22503 ECOLOGICAL SERVICES FRAMEWORK CONTRACT 3 PROJECT FORM Part 1 – to be completed by Environment Agency Project Manager								
Project title: Billingham Beck Restoration (OBC) **Bravo project ref (if applicable):** [redacted] **Date: 23/10/2020**								
Contracting Authority (Environment Agency; Natural England; Defra etc)	**Environment Agency**							
Environment Agency Project Manager:	[redacted]	**Phone number:**	[redacted]					
Budget holder:	[redacted]	**Cost code:**	[redacted]					
Procurement Contact (if over £50k):	[redacted]	**Email:**	[redacted]					
Project Start Date	1 December 2020							
Project Completion Date	31 March 2020							
For any projects over £10k, full competition is required (i.e. all suppliers on the Lot invited to quote). Please tick	**Direct Award**		**Mini-comp**	X				
Lot number 1/2/3/4	1		2		3		4	X
Proposal return date: ***(no less than 10 working days from current date)***	**Friday 13 November 2020**							

Notes	The Environment Agency has secured indicative allocation funding for this project. Any extensions, or amendments to existing orders need to be discussed with the Contract Manager first and the table in section 6 completed to authorise the change to the Supplier. A **Prior Rights Schedule** to record data being shared between parties and a **GDPR Schedule** (if personal data is being handled as part of the project) must be completed with the successful Supplier at contract start up and updated throughout the project and held as part of the contract record.

Evaluation criteria:		
Price	**Weighting**	**50%**
Quality	**Weighting**	**50%**
Quality Sub-Criteria Weightings:		
Approach & Methodology		**50**
Proposed Staff		**30**
Project Management (including project plan)		**20**

Specification

The Supplier's required Limitation of Liability is one million pounds.

1. Description of work required – overall purpose & scope

Overarching Project Objectives

The Billingham Beck Restoration involves the regeneration and enhancement of important habitat along the river corridor environment adjacent to the A19. This includes land within Billingham Beck Valley Country Park (BBVCP), which is also a designated Local Wildlife Site. The location of Billingham Beck is shown in Figure1 below.

The Project aims to deliver an ambitious option with improved water quality, enhanced and more resilient biodiversity, improved habitat connectivity between conservation core sites, all resulting in a biodiversity net gain, as well as protecting and enhancing the character and quality of the remaining natural landscape on the peri-urban fringe.
The Project aims to lead to the delivery of

- Weir fish bypass channel
- In channel morphological improvements
- Riparian habitat improvements
- Floodplain water dependent habitat restoration
- Water level management improvements
- Grassland habitat enhancements (pollinator strategy)
- Additional hectares of priority habitat

The principal reason to invest now is the opportunity to align and integrate habitat enhancement works with Highways England (HE) scheduled widening of the A19 between Wynyard and Norton from 2020-2022.

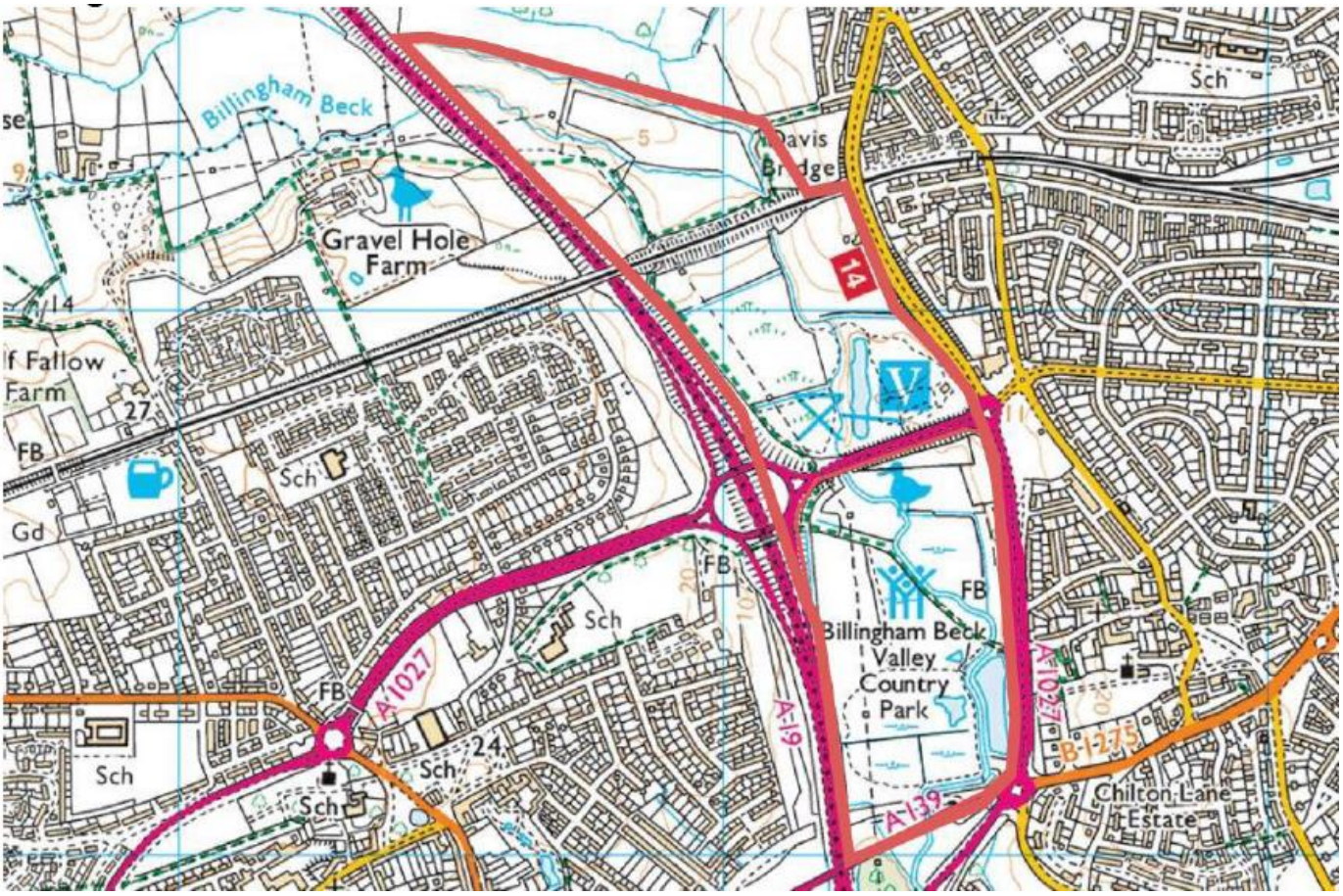


Figure 1 – illustration of project area

Project Activities
The Supplier will:

1. Provide a baseline hydraulic model that allows the assessment of impacts of potential landscape interventions within Billingham Beck Valley Country Park (BBVCP) on land, roads and property upstream and downstream.

This model will be based on the Stockton East Integrated Catchment Model (SEICM) baseline model and a HE ICM A19 model.

2. Assess the suitability for the two models to be amalgamated. Amalgamate the two models. Sense check the performance of the amalgamated model.

3. Agree storm event parameters and boundary conditions to be used. The inflow hydrographs for the Billingham Beck will be provided with the HE A19 FRA model.

4. Consider both physical interventions and innovative natural solutions to restore the Billingham Beck and improve habitat in the BBVCP. Taking into account tidal influence, saline intrusion and sea level rise due to climate change as per https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances. Agree options with Project Board [redacted] of partners. Build upon but do not be limited by the Billingham Beck Valley Park: Phase 1 & 2.1 Report August 2020.

5. Propose options for improved fish passage opportunities such as easement at weir. Take into consideration any existing work of partners[redacted]

6. Consider the management of SuDS to treat discharges to watercourses within the BBVCP. There are 5 combined sewer outfalls into the BBVCP and an iron rich discharge. The A19 drainage is not to be considered at this stage, but may be considered as additional works at a later stage.

7. Consider impacts particularly around existing utility apparatus/assets and railway embankment.

8. Consider innovative approaches to reducing waste and maximise the reuse of site won materials.

9. Consider opportunities to maintain/facilitate/improve public right of way connectivity.

10. Review the options before commencing modelling and propose any changes and/or additional options to be incorporated for discussion and acceptance with the Environment Agency.

11. Produce concept design of up to **5 options** detailing topography and habitat type and at a range of costs from £250k to £1M

12. Identify a preferred option in consultation with the project board and produce an outline design of this option.

13. Model the effect of the preferred option following Stockton Borough Council design guidance for flood risk assessments which will require as a minimum the following rainfall return periods 1 in 2, 1 in 30, 1 in 100 and 1 in 100 + 40% allowance for climate change. Identify any change in flood risk outside of the works area particularly Billingham Golf Club and land upstream of the A19 as far as the HE model allows.

14. Appraise options, to calculate forecasted biodiversity gains resulting from the proposed changes utilising the DEFRA Biodiversity Metric 2.0, and specifying the area and likely target condition of appropriate habitat type for lowland floodplain most likely to establish given identified frequency and depth of inundation.

15. Produce a summary table of likely net biodiversity gain or loss for each habitat type, taking into consideration baseline biodiversity metric assessments undertaken by INCA (terrestrial) and EA (river) and as detailed in Feasibility Report 2020.

16. Produce a value for money and benefit cost ratio assessment in line with Highways England standard.

17. Prepare an Outline Business Case (OBC). The OBC shall include the biodiversity net gain, economic and carbon estimates for each option assessed to identify a preferred option.

18. Provide Final Report including modelling completed, methodology, comparison and consideration of options taking account of constraints on costs, no unacceptable increase to flood risk to areas outside the BBVCP, presence of services, habitat enhancement, and access requirements.

Other services required

a) The Supplier shall attend contract start-up meeting with the Environment Agency PM to finalise project scope and deliverables for the project.

b) The Supplier will attend an initial optioneering meeting to confirm a long list of options and considerations.

c) It is not anticipated that any further topographic surveys, ecological surveys or utility service searches will be required in order to determine the preferred option and develop the outline design for OBC. The Supplier will detail any further survey work required to progress to detailed design post OBC.

d) The Supplier will determine if any structural or ground investigation is required to complete detailed design of the preferred option post OBC. The Supplier shall produce the ground investigation specification and the Agency will determine how to procure any intrusive investigation work.

e) The Supplier will attend 4 monthly progress meetings and produce minutes of the meetings. They will also produce a monthly progress report including details of work completed, risks to delivery and a forecast of likely contract payments until completion.

f) The Supplier will support the Environment Agency in engagement with stakeholders, the community and landowners. This will include attending 2 meetings and preparing materials for use in engagement.

g) The Supplier will actively seek efficient solutions and communicate any efficiencies that could be claimed through the Agency's efficiencies reporting process.

h) The Supplier will also actively seek low carbon solutions and will complete the Agency's Carbon Calculator for any preferred options identified.

i) The Supplier will undertake the role of Designer and Principal Designer under the Construction Design and Management Regulations (2015)

j) The Supplier shall be responsible for complying with copyright, including the procuring any licences required, relating to the use 3rd party data for the project.

k) The Supplier will be responsible for arranging any access required to undertake site visits in the study areas.

l) Any meetings will be conducted in accordance with any Covid restrictions on working practices.

The Supplier shall provide a proposal in Part 2 of this form, on how they propose to achieve the above outputs. Information to be provided under each heading includes:

<u>Approach and Methodology</u>:

- Your reply should include your proposed methodology and confirm the deliverables listed below.
    - Amalgamated SEICM and HE ICM models
    - Concept design for 5 options and outline design for the preferred option
    - Biodiversity gains calculations for 5 options
    - Carbon calculations for 5 options
    - Benefit cost ratio assessment in line with HE standard for 5 options
    - Scope of ecological, topographical and geotechnical survey works required to complete FBC for the preferred option
    - OBC
    - Final report
- Identification of key project risks and how they will be mitigated. A summary risk table should be included in your reply.
- Your reply should also include details of how you will manage risks relating to the ongoing Covid19 pandemic from a business continuity perspective and operationally.

<u>Project Management</u> (including draft programme plan):

- Programme to include milestone dates for payment schedule tasks defined in section 3 of this form.

Project Staff (including team organisation chart and CVs for key project staff):

- Demonstrate appropriate skill and competency.
- Previous experience.

Proposal Cost

- Your cost breakdown will include cost reimbursable rates for staff and estimated hours.
- Your reply should also include details of how you will manage risks relating to the ongoing Covid19 pandemic. This should also include for site visits and surveys.

2. Required skills / experience from the Framework Supplier

- Experience of monetarising biodiversity uplift
- Experience of feasibility and design of solutions to restore wetland habitat.
- Stakeholder Engagement
- Report and Business Case development
- Project Management
- Experience of CDM competency

3. Proposed programme of work and payment table (Detailing specific tasks, deliverables & completion date where appropriate) Payment schedule should detail the % amount that will be paid after delivery of each task

Task no.	Task and deliverable	Completion date	Payment schedule
1	Familiarisation with Stockton East NIDP ICM 2020 hydraulic model and update with A19 ICM drainage model. Agree baseline model and boundary conditions.	18/12/2020	[redacted]
2	Develop up to five options for restoring Billingham Beck and habitat Including water dependent habitat	29/01/2021	[redacted]
3	Appraise options and agree preferred option.	05/02/2021	[redacted]
4	Model the preferred option.	26/02/2021	[redacted]
5	Produce OBC including additional survey scope	12/03/2021	[redacted]
6	Produce report and complete Project	31/03/2021	[redacted]

ECOLOGICAL SERVICES FRAMEWORK CONTRACT 2 (EAAA-9BEDDK)
TASK QUOTATION SHEET
Part 2 – to be completed by Framework Supplier Project Manager

Framework Supplier name		JBA Consulting	
Supplier Project Manager name		[redacted]	
Supplier project manager phone number:	[redacted]	**Supplier project manager e-mail address:**	[redacted]

Part 2 - Supplier Proposal (details to be provided by the Supplier)
Methodology, project management and proposed staff to be ***Limited to 6 sides of A4 plus programme and CV's.***
Cost breakdown to be included separately

1. Approach & Methodology

The project will be led from our Newcastle office with additional technical input from other offices.

Amalgamated SEICM and HE ICM models

It is understood that the impacts of the proposed project will be hydraulically assessed by amalgamating two existing models (HE A19 FRA and the Stockton East Integrated Catchment Model (SEICM)) in Infoworks ICM. It is assumed that the models are fit for purpose for the study. A high level review of the models will be undertaken before they are combined into a single model. Once amalgamated the model will undergo sensitivity testing for various parameters including, but not limited, to roughness coefficients, inflows and downstream boundary conditions to build confidence that the model is performing correctly. The key outputs from hydraulic model will be to inform the design of the various options to restore and improve the habitat of the Billingham Beck and to assess the impact of the proposed options on others in terms of flood risk. The model will be used to determine peak water levels, depths velocity and hazards. It is anticipated that the model will be run to inform the design of restoration solutions. This will be an iterative process as designs to improve morphological conditions and water level management will require testing and refinement to meet the agreed project goals. Following the design and development of a **preferred option** a "post development" scenario will be developed within the hydraulic model to represent the design. The baseline and proposed model will be run for a range of return periods, including the 1 in 2, 1 in 30, 1in 100 year return periods as well as the in 1 in 100 year with an allowance for climate change. The impact of the proposed design will be assessed by comparing pre and post development flood levels, velocities and volumes to ensure that the preferred option has no net detriment in terms of flood risk. A modelling report will be drafted to document to works undertaken.

Concept design for up to 5 options and outline design for the preferred option

We (JBA PM and Options Team) will undertake a walk-over survey with EA PM Team in addition to a desk-studies (e.g. geo-environmental, utilities) to identify opportunities and constraints. Following a technical review of the available project data, JBA would develop a short list of options. JBA would use its experience of similar projects to provide measurable benefits to the support options. Given the history of previous industrial usage across the area we will use a desk-based assessment to identify areas of potential infilling and landfilling across the site using available historic mapping (obtained from a Landmark Envirocheck Report) and LIDAR data. This will be augmented with a review of local geological and hydrogeological conditions as revealed by available British Geological Survey (BGS) mapping. Previous experience on sites of a similar nature shows that the presence of historic sources of contamination can represent a significant constraint to achieving the objectives of a restoration scheme as envisaged. Key to option development would be determination of the benefits of each option. We are proposing that option appraisal and selection will be supported by an **Option Workshop** attended by invited stakeholders and facilitated by JBA. This can be delivered remotely through Teams and through a dedicated sharepoint site or using JBARN. The options workshop will be

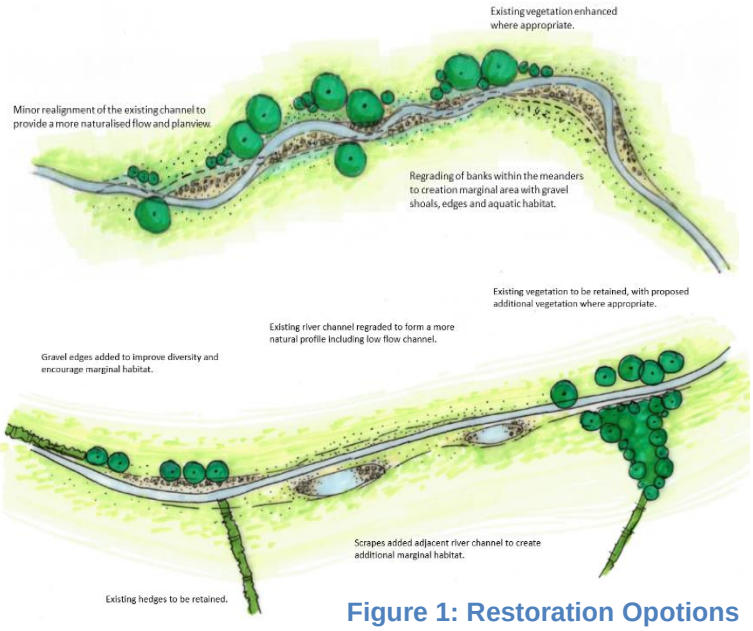


Figure 1: Restoration Opotions

supported by baseline option appraisal sheets describing the constraints and opportunities for each option (maximum of 5), concept design and **landscape visioning** sketches. We would undertake a **Multi-Criteria Analysis (MCA)** to determine the suitable options. A key feature of MCA is its emphasis on the judgement of the decision making team, in establishing objectives and criteria, estimating relative importance weights and, to some extent, in judging the contribution of each scenario to each performance criterion (e.g. OM4 creation, low carbon solutions, buildability, WFD benefits etc). Within the option assessment we shall consider wider habitat creation opportunities than channel alignment that will still contribute to WFD targets. For example, the opportunities to recreate some of the sedge beds has been identified and would be beneficial for the river system and in-channel features to create diversity. Refinement of the viable options will require assessment of **economic, environmental, technical and risk issues**. Thorough investigation of these issues will we make sure that that the preferred option can be delivered. The Options Appraisal will:

- Provide a clear record of the appraisal process and a well-argued justification for the favoured options;
- Enable the Environment Agency to make informed decisions in regard to support and funding;
- Gain support from other organisations that have an interest in the scheme [redacted]
- Consider legal obligations, consultation with third parties, identify the agreements and permissions;
- Assess and manage risk – including the likelihood of design conditions being exceeded or failing; and
- Consider Technical Feasibility - consideration of climate change, consideration of land use, sediment transport and hydraulic models to quantify risk, and engineering design and costs.

Biodiversity gains calculations for up to 5 options

The Defra Biodiversity Metric 2.0 will be used to calculate biodiversity net gain associated with up to 5 shortlisted options. A new version of the Defra Metric with improved functionality is scheduled to be released at the end of 2020/early 2021. Should this be released before the end of January 2021, we would aim to use this most up to date version (pending discussion with you). The good practice principles (Baker *et al.,* 2016) and practical guidance (Baker *et al.,* 2019), as well as relevant technical guidance for the habitats on site and proposed to be created, will be followed. The baseline information as provided by INCA for terrestrial habitats and the EA for the river habitats, described in the Feasibility Report 2020 would be put into the metric as the site baseline for each option. Full information gathered as part of the River Metric Survey and INCA assessments (including mapped habitat shapefiles additional to the supplied 'Billingham Beck Biodiversity Net Gain River Assessment' report) would be required to ensure an accurate baseline. It has been assumed this would be provided and that no additional surveys are required for the net gain assessments (bar information collected from the walk-over survey). Information from the JBA hydrology team on the frequency and depth of inundation for each option would be used to determine the area of lowland floodplain (and adjacent habitats) that could feasibly be created. Where relevant, this will consider potential longer-term changes in tidal inundation and saltwater intrusion, as well as any physical interventions and NFM solutions where these relate to habitat creation or enhancement.

Carbon calculations for 5 options

We will proactively use EA carbon tools to assess the overall carbon impact of the scheme and identify opportunities to reduce and sequester residual carbon emissions through clever, considered design and employing PAS 2080 (Carbon Management in Infrastructure)'s carbon reduction hierarchy. Where possible we will complement the use of the EA Carbon Tools with other available tools such as our own Revil tool and the EC3 Tool. Our Carbon Champion, [redacted] is facilitating training in Carbon Planning Tools for the EA and is working alongside the EA to identify where its Minimum Technical Requirements could be modified to actively encourage the use of innovative low carbon solutions and materials, e.g. nature-based solutions. There are several discharges into Billingham Beck which may affect overall surface water quality. We will identify potential options for treatment of water quality, for example through the use of SUDS/passive constructed wetlands type solutions. For the purposes of this study our assessment will be limited to discussions with the Client team to obtain an understanding of their particular concerns, a site walkover to visually inspect the outfall points with basic constraint mapping (typically including land availability, land quality and geotechnical issues, access routes, and environmental issues) to identify potential treatment/SUDS areas to capture the discharges. Within this assessment we will consider opportunities for reducing generation of wastes and optimising opportunities for re-use of site won soils for future creation of such treatment areas. This approach will also be integrated into wider opportunities for soil re-use across the wider scheme. At this stage gauging of discharge flows and monitoring of water chemistry is excluded from our proposal.

Benefit cost ratio assessment in like with HE standard for up to 5 options

The assessment would start with a review of baseline options and modelling. Setting a realistic baseline is essential to evaluating the scheme benefits. We would also discuss with the team an appropriate appraisal period as this may not be standard for the options considered and may vary from a typical flood mitigation scheme. JBA has developed software to calculate direct flood damages using the baseline and option modelling and standard MCM depth damage curves extremely efficiently (**Innovation**). This will assess the impact (within the modelled reach) of both positive and any negative impacts of flood level/flow changes as a result of the options. Direct flood damages will be calculated using the updated depth damage curves provided under licence by the Flood Hazard Research Centre (FHRC). We will use the National Property Dataset to determine the properties at risk (as appropriate). A key aspect

of this project will be the environmental benefits and OM4 aspects. Due to the importance of this, we propose to undertake a review of the ecosystem services applicable to the site and each option. This will be informed by the biodiversity gains assessment to help identify key ecosystem services over and above the standard services included in the OM4 calculations. If any services are significant enough, we will value these using available tools and approaches recommended by ENCA to provide additional benefits and to help contribute to OM1 benefits (for example, the recreation benefits may be underestimated within the OM4 calculations). JBA has been developing several bespoke approaches and have used a number of tools [redacted] to monetise key ecosystem services for other NFM and river restoration projects (**Innovation**). The biodiversity net gain information will also be used to determine the area and quality of each habitat type created or modified by each option to assess the OM4 benefits. **Scheme costs** will be derived by our engineers using a combination of the Environment Agency Long Term Costing tool supplemented by unit rates from other similar projects, and making allowances for future maintenance costs, risk and optimism bias. We would not seek to engage a contractor at this stage, unless specifically requested by the Environment Agency to do. Testing of the economics and selection of the preferred option will be undertaken using benefit cost ratio assessment in line with Highways England standards.

Outline Business Case (OBC)

We recommend preparation of an OBC following the **Short Form business case** (based on the range of options considered). JBA will produce the **strategic, economic and financial cases** with the Environment Agency providing the text for the **commercial and management cases**. We would be happy to provide support to the Client team in the development of these cases, however we believe that the Client is best placed to complete this. [redacted] will lead the preparation of the OBC , which will be reviewed independently within JBA. [redacted] has direct experience in the preparation of SOC, OBC and FBC for Environment Programme projects and projects with the PCM Teams in the North East. [redacted] will provide support and technical review for the OBC. [redacted] **Partnership funding scores** will be derived for the preferred option.

Final report

The Final Report will provide a justification for the preferred option, describing a robust and comprehensive option selection process. The report will identify key risks associated with the options and state the requirements to progress the project to FBC and final delivery including the **scope of ecological, landscape, topographical and geotechnical survey works required to complete FBC for the preferred option**

CDM

JBA has extensive experience in management of design and construction works under the Construction (Design and Management) Regulations 2015. We will work with the EA as the Client under these regulations. We will provide a Principal Designer as requested by the client. We have assumed that Pre-Construction Information (PCI) will be available from the Client once the works have been commissioned.

Key Project Risks (Risk Table to include Covid-19 risks)

Covid Risk Assessment **Our proposal is based on the curent covid constraits and the guidance / requirements established by Central Government. We have assumed that access for surveys (e.g. walk-over, topographic) is possible where safe to do so. JBA has skilled offices [redacted] and therefore staffing should not be an issue should local lock-downs be implemented restricting staff from [redacted] and movements into [redacted]. If no site visits are premitted, we believe that that it may be possible to complete the modelling using remote sources (e.g. lidar) however there will be quality risks associated with this.**

Table 1: Covid statement

2.Project Management (inc Project plan)

The proposed management structure is provided in the Organogram (Part 3). [redacted] Continued compliance to the standard ensures our clients that quality standards are maintained and monitored. Work carried out in this project by any member of staff will be subject to JBA's QA procedure. To comply with JBA's IMS several Technical Reviewers will be required dependent upon the discipline. Technical Review Certificates will be provided at appropriate stages.

Project Programme: Our initial draft project programme is found below. We will aim to agree and finalise the project programme with you at our inception meeting. Some flexibility will be needed in the light of the prevailing Covid-19 guidance and associated restrictions on business working, travelling and social distancing. At this meeting we will

agree the consultation approach and extent and consideration of our additional option for stakeholders to be more deeply involved in the development of the Outline Business Case.

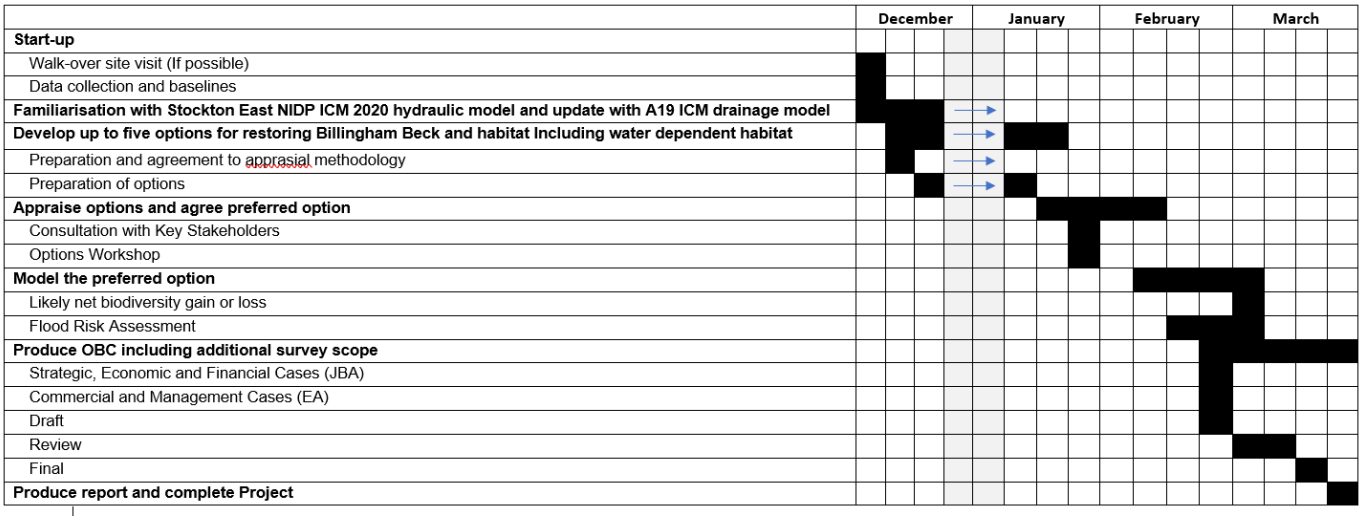


Figure 2 - Programme

The programme assumes 4 monthly progress meetings and produce minutes of the meetings and progress reports. JBA will support the Environment Agency in engagement with stakeholders, the community and landowners. This will include attending 2 meetings and preparing materials for use in engagement. [redacted].

Sustainability: Central to JBA's [redacted] EMS is to reduce environmental impacts in undertaking the feasibility work and maximising the environmental and sustainability outcomes (SD Goals) of the project as implemented. We have established a number of IMS objectives that are aligned to our business strategy and consistent with our IMS policies. The objectives cover all areas of our IMS and we monitor, measure and report our performance.

Biosecurity: JBA recognises the importance of having a stringent biosecurity policy within our business and we employ effective biosecurity measures to demonstrate to our staff, the public and customers that we take our corporate responsibility seriously. We abide by our own Biosecurity Policy and Guide to Biosecurity (available on request), ensuring appropriate biosecurity control measures are undertaken by all staff.

Health and Safety: This project will be managed in accordance with JBA standard operating procedures which are based on risk assessment. Examples of **site and office risk assessments** and a copy of our company H&S policy can be made available on request. Final project specific site risk assessments and **safe systems of work** (JBA and any sub-contractors) will be agreed with the client before relevant task commencement.

Risks: The main risks identified, which are not generic (e.g. changes in scope, loss of staff, poor weather delaying site work, site work access permissions, computer problems, etc.), relate to the timely delivery of all relevant information and datasets to JBA, receiving comments on draft deliverables as programmed, and the consequences of the prevailing Covid-19 guidelines and restrictions during the course of the project. A live risk register will be maintained throughout the project, with any early warnings submitted to the EA Project Manager. Covid-19 is likely to have a large impact on site visit costs (as reflected in our proposed costs) since each surveyor will have to take a separate vehicle. We will also aim to agree adequate engagement and report review periods with you during our inception meeting. Unknown utilities present a significant risk to the project in terms of time, cost and meeting the objectives of the restoration. As part of the desktop study we will request record plans from all statutory service providers and record utilities that could impact of the restoration. Existing utilities will be mapped on the options and design proposals with an assessment of the risk to the project and identification for the need of further-site investigation surveys during the delivery stage. We are not proposing to undertake an Site Investigation including trial pits to locate services at this stage.

Assumptions: We have made the following assumptions in development of this fee proposal:

- A desk top study will be undertaken for Utilities. No SI or trial pits will be undertaken. Client to provide PCI.
- We will highlight the requirement for any structural or ground investigation. It is assumed that this would be completed post OBC. An outline scope for the ground investigation would be prepared at OBC. The Agency will determine how to procure any intrusive investigation work.
- It is assumed that JBA will produces the strategic, economic and financial cases with the Environment Agency providing the text for the commercial and management cases.
- Our cost benefit analysis will be based on preliminary designs for the preferred option. We do not intend to obtain a Contractor's cost at this stage.
- At this stage gauging of discharge flows and monitoring of water chemistry is excluded from our proposal.
- Produce concept design of up to **5 options** detailing topography and habitat type.
- We have assumed that we will receive one set of comments back from the project team.

3. Proposed Staff who will do the work and briefly state previous relevant experience

The proposed project team below includes staff who have extensive experience in hydraulic modelling, urban drainage, SUDS, carbon calculations, ecology and BNG. These are shown in the Project Organogram. **2-page CVs are provided for everyone in the proposed Project Team.**

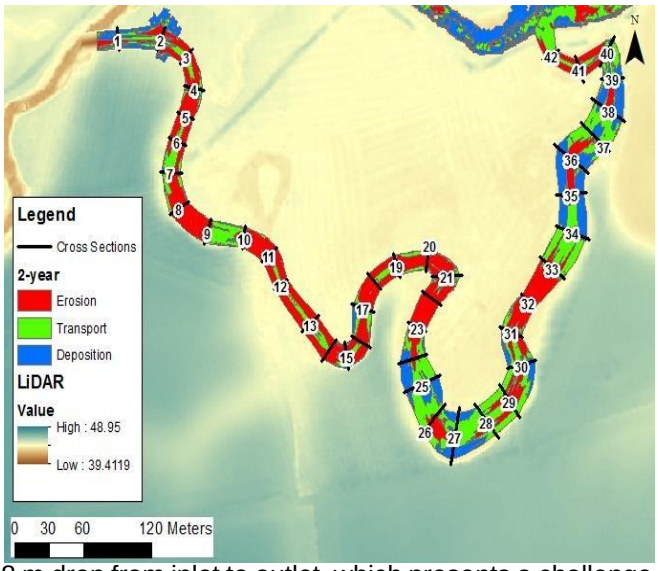
[redacted]

Figure 3 - Organogram

[redacted] There will be a systematic approach to record and feedback quality and value issues to the project. We are committed to the continued improvement of our services and our approach will ensure that this can be achieved. [redacted]

Relevant project experience

Feasibility study and detailed design for re-naturalising the channel at Pont Ends, Rivers Pont and Blyth, Northumberland. The Rivers Pont and Blyth, Northumberland have suffered from extensive straightening and dredging in the past as part of measures to improve flow conveyance and land drainage. Both channels are now heavy incised and degraded. The banks are steep and eroding resulting in loss of land and large input of fine material adversely affecting water quality and 'drowning-out' gravels. Design, modelling and appraisal work was completed by **JBA's multi-discipline teams** [redacted]. Following feasibility, six options were short-listed. Options were developed using the baseline ecological and geomorphological surveys, historic evidence, LiDAR information and knowledge of the catchment system and likely opportunities. The options were subject to assessment using a simplified **Multi Criteria Assessment (MCA)** to determine the preferred option.



During Detailed Design a **3-D model** was created for the proposed new channel established through reconnection of the palaeo channel. The length of additional channel is approximately 1080m. The design model shows a fall of 0.588 m drop from inlet to outlet, which presents a challenge to ensure diversity in the channel given the low gradient. Reconnection of the palaeo channel was modelled using

[redacted]**JBA's 2D modelling software**. The 1 in 2-year flood event represents the effective channel-forming discharge for the river. The results from the modelling suggest that the 1 in 2-year return period flows will be adequate to mobilise fine sediments through the new channel to prevent siltation. The design includes in-channel features such as woody debris, riffles and low-flow channels to provide additional diversity. These localised conditions should provide an improved environment for fish. Scour potential was identified at the tie-locations. The design included the application of soft-engineering techniques in lower velocity areas, and rock-rolls to reduce scour risk in locations where higher velocities were predicted. The design criteria aim to provide sustainable solution that could naturally adapt and reduce long-term maintenance requirements.

Tees Estuary Enhancement Project, [redacted] Environment Agency. JBA was appointed [redacted] to support the detailed design of a series of enhancement features to encourage an increase in inter-tidal habitat on a 500m section of estuary on the River Tees, Middlesbrough. The aim was to increase inter-tidal habitat through widening the river edge using NFM features to provide additional habitat through low, middle and high tidal range. Our designs used a combination of naturally sourced materials, including brash from clearance at a local FRM construction site and coir rolls, avoiding as far as possible the use of micro-plastics found in many geotextiles and aimed to encourage natural accumulation of sediments along the section of the watercourse. JBA helped develop a set of options, co-ordinated the option workshop with key stakeholders [redacted] provided the detailed design of the preferred option and supported TeRT with the submission and planning and the Marine Management Organisation (MMO) Licence. JBA was Principal Designer.

FRA, environmental permit, detailed design, discharge of conditions, River Stour, Stourbridge

JBA was commissioned to undertake a flood risk assessment to support the planning application, environmental permit, detailed design, discharge of conditions for a proposed new Medical Centre along the River Stour in Stourbridge. The derelict site had been vacant since the previous industrial buildings were demolished on 2011. Throughout the site the River Stour was heavily managed, and its channels controlled by brick and concrete walls that lined most of the banks, limiting natural processes. In places the wall was being eroded and undermined by the river. A hydraulic model was used to understand existing flood mechanism and to test the effect of different flood mitigation options to enable development on site whilst also providing third-party benefits. Through consultation with the Environment Agency [redacted], a range of flood mitigation options were developed. The selected option involved alterations to the River Stour's channel to provide the extra capacity and ensure overland flows redirected into the channel do not increase flood risk downstream, along with localised ground raising on site and an interceptor ditch/swale. The River Stour through Stourbridge is deeply incised and largely disconnected from its floodplain for all but very large flood events. By removing the brick walls from the channel and excavating part of the channel banks to provide extra flood storage, small sections of floodplain would be reconnected to the channel. This not only has a flood risk benefit but allows flood flows to spill out of the channel and reduces erosive energy that can lead to exacerbated bank erosion, thus restoring natural interaction between the channel and its riparian zone and floodplain. JBA then went onto deliver a detailed design for the scheme and secured an Environmental Permit for the client to commence work on site. Pre-established coir rolls lined the bank toe and a combination of coir pallets and erosion control matting was to cover the upper bank (new riparian zone) in the final design before vegetation could establish. These techniques were considered more sustainable and preferable to hard-engineered options and a significant improvement to the existing conditions. The proposed river works offered the opportunity to re-naturalise the hard-engineered banks of the River Stour and restore hydromorphic functioning of the riparian zone and floodplain within the excavated areas around the channel.

4. Proposal cost *Please use day rates, including any applicable discounts, as agreed under the framework contract.* *Full details are provided on the supporting PDF – Please see summary below.*					
Task No.	**Supplier name**	**Framework grade**	**Day rate**	**No. of Days or part thereof**	**Cost**
[redacted]	[redacted]				[redacted]
[redacted]	[redacted]				[redacted]
[redacted]	[redacted]				[redacted]
[redacted]	[redacted]				[redacted]
[redacted]	[redacted]				[redacted]
	[redacted]				[redacted]
	[redacted]				[redacted]
	[redacted]				[redacted]
			[redacted]		[redacted]
[redacted]		[redacted]			[redacted]
				Total overall cost	**£53,629.33**

5. Terms & Conditions
Note to Supplier – All call off contracts under the Ecological Services Framework are subject to the terms and conditions issued with the framework, including the Prior Rights Schedule and GDPR Schedule completed at award of the call-off contract.

Notes	You must have a purchase order number from the EA project manager before you start any work in connection with this proposal. **If you have carried out a protected species survey, data collected must be uploaded onto the NBN network. Please take account of this in your quote.**
Supplier Project Manager:	[redacted]
Signature :	[redacted]
Date:	13/11/2020

6. Proposal Acceptance			
Notes	All agreed post submission amendments to scope, proposal, timetable or costs must be updated prior to accepting the proposal. A commission code must be obtained from Stephen Perriss prior to confirming award and must be quoted on your purchase order. A Bravo ECM reference should be obtained from Commercial if the project has been issued by Bravo and quoted on your purchase order.		
Authorisation	**Name**	**Signature**	**Date**
Contract Project Manager	[redacted]	[redacted]	24/11/2020
Authorised Contracting Authority Signature	[redacted]	[redacted]	25/11/2020

DgC Authorised Signature (if required)	[redacted]	[redacted]	25/11/2020
Commission Code			
Bravo ECM Ref (if applicable)	[redacted]		

7. Change Control **All amendments to scope, timetable or costs must be submitted to and approved by the PM Prior to implementing the change.**			
Change Details	**Revised completion date (if applicable)**	**Revised Cost (if applicable**	**Approved by EA PM / Date**