

# ***Loxwood Flood Risk Management Scheme***



## **Short Form Strategic Outline Business Case (SOC)**

**Version No:** FINAL v2.0

***Date:*** April 2016

## FINANCIAL SCHEME OF DELEGATION (FSoD) APPROVALS

1.	<b>Project name</b>	Loxwood Flood Risk Management Scheme				
	<b>Project ref.</b>	SOC008E/000A/026A	<b>Project Code</b>	ENVIMSE100436	<b>Start date</b>	2016/2017
	<b>Programme</b>	Solent and South Downs Appraisal Package 107			<b>End date</b>	2018/2019
	<b>Hub or Head Office</b>	South	For FSOD use only			
	<b>Area name</b>	Solent and South Downs	<b>FSoD reference</b>	<b>F/1617/0247</b>		
	<b>Function</b>	FCERM	<b>FSoD Date</b>	01/06/2016		

2.	<b>Role</b>	<b>Name</b>	<b>Post Title</b>	<b>% time allocated to project</b>
	<b>Project Sponsor</b>	Gordon Wilson	Area FCERM Manager	2%
	<b>Project Executive</b>	Alastair Pitcher	Project Manager 1	5%
	<b>Project Manager</b>	William Culley	Project Manager 2	15%

3.	<b>Risk Potential Assessment (RPA) Category</b>	Low	<input checked="" type="checkbox"/>	Medium	<input type="checkbox"/>	High	<input type="checkbox"/>
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4.	<b>FSoD schedule</b>	<b>Description</b>	<b>Delegation</b>	
			<b>National – up to</b>	<b>Area – up to</b>
	A1	Projects (includes FCERM revenue)	£5m	£5m
	A2	FCRM capital project within approved strategy	£100m WLC Defra	£10m
	A3	FCRM capital project outside of approved strategy	£100m WLC Defra	£5m
	A5	Consultancy project	£500k	£500k
	T2	Corporate Property Projects /acquisitions	£5m	£5m

5.	<b>FSoD value</b>	<b>£k</b>
	<b>Strategic Outline Case (SOC)</b>	140
	<b>Full Business Case (FBC)</b>	
	<b>Whole Life Costs (WLC) of Project (if applicable)</b>	
	<b>Financial benefits</b>	
	<b>Non-financial benefits</b>	Yes

6.	<b>Required level of Environmental Impact Assessment (EIA)</b>	N/A <input type="checkbox"/>	Low <input type="checkbox"/>	Medium <input checked="" type="checkbox"/>	High <input type="checkbox"/>
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7.	<b>NPAS/LPRG chair</b>	<b>Post title</b>	<b>Assurance confirmation</b>		<b>Date</b>	
	Lesley Newport	Lead assurer	RED <input type="checkbox"/>	AMBER <input type="checkbox"/>	GREEN <input checked="" type="checkbox"/>	31/05/2016

8.	<b>FSoD approver(s) name</b>	<b>Post title</b>	<b>Emailed approval</b>	<b>Date</b>
	James Humphrys	Area Manager	See below	02/06/2016

9.	<b>Form G</b>	<b>Form G value (£k)</b>	<b>FSoD ref.</b>	<b>Latest FSoD authorised cost (£k)</b>
	1			
	2			
	3			

10.

**For FSoD Coordinator use only:**

**From:** Humphrys, James  
**Sent:** 02 June 2016 13:14  
**To:** National Project Assurance Service  
**Cc:** Wilson, Gordon  
**Subject:** RE: For approval - Loxwood FRM (F/1617/0247)

Approved.  
JAH

**James A Humphrys**  
**Environment Agency**  
**Area Manager (Solent & South Downs)**

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Appendix A Extracts from West Sussex County Council Legal Agreement

# 1. Executive Summary

## 1.1. Introduction

This project, Loxwood Flood Risk Management (FRM) Scheme, forms part of the Solent and South Downs Appraisal Package 107.

This project requires an estimated £881k investment to better protect 33 no. residential properties from the risk of flooding for a 50 year benefits period.

There is community and political pressure to address the ongoing fluvial, surface water and sewage flooding issues in the rural village of Loxwood. The flooding mechanisms and exact number of properties at risk are currently uncertain. Therefore, this appraisal project aims to provide a greater understanding of the benefits that could be realised and provide an accurate economic justification.

This Strategic Outline Case (SOC) sets out to develop Outline Business Case (OBC) and obtain Full Business Case (FBC) assurance.

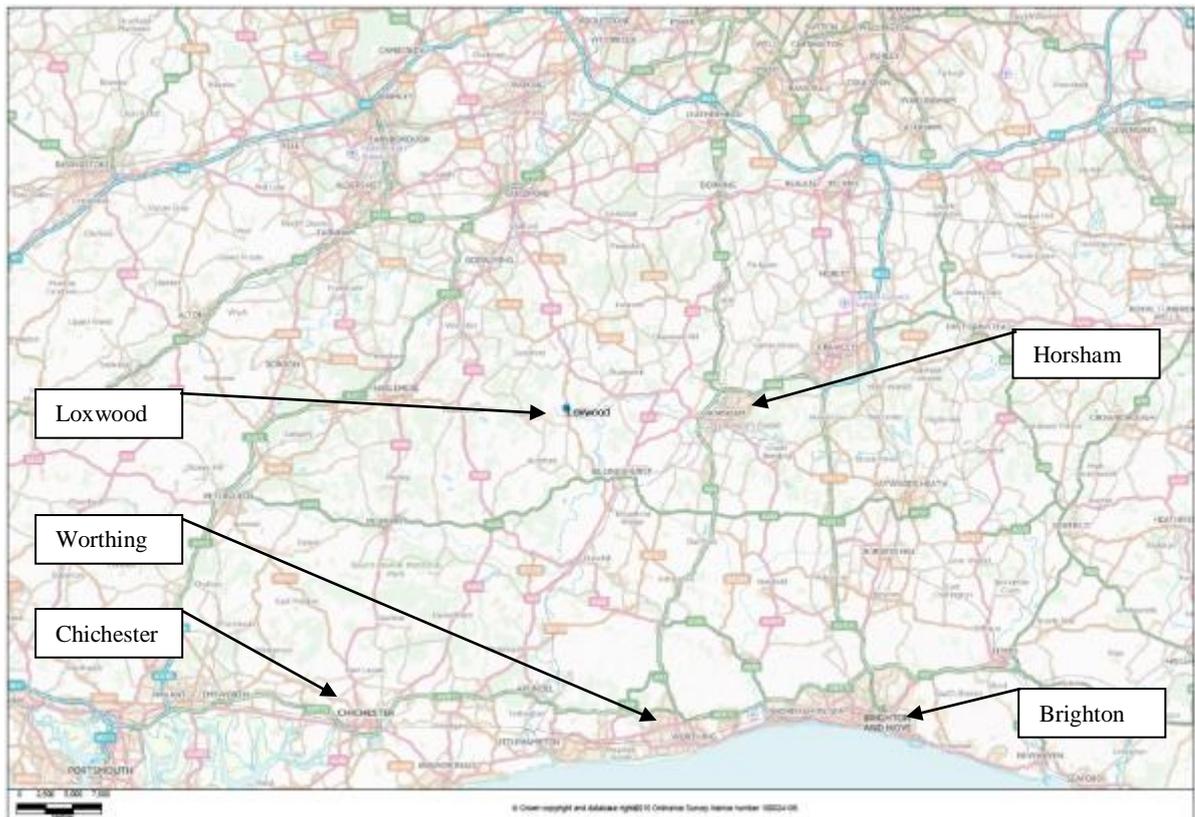
## 1.2. Strategic case

This project is required to obtain a greater understanding of the flooding mechanisms that occur on a regular basis within the rural village and confirm if a flood risk management scheme is viable.

### Strategic context

The rural village of Loxwood, West Sussex, is affected by flooding issues on a regular basis. The River Lox, a relative small and narrow watercourse in the upper part of the River Arun catchment, runs directly through the heart of the village and generally comes out of bank most winters. There are steep hillsides in and around Loxwood and the village itself has been subject to inappropriate development in the floodplain.

Figure 1: Loxwood Location Map



Anecdotal evidence suggests that in the winter of 2013/2014 approximately 25 no. properties were affected by flood waters. The exact source of flooding is uncertain, but is likely to be a combination of fluvial flows, surface water and sewerage water. Potential sources of flooding are further described in “The case for change”.

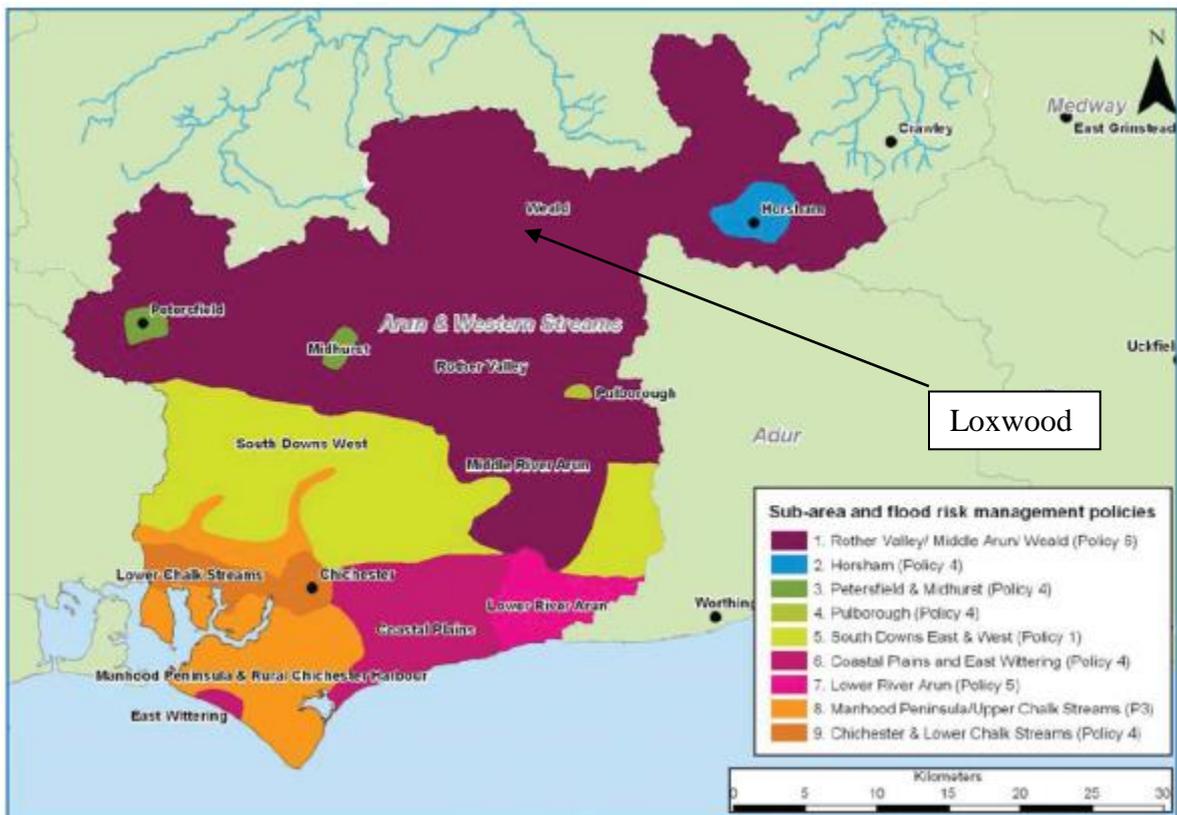
The Environment Agency is in continued discussions with West Sussex County Council (WSCC), Chichester District Council (CDC), Loxwood Parish Council (LPC) and Southern Water regarding the sources of flooding, and allocating responsibilities and plans to reduce the issues.

LPC have previously appointed a small independent consultant to undertake an initial flood risk assessment and identify flood risk reduction measures. Limited information made available from this study has indicated some form of flood risk reduction measures may be available to the village.

A community led flood forum group has been established which provides a political drive for a FRM scheme to be implemented.

The village of Loxwood is located within Rother Valley / Middle Arun / Weald sub-area of the Arun and Western Streams Catchment Flood Management Plan (CFMP) (*Environment Agency, 2009*). The CFMP states the preferred policy option for this sub-area is Policy 6, which is; “areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits”. An extract from the CFMP is provided in Figure 2.

Figure 2: Extract form Arun and Western Streams CFMP, Sub-areas and FRM policies



The River Basin Management Plan (RBMP) South East River Basin District (*Environment Agency, 2009*) states that for the Arun and Western Stream catchment an “Action in the catchment should lead to improvement in water quality and fish movement. As a result, the ecological status of water bodies will improve”.

This scheme also aims to deliver parts of national level strategies defined by the following three documents; DEFRA Policy, Environment Agency Corporate Plan, and National Flood and Coastal Erosion Risk Management (FCERM) Strategy.

### *DEFRA Policy*

The Environment Agency and its partners work to high level policies set by DEFRA that are of relevance to this scheme:

- Reducing the Threats of Flooding and Coastal Change;
- Adapting to Climate Change; and
- Protecting and improving people's enjoyment of the countryside.

These have all been recently updated during 2014 to incorporate all relevant legislation and best practice. They are integral to the scheme's objectives and the Environment Agency's Corporate Plan as set out below.

### *Environment Agency Corporate Plan*

The Environment Agency's corporate plan (2014-16) is structured around three main business areas: flood and coastal risk management; water, land and biodiversity; and regulated business. Its work is based on the following priority areas;

- A changing climate;
- Increasing the resilience of people, property and businesses to the risks of flooding and coastal erosion;
- Protecting and improving water, land and biodiversity;
- Improving the way we work as a regulator to protect people and the environment and support sustainable growth;
- Working together and with others to create better places;
- Ensuring that we are fit for the future.

### *National Flood and Coastal Erosion Risk Management (FCERM) Strategy*

The National FCERM Strategy, dated September 2011, sets out a national framework for managing the risk of flooding. It helps organisations and communities to understand their different roles and responsibilities and is particularly relevant to Lead Local Flood Authorities (LLFAs) and Regional Flood and Coastal Committees (RFCCs), which have new duties under the Act. It promotes local decision-making and engagement, and encourages beneficiaries to invest in flood risk management.

### **The case for change**

There are pressures from the local community and a local MP (of the adjacent constituent) for actions that reduce existing flood risk. There is a willingness from the LLFA, WSCC, to contribute to a FRM scheme. However, the flooding mechanisms and the number of properties at risk need to be established in order to identify viable and affordable options to reduce the problem.

It is currently considered that the watercourse is under capacity with undersized culverts along its length and high levels of siltation. Furthermore the watercourse contains several 90 degree bends which do not allow for efficient conveyance. The surface water system through the village is also considered to be under capacity and has issues draining into the River Lox when it is in full flow. WSCC highways authority have undertaken some investigation and clearance works and regularly reported to the Parish Council.

The boundary between Southern Water and Thames Water is to the north of Loxwood. There are current uncertainties regarding how much influence the Thames Water system has on the Southern Water system within Loxwood.

National Flood Risk Assessment (NaFRA) mapping data (shown in Figure 3) indicates there are 16 no. properties at risk from fluvial flooding;

- 6 no. at high risk (<3.33% annual event probability (AEP)),
- 4 no. at moderate risk (<1% AEP), and a further

- 6 no. at low risk (>1% AEP). .

Furthermore, the NaFRA data indicates an electrical sub-station is also at high-risk of flooding.

The risk of flooding from surface water is shown in Figure 4. Assessment of this mapping has indicated there are 43 no. properties at risk from surface water flooding:

- 18 no. properties at high risk from surface water flooding (<3.33% AEP),
- 12 no. properties at moderate risk (<1% AEP), and
- a further 13 no. at low risk (>1% AEP), .

This high-level analysis indicates that 21 no. properties are at high risk from either fluvial or surface water flooding issues, 12 no. more properties are in the moderate risk banding, and a further 13 no. in the low risk banding. Therefore a total of 46 no. properties may be at risk from flooding, as shown in Table 1.

**Table 1: Summary of Properties at Risk**

Flooding Mechanism	Estimated Number of Properties at Risk		
	<3.33% AEP	<1% AEP	>1% AEP
	High Risk	Moderate Risk	Low Risk
Fluvial	6	10	16
Surface Water	18	30	43
Combined	21	33	46

Through the development of the business case an accurate number properties at risk and their current standard of protection will be calculated. This will be achieved through the creation of a hydraulic model based on topographic information.

## Objectives

The main objectives of the Loxwood FRMS project are described in Table 2.

**Table 2: Loxwood FRMS – Main Objectives**

No	Critical Success Factor	Measurement Criteria	Importance (1-5)*
1	Determination of the number of properties at risk from flooding through hydraulic modelling of the River Lox and the surface water drainage system.	Accurate calculation of the benefits.	1
2	Determination if a suitable cost-effective option can be implemented to better protect the local community from multi-sources of flooding.	Accurate calculation of short list option costs. Low cost measures, as benefits may be limited.	4
3	Assess if a suitable FRMS can also deliver environmental benefits.	Assessment during long list optioneering to be taken forward to short list if OM4a environmental benefits are also achievable.	5
4	Engage pro-actively with the local community. This is especially important as if the appraisal process cannot find a suitably economically justifiable solution the Environment Agency Area PSO Team will need to continue to work with the residents to manage flood risk.	Awareness of the community that any works undertaken will provide some benefits to future flood resilience even if a full FRM scheme is not economically justifiable.	2
5	Engage pro-actively with West Sussex County Council, Chichester District Council and Southern Water to find a cost effective solution that can be delivered.	As the scheme develops external contributors are aware of their likely required contribution, so these are secured prior to construction.  Reduction in possible surface water improvement costs via integration with	3

No	Critical Success Factor	Measurement Criteria	Importance (1-5)*
		Southern Water's maintenance regime.	
6	To ensure scheme delivery by obtaining funding from external contributions so that the Partnership Funding Score is greater than 100% and by maximising the Flood and Coastal Erosion Risk Management Grant in Aid (FCERM GiA) contribution, achieved through efficiencies and optimised scheme design.	Continued communication with delivery partners regarding likely external contributions required.  Accurate assessment of construction costs.  Identification of, and commitment from, other external contributors.	1

**1 = High importance**

Figure 3: National Flood Risk Assessment (NaFRA) Flood Map for Loxwood

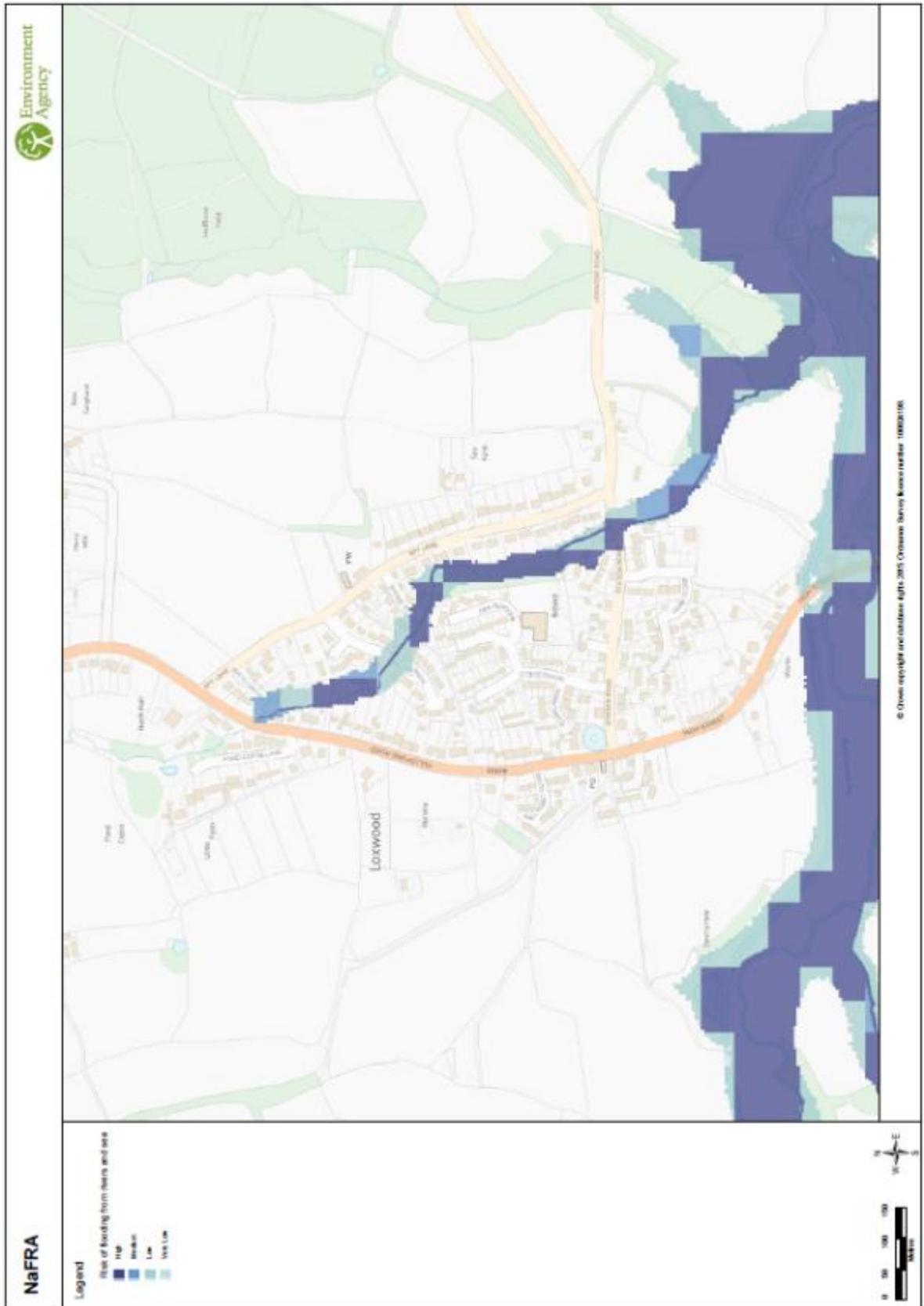


Figure 4: Risk of Flooding from Surface Water for Loxwood



### 1.3. Economic case

An initial analysis has calculated benefits of £881k. Whole-life costs may not exceed this value to ensure a Benefit Cost Ratio (BCR) of greater than 1. The appraisal process will confirm scheme viability in a phased manner.

#### Options considered

Some FRM options have been identified by LPC, WSCC Highways Authority, Southern Water and Environment Agency Planning and Strategic Overview (PSO) Area staff. The list provided in Table 3 provides an overview of options that may be achievable. Through the commission of a Water and Environmental Framework (WEM) supplier this option list will be reviewed and supplemented to form a long list. Further scrutiny will then be undertaken to derive a short list of options for further appraisal.

**Table 3: Loxwood FRMS Concept Options**

Option	Description	Benefits delivered / Risks involved	Reason for short list or rejection
0	Do Nothing	Continued regular flooding to properties.	Baseline
1	Do Minimum	The benefits of each option and the technical, environmental, and social risks will be considered during the appraisal process.	Tbc
2	Property Level Protection (PLP)		
3	Land management		
4	Improved conveyance		
5	Local embankment and wall raising		
6	Upstream storage		
7	Bypass channel		
8	Surface water drainage improvements		
9	Combination of measures arising from Options 2 to 8.		

#### Key findings

A high-level estimate, based on the number of properties at risk described in Section 1.2 has indicated that indicated present value (PV) whole-life benefits of £881k. This value has been derived based on average annual damages to residential detached properties.

As this project has not come from an initial assessment (IA), there are no costing available. To provide a baseline understanding of potential costs an approach taken on recent IAs in the South Hub has been applied to Loxwood. The approach was driven by cost data derived from Project Costing Tool (PCT). Costs for each activity (i.e. appraisal, staff costs, risk, etc.) are based on percentages of the estimated maximum PV whole-life costs and are described further in Section 1.5.

To enable justification of the economic case the PV whole-life costs, inclusive of appraisal, design, construction, and post-construction costs must be less than the estimated benefits value of £881k in order to achieve a benefit cost ratio (BCR) of greater than 1.

This costing approach suggests the capital construction costs of £388k and a construction cost risk contingency of £193k will be needed. It is therefore considered that the nature of any flood mitigation measures are likely to be small scale but that a FRM scheme could be constructed for Loxwood.

The flood reduction measures may not be led by the Environment Agency with FCERM GiA funding. Reduction measures may be led wholly or partly by WSCC highways or Southern Water. The permutations in delivery partners strengthens the potential for a flood reduction scheme to be delivered with only limited benefits available.

## Preferred way forward

The preferred way forward for Loxwood is to include it in Appraisal Package 107 to accurately identify the number of properties at risk of flooding and the PV whole-life benefits that may be realised. It is the intention of the project to be appraised in a phased manner with clear programmed checkpoints, with the aim to confirm project viability early and avoid potential abortive spend. The initial stage will include the gathering of topographic survey of the River Lox, property threshold levels, and information regarding the existing surface water drainage and sewerage systems. This information will be used to create a suitable hydraulic model of the village and clarify the flooding mechanisms. The model will require hydrology obtained from a donor catchment.

The number of properties at risk and a high-level evaluation of the benefits that may be realised would be undertaken. At this checkpoint, if the value of the benefits is deemed by the project team to be too low for a sufficient FRM scheme to be fully appraised and implemented the project will be returned to the West Sussex PSO team, WSCC and Southern Water. The gathered project data will aid these party's ongoing communications with the local community regarding flood risk resilience.

## 1.4. Commercial case

The project will form part of the Solent and South Downs Appraisal Package 107. This Commercial Case has previously been assured by NPAB via another project included in the Appraisal Package (name: Romsey FAS, NPAS reference: JS00229, assurance date: 26<sup>th</sup> February 2016).

Changes have occurred since this assurance due to responses to NPAB and procurement strategy development. These changes have been assured, for clarity they have been **highlighted** below.

### Introduction and Procurement Strategy

This project will form part of the Solent and South Downs Appraisal Package 107 in order to drive efficiencies in internal procurement and project management costs. This project will be one of ~~eight~~ **seven** projects that form the package.

The projects in the package have been put together based on location; urgency due to political pressures; similarity of potential flood reduction measures; and secured external funding to complete the appraisal process.

Packaging opportunities for approximately 100 projects were assessed across the South Hub by the ncpms South package manager; project executives and managers; procurement officers; Area programme team leaders and members from Partnership and Strategic Overview team members. The Solent and South Downs Appraisal Package 107 stems from this assessment.

The ~~eight~~ **seven** projects in Appraisal Package 107 are shown in the table below. Options to add additional projects to the package at a later stage are being explored. Any potential future projects will be listed within the tender documents to ensure adherence to Environment Agency procurement practices. All projects listed, and any potential future projects, will require SOCs before inclusion into the contract.

Table 4: Projects in Solent and South Downs Appraisal Package 107

Project Name	Project Type
Angmering Flood Alleviation Scheme	Fluvial Flood Risk Management
Romsey Flood Alleviation Scheme	Fluvial Flood Risk Management
River Ems Westbourne Flood Alleviation Scheme	Fluvial Flood Risk Management
Pagham Harbour Inland Banks, Sidlesham	Coastal Flood Risk Management

Project Name	Project Type
Loxwood Flood Risk Management Scheme	Fluvial Flood Risk Management
Horsham Assets	Fluvial Asset Management
Elmer Beach Management	Coastal Flood and Erosion Risk Management
Arundel Tidal Defences — Phase 4	Coastal Asset Management
Goring and Ferring	Coastal Erosion & Fluvial Flood and Risk Management

The agreed approach in the procurement strategy for the main appraisal contract is to use the Water and Environment Management (WEM) Framework Lot 3 suppliers. The Lot 3 suppliers have been chosen as they have the better capabilities to deliver outputs because the package requires a consultant, rather than contractor led approach.

The Professional Services Contract, Option C target cost contract will be used, using the WEM incentivisation model.

If a supplier bids on two or more packages, then they must be able to demonstrate within their proposal that there are significant efficiencies and savings to be made which will benefit the Environment Agency. Furthermore, the supplier will need to demonstrate they have sufficient resource capacity to manage more than one package.

The packaging procurement approach is slightly different to the single project procurement approaches, therefore ncps South held two supplier days for all packages in the South, prior to issuing the tenders. The supplier days acted as open forum, with two representatives from each supplier attending, alongside key representatives from the Environment Agency's delivery team. The benefits and purpose of the supplier day are to:

- Engage early with the supply chain, which will act as part of the expression of interest. It will also allow for the Consultants to align their resource accordingly if they wish to submit a tender;
- Discuss the proposed packages that have been identified and any challenges that these packages may have;
- By adopting a collaborative working approach where the Environment Agency works closely with its supply chain allows for greater efficiencies to be gained; and
- The intention is to share the scope and procurement approach with the supply chain to gather any feedback on where possible changes may need to take place, or where certain items aren't achievable or realistic.

### **Key contractual terms & risk allocation**

Sectional Completion is to be used as some of the projects within the package require delivery by certain dates due to funding availability/area prioritisation. The use of sectional completion will put constraints on the consultants programme; however, the benefit of using sectional completion is that the supplier will be able to ensure they keep the relevant staff working on the right projects at the right time which is of key importance to delivering a quality outcome. Sectional completion will be applied to the Romsey project, which is a priority project within the package. The main driver is the political and public pressure for a Romsey scheme to be delivered as soon as possible.

Delay damages will be applied to the sectional completions and the Completion Date.

A risk workshop will be programmed for the start of the project where risk register will be developed to assess the risks and assign mitigation measures.

Key known risks will be allocated in the PSC contract.

The basis of the PSC Scope for delivering the OBC and FBC will essentially be outcome focused (with some exceptions) with the appraisal supplier having the responsibility for producing the Business Case (strategic, economic and financial cases) that is accepted

by the project board (at OBC) and NPAB (at FBC). Summary of the obligations/liabilities allocated under the appraisal and business case scope:

- The main provided data is the hydraulic model, where available for projects within the package, and is provided at Site Information. The supplier takes the responsibility for its accuracy.
- The Agency will prescribe what modelling work is required and take the risk for any additional work if the models cannot support the options appraisal process.
- There are a high number of statutory and non-statutory stakeholders requiring consultation and approvals. Getting approvals from those stakeholders that have an input based on known processes or statutory requirements (i.e. Planning Approval) will be the responsibility and risk of the Lot 3 supplier. The Agency will take the risk of additional time/cost due to prolonged negotiations for difficult to define consultation, e.g. with landowners, business & private property owners, community groups. However the scope will state that the Lot 3 supplier has responsibility for ensuring consultation deliverables are to appropriate standard and delivered to a timely manner that will assist in ensuring consultation is a successful exercise.
- The Lot 3 supplier will be required to scope, procure and manage additional physical survey, environmental and heritage surveys, and ground investigation works and take responsibility for the outcomes of these surveys in support of justifying the preferred options.

### Procurement route and timescales

There will be three contracts required to provide delivery of all projects within the package up to FBC, as shown in Table 5.

**Table 5: Solent and South Downs Appraisal Package 107 Contracts**

Description	Supplier	Framework	Contract type / option	Estimated Value (£k)
Appraisal and FBC development	tbc	WEM Lot 3	PSC Option C	1,000
Cost Consultant	tbc	NCMF2	PSC Option E	100
Early Supplier Engagement (ESE)	tbc	WEM Lot 4	PSC Option E	100

The project team considers that for the tender assessment a ~~50 60~~ quality ~~50 40~~ price split was the most appropriate evaluation model to use. The quality of each proposal will be scored against the following criteria:

- Key Staff and availability – ~~40%~~ 24%
- Methodology including programme – ~~30%~~ 36%
- ~~Innovation and efficiencies – 10%~~

All consultants on WEM Lot 3 ~~will be~~ were invited to tender:

- Mott MacDonald
- CH2M Hill
- Capita
- Jackson Hyder
- Jacobs

A summary of planned procurement milestones is:

- Issue tender documents to WEM 3 suppliers: ~~21<sup>st</sup> March 2016~~ 29<sup>th</sup> March 2016
- Tender returns: ~~6<sup>th</sup> May 2016~~ 17<sup>th</sup> May 2016 (7 week tender period).
- Tender assessment period: May 2016.
- Appoint WEM Lot 3: June 2016.
- Appoint WEM Lot 4 ESE supplier: by June 2016.
- NCMF cost consultant: by June 2016.

## Efficiencies and commercial issues

The main driver behind the package is the realisation of efficiencies. A summary of the main efficiencies that are expected to be achieved are shown in Table 6.

**Table 6: Summary of Potential Efficiencies**

Efficiency Activity	Description	Other Benefits
Continuous work programme	Delivering a package of projects significantly reduces the risk of stop-start delivery, and enables full time assignment of dedicated team which reduces risk of programme delays.	Downstream savings via accelerated programme
Lessons Learnt	Applying lessons learnt between each Priority Package.	Enables technical resources to use their time more effectively, adding value via expert judgement.
Site visits	Enables 2 or 3 visits per day, reducing number of days on site and thus travel costs and time.	Reduced carbon footprint; reduced exposure to risks associated with travel.
Data collection	Single data collection exercise not repeated for each site.	Data consistency; less demanding on EA resources
Meeting efficiencies	Face to face project management meetings and technical review meetings arranged to cover multiple projects in a single meeting, saving time and travel costs.	Reduced carbon footprint; reduced exposure to risks associated with travel. Improved consistency/quality in final deliverables.
Area wide data analysis	Calculation of properties at risk (as per NaFRA, hydraulic modelling, EA FZ data), automatic production of constraint/opportunity maps.	Enables technical resources to use their time more effectively, adding value via expert judgement.
PPMT reporting	Potential for generic information to be used across all projects in the package.	Enables EA staff to focus on the quality of outcomes.
Procurement	Reduces tendering time, and assessment of individual tenders.	Reduces programme delivery delays.
Single supplier liaison	Reduced EA PM and PE time as only dealing with one supplier rather than several separate ones.	To ensure EA Area staff receive consistent and compatible outputs that can be easily compared and assessed.
PM Standardisation	Standard report and other tool formats that can be tested and reviewed early on for repeated use during the package.	Creates consistency and reduction in potential errors.
Design Standardisation	Repeat of outline designs across projects where applicable.	Reduces programme delivery delays. Reduces EA review time.

The project team will be able to assess the value of efficiencies once a market price for the appraisal works has been obtained. This will be compared to cost estimates derived from PCT.

An efficiency register will be produced for the scheme and reviewed on a monthly basis as part of the scope.

It is anticipated the package will be able to drive a further 10% efficiency through the lifetime of the contract via the items listed; however, it is unlikely these efficiencies will be available for projects at the beginning of the programme as better ways of working may yet to be established. We will be able to use the earlier programmed projects' financial information to benchmark efficiencies on other projects in the package.

At present it is difficult to fully assess the value of efficiency savings that could be derived, however a key package target is to maximise efficiency savings.

## 1.5. Financial case

This project requires an estimate £881k present value whole-life cost investment based on PCT data. An estimated £723k is required from external contributors to complete the detailed design and construction phases. Funding for the appraisal stage has already been secured.

Costs shown in this case are an estimate of the worst case PV whole-life costs that can be afforded to maintain scheme economic viability and achieve a BCR of not less than 1, or no greater than the PV whole-life benefits estimated at £881k, as described in Section 1.3.

The costs have been derived from the use of PCT data successfully adopted by schemes in the Solent and South Downs area during recent IA studies. The costs are based on the following breakdown:

- EA staff 4.5%
- Appraisal 6.6%
- Detailed Design 3.6%
- Supervision 3.3%
- Capital construction 44.0%
- Optimum bias 27.6%
- Future costs 10.30%

It is recognised that the generic percentages may not be a true representation for the proposed FRM scheme at Loxwood. However, at SOC stage the financial split of around 18% for enabling activities and staff, 44% for construction, 10% for future costs, and 27% as an optimum bias appears appropriate.

The optimum bias of 27.6% relates to its percentage within the whole-life cost estimate; however, in terms of the initial investment cost this optimum bias / risk contingency value represents an additional 44%, as suggested by the PCT during recent IAs.

It is considered that the information presented below will provide a baseline against which project spend can be monitored therefore enabling the project to be stopped should any overspend be predicted.

### Summary of financial appraisal

The current projected financial position for the delivery of Loxwood FRM scheme is shown in Table 7. The projected present value whole-life costs total £881k. It is assumed, for the purposes of this SOC, that appraisal work and the production of an Outline Business Case will be completed in Year 1 (2016/17). Detailed design and construction is anticipated to commence and be completed within Year 2 (2017/18). The actual programme and profile of spend to FBC will be confirmed by the Lot 3 supplier upon contract award. **Error! eference source not found..**

Table 7: Summary of Projected Project Costs

Project Summary £k	Yr 0 (15/16)	Yr 1 (16/17)	Yr 2 (17/18)	Yr 3 (18/19)	Yr 4+ (19/20+)	Total
Staff		20	20			40
Initial investment:-						
- Capital cost		93	658			751
Future costs				3	88	91
<b>Project Total</b>		<b>113</b>	<b>678</b>	<b>3</b>	<b>88</b>	<b>881*</b>

\*Rounded

## Funding sources

The following has been calculated based on achieving a minimum BCR of 1, and on the assumption that 32 no. of the very significant (NaFRA high) and significant (NaFRA moderate) risk properties are better protected against flooding in accordance with Outcome Measure 2 (OM2) for a 50 year duration of benefits.

**Table 8: Annualised Funding Profile**

Annualised funding profile (£k)	Yr 0 (15/16)	Yr 1 (16/17)	Yr 2 (17/18)	Yr 3 (18/19)	Yr 4+ (19/20+)	Total
Grant in Aid		68				68
Contributions		45	678			723
Future Costs				3	88	91
<b>Project Total</b>		<b>113</b>	<b>678</b>	<b>3</b>	<b>88</b>	<b>881*</b>

\*Rounded

A raw partnership funding score of 18% has been calculated using the Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA). It is therefore projected that FCERM GiA partnership funding (PF) to the value of £158k is required, as detailed in Table 8.

External contributions are required to make up the remaining 82%, to the value of £723k. Public contributions, provided by the local authority West Sussex County Council (WSCC) has been secured for the appraisal of this project. WSCC are providing £680k over the current six year programme for West Sussex local projects. The SSD Area Programming Team have allocated this contribution to the West Sussex projects with Appraisal Package 107. The £680k represents approximately 95% of all estimated external contributions required for the appraisal of West Sussex projects. Extracts of the legal agreement between the Environment Agency and WSCC are provided in Appendix A.

During business case development the project team will improve benefits and obtain greater construction cost certainty thereby improving the FCERM GiA element of the partnership funding score. Efficiency management via the Appraisal Package shall also contribute to reducing overall costs up to FBC.

Project viability through construction is dependent on external contributions. There are strong contract management systems established to drive obtaining external contributions and ensuring successful delivery.

## Overall affordability

Table 9 **Error! Reference source not found.** details the estimated spend profile of the scheme. The figures include a £244k risk contingency value. This risk value represents an additional 44% of all initial investment costs.

Greater certainty of whole-life costs, spend profile and levels of risk contingency will be developed through the appraisal process.

**Table 9: Annualised Spend Profile**

Annualised spend profile (£k)	Yr 0 (15/16)	Yr 1 (16/17)	Yr 2 (17/18)	Yr 3 (18/19)	Yr 4+ (19/20+)	Total
<b>Appraisal</b>						
Staff Costs		20				20
External Consultants Fees						
WEM Lot 3 – Appraisal		33				33
WEM Lot 3 – Environmental Surveys		7				7
WEM Lot 3 – Site Investigation		9				9
Principal Designer		3				3
WEM Lot 4 – ESE		3				3

Annualised spend profile (£k)	Yr 0 (15/16)	Yr 1 (16/17)	Yr 2 (17/18)	Yr 3 (18/19)	Yr 4+ (19/20+)	Total
NCMF2		3				3
Risk contingency		35				35
<b>SUB-TOTAL</b>		<b>113</b>				<b>113</b>
<b>Detailed Design</b>						
Staff Costs			10			10
External Consultants Fees						
WEM Lot 4 – Detailed Design			22			22
Principal Designer			2			2
NCMF2			2			2
Risk contingency			16			16
<b>SUB-TOTAL</b>			<b>52</b>			<b>52</b>
<b>Construction</b>						
Staff Costs			10			10
External Consultants Fees						
WEM Lot 4			388			388
ECC PM			12			12
ECC Supervisor			18			18
Principal Designer			3			3
NCMF2			3			3
Risk contingency			193			193
<b>SUB-TOTAL</b>			<b>627</b>			<b>627</b>
<b>Initial Investment</b>		<b>113</b>	<b>678*</b>			<b>791*</b>
Future costs:						
- revenue PV costs				3	70	73
- capital PV costs					18	18
<b>Project Whole Life PV Costs</b>		<b>113</b>	<b>678</b>	<b>3</b>	<b>88</b>	<b>881*</b>

\*Rounded

During NPAS review of this SOC (May 2016) the SSD Appraisal Package 107 tenders for the Lot 3 appraisal works and the Lot 4 ESE works have been returned. Comparing estimates shown in the table above with the returned tender prices it is necessary to increase the FsoD value for the production of the FBC. The increase required is £27k giving a total FsoD value of £140k.

This increase can be broken down into the following:

- For the 'WEM Lot 3 Appraisal' and 'WEM Lot 3 – Environmental Surveys' elements the increase is £8k;
- For the 'WEM Lot 4 – ESE' element the increase is £11k; and
- For the appraisal 'Risk Contingency' element the increase is £8k in line with the 44% previously used.

The change is required as greater cost certainty has been gained during the SOC review period. Given the FsoD increase is small, and for efficient use of staff time, the tables shown in Section 1.5 and throughout this SOC have not been updated to reflect this change; however, the FsoD coversheet has been amended to allow for this increase.

## 1.6. Management case

Management of the project will be via ncpms as part of the Solent and South Downs Appraisal Package 107. The Senior User will be from the West Sussex PSO team.

### Project management

This project will form part of Appraisal Package 107. Each project shall be managed in full by the project team with respect to the staff responsibilities required to ensure a successful delivery.

The Loxwood FRM scheme is one of an estimated seven projects within the Appraisal Package. All of the projects are within West Sussex, with the exception of one located in Hampshire (Romsey FAS). The Hampshire project is to be programmed as a high priority to ensure a rapid delivery. It is considered that having all other projects with the same LLFA boundary additional efficiencies can be realised by continual working with the West Sussex Area staff.

The project governance structure is shown in Figure 5 and staff roles and responsibilities are detailed in Table 10. It is currently considered there will be one project board for all appraisal projects within West Sussex. Representatives from WSCC will be invited to attend project board meetings on an occasional basis so they are aware of developments. This may also assist in securing contributions for future stages of projects' delivery.

Figure 5: Project Governance Structure

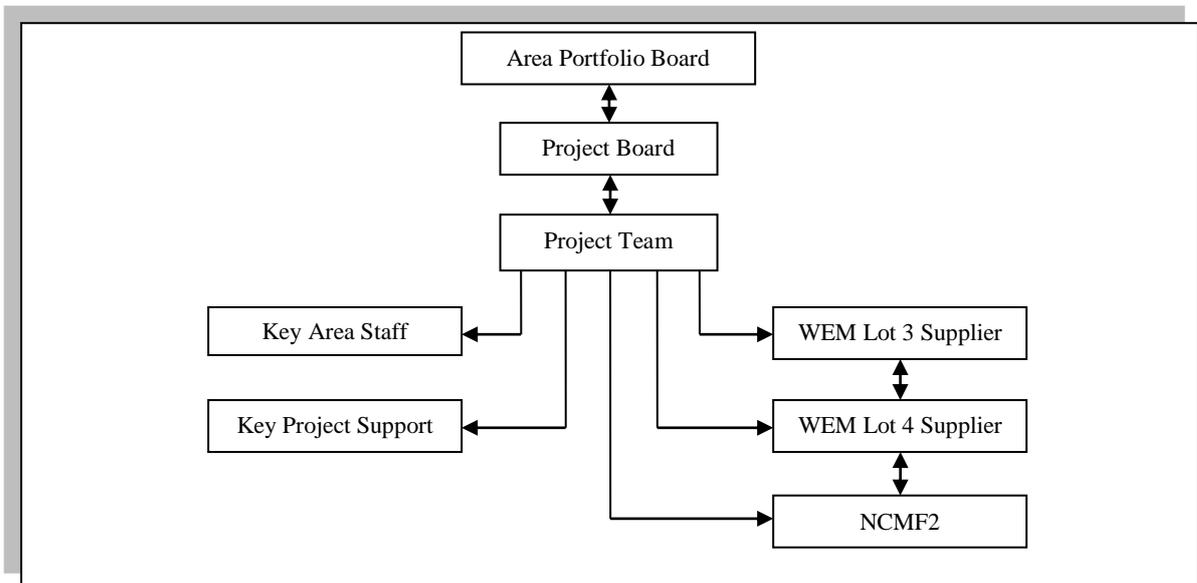


Table 10: Roles and Responsibilities

Role	Name	Responsibilities
<b>Area Portfolio Board</b>		
Area Programme Leader	Ian Walker	Maintains overview of all projects within the Medium Term Plan.
Project Sponsor	Gordon Wilson	Identifies need; Promote project mandate and set strategic direction; Appoint the Project Executive and Senior User; Holds project executive accountable for delivery of products in line with business case; Lead review of project's benefits realisation.
<b>Project Board</b>		
Project Executive	Alastair Pitcher	Accept the project brief; Set project tolerances; Approve appointment of PM; Responsible to the project sponsor for delivery; Review and approve completed stages; Monitor project is on course to deliver; Provide assurance that products have been delivered to meet requirements; Notify business that project is complete ;Accept closing reports;
Senior User	Claire Francis	Finalise project brief; Supply technical and quality requirements and detailed scope of deliverables in project brief to satisfy project mandate; Responsible for representing input from all users; Represents the interests of the project

Role	Name	Responsibilities
		sponsor on the project board; Responsible for user need related project assurance; Communications to full user group and stakeholders; Ensure user resources are made available; Sign off products as delivered in accordance with project brief and quality; Receive project files at end of project.
Senior Supplier	tbc	Agrees the objectives for supplier activities; Responsible for the quality assurance of products produced by supplier; Manages resources to ensure delivery of their products; Responsible for supplier and delivery related assurance although may delegate where appropriate.
<b>Project Team</b>		
ncpms Project Manager	William Culley	Manage the project on a day-to-day basis, within the tolerances agreed with the project board; Manages the production of required products within agreed tolerances on quality, cost and time; Ensures project team members deliver required products to specification and within agreed tolerances; Develops and implements the project plan; Responsible for overall progress and use of resources, and initiates corrective action where necessary; Operates change control, seeking the project board and project executive's authorisation for change as necessary; Manages and monitors business and project risks/issues and develops contingency plans; Responsible for delivering products that are fit for purpose thereby enabling benefits to be realised; Liaise with programme management or related projects to ensure that work is neither overlooked nor duplicated; Monitors progress against plans and reports to the project board; Liaise with the project board or its appointed project assurance roles to assure the overall direction and integrity of the project; Identifies and obtains support and advice required for the management, planning and control of the project; Responsible for project administration directly or delegates to project support
Senior User Rep.	Andy Townsend	Undertakes activities on behalf of the Senior User; Liaises with key area staff; Leads community and stakeholder engagements.
NEAS Officer	Oliver Sykes	Provides input and guidance to environmental matters; Ensures compliance with environmental legislation; Liaises with statutory consultees
One Commercial Lead	Ben Rawlings	Develops and updates the procurement strategy; Drafts and ensures signing off of all contracts.
Consultant Project Manager	tbc	Manages the day-to-day operations of the WEM Lot 3 supplier's team in accordance with the contract; Communicates directly to the ncpms; Project Manager regarding all project matters; Seeks efficiencies; Ensures highest quality outputs; Ensures delivery to programme and budget.
<b>Key Area Staff</b>		
Asset Performance Advisor	Andy Walker	Provide technical and local FRM knowledge to inform the design.
Area Modelling Lead	Jon Denman	Provide guidance on hydraulic modelling.
Sustainable Places	tbc	Provide input into option designs regarding sustainable planning and developments.
<b>Key Project Support</b>		
Package Manager	Mike Gara	Communicates with PE and PM regarding programme delivery dates and benefits realised; Sets programme for future packages of construction works following FBC.
Estates	Sam Smith	Provides advice on landowners and estates.
Legal	tbc	Provide legal advice.
Comm's.	tbc	Provides advice on communications and marketing.
<b>WEM Lot 3 Supplier Team</b>		
Numerous	-	Engineering, environmental and economic consultancy staff under the direction of the Consultant's Project Manager. Tasks include: Gathering of data and surveys; Hydraulic modelling; Optioneering; Economic appraisal; Engineering and environmental assessments; Outline designs and specifications; Development of (parts of) Full Business Case; Production of Works Information.
<b>WEM Lot 4 Supplier</b>		
Early Supplier Engagement	tbc	Provide accurate cost estimates and buildability statements.
<b>NCMF2</b>		
Cost Consultant	tbc	Provides analysis of contract costs; Provides analysis of whole life costs estimations.

## Project plan

An outline of the project specific milestones are estimated in Table 11 **Error! Reference source not found.** This programme will be confirmed by the WEM Lot 3 Supplier upon contract award.

**Table 11: Project Milestones**

Milestone Description	Estimated Start date	Estimated End date	Asset to be created	Budget Required (£k)	Staff Required (FTE)
Topographic survey, hydraulic modelling and outline whole-life benefits assessment	Jun 2016	Jul 2016	Hydraulic model.	5	0.05
Appraisal and production of the Outline Business Case	Aug 2016	Nov 2017	Gateway 1.	6	0.05
Production of Works Information and Design and Construction (D&C) tender information	Dec 2016	Feb 2017	Tender pack.	5	0.05
D&C tender period	Mar 2017	Apr 2017		3	0.05
FBC assurance and D&C contract award	May 2017	May 2017	Gateway 3.	2	
Detailed Design and Construction	June 2017	May 2018	To be confirmed. Gateway 2. Gateway 4.	19	0.2
<b>TOTAL</b>				<b>40</b>	<b>0.40</b>
<b>AVERAGE / YEAR</b>				<b>20</b>	<b>0.20</b>

### Benefits realisation

A Benefits Realisation Plan covering what benefits are to be measured will be developed in the next stage of the project. This will state who is accountable for the expected benefits, how and when achievement of expected benefits will be measured and what resources are needed to carry out the work. Consideration will also be given to whether dis-benefits should be measured and reviewed. It is anticipated that benefits will be split into three categories;

- Financial – cashable (cash releasing);
- Financial – non cashable (cost avoidance); and
- Non-financial.

The Project Manager will work closely with the Project Board to profile anticipated benefits and maintain the efficiency register.

### Risk management

The current risks identified are shown in Table 12. A full project risk register will be produced and monitored during the business case development.

**Table 12: Summary of Key Project Specific Risk**

	Key Risks	H/M/L	Owner	Mitigation
1	Unviable economic justification.	L	EA	Series of checkpoints to determine way forward, especially following initial assessment of whole-life benefits and potential termination of project.
2	Damaged Environment Agency reputation due to unviable scheme.	L	EA	Area PSO team to communicate scheme expectations to the community prior to topographic

	Key Risks	H/M/L	Owner	Mitigation
				survey and hydraulic modelling.
3	Environmental issues including planning permission, heritage, WFD, protected species	M	EA	EIA screening and appropriate mitigation measures included in the design.
4	External contributions	M	WSCC	Continued communication with WSCC regarding likely construction costs and level of contributions required.  Identification of other contributors.
5	Landowner engagement	M	EA	Potential options may require land purchase or compensation. Early identification of landowners and engagement essential.

### Assurance, approval & post project evaluation

Assurance of this SOC will be provided by the National Project Assurance Services (NPAS) based on its estimated value. The Commercial Case, as detailed in Section 1.4, has been assured by National Project Assurance Board (NPAB) as this is relevant to other projects within Appraisal Package 107, some of which have an estimated whole-life cost of over £2M.

The OBC will be assured by the Project Board. This is considered a reasonable level of assurance given the value of the works is less than £2M.

The FBC will be again be assured by NPAS. Again, the Commercial Case may require NPAB assurance subject to the project being re-packaged with other projects of greater value when nearing the construction stage.

An End Project Report will be completed following construction.

## 1.7. Recommendation

It is recommended that the Loxwood FRM Scheme is approved on its own merit prior to its inclusion in the Solent and South Downs Appraisal Package 107. The key reason for warranting approval is that this project has significant political and community drivers due to ongoing flooding within the village.

The flooding mechanisms and economic justification are currently uncertain; however, there is a potential of an FRM scheme with low cost measures by combining implementation with more than one party (i.e. Southern Water, WSCC Highways). There is a good opportunity to assess the flood risk and update flood maps.

Any works undertaken up to a point of failure will provide benefits to the Area PSO team, and wider parties, during ongoing communications with the community. Further defined economic justification for the implementation of the project will be provided through the appraisal work and subsequent production of the Outline Business Case and Full Business Case.

I confirm that the documentation is ready for submission to NPAS

I, as Project Executive, have ensured that relevant parties have been consulted in the development of this project and the production of this submission in particular the Project Sponsor and Senior User.

<b>Name</b>	Alastair Pitcher
<b>Job Title</b>	ncpms Project Manager 1
<b>Emailed approval</b>	28 <sup>th</sup> April 2016
<b>Date</b>	28 <sup>th</sup> April 2016

### Version Control

<b>Version</b>	<b>Status</b>	<b>Signed-off by</b>	<b>Date</b>	<b>Date issued</b>
FINAL v1.4	FINAL For NPAS submission	AP	28.04.16	28.04.16
FINAL v1.5	FINAL response to NPAS comments	AP	25.05.2016	25.05.2016
FINAL v2.0	FINAL assured and FSoD sign- off	JAH	02.06.2016	02.06.2016

## **Appendix A**

### Extracts from West Sussex County Council Legal Agreement



AS WITNESS the hands of authorised signatories for the Parties hereby agree.

SIGNED for and on behalf of the  
ENVIRONMENT AGENCY

SIGNED for and on behalf of West Sussex  
County Council

Name: *D. Matthews*  
*DEREK MATTHEWS*

Name: *G. C. STEWARD*  
*G. C. STEWARD*

Position: *PROCUREMENT MANAGER*

Position: *Chief Executive*

**APPENDIX 1  
PROJECT SPECIFICATION  
SIX YEAR CAPITAL PIPELINE  
1-0974-000**

**1. Project summary**

This project will provide contributions towards projects within the Environment Agency's Six Year Capital Pipeline. This will help increase the Partnership Funding score for the projects the Agency and West Sussex County Council decide to allocate the contributions to.

Working in partnership, the Environment Agency will manage the project and West Sussex County Council will provide the finance as set out in this Agreement.

**2. Project partners**

Environment Agency and West Sussex County Council.

**3. Overall strategic objective**

Deliver a host of schemes across the next six years in line with the Agency's Six Year Capital Pipeline

**4. Specific objectives**

- Allocate the contributions from West Sussex County Council to various schemes within the Six Year Capital Pipeline as listed below.
- £400,000 of the contribution in 2015/16 will be specifically used for the "Shoreham Adur Tidal Walls Scheme".
- £200,000 of the contribution in 2015/16 will be specifically used for the "Aldingbourne Rife Integrated Flood Risk Management Plan and Works"
- £200,000 of contribution in 2016/17 will be spent on projects to be agreed by the Project Board in due course
- £120,000 of the contribution in 2017/18 will be specifically used for the "Arundel Tidal Defence Improvements, - Phase 1 scheme"
- £60,000 of contribution in 2017/18 will be spent on projects to be agreed by the Project Board in due course
- £200,000 of the contribution in 2018/19 will be specifically used for the "Arundel Tidal Defence Improvements, - Phase 1 scheme"
- £200,000 of contribution in 2019/20 will be spent on projects to be agreed by the Project Board in due course
- £200,000 of contribution in 2020/21 will be spent on projects to be agreed by the Project Board in due course

**5. Programme of work and parties' responsibilities**

**5.1 Parties' responsibilities**

- Environment Agency – Will manage the project from inception to completion. It will manage the day to day tasks as needed to ensure a timely completion of the project.
- West Sussex County Council – Will provide the financial contribution limited to a maximum contribution as shown in Appendix 2 for the next six years.