

Short Form Business Case with guidance for a FCERM change project for Local Authorities, Internal Drainage Boards and other risk management authorities



[\[Link to GOV.UK Flood and coastal defence: develop a project business case\]](#)

This business case template should be used for justifying schemes where the total scheme cost is less than £2 million.

For a flood risk scheme, send us your business case with a completed FCERM 2.

For a coastal scheme, send us your business case with a completed CPA1 and include a copy with a completed CPA2.

The procedures when applying for grant are set out in the Grant Memorandum and you should follow them to make sure that the total cost for approval is eligible for a grant. Once the scheme is approved you are eligible for a grant for the cost you have incurred in preparing your business case. This cost should be included in your application.

Exclude the cost of studies if you have previously claimed grant under a separate FCERM7. The whole life cost includes all development and study costs.

The business case describes your application for Flood and Coastal Erosion Risk Grant in Aid (FCERMGiA). It should contain all relevant evidence to satisfy a reader with no knowledge of the scheme that in technical, environmental and economic terms, your recommended investment decision is correct and deserves public investment.

We have provided this template with advice to help you compile your business case. Within the headings you can vary the content and material you wish to include. Include supporting information in appendices.

The template contains guidance notes. Please delete them from the completed the business case.

Contact your local Environment Agency Area Flood and Coastal Risk Manager and Partnership & Strategic Overview teams. They can provide advice and support you to prepare your business case.

Lead Authority: Derby City Council
Project Title: Cuttle Brook Flood Alleviation Scheme
Short Form Business Case
Version No 3
November 2018



BUSINESS CASE APPROVAL SHEET

1 Review & Technical Approval				
Project title				
Authority project reference		EA reference		
Lead authority		Date of submission		
Consultant				
<p>'I confirm that this project meets our quality assurance requirements, environmental obligations and Defra investment appraisal conditions, that all internal approvals, including member approval, have been completed and recommend we apply to the Environment Agency for capital grant and local levy in the sum of £</p>				
Job title	Name	Signature	Date	
Authority Project Executive				
<p>'I have reviewed this document and confirm that it meets the current business case guidelines for local authority and Internal Drainage Board applications.'</p>				
OBC reviewer				
<p>'I confirm that the project is ready for assurance and that I have consulted with the Director of Business Finance'</p>				
Area Flood & Coastal Risk Manager				
Assurance sign off - (Tick the appropriate box)				
AFCRM Assurance <input type="checkbox"/> Projects < £500k Or Projects < £1m (if GiA & Levy <£500k)		NPAS Assurance <input type="checkbox"/> Projects £500k - £2m		
Recommendation for approval				Date
AFCRM or NPAS Chair				
Project total as approved (£k)		Version Number		
Project total made up of :	Capital Grant (£k)			
	Levy (£k)			
	Other Contributions (£k)			
2 Project Financial approval				
Financial scheme of approval	Project total	Name	Signature	Date
Area Flood & Coastal Risk Manager	<£100k or <£1m (if			

	GiA & Levy <£100k)			
Director of Business Finance	All projects >£100k			
Plus:				
Area Director	£100k- £1m			
Director of Operations	£1m -£10m			
3 Further approvals (if applicable)				
Date sent (or N/A)			Version number (if different)	
Date approved (or N/A)				
Final Comments				

For FSoD Coordinator use only:

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Business Case

Approval Requested

The Cuttle Brook is a tributary of the River Trent, located in the southern parts of Derby. Cuttle Brook extends from Littleover in the West to Chellaston in the East and is shown to be at risk of both surface water flooding (as detailed in the Risk of Flooding from Surface Water dataset [RoFfSW]) and fluvial flooding with reports of flooding to properties adjacent to the brook being made to Derby City Council as Lead Local Flood Authority over the past 20 years with notable events in July 2003, July 2007 and June 2008.

The study area is within the Cuttle Brook catchment between Willson Avenue (upstream of Sunnydale Park) and the industrial estate downstream of the railway line south of Caxton Park. The Cuttle Brook is characterised by an urbanised catchment comprising numerous sewer systems draining into an open watercourse with residential developments on one or both sides. Properties between Sunnydale Park and Caxton Park are currently not protected by existing flood defences and are known to have flooded in the recent past. Local residents have reported flooding to Derby City Council, with mixed messages of the source of flooding between surface water and fluvial sources therefore this OBC has utilised an integrated urban drainage model to develop a fuller picture of flood risk to the site.

The objective of the Cuttle Brook Scheme is to provide a higher standard of flood protection to existing properties through provision of infrastructure that is aligned to delivery of environmental enhancements to maximise the investment of European Regional Development Funding that has already been secured.

Several options were assessed against the main study objective of:

Providing a higher standard of flood protection to existing properties through provision of infrastructure that is aligned to delivery of environmental enhancements to maximise the investment of European Regional Development Funding that has already been secured.

The table below show options carried forward to shortlist, and those rejected at long list, with the rationale for rejections.

Options	Description	Short list or reject
	Do Nothing	Carry forward
	Do Minimum	Carry forward
1	New culvert/ sewer at Willson Avenue	Reject – limited surface water flow routes shown in this location from revised modelling
2	Enlargement of pond with embankment at Sunnydale Park	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
3	Environmental enhancements in Sunnydale Park	Reject as stand alone option – does not provide flood risk benefits. This option can be used to deliver environmental enhancements alongside other options which deliver flood risk benefits.
4	Mound in Sunnydale Park	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
5	Culvert daylighting in Caxton Park	Reject as stand alone option – does not provide flood risk benefits. This option can be used to deliver environmental enhancements alongside other options which deliver flood risk benefits.

Options	Description	Short list or reject
6	Pond enlargement without embankment in Sunnydale Park	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
7	Property Level Resilience	Reject – does not achieve Derby City Council's objective of using ERDF funding to deliver environmental benefits and flood risk benefits. This flood risk scheme would be entirely separate to any environmental enhancements.
8	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park, Culvert daylighting in Caxton Park and Pond enlargement without embankment in Sunnydale Park</i>	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
9	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Culvert daylighting in Caxton Park</i>	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
10	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Pond enlargement without embankment in Sunnydale Park</i>	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.

Through liaison with Derby City Council regarding financial benefits achieved alongside non financial benefits including number of properties protected, environmental enhancements delivered, the ability to leverage the European Regional Development funding and availability of match funding, the preferred option was identified as “Do Something H”, a combination of environmental enhancements and flood alleviation measures located within Sunnydale Park. The benefits of this scheme include:

- Natural flood management interventions
- 31 Properties with reduced flood risk (OM2s)
- Parts of environmental enhancement programme funded by European Regional Development Fund delivered alongside flood risk scheme (delivering match funding required for ERDF).

Contractors and construction fees have been provided by Balfour Beatty through the SCAPE framework and as such have been market tested providing a higher degree of confidence that outturn costs will not significantly deviate from the quoted costs. Consultant fees have been provided by JBA Consulting and a 30% optimism bias has been included in the final cost for approval, alongside the 95th percentile risk allowance.

The total budget cost for approval is £1,176.38k comprising funding from the following sources:

- European Regional Development Fund £276.37k
- Derby City Council £250k

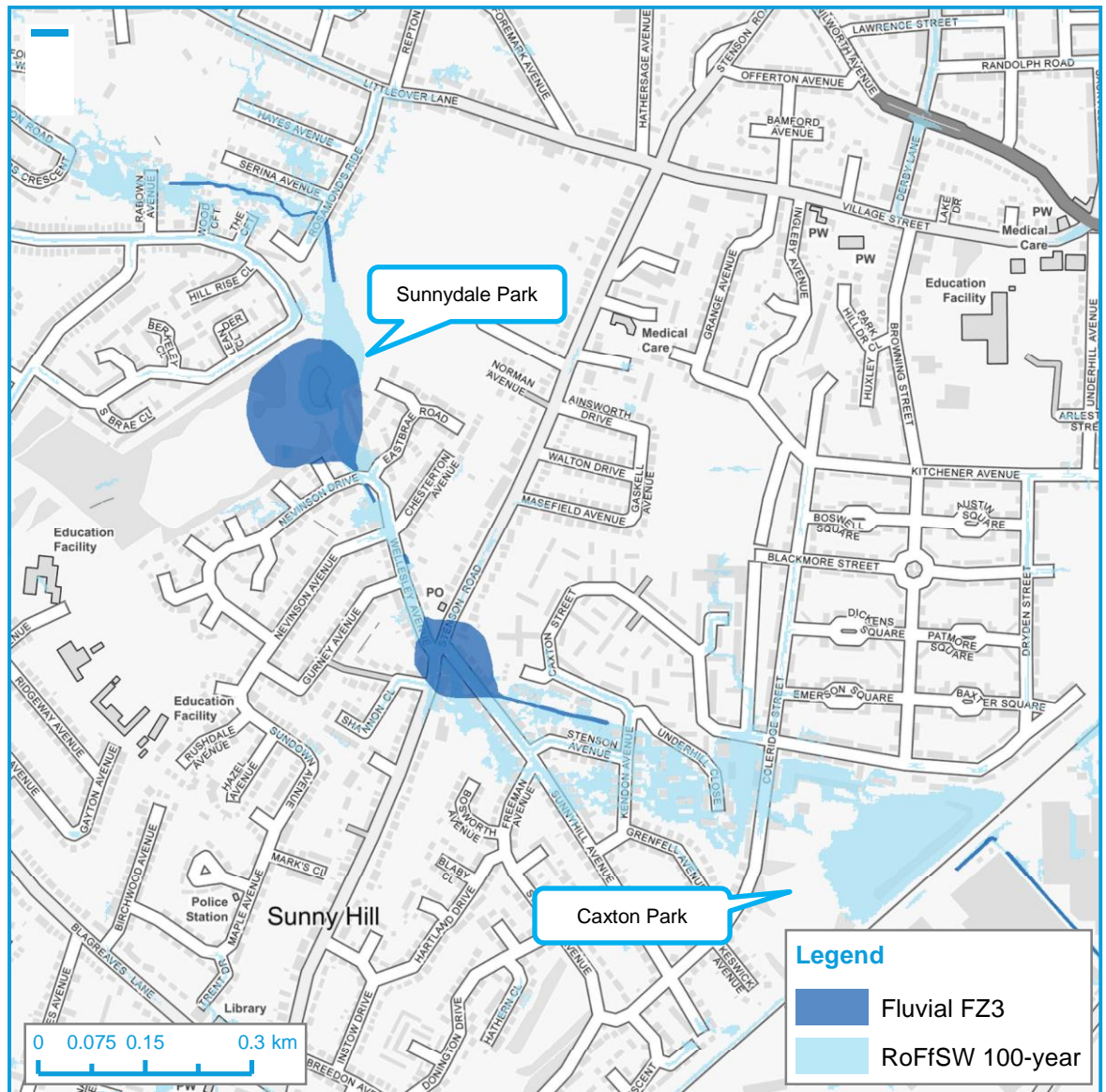
- Local Levy £260.15k
- FDGiA £389.85

1. Strategic case

Introduction

The Cuttle Brook is a tributary of the River Trent, located in the southern parts of Derby. Cuttle Brook extends from Littleover in the West to Chellaston in the East and is shown to be at risk of both surface water flooding (as detailed in the Risk of Flooding from Surface Water dataset [RoFfSW]) and fluvial flooding with reports of occasional flooding to properties adjacent to the brook being made to Derby City Council as Lead Local Flood Authority over the past 20 years.

Existing flood risk mapping shows properties at risk of surface water flooding up and downstream of Sunnydale Park, notably along Wellesley Avenue and Sunnyhill Avenue. Properties to the east of Sunnyhill Avenue to Coleridge Street are also shown to be at risk.



Several modelling studies have been undertaken to more fully understand the flooding mechanisms along the Cuttle Brook and have highlighted potential interventions to alleviate the flood risk along the upper reaches of the watercourse around Sunnydale Park and Caxton Park.

Derby City Council have been successful in a bid for European Regional Development Funding to enable a more strategic flood alleviation and environmental enhancement scheme to be delivered. This funding requires the amounts to be matched funded from other sources and this Outline Business Case aims to obtain Flood Defence Grant in Aid funding to deliver a series of

flood alleviation measures across the study area to complement the environmental enhancements being undertaken through the ERDF funding.

Study Area

The study area is within the Cuttle Brook catchment between Willson Avenue (upstream of Sunnydale Park) and the industrial estate downstream of the railway line south of Caxton Park. The Cuttle Brook is characterised by an urbanised catchment comprising numerous sewer systems draining into an open watercourse with residential developments on one or both sides. Historic flooding in the catchment has been noted from several sources¹:

- Watercourse flooding (fluvial);
- Surface water runoff from public open space;
- Sewer flooding.

With flooding events recorded in Derby City Councils incident register for July 2003, July 2007 and June 2008.

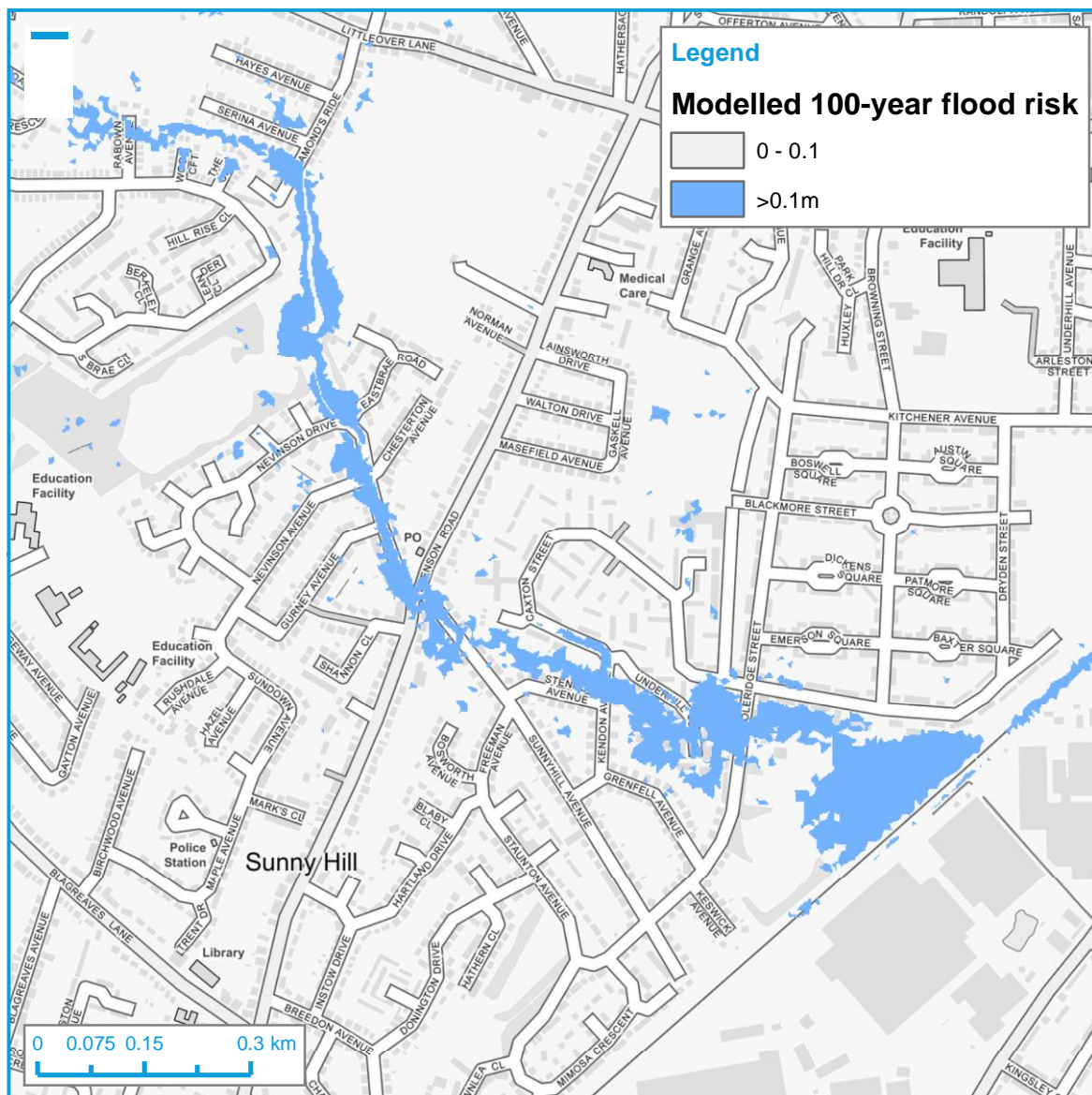
Along the reach of the Cuttle Brook between Sunnydale and Caxton Parks, the watercourse passes through several significant lengths of culvert, in fact in some locations, notably through Caxton Park, it is designated as a Severn Trent Water surface water sewer.

Existing flood risk modelling published on the UK Government Flood Maps website is based on historic fluvial modelling and generalised country wide surface water models with no explicit representation of sewers. Derby City Council have also developed an Integrated Urban Drainage model which is currently available in draft format, this shows significantly reduced flood risk when compared to the Risk of Flooding from Surface Water dataset published UK Government Flood Maps website. The model is subject to several recommendations to improve the representation of flood risk across Derby and these have been implemented locally across the Cuttle Brook catchment (incorporating sewer catchments draining towards the watercourse) to improve confidence in the flood risk datasets used to support the Outline Business Case.

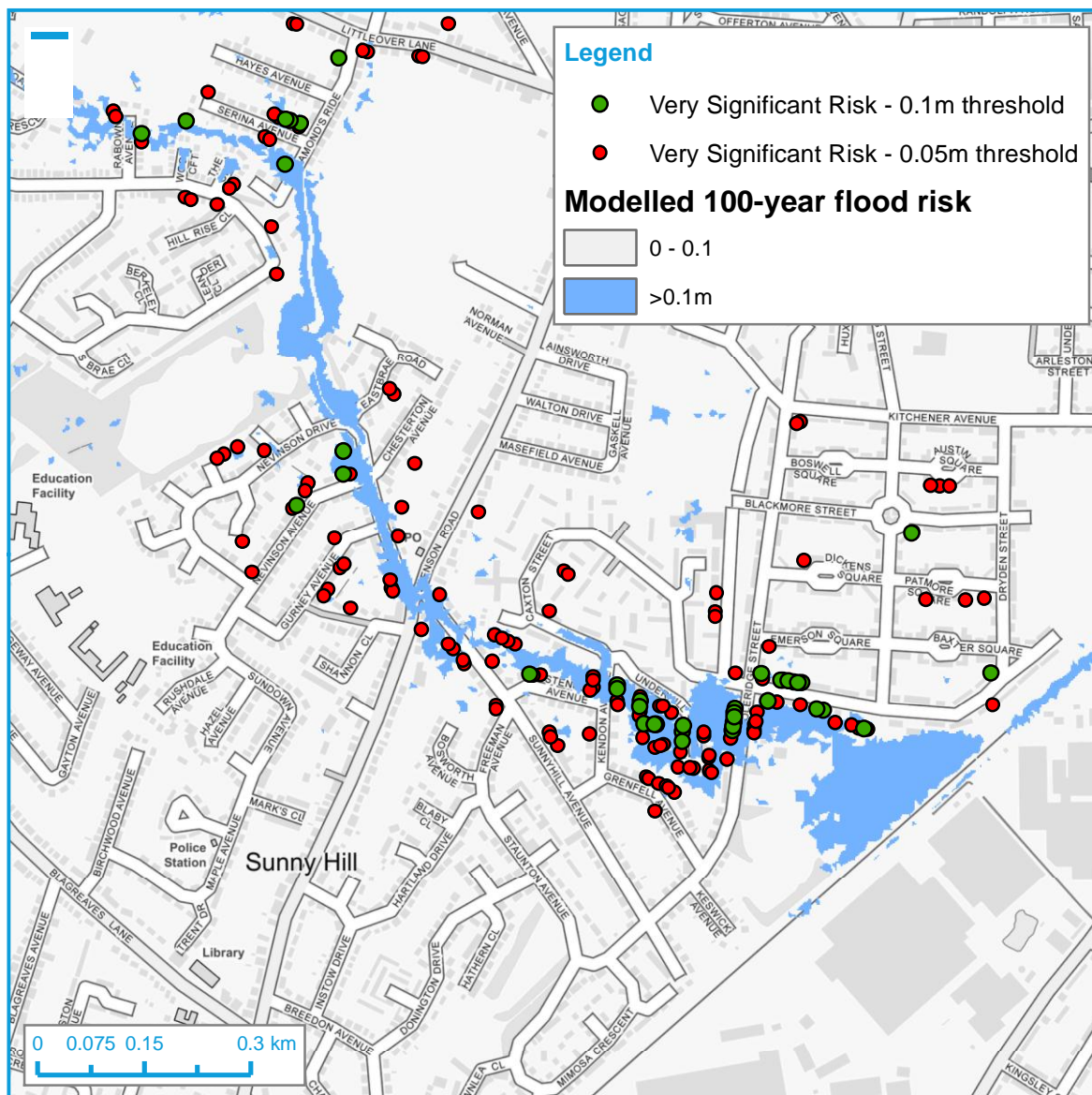
It is unsurprising that the existing system cannot convey the 100-year flow and properties are shown to be at risk, therefore a hydraulic modelling exercise has been undertaken using Derby City Council's Integrated Urban Drainage model to account more accurately for the urban nature of the catchment and the potential for flooding from fluvial, sewer and surface water sources.

The output from the updated integrated urban drainage model is shown below and is broadly comparable to that shown in the published RoFfSW dataset.

¹ Derby City Council SFRA (2009)



The modelling has shown 235 residential properties at very significant risk of flooding (assuming a property threshold of 0.05m), this falls to 47 if the property threshold is increased to 0.1m. A visual assessment of property thresholds was undertaken using Google Street view mapping and this was verified by Derby City Council staff. It was concluded that in the absence of detailed threshold survey, a 0.05m threshold was appropriate for analysis in this OBC.



Strategic context

The Flood and Water Management Act 2010 established Derby City Council as a Lead Local Flood Authority (LLFA). This Act placed a number of actions on the Council including managing local flood risk such as groundwater flooding, surface water run-off, ordinary watercourses and preparing and maintaining a strategy for local flood risk management.

The following Business Strategies provide further Strategic Context to support the implementation of improvement works to the Cuttle Brook.

Derby City Council's medium-term plan produced and submitted to the Environment Agency in 2014 prioritised five watercourses within Derby City for investment during the plan period. This included the Cuttle Brook and outlined potential interventions to reduce flood risk in the catchment.²

Derby and the Cuttle Brook catchment are located within Policy Area 5 of the Trent Catchment Flood Management Plan³ (CFMP). Policy 5 covers "areas of moderate to high flood risk where we can generally take further action to reduce flood risk."

² Derby City Council Medium Term Plan Support 2014

³ Trent Catchment Flood Management Plan – Summary Report, Environment Agency, December 2009

The Cuttle Brook is also referenced within Derby City Councils Local Flood Risk Management Strategy, with the delivery strategy stating that Derby City Council will work with the Environment Agency to promote capital flood risk management schemes for the Cuttle Brook.⁴

Nationally, the Environment Agency have a target to deliver 300,000 homes better protected by 2021; this project, though lead by Derby City Council as LLFA will contribute to delivery of this target.

The case for change

Properties between Sunnydale Park and Caxton Park are currently not protected by existing flood defences and are known to have flooded in the recent past. Local residents have reported flooding to Derby City Council, with mixed messages of the source of flooding between surface water and fluvial sources therefore this OBC has utilised an integrated urban drainage model to develop a fuller picture of flood risk to the site.

Objectives

The objective of the Cuttle Brook Scheme is to provide a higher standard of flood protection to existing properties through provision of infrastructure that is aligned to delivery of environmental enhancements to maximise the investment of European Regional Development Funding that has already been secured.

The scheme is to also be proactively collaborative in nature, with local groups including the Friends of Sunnydale Park taking ownership and assisting with maintenance of the assets.

The following investment objectives were outlined at the start of this project. All short-listed options are required to comply with these objectives:

- Communities feel safer once the project is complete and experience reduced incidences of flooding over the appraisal period;
- Improved watercourses that benefit local communities and improve local biodiversity, contributing to Water Framework Directive objectives and/or the Wellbeing of Future Generations Act goals.

Environmental Considerations

There are no statutory designations (SSSI, Ramsar, etc.) covering the Cuttle Brook study area.

A Preliminary Environmental Assessment and built heritage assessment have been undertaken and are provided in Appendix B. These show some environmental concerns around the presence of Newts in the existing pond at Sunnydale Park and highlight the requirements for some additional surveys throughout detailed design. These risks to delivery have been highlighted in the project risk register and accounted for in programme.

Local residents would be the key receptor of any environmental effects of construction works. Potential sources of environmental impact of construction works, such as exhaust fumes, dust, noise and traffic movements, would require consideration.

Project constraints and key risks

Constraints that affect the development of flood risk management options include;

- Existing railway downstream of Caxton Park;
- Ecological constraints around Newts in Sunnydale Park;
- Buried services;

⁴ Derby Local Flood Risk Management Strategy (2017), Derby City Council

- Funding restrictions on European Regional Development Funding
- Flood Defence Grant in Aid funding – any slippage to programme could put funding at risk.

Key risks

Key risks that may affect the development of flood risk management options are provided in a separate risk register (Appendix B) with include the following highlighting mitigation strategies and residual likelihood of occurrence. A summary is provided below.

	Key Risks	Mitigation
1	Design basis changes during design and construction period due to limitations of existing information e.g.: <ul style="list-style-type: none"> • Unfavourable ground conditions • Further ecological surveys reveal additional mitigation 	Ensure appropriate site investigations carried out at design stage. Utilise local knowledge of DCC staff.
2	Funding shortfall <ul style="list-style-type: none"> • Funding becomes unavailable through one or more funding stream e.g. due to programme extensions due to multiple risks materialising. 	DCC to investigate opportunities for additional funding.
3	Environmental impact arising from the works or restrictions due to protected or invasive species increase project cost or programme.	Works to be programmed to accommodate environmental constraints with appropriate investigations during design stage in line with ecological file note recommendations.
4	Temporary increased flood risk due to potential obstructions during construction.	Commission Contractor suitably experienced in this type of construction and provide measures for over pumping and/or diversions.
5	Unacceptability of option with the public due to disruption during construction phase.	Carry out early and regular public consultation to keep residents informed.

2. Economic case

At the outset of this study, Derby City Council provided their thoughts on potential flood alleviation measures through the work carried out for their Medium-Term Plan. These were used as the basis for the longlist options with variations of the options assessed throughout the study. The longlist options considered, along with a Strengths Weaknesses Opportunities and Threats (SWOT) analysis, is provided below.

<i>Option Considered</i>	<i>Strengths</i>	<i>Weaknesses</i>	<i>Opportunities</i>	<i>Threats</i>
<i>Do Nothing</i>	<ul style="list-style-type: none"> Reduced maintenance costs 	<ul style="list-style-type: none"> Increased flood risk No environmental enhancements through ERDF 	<ul style="list-style-type: none"> Limited opportunities under Do Nothing 	<ul style="list-style-type: none"> Reduction in value placed on Sunnydale Park by local residents & consequent volunteer support provided due to perceived lack of Council investment.
<i>Do Minimum</i>	<ul style="list-style-type: none"> No capital costs No additional maintenance costs 	<ul style="list-style-type: none"> Increased flood risk due to climate change 	<ul style="list-style-type: none"> Limited opportunities under Do Minimum 	<ul style="list-style-type: none"> Reputational damage to DCC & EA due to early public consultation and commitment to scheme
1. New culvert/ sewer at Willson Avenue	<ul style="list-style-type: none"> High community visibility 	<ul style="list-style-type: none"> Revised modelling shows limited surface water flow route in this location Disruption to residents Maintenance 	<ul style="list-style-type: none"> Allows engagement with local residents 	
2. Enlargement of pond with embankment at Sunnydale Park	<ul style="list-style-type: none"> Provides additional flood storage 	<ul style="list-style-type: none"> Requires some flood walls locally around properties. Residents' concerns over embankments 	<ul style="list-style-type: none"> Could enable additional enhancement of the public open space Potential of collecting highway drainage into expanded pond 	<ul style="list-style-type: none"> Public opinion on changes to public open space Need for planning consent
3. Environmental enhancements in Sunnydale Park	<ul style="list-style-type: none"> Creation of habitat Provides additional storage Funding available 	<ul style="list-style-type: none"> Does not offer significant reduction in flood risk 	<ul style="list-style-type: none"> Despite no flood risk benefit, there are opportunities for environmental enhancement to be included as part of wider flood scheme 	<ul style="list-style-type: none"> Public opinion on changes to public open space Reputational damage to

	through ERDF		through ERDF match funding.	DCC & EA due to early public consultation and commitment to flood risk scheme
4. Mound in Sunnydale Park	<ul style="list-style-type: none"> Intercepts surface water flow route and directly reduces flooding to properties 	<ul style="list-style-type: none"> Residents' concerns over changes in levels of Sunnydale Park 	<ul style="list-style-type: none"> Could be linked with environmental improvements Offers opportunities for NFM funding through Local Levy. 	<ul style="list-style-type: none"> Public opinion on changes to public open space
5. Culvert daylighting in Caxton Park	<ul style="list-style-type: none"> Creation of habitat Provides additional storage Some funding available through ERDF 	<ul style="list-style-type: none"> Does not offer significant reduction in flood risk due to surface water 	<ul style="list-style-type: none"> Despite no flood risk benefit, there are opportunities for environmental enhancement to be included as part of wider flood scheme through ERDF match funding. 	<ul style="list-style-type: none"> Public opinion on changes to public open space Reputational damage to DCC & EA due to early public consultation and commitment to flood risk scheme
6. Pond enlargement without embankment in Sunnydale Park	<ul style="list-style-type: none"> Provides additional flood storage 	<ul style="list-style-type: none"> Offers lower SoP than option 2 (with embankments) 	<ul style="list-style-type: none"> Could enable additional enhancement of the public open space Potential of collecting highway drainage into expanded pond 	<ul style="list-style-type: none"> Public opinion on changes to public open space
7. Property Level Resilience	<ul style="list-style-type: none"> Can directly protect those properties at risk 	<ul style="list-style-type: none"> Not a strategic solution Measures can fail or be exceeded Passive measures would be required, as opposed to barrier's requiring deployment. Not all residents will uptake – DCC have had limited 	<ul style="list-style-type: none"> Could be linked with improving community awareness of flood risk 	<ul style="list-style-type: none"> May not be acceptable to local residents

		positive responses on recent schemes		
<p><i>8. Combined option 1</i></p> <p>Environmental enhancements in Sunnydale park, Mound in Sunnydale park, Culvert daylighting in Caxton Park and Pond enlargement without embankment in Sunnydale Park</p>	<ul style="list-style-type: none"> • Creation of habitat • Provides additional storage • Funding available through ERDF • Intercepts surface water flow route and directly reduces flooding to properties • Provides additional flood storage 	<ul style="list-style-type: none"> • Opportunities for maximum flood benefits not achieved • Residents' concerns over changes in levels of Sunnydale Park 	<ul style="list-style-type: none"> • Additional enhancement of public open space • Links to ERDF funds for environmental enhancement and match funding • Offers opportunities for NFM. 	<ul style="list-style-type: none"> • Public opinion on changes to public open space
<p><i>9. Combined option2</i></p> <p>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Culvert daylighting in Caxton Park</p>	<ul style="list-style-type: none"> • Creation of habitat • Provides additional storage • Funding available through ERDF • Intercepts surface water flow route and directly reduces flooding to properties 	<ul style="list-style-type: none"> • Opportunities for maximum flood benefits not achieved • Residents' concerns over changes in levels of Sunnydale Park 	<ul style="list-style-type: none"> • Additional enhancement of public open space • Links to ERDF funds for environmental enhancement and match funding • Offers opportunities for NFM. 	<ul style="list-style-type: none"> • Public opinion on changes to public open space
<p><i>10. Combined option 3</i></p> <p>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Pond enlargement without embankment in Sunnydale Park</p>	<ul style="list-style-type: none"> • Creation of habitat • Provides additional storage • Funding available through ERDF • Intercepts surface water flow route and directly reduces flooding to 	<ul style="list-style-type: none"> • Opportunities for maximum flood benefits not achieved • Residents' concerns over changes in levels of Sunnydale Park • Opportunities for maximum environmental enhancement s not achieved (Caxton Park not 	<ul style="list-style-type: none"> • Additional enhancement of public open space • Links to ERDF funds for environmental enhancement and match funding • Offers opportunities for NFM. 	<ul style="list-style-type: none"> • Public opinion on changes to public open space



- properties implemented)
Provides additional flood storage

Following the SWOT analysis, a collaborative decision was taken with Derby City Council on those options to be carried forward to shortlist. The options were evaluated against Derby City Council's main objective of:

Providing a higher standard of flood protection to existing properties through provision of infrastructure that is aligned to delivery of environmental enhancements to maximise the investment of European Regional Development Funding that has already been secured.

The table below shows options carried forward to shortlist, and those rejected at long list.

Options	Description	Short list or reject
	Do Nothing	Carry forward
	Do Minimum	Carry forward
1	New culvert/ sewer at Willson Avenue	Reject – limited surface water flow routes shown in this location from revised modelling
2	Enlargement of pond with embankment at Sunnydale Park	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
3	Environmental enhancements in Sunnydale Park	Reject as stand alone option – does not provide flood risk benefits. This option can be used to deliver environmental enhancements alongside other options which deliver flood risk benefits.
4	Mound in Sunnydale Park	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
5	Culvert daylighting in Caxton Park	Reject as stand alone option – does not provide flood risk benefits. This option can be used to deliver environmental enhancements alongside other options which deliver flood risk benefits.
6	Pond enlargement without embankment in Sunnydale Park	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
7	Property Level Resilience	Reject – does not achieve Derby City Council's objective of using ERDF funding to deliver environmental benefits and flood risk benefits. This flood risk scheme would be entirely separate to any environmental enhancements.
8	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park, Culvert daylighting in Caxton Park and Pond enlargement without embankment in Sunnydale Park</i>	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.
9	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Culvert daylighting in Caxton Park</i>	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.

Options	Description	Short list or reject
10	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Pond enlargement without embankment in Sunnydale Park</i>	Short list – meets Derby City Council's objectives of delivering flood risk benefits alongside environmental enhancements.

The shortlisted options are presented in the table below.

Options		Description	Technical, Environmental & Social matters
1	Do nothing	<i>No further maintenance on the ditches and drainage system.</i>	Reduced SoP due to reduced maintenance of watercourse, siltation of pond in Sunnydale Park and increased vegetation growth along banks reducing conveyance. Reduced maintenance regime will also lead to increased vlockages at bridges and culverts.
2	Do minimum	<i>Continue existing maintenance regime</i>	Access to much of the existing watercourse is poor as it runs through culverted sections in highways and through private land. It is considered unlikely that riparian owners are fully aware of their responsibilities.
3	Do something A	<i>Pond enlargement with embankment</i>	Delivers maximum flood protection alongside some environmental enhancements in Sunnydale Park. Stakeholder engagement required around changing landscape in Sunnydale Park.
4	Do something C	<i>Mound in Sunnydale park</i>	Diverts surface water flow route in Sunnydale Park protecting a more modest number of properties. Stakeholder engagement required around changing landscape in Sunnydale Park.
5	Do something E	<i>Pond enlargement without embankment in Sunnydale Park</i>	Environmental enhancement created alongside flood protection in Sunnydale Park. Stakeholder engagement required around changing landscape in Sunnydale Park.
6	Do Something F	Combination of options <i>Environmental enhancements in</i>	Environmental enhancement created alongside flood protection in

Options		Description	Technical, Environmental & Social matters
		<i>Sunnydale park, Mound in Sunnydale park, Culvert daylighting in Caxton Park and Pond enlargement without embankment in Sunnydale Park</i>	Sunnydale Park. Stakeholder engagement required around changing landscape in Sunnydale Park.
7	Do something G	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Culvert daylighting in Caxton Park</i>	Environmental enhancement created alongside flood protection in Sunnydale Park and at Caxton Street. Stakeholder engagement required around changing landscape in Sunnydale Park.
8	Do something H	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Pond enlargement without embankment in Sunnydale Park</i>	Environmental enhancement created alongside flood protection in Sunnydale Park. Stakeholder engagement required around changing landscape in Sunnydale Park.

Key findings

The following table presents the findings of the economic analysis. The present value damages have been obtained from the hydraulic modelling and utilise information from the National Receptor Dataset. The present value costs have been estimated using contractor costs estimates and include an optimism bias of 30%.

Optimism bias has been reduced from 60% to 30% through discussions with Derby City Council and the Environment Agency for two principal reasons:

1. Costs have been provided by Balfour Beatty through their supply chain and are therefore market tested, rather than using a unit cost approach;
2. A detailed risk register has been developed for the preferred option, including a risk allowance within the final cost for approval.

Given the approach to costing and understanding the risks to this scheme, an allowance of 60% for optimism bias is considered unnecessary and a reduction to 30% more appropriate.

Option		Present Value costs (£k)	Present Value damages (£k)	Present Value benefits (£k)	Average benefit: cost ratio (BCR)	Incremental benefit: cost ratio (IBCR)	Option for incremental calculation
1	Do nothing		7,599				
2	Do minimum	82	6,630				
3	Do something A	1,481	5,073	2,526	1.7	1.1	Do Min
5	Do something C	393	6,406	1,193	3.0	0.7	Do Min
7	Do something E	721	5,323	2,276	3.2	2.0	Do Min
8	Do Something F	2,062	5,276	2,323	1.2	0.7	Do Min
9	Do Something G	1,564	6,406	1,193	0.8	0.5	Do Min
10	Do Something H	1,164	5,276	2,323	2.0	1.2	Do Min

Non-financial benefits

Flood risk management schemes reduce flooding but can also enhance the area in terms of economic function or acceleration of regeneration. The wider and non-financial benefits of the shortlisted options have been evaluated against the against Derby City Councils main objective.

Providing a higher standard of flood protection to existing properties through provision of infrastructure that is aligned to delivery of environmental enhancements to maximise the investment of European Regional Development Funding that has already been secured.

There are no non-financial benefits associated with the Do nothing and Do minimum options. The non-financial benefits associated with the Do something options are presented below:

Option	Non-financial benefits
Do something A	<i>Pond enlargement with embankment</i> <ul style="list-style-type: none"> 65 Properties protected (OM2's) Parts of environmental enhancement programme funded by European Regional Development Fund delivered alongside flood risk scheme (delivering match funding required for ERDF).
Do something C	<i>Mound in Sunnydale park</i> <ul style="list-style-type: none"> Natural flood management interventions 9 Properties protected (OM2's) Parts of environmental enhancement programme funded by European Regional Development Fund delivered alongside flood risk scheme (delivering match funding required for ERDF).
Do something E	<i>Pond enlargement without embankment in Sunnydale Park</i> <ul style="list-style-type: none"> 23 Properties with reduced flood risk (OM2's) Parts of environmental enhancement programme funded by European Regional Development Fund delivered alongside flood risk scheme (delivering match funding required for ERDF).
Do Something F	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park, Culvert daylighting in Caxton Park and Pond enlargement without embankment in Sunnydale Park</i> <ul style="list-style-type: none"> Natural flood management interventions 31 Properties with reduced flood risk (OM2's) Parts of environmental enhancement programme funded by European Regional Development Fund delivered alongside flood risk scheme (delivering match funding required for ERDF).
Do Something G	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Culvert daylighting in Caxton Park</i> <ul style="list-style-type: none"> Natural flood management interventions 9 Properties with reduced flood risk (OM2's) Parts of environmental enhancement programme funded by European Regional Development Fund delivered alongside flood risk scheme (delivering match funding required for ERDF).
Do Something H	Combination of options <i>Environmental enhancements in Sunnydale park, Mound in Sunnydale park and Pond enlargement without embankment in Sunnydale Park</i>

Option	Non-financial benefits
	<ul style="list-style-type: none"> • Natural flood management interventions • 31 Properties with reduced flood risk (OM2s) • Parts of environmental enhancement programme funded by European Regional Development Fund delivered alongside flood risk scheme (delivering match funding required for ERDF).

Preferred way forward

Ongoing liaison with Derby City Council regarding financial benefits achieved alongside non financial benefits including number of properties protected, environmental enhancements delivered, the ability to leverage the European Regional Development funding and availability of match funding resulted in “Do Something H” becoming the preferred option for Cuttle Brook.

3. Commercial case

Procurement strategy

On the basis that the Do something options are taken forward, Derby City Council would remain the lead organisation in promoting the scheme. In order to successfully deliver the scheme, the following tasks will need to be completed:

- Appoint a designer;
- Ensure that all necessary consents and permits are in place;
- Secure funding;
- Appoint a contractor to construct the scheme;
- Undertaken a post-project evaluation

It is proposed that Derby City Council will appoint Balfour Beatty through the SCAPE framework using a Design and Build contract

Key contractual terms and risk allocation

The design stages (including Early Contractor Involvement) will be carried out under the terms and conditions of the NEC3 Professional Services Contract (June 2005) (with amendments 2006 & 2011). The contract is most likely to be managed under a fixed price structure.

The construction contract will be developed in a two-stage process where the Employer and the Contractor will undertake a design audit, review procurement lead-in periods, develop the risk register and investigate value engineering opportunities during a further ECI stage. Subject to the outcome of this stage, funding levels and the performance of the successful tenderer to complete the construction of the works. The construction works will be carried out under terms and conditions of the Engineering and Construction Contract (June 2005) (with amendments 2006 & 2011) Option A Fixed Fee Contract.

As with any construction project there are substantial risks present in both the design and construction phases. These can include the need to spend money on unplanned items (e.g. diversion of a service not shown on utilities plans), changes in legislation or design standards, and changes in project scope. As part of the tender process a risk register should be developed to provide a tool for quantifying the likelihood of a particular risk occurring and the impact that it will have on delivery (programme and cost).

Efficiencies and commercial arrangements

The proposed use of an existing framework to procure the works will provide efficiencies over an open market tender exercise in procurement and delivery. These efficiencies will include:

- Client efficiencies in procurement;

- Designer and contractor efficiencies in already being familiar with the design, constraints and risks.

These efficiencies have already been incorporated into the budget costs presented in this OBC and are estimated at 5% of total funds requested for approval.

Derby City Council should continue to identify other sources of funding and whether the works can be packaged with other schemes to drive additional efficiency.

Where additional efficiencies are materialised or risk does not occur, it is proposed that any funding excess will be returned to Local Levy and Derby City Council on a 50:50 basis.

4. Financial case

Financial Summary

The financial analysis has been carried out on the combined option, option H. Contractors and construction fees have been provided by Balfour Beatty through the SCAPE framework and as such have been market tested providing a higher degree of confidence that outturn costs will not significantly deviate from the quoted costs. Consultant fees have been provided by JBA Consulting.

	Cost for economic appraisal (PV)	Whole-life cash cost	Total Project cost (approval)
Costs up to OBC	N/a – sunk costs	£20k	Exc previous app
<u>Costs after OBC</u>			
Existing staff costs	£30k	£30k	£30k
Further staff costs			
Consultants' fees	£30k	£30k	£30k
Contractors' fees	£50k	£50k	£50k
Cost consultants' fees			
Site investigation and survey	£10k	£10k	£10k
Construction	£588k	£588k	£588k
Site supervision			
Environmental mitigation	£4.6k	£4.6k	£4.6k
Environmental enhancement			
Land purchase & compensation			
Other			
<u>Risk Contingency</u>			
Optimism Bias	£213.78k	£213.78k	£213.78k
Risk - Monte Carlo 95%ile or similar	N/a	N/a	£250k
Risk - Monte Carlo 50%ile or similar	£170k	£170k	N/a
Inflation	N/a	N/a	£0
Future costs (construction + maintenance)	<u>£52.5k</u>	<u>£52.5k</u>	N/a
Optimism Bias on future costs	£15.75k	£15.75k	
Project total cost	£1,164.1k	£1,164.1k	£1,176.38k

Funding sources

	%	Description	Total £k
Raw Partnership Funding score	33		
<u>Funding:</u>			
Contributions (list)		ERDF Derby City Council Capital Spend	276.37 250
Other: (list)		Local Levy TBC	234.15
Local Levy			26
Non GiA contributions			728.89
Adjusted Partnership Funding score	100		
Grant in Aid		OM1 + OM2 +OM4	389.85
Project total cost (approval)			1176.38

Overall affordability

Annualised spend profile (£k)	Yr 0 2018	Yr 1 2019	Yr 2 2020	Yr 3 2021	Yr 4+	Total
Staff costs	5	25				30
Construction & other costs	50	632.6				682.6
Optimism bias & risk contingency	16.5	447.28				463.78
Inflation						
Project total capital cost	71.5	854.9				1176.38

5. Management case

Project and contract management

Project management

The key success factors for the scheme are:

- Coordination of Third Party Interfaces
- Timely Delivery
- Delivery of a Quality Product
- Zero Health and Safety Incidents
- Maximum Community and Environmental Benefits
- Delivering within programme and to budget

Project structure and governance

The project will be delivered and managed by officers of Derby City Council with Governance from elected Members of the Council. The Senior Responsible Officers are Kevin Tozer, Team Leader of Flood Risk within Streetpride and Nick Tolley Senior Engineer within Flood Risk in Streetpride.

Project Team

Stakeholders will be invited to meet approximately quarterly, with meetings chaired by the Head of Engineering and Transport.

Contract Management

The scheme will be delivered by Derby City Council. The Council have in-house knowledge of the area and have a record of delivering successful infrastructure and regeneration schemes of this nature.

The proposed procurement approach and contractual arrangements are set out in Section 4. Derby City Council fully advocate the prescriptive management approach prescribed by the NEC Contract Conditions and utilise complimentary communications systems to make sure that the contract is managed proactively and that Value Engineering and Risk Management initiatives are maintained throughout the duration of the scheme.

Contractor performance is benchmarked via Framework KPI's and best practice workshops are encouraged.

Schedule

The timescales presented below represent a best guess for the likely timescales of delivering the scheme and is based on the assumption that Derby City Council appoint a designer through SCAPE in January 2019.

Activity	Date (DD/MM/YYYY)	Comment
Other (detail as necessary) Detailed Design complete	May 2019	
Work to be started on site	August 2019	
Work substantially completed by	January 2020	Mitigation measures due to Great Crested Newts may delay start of site work and consequently completion of works until April 2020

Outcomes

The Cuttle Brook scheme will deliver flood risk benefits and environmental enhancements located around Sunnydale Park. Derby City Council will own and maintain the assets created as part of the scheme, the majority of maintenance will include slight changes to park maintenance switching from grass cutting to wildflower meadow maintenance.

Derby City council will continue regular maintenance of the pond at Sunnydale Park and the outlet culvert and overflow weir which will be modified as part of the scheme. Table 5 outlines the Outcome measures delivered as part of the scheme.

Table 5 – Outcome Measures delivered by the project

Contributions to outcome measures	
Outcome 1 – Ratio of whole-life benefits to costs	
Present value benefits (£k) [Value taken from table 1]	2,323
Present value costs (£k) [Value taken from table 1]	1,164
Benefit: cost ratio [Value taken from table 1]	2.0
Outcome 2 – Households at reduced risk [Values taken from the PF calculator]	
2a – Households moved to a lower risk category (number – nr)	31
2b – Households moved from very significant or significant risk to moderate or low risk (nr)	28
2c – Proportion of households in 2b that are in the 20% most deprived areas (nr)	8 (0.28)
Outcome 3 – Households with reduced risk of erosion [Values taken from the PF calculator]	
3a – Households with reduced risk of erosion (nr)	
3b – Proportion of those in 3 protected from loss within 20 years (nr)	
3c – Proportion of households in 3b that are in the 20% most deprived areas (nr)	
Outcome 4 – Water framework directive [Values for OM4a to 4c taken from the PF calculator]	
4a – Hectares of water-dependent habitat created or improved (ha)	0.5
4b – Hectares of intertidal habitat created (ha)	
4c – Kilometres of river protected (km)	
4d – Kilometres of WFD water body enhanced through FCRM	
4e – Kilometres of water body opened up to fish and /or eel passage through FCRM	
4f – Kilometres of river habitat enhanced (including SSSI) through FCRM	
4g – Hectares of habitat (including SSSI) enhanced through FCRM	
4h – Hectares of habitat created through FCRM	

Risk, constraint and dependency management

Changes are inevitable in construction projects and Change Management is a critical problem faced by the construction industry. The effort of managing change orders imposes a huge

burden on project management. Changes are identified as the major cause of project delay, cost overruns, defects, or even project failure.

The prescriptive processes detailed within the NEC3 are essential in the effective control of change. DCC are advocates of using Contract Change Management Software that improves communications and facilitates a documented proactive approach based around a Risk Register.

The Project Manager will be responsible for the maintenance of the Risk Register and will engage all members of the delivery team to develop a register that is robust and considers all aspects of potential cost, programme, third-party or technical risk. It is essential that the risk registers are discussed in workshops by team members with differing views and that solutions are owned by members of the entire team.

A Risk Register has been developed at OBC stage and this should remain live throughout the detailed design and construction phases of the scheme.

Sustainability

The appraisal of the Cuttle Brook scheme to date has identified requirement for some additional ecological surveys for great crested newts; through liaison with JBA's ecologists who have undertaken the preliminary ecological appraisal and surveys, Balfour Beatty (delivery contractor through the Scape framework) have implemented an appropriate programme to allow for additional surveys and appropriate monitoring throughout construction.

The scheme will be delivered through the Scape framework which has key performance indicators around use of local contractors which Balfour Beatty will be evaluated against. Use of a local supply chain will minimise carbon emissions through the construction phase of the project. A sustainability register will also be managed throughout the detailed design and build phases of the study

Assurance

EA / Trent RFCC

Environment Agency and Trent RFCC reviews of the project will be conducted at key decision points for approval of further funding. These will be:

- Progress to Detailed Design
- Progress from Detailed Design to Construction

Local Authority

Derby City Council is fully aware of the importance of collecting and reporting accurate data relating to its operations and has a proven track record of doing so successfully.

A Monitoring and Evaluation Plan will be developed which will outline the system that will be used to effectively collect all data relating to the Operation. The Monitoring & Evaluation Plan will consider:

- Evaluation Objectives
- Lessons learned from previous projects
- Operational Context
- Activities to be undertaken
- Management Responsibility
- Delivery Plan
- Indicators
- Targets
- Data Quality
- Reporting Arrangements
- Evaluation
- Potential use of Evaluation
- Indicative Timetable

- Dissemination

Engagement with Stakeholders

Following approval of this OBC, further studies and investigations will be carried out in order to ascertain the required level of information to forward the project to the detailed design stage. Further stakeholder engagement with the following key stakeholders is recommended:

Environment Agency

As the regulatory authority in England, and also as a client organisation with extensive experience in flood alleviation capital schemes, consultation is imperative to efficiently adhere to environmental legislation and share best practice.

Riparian owners

Informing, managing and enforcing riparian owner responsibilities for maintenance of flows is an important part of the proposal for managing flood risk. This also helps to make sure that the public purse is not paying for these private liabilities.

Businesses in the area should be consulted regarding their access requirements. This should include identifying any seasonality in their business that may allow the project to minimise disruption through carefully timing the works.

Local businesses, residents and public

Before the construction phase of the project begins, the local businesses, residents and public need to be informed of issues that may affect them, such as accessibility, construction traffic, and changes to flood risk, most likely via written notices.

Service providers

Consultation should be sought from utilities providers to confirm exact locations of buried services.

Other interested parties

The consenting process follows the detailed design stage, and the need for an Environmental Impact Assessment (EIA) will be confirmed via an EIA screening opinion from Derby City Council. Should an EIA not be required, a range of environmental assessments, based on the topics covered in this report, are likely to be required to support the approval of the project. The preparation of an EAP will be required to capture the mitigation and enhancement measures. Other statutory consents relating to footpath or road closures/diversions or protected species, will also be sought if required, subject to consultation with relevant authorities. Stakeholder engagement is imperative at each of these stages.

Evaluation

The Evaluation will report on the impact and effectiveness of the operation and will include feedback on indicators, aims and objectives, effectiveness of project management and will make recommendations or suggestions or improvement or ideas for future operations.

The evaluation final report will be distributed upon completion of the project and will be made available to the Environment Agency, stakeholders and will be reported to the relevant senior management and cabinet boards as appropriate.

The longer-term benefits will be monitored including long term community benefits, business growth, tourism and jobs created on the site following construction.

Appendix A: Partnership funding calculator

Appendix B: List of reports produced

Risk Register

Preliminary Ecological Appraisal

Geo-environmental report

Hydraulic modelling note

Designers risk assessment

Scheme Drawings