain and show how accurate and up to date information on the whole-life cost and carbon of options is driving optimum solutions at all stages of design development.
- Capture lessons learnt relevant to scheme delivery for the EA PM to include in the scheme lessons learnt log to be appended to the OBC.
- Provide a detailed programme in Microsoft Project meeting all requirements of Cl.31 of the Conditions of Contract.
- Provide a baseline programme for the project start up meeting.
- Update the programme monthly for progress meetings with actual and forecast progress against the baseline.

The contract will be administered using FastDraft.

3.2. Background Information Review

The Consultant shall review the information provided (per the table in Section 1.2) and produce a short technical summary explaining how best use will be made of historical data and notifying the Client of any deficiencies in its adequacy.

3.3. Site Investigation

3.3.1. Initial Site Walkover

An initial site walkover visit will be undertaken with the project manager, environmental and technical leads. Following the site walkover, a note will be produced and shared with the client within two weeks of the site visit having been undertaken, in accordance with Section 1 LIT 65150 MTR for Environment and Sustainability.

3.3.2. Topographic Survey

The *Consultant* will review previous topographic survey to identify gaps in existing data. The Consultant will use this to inform the scope of any supplementary topographic survey required **AD: to complete the modelling scope described in Appendix 2.**

The *Consultant* shall work with NEAS to ensure that environmental and sustainability constraints within the likely scheme footprint are identified and included in the survey and to determine if efficiencies can be made by joint working.

For any supplementary surveys the *Consultant* shall procure cross sectional survey of the main river and spatial survey of the floodplain **AD: as required to complete the modelling scope in Appendix 2.** Spacing of the survey shall be determined to suit the hydraulic model and shall include a survey of all restrictions, bridges, culverts, and structures. Survey procurement shall include:

- Preparation of a brief and procurement of the survey in accordance with the current version of the Environment Agency's National Standard Technical Specifications for Surveying Services, to enable the above.
- Review and agree surveyors' site risk assessment.
- Supervision and management of topographic survey company.
- Review data / checking deliverables.

The *Consultant* shall use the outputs from the topographic survey in their modelling and option appraisal.

AD Any additional topographical survey required to support the appraisal is to be communicated to the Service Manager for acceptance and will be managed under this contract via a Compensation event.

Survey company costs are not included in the client-set target price; they will be the subject of a Compensation Event.

3.3.3. Ground Investigation

The Consultant shall scope the Ground Investigation required to be able to undertake an options appraisal and detailed design and agree the scope with the Client.

AD Any additional ground investigations required to support the appraisal are to be communicated to the Service Manager for acceptance and will be managed under this contract via a Compensation Event.

The Consultant shall ensure that the environmental risks and opportunities associated with the Ground Investigation, including the collection of environmental evidence to support Appraisal and Assessment, are identified and addressed.

In scoping the Ground Investigation works the Consultant shall include the necessary works to facilitate efficient and sustainable materials management planning and re-use within the project.

The Consultant shall identify any contaminated land within the area of the project and specify testing within the Ground Investigation scope such that it can be classified properly for disposal.

The Consultant shall clearly communicate the scope of the Ground Investigation to the Lot 2 contractor for the Lot 2 contractor to undertake.

The Consultant shall provide site attendance during the Ground Investigation undertaken by the Lot 2 contractor to ensure it meets the requirements of the options appraisal and outline/detailed design. The Client will appoint a ECC Supervisor for the ground investigation. The Consultant site attendance will be subject to a Compensation Event.

The Consultant shall produce a summary of key interpretative decisions for the Ground Investigation undertaken by the Lot 2 contractor.

AD: The Consultant shall be responsible for ensuring all relevant Permits and Consents are in place to allow any surveys or ground investigations. The Lot 2 Contractor is responsible for obtaining the Flood Risk Activity Permit.

AD: The Consultant shall carry out a Habitat Regulations Assessment (HRA) screening report for the Ground Investigations, submitting to NEAS and Natural England if necessary.

3.3.4. Services Search

The Consultant shall obtain services data from utility companies and shall ensure services data is requested from relevant landowners. This shall include direct costs of obtaining data. This shall be incorporated into the appraisal, including preparation of plans.

The Client will arrange for a non-intrusive survey to detect key utilities (e.g. GPR etc.) to inform SI and or options appraisal. The Consultant shall determine the extent of the survey and produce a specification for the survey in accordance with LIT 12516 and Principal Designer discussion, defining type and purpose of survey including extents and available information.

The Lot 2 Contractor shall procure the surveyor. The Consultant shall provide a site supervisor to manage the survey supplier.

The outputs from this survey shall be included in the appraisal, including revising the plans.

3.4. Hydrology & Hydraulics

The existing modelling is identified in the table in section 1.2.

The Consultant shall verify the model(s) to be used with quality and extent checks.

The Consultant shall provide the service in accordance with the Modelling Technical Scope (Appendix 2).

Additional runs shall be allowed for the final design case to give a sensitivity analysis on key parameters.

The output shall be designed to interface with the cost effectiveness of options analysis to allow for depths and durations of flooding to be determined.

AD: Hydraulic model output will be used to support geomorphological channel stability analyses for baseline conditions and short-list intervention options.

3.5. Economics Appraisal

The Consultant shall undertake a cost effectiveness analysis (CEA) approach to establish the least cost method of fulfilling the obligations, rather than a full cost benefit analysis (CBA).

The Consultant shall provide the results of this section of the study in an economics report which shall feed into the economics appendix of the OBC. This will provide a clear view of the process in order that the economic lead for the review team can review the process. As a minimum this will include, but not be limited to:

- Overview of methodology adopted.
- Parameters quantified and standards used (e.g. Multi-Coloured Manual).
- Parameters considered and not used together with reasons.
- Key receptors/ major beneficiaries.
- Wider benefits.
- Assumptions made.
- How the decision rules have been applied.
- What sensitivity tests have been applied and why.
- Treatment of climate change, carbon reduction and sustainability benefits.
- FCERM-AG spreadsheets and PF calculator.

3.6. Environmental Assessment

The Consultant shall confirm in the activity schedule the expected environmental outputs agreed through engagement with NEAS. The activities identified shall consider proportionality whilst supporting the achievement of the Client's wider aspirations.

The Consultant shall give due consideration of the environment and sustainability risks and opportunities throughout the design evolution of the project to maximise the delivery of Client and project objectives.

The Consultant shall ensure that the project level assessment sits within the context of any previous strategic environmental assessment and supporting information for the area and brings forward all relevant information and conclusions.

The Consultant shall establish and understand the baseline and the legal and policy context to identify the key environmental/sustainability risks and opportunities. This shall support the options appraisal and justify the need for any future environmental assessment activity.

The Consultant shall report the findings of the scoping exercise as required which will form an Appendix to the OBC with relevant summary details incorporated into the relevant section(s) of the OBC main text.

AD: A Screening Water Environment Regulations (Water Framework Directive) Assessment (screening) will be undertaken by the Consultant to identify any project aspects that require further consideration to ensure compliance with the Water Environment (WFD) Regulations and identify any risks or opportunities to receptors based on the relevant water bodies and their water quality elements (including status, objectives, and the parameters for each water body). This is in accordance with Section 10 in LIT 65150 Minimum Technical Requirements for Environment and Sustainability.

AD: A baseline geomorphology survey will be undertaken to understand channel conditions within the site boundary. This survey will follow an adapted fluvial audit approach, mapping geomorphological features, processes (e.g. bars, erosion), and recording evidence of modifications and human pressures. Georeferenced photographs will also be recorded. Other geomorphological survey approaches, such as cross-sections, flow velocity and Wolman counts will not be undertaken. Geomorphology survey data will be used to inform the baseline scenario in the Preliminary Water Environment Regulations Assessment.

AD: The Consultant will undertake a Preliminary Water Environment Regulations (Water Framework Directive) Assessment of the preferred option, including an assessment of opportunities to deliver improvements through option selection and integrated design elements. This is in accordance with Section 10 in LIT 65150 Minimum Technical Requirements for Environment and Sustainability.

AD: The Consultant shall report on the CEEQUAL assessment in accordance with the hub workload plan.

AD: The Consultant shall undertake scoping of environmental requirements at subsequent stages of the project (i.e. OBC-FBC) in parallel to and integrated with the options development process in order to ensure that environmental information and environmental stakeholder engagement influences the development, appraisal and selection of options.

AD: The Consultant shall support engagement with relevant environmental consultees (internal and external) through a scoping consultation process to inform scheme development. The Consultant shall identify opportunities for the scoping consultation process to align with the stakeholder engagement plan for internal and external stakeholders.

AD: projects requiring a statutory Environmental Statement or a non-statutory Environmental Report, the Consultant shall record the scoping process and environmental and sustainability assessment methodology for the preferred option in a Scoping Report (Preliminary Environmental Information Report). The Scoping Report shall be proportionate and include the environmental information required to support the Outline Business Case submission, and where necessary, to obtain an Environmental Impact Assessment (EIA) screening opinion from the relevant Competent Authority. Prior to any external consultation, the Consultant shall make provision for and incorporate comments from a consultation with internal stakeholders.

3.7. Option Development

AD: The consultant will produce a supporting file note on the 'Geomorphological assessment of channel stability'. This file note will review and analyse readily available data (baseline geomorphological survey, topographic survey, hydraulic modelling results) to understand channel conditions at the site which may be contributing to the observed issues. This file note will support the optioneering process and form an appendix to the optioneering report.

The Consultant shall undertake an options appraisal, which will include a review of the previous work, to prepare a long list of options. The long list shall not be constrained by previous work and will be agreed with the Client at an options meeting, where the Client will invite representation from internal stakeholders. The Consultant shall screen and assess this long list of options for technical, environmental, sustainability, carbon, and economic suitability, as considered appropriate.

Following this screening, the Consultant shall prepare a short list of viable options for the Client's approval, giving reasons for including or excluding each of the long list options. The most sustainable option shall be included in the short list. On the agreement of the Client, the Consultant shall assess in detail these options for technical, environmental and economic suitability, as discussed in the relevant sections of this brief, utilising the evidence and data collated as part of this commission.

Options appraisal shall include engagement with the ESE contractor on pricing, buildability and maintainability and the Client including Field Services and Area FCRM.

The Consultant shall analyse and appraise the carbon footprint of options as outlined in Section 3.11.

The Consultant shall seek options that support the Mission 2030 sustainability targets.

The Consultant shall use these outputs to select a preferred option. The Consultant shall facilitate 2 design workshops and facilitate risk workshops to produce a risk register with analysis in accordance with LIT 14847 Risk Guidance for Capital Flood Risk Management Projects.

The Consultant shall contribute to the development of the business case for the preferred option and the outline design including provision of specification, drawings and documentation required for Early Supplier Engagement.

The Client shall draft the scope for the next stage of the project (OBC-FBC) and the Consultant shall support the Client to produce the scope.

3.8. Stakeholder Engagement

The Consultant shall support the Client in the development and maintenance of a stakeholder engagement plan in accordance with the EA guidance “Working with Others” including agreement of key stakeholders with discussion with the Client. The Consultant shall ensure that the results from the stakeholder engagement informs the appraisal.

The Consultant will support the Client with quarterly circulation of updated communications record at progress meetings.

The Consultant shall provide technical support, prepare information for and attend a key stakeholder meeting as well as preparing information and reviewing external communications prepared by Others (e.g. quarterly newsletters).

The Client will arrange and advertise 1 public meeting/workshop. The Consultant shall provide technical support, prepare information for input into the consultation documents and prepare site plans and typical outline design drawings for public display. Attendance at these meetings shall include the Consultant project manager, environmental lead and other roles as necessary.

The Consultant shall provide technical support and attend 4 no. meetings with key external organisations/individuals impacting upon option selection process. The current known stakeholders are identified in Appendix 3.

The Consultant shall consider the following and document how they are addressed on this contract:

- Public diversity in engagement and perception of the project team.
- Accessibility.
- How inclusive environments are created for the project team.

3.9. Health & Safety

Health, Safety and Wellbeing (HSW) is the number one priority of the Client. The Consultant shall promote and adopt safe working methods and shall strive to deliver design solutions that provide optimum HSW to all.

The Consultant shall follow and comply with the requirements outlined in the Safety, health environment and wellbeing (SHEW) Code of Practice (LIT 16559).

The Consultant shall supply designer risk assessments, drawings and any other data required to fulfil their duties under CDM.

The works on site included in the geotechnical section will be subject to notification to the HSE. Appraisal work to outline design shall be treated as if it was notifiable.

3.10. [Outline] Business Case Submission

The Consultant shall aggregate all of the work undertaken from this commission into a business case document – the Outline Business Case. The format of this document and guidance on the contents is detailed in Write a Business Case LIT 55124 (Link) and the Business Case templates.

The Consultant shall be responsible for dealing with responses to queries during the approval process and any resubmission required.

The OBC Delivery is to be in accordance with the Client's submission programme for either the National Project Assurance Service (NPAS) or the Large Projects Review Group (LPRG) for projects costing over £10m. The Client shall be kept up to date of progress and submission dates in order that the delivery of this to the review team can be programmed and a place booked at the appropriate review meeting.

This section of the study shall conclude with the final approval of OBC using latest EA Guidance including all appendices and FSoD approval following submission to NPAS or LPRG.

3.11. Carbon [Optimisation]

A SOC/OBC/FBC must aim to minimise carbon emissions by:

3.11.1. Stating 'minimised carbon' as a strategic objective.

3.11.2. Appraising and ranking options by their net whole-life carbon impact value (cost-benefit) in tCO₂e and monetised as carbon £ NPV.

3.11.3. Selecting a most likely/preferred option that best delivers the outcome measures and strategic objectives whilst minimising carbon based on the ranked carbon impact measures.

3.11.4. Optimising for lowest carbon in the design of the proposed option and evidencing this through an assessment of carbon forecast against a carbon budget.

3.11.5. An SOC/OBC/FBC must have a supporting carbon appendix that reports the results of appraising carbon impacts and the carbon assessment.

3.11.6. A carbon impact tool and guidance is available as part of the FCRM Appraisal Guidance.

3.11.7. The EA carbon assessment tool is ERIC for calculating carbon forecasts (ERIC CMT or CC tool) and a carbon budget (ERIC CBUD sheet).

3.11.8. The carbon appendix is a further EA spreadsheet tool available to projects and must have been verified by EA appointed Carbon Specialist before submission of the SOC/OBC/FBC.

3.11.9. The project should be looking at how to minimise carbon throughout the SOC/OBC/FBC stage. The project will produce 'draft' versions of carbon assessments (as forecasts) as well as carbon budgets to reflect their consideration of opportunities and constraints in reducing carbon as they progress their appraisal of options and optimisation of a proposed option and design. A monthly report of the 'draft' forecast and budget of a most likely/proposed option must be provided via FastDraft (using the carbon form) to inform the EA of progress.

3.11.10. The project preparing the SOC/OBC/FBC will submit the carbon appendix and supporting carbon assessment and carbon budget (i.e. ERIC) for verification by an EA appointed Carbon Specialist via Asite. The verification process requires project team engagement with the verifier and may result in actions to:

3.11.11. update the carbon appendix and supporting carbon assessment and budget (i.e. ERIC).

3.11.12. set out most likely opportunities fo

The verified forecasts and budgets from this process will be required in the SOC/OBC/FBC and for the performance measure set out in this contract.

3.11.13. The verification information in the carbon appendix will be required for an EA process of carbon budget authorisation managed by EA Project Sponsor.

4. General

Add any project specific requirements.

5. Relevant Guidance

The Consultant shall deliver the service using the following guidance:

Ref	Report Name	Where used
LIT 16559	Safety, health environment and wellbeing (SHEW) Code of Practice	Throughout
183_05	Data management for FCRM projects	Mapping and modelling
379_05	Computational Modelling to assess flood and coastal risk	Modelling
LIT 14847	Risk Guidance for Capital Flood Risk Management Projects	Option development
OI 120_16	Whole-life Carbon Planning Tool	Option development
LIT 14284	Whole Life (Construction) Carbon Planning Tool User Guide	Option development
	Access for All Design Guide	Option development
	Project Cost Tool	Costs
LIT 12982	Working with Others: A guide for staff	Consultation & Engagement
Gov.uk	Appraisal Guidance Manual	OBC
672_15_SD03	Business case template – 5 case Model	OBC
672_15_SD02	Short Form Business case template	OBC
LIT 4909	Flood and Coastal Erosion Risk Management appraisal guidance (FCERM-AG)	OBC
	Flood and Coastal Erosion Risk Management: A Manual for Economic Appraisal (the 'Multi Coloured Manual')	OBC
OI 1334_16	Benefits management Framework	OBC
Gov.uk	Partnership Funding Calculator Guidance	OBC
LIT 15030	The Investment Journey	OBC
LIT 55124	Write a Business Case	OBC

Ref	Report Name	Where used
LIT 14953	FCRM Efficiency Reporting – capital and Revenue	OBC
LIT 12280	Lessons Log template	OBC
LIT 55096	Integrated Assurance & Approval Strategy	Approvals

6. Requirements of the Programme

The Consultant shall provide a detailed programme in Microsoft Project meeting all requirements of Cl.31 of the Conditions of Contract.

The Consultant shall provide a baseline programme for the project start up meeting and shall update the programme monthly for progress meetings with actual and forecast progress against the baseline. The programme shall also include alignment and submission of the BIM Execution Plan (BEP) and Master Information Delivery Plan (MIDP).

The programme shall cover all the activities and deliverables in the project, and include all major project milestones from commencement to the end of the reporting, consultation and approvals stage.

The programme shall include review and consultation periods for drafts, scoping letters, statutory consultation etc.

The programme shall identify time risk allowance on the activities and float.

The following are absolute requirements for Completion to be certified:

- Population of the Client's latest version of the Project Cost and Carbon Tool, or its successor
- Transfer to the Client of BIM data
- Clause 11.2(2) work to be done by the Completion Date

7. Client-provided Services

Access to Environment Agency systems and resources including:

- Asite.
- FastDraft.
- Collaborative Delivery Community SharePoint access.

AD: Provision of Principal Designer (Arup to be appointed under separate option C contract as agreed at framework level).

Site access authorisation letter(s).

Previous studies listed in Section 1.2.1. The Client will provide the previous studies within two weeks of contract award.

8. Data

Requirements for the handling of project data are covered by the framework schedules.

9. Client's Advisors

The Client for the Contract is represented by the Programme & Contract Management (PCM) team, primarily the EA Project Manager, acting as the Service Manager, and in their absence the Project Executive. Instructions may only be given by these staff.

The Client has a number of advisory departments. Instructions will only be deemed enacted from them when they are confirmed by an Instruction from the Client. These departments include Asset Performance, Partnership & Strategic Overview, NEAS, etc.

The Client's organisation has a regulatory function. Communications from the Environment Agency in its capacity as a regulator are not to be confused with communications as the Client.

10. Client Documents [Requiring Consultant Contributions]

The Client maintains several project documents, the Consultant is required to contribute to these Client owned documents:

- Project Risk Register.
- Project Efficiency CERT Form.
- Scheme Lessons Learnt Log.
- Cost and Carbon Tool (CCT).

Appendices

Appendix 1: BIM Protocol

The *Consultant* shall adhere to the Environment Agency's Employers Information Requirements (EIR) framework level minimum technical requirements.

All *Client* issued information referenced within the Information Delivery Plan (IDP) requires verifying by the Consultant unless it is referenced elsewhere within the Scope.

<https://www.asite.com/login-home>

The *Consultant* shall register for an Asite Account and request access to the project workspace to view the IDP.

Appendix 2: Modelling Technical Scope

1. Introduction

Modelling is required in support of a business case for a project to address channel scour issues on the River Calder at Back Waterloo. The project will involve reinstating the bed of the channel and installing measures to prevent scour and undercutting of the riparian walls. This scour is likely to have occurred as a result of the removal of a weir and sluice structure. It has serious implications for the training walls that support the main highway (A6033), the services within this highway and six residential properties. If the walls collapse adjacent to the highway, it would be rendered impassable, potentially for an extended period, and the services would also likely be cut off. A wall collapse in the vicinity of the six properties could result in their collapse into the channel. Both of these scenarios are associated with a significant risk of loss of life and would result in partial or full blockage of the channel, with implications for local flood risk.

The Environment Agency removed the weir and sluice structure which is likely to have instigated the scour. If the scour resulted in damage to others' property, there is potential for the EA to be found liable. The business case is therefore based on the need for the EA to address a legal obligation. Consequently, a cost-effectiveness analysis (CEA) is required to identify the most cost-effective means of mitigating the risks. Guidance also recommends preparation of a high level estimate of the economic benefits of intervening to address such issues in order to verify value for money.

The approach set out in this document has been discussed and agreed in consultation, and advice from, the Environment Agency's Evidence and Risk team.

2. Modelling objectives

The project objective is to reduce the risk of further bed scour occurring and provide toe support to the riparian walls and structures that has been lost since the scour took place. This will mitigate the risks identified above. Provided the reinstated channel is of equivalent hydraulic capacity to the channel that existed before the scour took place, the proposals will not increase flood risk upstream or downstream. The modelling objective is to verify that the proposed design will not increase flood levels locally, nor increase peak flows downstream, relative to the situation that existed prior to the scour occurring. A secondary modelling objective is to provide an indication of the flood risk consequences of a wall collapse to inform a high level estimate of the economic benefits of the project.

In light of these objectives, the overall approach is to use a baseline reflecting the river channel post weir and sluice removal but pre scour to provide a target and comparable levels that would be considered for further works at Back

Waterloo. The approach is therefore concerned primarily with comparative flows and levels, rather than predicting absolute values.

3. Models available

There is a 1D/2D model of this reach of the river - the “Calder Model Investigations model”. This was used by Arup to assess the implications of the demolition of Shade Chapel and removal of a section of collapsing culvert, following a flood in 2019. This model covers a large area (it extends all the way down through Todmorden) and takes several hours to run. A comprehensive review of this model is beyond the scope of this project. However, a model that is fully capable of informing the detailed design of the measures local to Back Waterloo will be required – and this model is a good starting point.

4. Survey

The 1D/2D model was not specifically designed to inform hydraulic design of measures at this location and there will be a need for additional survey of the channel and hydraulic structures in this vicinity. This may also necessitate internal culvert surveys. Survey will also be obtained to allow full replication of the as built situation at Shade Chapel. This survey will be procured following a review of the model geometry and the model parameters/coefficients local to the study area. On receipt of the survey, it will be reviewed for adequacy and then incorporated into the model.

5. Baseline development

Hydrology

No updates to the model hydrology are proposed as part of this project.

Hydraulics

The baseline case is assumed to be the situation that existed prior to the scour occurring but post weir and sluice removal. This geometry will need to be replicated as closely as possible using the available information and evidence. The weir and sluice structure may be present in the hydraulic model, which was developed some time ago, and if so, this would be removed to reflect the proposed baseline situation at Back Waterloo. It is assumed that the baseline situation at Shade Chapel is the current configuration, post demolition and culvert removal.

The channel is narrow and tightly confined by riparian training walls from upstream of Shade Chapel to downstream of the study reach. All geometry modifications proposed as part of this project will be in the channel within the 1D domain. On this basis, and in the interests of developing a modelling tool that is quick to both update and to simulate design iterations, the model will be truncated as a local 1D only model from a suitable point downstream of Back Waterloo to a point just upstream of Shade Chapel.

6. Options development

The model geometry will be amended to reflect the following scenarios:

- Baseline – as defined in “modelling objectives” above.

- Intervention options – there will be a need to develop the hydraulic design iteratively until a design has been developed that achieves the project objective of no net detriment. The likely interventions that may be considered are:
 - adding erosion protection to the bed of the watercourse.
 - filling in scour holes.
 - removal of existing erosion protection, strengthening works to existing walls.
 - protection works to a sewer pipe.

7. Environmental Permit Application

It is assumed that an assessment of any changes in flood risk will be required to inform an environmental permit application. To demonstrate no net detriment, backwater profiles will be provided for a range of in-bank flows for the baseline and the “with scheme” case. This work will be undertaken using the local 1D model. The backwater profiles for a range of in-bank flows associated with the agreed baseline and proposed design will be presented, illustrating the impacts of the scheme. Provided no substantive changes are shown to occur as a result of scheme implementation, then the permit application should be successful.

8. Economic appraisal

The primary benefits will likely be those associated with loss of life, loss of the six properties, loss of access along the A6033 and loss of services. These damages will be calculated using standard techniques in the Multicoloured Manual.

Collapse of the riparian retaining walls will also affect flood risk, opening-up a pathway for floodwater to flow down the A6033 into Todmorden. The business case may therefore be strengthened by a high-level estimate of the economic damages associated with this mechanism. This will be explored using the existing 1D/2D model, which will be run, in its existing state, for a range of return periods (assuming the model remains stable). The model will then be updated and run to simulate a credible wall collapse scenario. This scenario, which requires modelling of a highly-complex set of circumstances, could be challenging to simulate. If the model cannot be stabilised under a credible representation of this wall collapse scenario, then an alternative means of providing an indication of these benefits will be proposed, if the primary benefits described above are not sufficient to make economic sense of the investment.

9. Deliverables

The following outputs will be provided as part of this work:

- The local (truncated) 1D only model files for the baseline and the preferred “with scheme” intervention option will be provided, along with the results files (1D results).
- The full 1D/2D Todmorden model files for the wall collapse scenarios used for the economics, along with the results files (1D results and 2D grids).
- Model log and/or brief model development report to accompany the model(s).
- Both hydraulic models and model log and/or brief model development report submitted to the Environment Agency Evidence and Risk modelling team for review.
- A flood risk statement to support permit applications.
- A brief technical appendix describing the economic assessment.

Flood mapping outputs are excluded from this scope.

Appendix 3: Stakeholder Engagement