



South Western CFRAM Study

Preliminary Options Report UoM 21

July 2016

The Office of Public Works

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The Office of Public Works

Jonathan Swift Street
Trim
Co. Meath

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	December 2015	TD / RM / JD	B. O'Connor	F. McGivern	Draft Issue
B	March 2016	T. Donovan	B. O'Connor	F. McGivern	Draft Issue
C	May 2016	T Donovan	B O'Connor	F McGivern	Draft Final
D	June 2016	T. Donovan	B. O'Connor	F. McGivern	Final
E	July 2016	J Desmond	T Donovan	F McGivern	Final

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Appendix A. Estimate of Costs

Summary

UoM	21	Optimism Bias	38.94%
AFA	Bantry	Site Investigation Estimate	€ 50,000.00
Option	1 - Flood Defences	Preliminaries	10%
Description	Fluvial and Tidal Flood Defences	Design Fees	13%
		Compensation and Land Acquisition	10%
		Archaeology and Environmental	10%
		Art Allowance	€ 38,000.00

Element Reference	Element	Capital Costs	PV O&M Costs	Total Costs
1	Walls	€ 2,766,915.43	€ 7,204.79	€ 2,774,120.22
2	Embankments	€ 72,009.68	€ 28,784.72	€ 100,794.40
3	Demountable Walls and Gates	€ 0.00	€ 0.00	€ 0.00
4	In-Channel Excavation	€ 0.00	€ 0.00	€ 0.00
5	Excavation on Land	€ 0.00	€ 0.00	€ 0.00
6	Weirs	€ 0.00	€ 0.00	€ 0.00
7	Weir Removal	€ 0.00	€ 0.00	€ 0.00
8	Bridges	€ 0.00	€ 0.00	€ 0.00
9	Bridge Underpinning	€ 0.00	€ 0.00	€ 0.00
10	Culverts	€ 0.00	€ 0.00	€ 0.00
11	Sluice Gates	€ 0.00	€ 0.00	€ 0.00
12	Road Raising	€ 112,944.27	€ 0.00	€ 112,944.27
13	Individual Property Protection	€ 0.00	€ 0.00	€ 0.00
14	Hydrometric Gauging Stations	€ 0.00	€ 0.00	€ 0.00
15	Flood Forecasting	€ 0.00	€ 0.00	€ 0.00
16	Pumping Stations	€ 130,200.00	€ 208,972.48	€ 339,172.48
17	Channel Maintenance	€ 0.00	€ 0.00	€ 0.00
18	Bank Protection	€ 0.00	€ 0.00	€ 0.00
19	Manhole Sealing	€ 0.00	€ 0.00	€ 0.00
		€ 3,082,069.38	€ 244,961.99	€ 3,327,031.37
		Basic Construction Costs		€ 3,082,069.38
		Preliminaries		€ 308,206.94
		Optimism Bias		€ 1,320,213.49
		Construction Costs (Excl VAT)		€ 4,710,489.81
		Design Fees		€ 612,363.68
		Σ Construction Costs and Fees		€ 5,322,853.48

Other Items

Allowance for Archaeology and Environmental Mitigation Measures	€ 471,048.98
Allowance for Compensation and Land Acquisition	€ 471,048.98
Site Investigation	€ 50,000.00
Art Allowance	€ 38,000.00
NPV Operation & Maintenance	€ 244,961.99
Optimism Bias - NPV O&M	€ 95,391.08
Σ Other Items	€ 1,370,451.03

Option Cost for Cost Benefit Analysis € 6,693,304.51

CFRAM Unit Cost Development Project					
Optimism Bias Calculator					
Prepared by:	MM	Date:	December 2015		
Site Reference:		Site Name:	Bantry	1 - Flood Defences	

Project risk components that influence total project cost	Weight 1-3 (3 being a higher weight)	Risk value (0-100%) 0% = no risk 100% = risk expected and not mitigated		Key:	Default weighting defined by OPW for all CFRAM projects
					Default risk value defined for all CFRAM projects
					Automated function cell (no input required)
					User defined - risk value, comments, justification
Procurement	Weight	Select from Dropdown Risk score		Comment/justification	
Complexity of Contract Structure	1	Medium	50%	Default risk value	
Late Contractor Involvement in Design	2	Medium	50%	Default risk value	
Poor Contractor Capabilities	1	Medium	50%	Default risk value	
Government Guidelines	1	Medium	50%	Default risk value	
Dispute & Claims Occurred	3	Medium	50%	Default risk value	
Information Management	1	Medium	50%	Default risk value	
Budgeting	2	Medium	50%	Default risk value	
Other	1	Medium	50%	Default risk value	
Project Specific					
Design Complexity	2	High	70%	Large scheme with walls, embankments and pump stations	
Degree of Innovation	2	Low	30%	Standard and proven methods	
Technology	2	Medium	50%	Pump stations and associated equipment required	
Services	3	Medium	50%	Unknown - town centre but works adjacent to sea / watercourse	
Ground conditions	3	Medium	50%	Unknown	
Health and Safety	3	Medium	50%	Large scale scheme - risks associated with working on coastal walls	
Other	1	Medium	50%	Surface water drainage and pump stations	
Client Specification					
Inadequacy of the Business Case	3	Medium	50%	Default risk value	
Large No. of Stakeholders	2	Medium	50%	High number of stakeholders but low interference	
Funding Availability	2	Medium	50%	Default risk value	
Project Management Team	1	Medium	50%	Unforeseeable	
Poor Project Intelligence	2	Medium	50%	Potential risk - same for all AFAs	
Other	1	Very Low	10%	None	
Environment					
Public Relations	2	Medium	50%	High number of stakeholders but low interference	
Site Characteristics	2	Medium	50%	Presence of invasive non-native species unknown	
Environmental Impact	3	Medium	50%	No significant environmental impacts	
Permits / Consents / Approvals	2	Medium	50%	Potential delays associated with foreshore license requirements	
Amenity and art	1	Medium	50%	Town centre - large number of stakeholders	
Contaminated land	3	Medium	50%	Unknown	
Archaeology	3	Medium	50%	Unknown	
Other	1	Very Low	10%	None	
External Influences					
Political	3	Medium	50%	Default risk value	
Economic	2	Medium	50%	Default risk value	
Legislation / Regulations	1	Medium	50%	Default risk value	
Multiple river users / stakeholders	2	Medium	50%	High number of stakeholders but low interference	
Flood events during construction	3	Medium	50%	History of flooding	
Other	1	Very Low	10%	None	
	68		47%		
Weighting to apply: 0.482				Minimum Optimism Bias:	10%
				Maximum Optimism Bias:	70%
				Calculated Optimism bias:	39%

1. Walls

2. Embankments

3. Demountable Barrier

3a. Flood Gate

4. In-Channel Excavation

5. Excavation on Land

6. Weir Construction

Select Weir Height from Dropdown	Comments	Min 10m	Max	(€)	(€)	Select	(€/weir)
		20m	(m)			H/L	
						Average	
Capital Cost				€ 0.00	Total PV Cost		€ 0.00
					Total Cost		€ 0.00

7. Weir Removal			
Description of Weir	Length of Weir	Rate	Cost of Construction
	(m)	(€/m)	(€)
Total Cost			€ 0.00

8. Bridges					
Description of Bridge	Remove or Replace	Area of Bridge	Rate	Cost of Construction	PV Costs
	Select Yes/No	(m²)	(€/m²)	(€)	(€/bridge)
Capital Cost				€ 0.00	€ 0.00
				Total Cost	€ 0.00

9. Bridge Underpinning				
Choose a suitable bridge from dropdown	Comments	Length of Bridge	Rate	Cost of Construction
		(m)	(€/m)	(€)
Total Cost				€ 0.00

10a. Culverts (Rural)									
Description of Culvert	Disposal of Spoil	Ground Type	Invert	Culvert Size	Length of Culvert	Rate	Cost of Construction	Maintenance Costs Estimate	PV Rate
	Select	Select Soil/Rock	Select (m)	Select (m)	(m)	(€/m)	(€)	Select H/L	(€/m)
		Soil	2.5					High	
								Average	
								Low	
								Average	
								Average	
								Average	
								Average	
								Average	
								Average	
								Average	
Capital Cost							€ 0.00	Total PV Cost	
								Total Cost	

10b. Culverts (Urban)									
Description of Culvert	Culvert	Invert	Culvert Size	Length of Culvert	Rate	Cost of Construction	Maintenance Costs Estimate	PV Rate	PV Cost
	Select New/Replacement	Select (m)	Select (m)	(m)	(€/m)	(€)	Select H/L	(€/m)	(€)
							High		
							Average		
							Low		
							Average		
							Average		
							Average		
							Average		
							Average		
							Average		
							Average		
Capital Cost						€ 0.00	Total PV Cost		€ 0.00
							Total Cost		€ 0.00

10c. Culverts (Headwall)				
Description of Culvert	Length of Culvert	Culvert Size	Rate	Cost of Construction
	(m)	Select (m)	(€/m)	(€)
Capital Cost				€ 0.00
Overall Capital Cost		€ 0.00	Overall PV Cost	€ 0.00
			Overall Cost	€ 0.00

11. Sluice Gates								
Select Gate Type	Comments	Size	Maintenance	Operation	Maintenance Costs Estimate	Capital Cost	PV Cost	Total Cost
		Select	Select	Select	Select H/L	(€)	(€)	(€)
Capital Cost						€ 0.00	PV Cost	€ 0.00
							Total Cost	€ 0.00

12. Road Raising			
	Length of Road	Cost of Construction	Cost of Construction
	(m)	(€)	(€)
Note cost is to raise road by 600mm			
Road Details			
Road rasing on seafront	145.1	€ 778.39	€ 112,944.27

Summary

UoM	21	Optimism Bias	47.41%
AFA	Bantry	Site Investigation Estimate	€ 50,000.00
Option	2 - Flood Defences & Tidal Barrage	Preliminaries	10%
Description	Fluvial Flood Defences and Tidal Barrage	Design Fees	13%
		Compensation and Land Acquisition	10%
		Archaeology and Environmental	10%
		Art Allowance	€ 64,000.00

Element Reference	Element	Capital Costs	PV O&M Costs	Total Costs
1	Walls	€ 34,513,203.74	€ 396,792.15	€ 34,909,995.90
2	Embankments	€ 72,009.68	€ 28,784.72	€ 100,794.40
3	Demountable Walls and Gates	€ 0.00	€ 0.00	€ 0.00
4	In-Channel Excavation	€ 0.00	€ 0.00	€ 0.00
5	Excavation on Land	€ 0.00	€ 0.00	€ 0.00
6	Weirs	€ 0.00	€ 0.00	€ 0.00
7	Weir Removal	€ 0.00	€ 0.00	€ 0.00
8	Bridges	€ 0.00	€ 0.00	€ 0.00
9	Bridge Underpinning	€ 0.00	€ 0.00	€ 0.00
10	Culverts	€ 0.00	€ 0.00	€ 0.00
11	Sluice Gates	€ 0.00	€ 0.00	€ 0.00
12	Road Raising	€ 112,944.27	€ 0.00	€ 112,944.27
13	Individual Property Protection	€ 0.00	€ 0.00	€ 0.00
14	Hydrometric Gauging Stations	€ 0.00	€ 0.00	€ 0.00
15	Flood Forecasting	€ 0.00	€ 0.00	€ 0.00
16	Pumping Stations	€ 0.00	€ 0.00	€ 0.00
17	Channel Maintenance	€ 0.00	€ 0.00	€ 0.00
18	Bank Protection	€ 0.00	€ 0.00	€ 0.00
19	Manhole Sealing	€ 0.00	€ 0.00	€ 0.00
		€ 34,698,157.70	€ 425,576.87	€ 35,123,734.57
		Basic Construction Costs € 34,698,157.70		
		Preliminaries € 3,469,815.77		
		Optimism Bias € 18,096,109.77		
		Construction Costs (Excl VAT) € 56,264,083.25		
		Design Fees € 7,314,330.82		
		Σ Construction Costs and Fees € 63,578,414.07		

Other Items

Allowance for Archaeology and Environmental Mitigation Measures	€ 5,626,408.32
Allowance for Compensation and Land Acquisition	€ 5,626,408.32
Site Investigation	€ 50,000.00
Art Allowance	€ 64,000.00
NPV Operation & Maintenance	€ 425,576.87
Optimism Bias - NPV O&M	€ 201,773.50
Σ Other Items	€ 11,994,167.02

Option Cost for Cost Benefit Analysis € 75,572,581.09

CFRAM Unit Cost Development Project

Optimism Bias Calculator

Prepared by:	AEP	Date:	December 2013
Site Reference:		Site Name:	Bantry 2 - Flood Defences & Tidal Barrage

Project risk components that influence total project cost	Weight 1-3 (3 being a higher weight)	Risk value (0-100%) 0% = no risk 100% = risk expected and not mitigated		Key:	
				<div></div>	Default weighting defined by OPW for all CFRAM projects
				<div></div>	Default risk value defined for all CFRAM projects
				<div></div>	Automated function cell (no input required)
				<div></div>	User defined - risk value, comments, justification
		Select from Dropdown			
Procurement	Weight	Risk score		Comment/justification	
Complexity of Contract Structure	1	Medium	50%	Default risk value	
Late Contractor Involvement in Design	2	Medium	50%	Default risk value	
Poor Contractor Capabilities	1	Medium	50%	Default risk value	
Government Guidelines	1	Medium	50%	Default risk value	
Dispute & Claims Occurred	3	Medium	50%	Default risk value	
Information Management	1	Medium	50%	Default risk value	
Budgetting	2	Medium	50%	Default risk value	
Other	1	Medium	50%	Default risk value	
Project Specific					
Design Complexity	2	Very High	90%	Specialised and complex design - tidal barrage	
Degree of Innovation	2	Very High	90%	Specialised design and construction methods	
Technology	2	Very High	90%	Tidal barrage gates and operation	
Services	3	Very Low	10%	Unknown - potential for services adjacent to barrage	
Ground conditions	3	Very High	90%	Unknown - tidal barrage required to significant depth	
Health and Safety	3	Very High	90%	Offshore construction	
Other	1	Medium	50%	Unknown risks associated with tidal barrage	
Client Specification					
Inadequacy of the Business Case	3	Medium	50%	Default risk value	
Large No. of Stakeholders	2	Very High	90%	High number of stakeholders - local residents, businesses. Bantry is a fishing harbour.	
Funding Availability	2	Medium	50%	Default risk value	
Project Management Team	1	Medium	50%	Unforeseeable	
Poor Project Intelligence	2	Medium	50%	Potential risk - same for all AFAs	
Other	1	Very Low	10%	None	
Environment					
Public Relations	2	Very High	90%	High number of stakeholders - significant impact on fishing harbour	
Site Characteristics	2	Low	30%	Presence of invasive non-native species unknown	
Environmental Impact	3	Very High	90%	Potential for significant impact	
Permits / Consents / Approvals	2	Very High	90%	Potential delays associated with foreshore license requirements etc.	
Amenity and art	1	Medium	50%	Large town with significant stakeholders	
Contaminated land	3	Very High	90%	Unknown - significant cost with any removal / disposal of material	
Archaeology	3	Low	30%	Unknown	
Other	1	Medium	50%	Unknown risks associated with tidal barrage	
External Influences					
Political	3	Medium	50%	Default risk value	
Economic	2	Medium	50%	Default risk value	
Legislation / Regulations	1	Medium	50%	Default risk value	
Multiple river users / stakeholders	2	Very High	90%	Large number of stakeholders - significant impact on fishing harbour	
Flood events during construction	3	High	70%	History of frequent flooding	
Other	1	Medium	50%	Unknown risks associated with tidal barrage	
	68	60%			
				Minimum Optimism Bias:	10%
				Maximum Optimism Bias:	70%
Weighting to apply: 0.624				Calculated Optimism bias:	47%

1. Walls

2. Embankments

3. Demountable Barrier

3a. Flood Gate

4. In-Channel Excavation

Total Excavation Costs € 0.00

6. Weir Construction

P:\Cork\DESIGN\projects\296235, SWRBD CFRAM Study\Preliminary Options Reports\UoM 21\Bantry\20160623 - Bantry - Cost Estimate 2

Summary

UoM	21	Optimism Bias	36.65%
AFA	Castletownbere	Site Investigation Estimate	€ 50,000.00
Option	1 - Flood Defences	Preliminaries	20%
Description	Tidal Flood Defences	Design Fees	13%
		Compensation and Land Acquisition	10%
		Archaeology and Environmental	10%
		Art Allowance	€ 25,500.00

Element Reference	Element	Capital Costs	PV O&M Costs	Total Costs
1	Walls	€ 849,681.72	€ 3,074.75	€ 852,756.47
2	Embankments	€ 0.00	€ 0.00	€ 0.00
3	Demountable Walls and Gates	€ 12,200.00	€ 26,128.82	€ 38,328.82
4	In-Channel Excavation	€ 0.00	€ 0.00	€ 0.00
5	Excavation on Land	€ 0.00	€ 0.00	€ 0.00
6	Weirs	€ 0.00	€ 0.00	€ 0.00
7	Weir Removal	€ 0.00	€ 0.00	€ 0.00
8	Bridges	€ 0.00	€ 0.00	€ 0.00
9	Bridge Underpinning	€ 0.00	€ 0.00	€ 0.00
10	Culverts	€ 0.00	€ 0.00	€ 0.00
11	Sluice Gates	€ 0.00	€ 0.00	€ 0.00
12	Road Raising	€ 0.00	€ 0.00	€ 0.00
13	Individual Property Protection	€ 0.00	€ 0.00	€ 0.00
14	Hydrometric Gauging Stations	€ 0.00	€ 0.00	€ 0.00
15	Flood Forecasting	€ 0.00	€ 0.00	€ 0.00
16	Pumping Stations	€ 130,200.00	€ 208,972.48	€ 339,172.48
17	Channel Maintenance	€ 0.00	€ 0.00	€ 0.00
18	Bank Protection	€ 0.00	€ 0.00	€ 0.00
19	Manhole Sealing	€ 0.00	€ 0.00	€ 0.00
		€ 992,081.72	€ 238,176.05	€ 1,230,257.76
		Basic Construction Costs		€ 992,081.72
		Preliminaries		€ 198,416.34
		Optimism Bias		€ 436,282.53
		Construction Costs (Excl VAT)		€ 1,626,780.59
		Design Fees		€ 211,481.48
		Σ Construction Costs and Fees		€ 1,838,262.07

Other Items

Allowance for Archaeology and Environmental Mitigation Measures	€ 162,678.06
Allowance for Compensation and Land Acquisition	€ 162,678.06
Site Investigation	€ 50,000.00
Art Allowance	€ 25,500.00
NPV Operation & Maintenance	€ 238,176.05
Optimism Bias - NPV O&M	€ 87,284.52
Σ Other Items	€ 726,316.68

Option Cost for Cost Benefit Analysis € 2,564,578.74

CFRAM Unit Cost Development Project				
Optimism Bias Calculator				
Prepared by:	MM	Date:	November 2015	
Site Reference:		Site Name:	Castletownbere	1 - Flood Defences

Project risk components that influence total project cost	Weight 1-3 (3 being a higher weight)	Risk value (0-100%) 0% = no risk 100% = risk expected and not mitigated		Key:	
					Default weighting defined by OPW for all CFRAM projects
					Default risk value defined for all CFRAM projects
					Automated function cell (no input required)
					User defined - risk value, comments, justification
Procurement	Weight	Select from Dropdown		Comment/justification	
Complexity of Contract Structure	1	Medium	50%	Default risk value	
Late Contractor Involvement in Design	2	Medium	50%	Default risk value	
Poor Contractor Capabilities	1	Medium	50%	Default risk value	
Government Guidelines	1	Medium	50%	Default risk value	
Dispute & Claims Occurred	3	Medium	50%	Default risk value	
Information Management	1	Medium	50%	Default risk value	
Budgeting	2	Medium	50%	Default risk value	
Other	1	Medium	50%	Default risk value	
Project Specific					
Design Complexity	2	Medium	50%	Scheme with coastal flood walls and defence barriers (gates)	
Degree of Innovation	2	Low	30%	Standard and proven methods	
Technology	2	Low	30%	No assets sensitive to technology	
Services	3	Low	30%	Unknown - large amount of services not expected	
Ground conditions	3	Medium	50%	Unknown	
Health and Safety	3	Medium	50%	Risks associated with working on coastal walls	
Other	1	Very Low	10%	None	
Client Specification					
Inadequacy of the Business Case	3	Medium	50%	Default risk value	
Large No. of Stakeholders	2	Medium	50%	High number of stakeholders	
Funding Availability	2	Medium	50%	Default risk value	
Project Management Team	1	Medium	50%	Unforeseeable	
Poor Project Intelligence	2	Medium	50%	Potential risk - same for all AFAs	
Other	1	Very Low	10%	None	
Environment					
Public Relations	2	Medium	50%	High number of stakeholders and interferences	
Site Characteristics	2	Medium	50%	Presence of invasive non-native species unknown	
Environmental Impact	3	Medium	50%	No significant environmental impacts	
Permits / Consents / Approvals	2	Medium	50%	Potential delays associated with foreshore license requirements	
Amenity and art	1	Low	30%	Large number of stakeholders but works mainly out of public sight	
Contaminated land	3	Medium	50%	Unknown	
Archaeology	3	Low	30%	Unknown - defences to rear of properties	
Other	1	Very Low	10%	None	
External Influences					
Political	3	Medium	50%	Default risk value	
Economic	2	Medium	50%	Default risk value	
Legislation / Regulations	1	Medium	50%	Default risk value	
Multiple river users / stakeholders	2	Medium	50%	Large number of stakeholders and interferences	
Flood events during construction	3	Medium	50%	History of frequent flooding	
Other	1	Very Low	10%	None	
	68	43%			
				Minimum Optimism Bias: 10%	
				Maximum Optimism Bias: 70%	
Weighting to apply: 0.444				Calculated Optimism bias: 37%	

1. Walls

2. Embankments

3. Demountable Barrier

3a. Flood Gate

4. In-Channel Excavation

5. Excavation on Land

6. Weir Construction

7. Weir Removal

Length of Weir	Rate	Cost of Construction
----------------	------	----------------------

Description of Weir	(m)	(€/m)	(€)
Total Cost			€ 0.00

8. Bridges	Remove or Replace Select Yes/No	Area of Bridge (m²)	Rate (€/m²)	Cost of Construction (€)	PV Costs (€/bridge)
Description of Bridge					
Capital Cost				€ 0.00	€ 0.00
Total Cost				€ 0.00	€ 0.00

9. Bridge Underpinning		Length of Bridge (m)	Rate (€/m)	Cost of Construction (€)
Choose a suitable bridge from dropdown	Comments			
Total Cost				€ 0.00

10a. Culverts (Rural)	Disposal of Spoil Select	Ground Type Select Soil/Rock Soil	Invert Select (m) 2.5	Culvert Size Select (m)	Length of Culvert (m)	Rate (€/m)	Cost of Construction (€)	Maintenance Costs Estimate Select H/L High Average Low Average Average Average Average Average	PV Rate (€/m)	PV Cost (€)
Description of Culvert										
Capital Cost							€ 0.00		Total PV Cost	€ 0.00
									Total Cost	€ 0.00

10b. Culverts (Urban)	Culvert Select New/Replacement	Invert Select (m)	Culvert Size Select (m)	Length of Culvert (m)	Rate (€/m)	Cost of Construction (€)	Maintenance Costs Estimate Select H/L High Average Low Average Average Average Average Average	PV Rate (€/m)	PV Cost (€)
Description of Culvert									
Capital Cost						€ 0.00		Total PV Cost	€ 0.00
								Total Cost	€ 0.00

10c. Culverts (Headwall)	Length of Culvert (m)	Culvert Size Select (m)	Rate (€/m)	Cost of Construction (€)
Description of Culvert				
Capital Cost				€ 0.00
Overall Capital Cost		€ 0.00	Overall PV Cost	€ 0.00
			Overall Cost	€ 0.00

11. Sluice Gates		Size Select	Maintenance Select	Operation Select	Maintenance Costs Estimate Select H/L	Capital Cost (€)	PV Cost (€)	Total Cost (€)
Select Gate Type	Comments							
Capital Cost					€ 0.00	PV Cost	€ 0.00	€ 0.00
						Total Cost	€ 0.00	

12. Road Raising	Length of Road (m)	Cost of Construction (€)	Cost of Construction (€)
Note cost is to raise road by 600mm			
Road Details			
Total Cost		€ 0.00	€ 0.00

13. Individual Property Protection		Factor Select	Number of Units	Rate (€)	Cost of Works (€)	PV Rate (€)	PV Cost (€)
Property Type	Comments						
Detached							
Semi-Detached							
Terraced							
Flat							
Residential average							
Shop							
Office							
Capital Cost				€ 0.00	PV Cost	€ 0.00	€ 0.00
					Total Cost	€ 0.00	

14. Hydrometric Gauging Stations		Number of Units	Maintenance Select H/L	Rate (€)	Capital Cost of Units (€)	PV Rate (€)	PV Costs (€)
Hydrometric Gauging Station	Comments						
Capital Cost				€ 0.00	PV Cost	€ 0.00	€ 0.00
					Total Cost	€ 0.00	

15. Flood Forecasting		Signage Select Yes/No	Maintenance Select	Number of Units	Rate (€)	Cost of Construction (€)	PV Cost (€)	PV Cost (€)
Category	Comments							

					Capital Cost	€ 0.00	PV Cost	€ 0.00
							Total Cost	€ 0.00

16. Pumping Stations		Number of Units	Rate	Capital Cost	Operation Cost	Running Cost	PV Cost	
Pumpstation Capacity	Comments		(€)	(€)	(€)	(€)	(€)	
0.02 m3/s								
0.05 m3/s								
0.1 m3/s		1	€ 130,200.00	€ 130,200.00	€ 80,429.30	€ 17,873.18	€ 98,302.48	110670
0.5 m3/s								
1.0 m3/s								
2.0 m3/s								
3.0 m3/s								
				Capital Cost	€ 130,200.00	PV Cost	€ 208,972.48	
						Total Cost	€ 339,172.48	

17. Channel Maintenance		Length of Channel	Rate	Maintenance Costs
Channel Type	Comments	(m)	(€)	(€)
			Total Cost	€ 0.00

18. Bank Protection		Fluvial/Coastal	Maintenance	Length	Rate	Cost of Construction	PV Rate	PV Cost
Description of Bank Protection	Select	Select		(m)	(€/m)	(€)	(€)	(€)
	Fluvial	High						
						Capital Cost	€ 0.00	PV Cost
								€ 0.00
								Total Cost
								€ 0.00

19. Manhole Sealing		No. of Manholes	Rate	Cost of Construction
Manhole Type	Comments		(€)	(€)
			Total Cost	€ 0.00

Summary

UoM	21	Optimism Bias	41.41%
AFA	Kenmare	Site Investigation Estimate	€ 50,000.00
Option	1 - Flood Defences	Preliminaries	8%
Description	Flood Defences	Design Fees	13%
		Compensation and Land Acquisition	10%
		Archaeology and Environmental	15%
		Art Allowance	€ 51,000.00

Element Reference	Element	Capital Costs	PV O&M Costs	Total Costs
1	Walls	€ 6,683,088.85	€ 13,393.94	€ 6,696,482.79
2	Embankments	€ 176,058.28	€ 62,711.50	€ 238,769.79
3	Demountable Walls and Gates	€ 63,200.00	€ 0.00	€ 63,200.00
4	In-Channel Excavation	€ 0.00	€ 0.00	€ 0.00
5	Excavation on Land	€ 0.00	€ 0.00	€ 0.00
6	Weirs	€ 0.00	€ 0.00	€ 0.00
7	Weir Removal	€ 0.00	€ 0.00	€ 0.00
8	Bridges	€ 0.00	€ 0.00	€ 0.00
9	Bridge Underpinning	€ 0.00	€ 0.00	€ 0.00
10	Culverts	€ 0.00	€ 0.00	€ 0.00
11	Sluice Gates	€ 0.00	€ 0.00	€ 0.00
12	Road Raising	€ 42,227.61	€ 0.00	€ 42,227.61
13	Individual Property Protection	€ 0.00	€ 0.00	€ 0.00
14	Hydrometric Gauging Stations	€ 0.00	€ 0.00	€ 0.00
15	Flood Forecasting	€ 0.00	€ 0.00	€ 0.00
16	Pumping Stations	€ 130,200.00	€ 208,972.48	€ 339,172.48
17	Channel Maintenance	€ 0.00	€ 0.00	€ 0.00
18	Bank Protection	€ 0.00	€ 0.00	€ 0.00
19	Manhole Sealing	€ 0.00	€ 0.00	€ 0.00

€ 7,094,774.75	€ 285,077.92	€ 7,379,852.67
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Basic Construction Costs	€ 7,094,774.75
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Preliminaries	€ 567,581.98
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Optimism Bias	€ 3,173,117.14
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Construction Costs (Excl VAT)	€ 10,835,473.87
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Design Fees	€ 1,408,611.60
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Σ Construction Costs and Fees	€ 12,244,085.47
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Other Items

Allowance for Archaeology and Environmental Mitigation Measures	€ 1,625,321.08
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Allowance for Compensation and Land Acquisition	€ 1,083,547.39
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Site Investigation	€ 50,000.00
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Art Allowance	€ 51,000.00
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NPV Operation & Maintenance	€ 285,077.92
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Optimism Bias - NPV O&M	€ 118,055.80
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Σ Other Items	€ 3,213,002.19
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Option Cost for Cost Benefit Analysis € 15,457,087.66

CFRAM Unit Cost Development Project				
Optimism Bias Calculator				
Prepared by:	MM	Date:	December 2015	
Site Reference:		Site Name:	Kenmare	1 - Flood Defences

Project risk components that influence total project cost	Weight 1-3 (3 being a higher weight)	Risk value (0-100%) 0% = no risk 100% = risk expected and not mitigated		Key:
				<div></div> Default weighting defined by OPW for all CFRAM projects <div></div> Default risk value defined for all CFRAM projects <div></div> Automated function cell (no input required) <div></div> User defined - risk value, comments, justification
Procurement	Weight	Select from Dropdown Risk score		Comment/justification
Complexity of Contract Structure	1	Medium	50%	Default risk value
Late Contractor Involvement in Design	2	Medium	50%	Default risk value
Poor Contractor Capabilities	1	Medium	50%	Default risk value
Government Guidelines	1	Medium	50%	Default risk value
Dispute & Claims Occurred	3	Medium	50%	Default risk value
Information Management	1	Medium	50%	Default risk value
Budgeting	2	Medium	50%	Default risk value
Other	1	Medium	50%	Default risk value
Project Specific				
Design Complexity	2	High	70%	Large scheme with walls, flood gates, embankments, road raising and pump stations
Degree of Innovation	2	Low	30%	Standard and proven methods
Technology	2	Medium	50%	Pump stations and associated equipment required
Services	3	High	70%	Unknown - town centre with large amount of services expected
Ground conditions	3	Medium	50%	Unknown
Health and Safety	3	Medium	50%	Large scale scheme but no unusual risks associated with works
Other	1	Medium	50%	Surface water drainage and pump stations
Client Specification				
Inadequacy of the Business Case	3	Medium	50%	Default risk value
Large No. of Stakeholders	2	High	70%	High number of stakeholders
Funding Availability	2	Medium	50%	Default risk value
Project Management Team	1	Medium	50%	Unforeseeable
Poor Project Intelligence	2	Medium	50%	Potential risk - same for all AFAs
Other	1	Very Low	10%	None
Environment				
Public Relations	2	High	70%	High number of stakeholders and interferences
Site Characteristics	2	Medium	50%	Presence of invasive non-native species unknown
Environmental Impact	3	High	70%	Potential for environmental impacts
Permits / Consents / Approvals	2	High	70%	Number of species of conservation importance present - Fresh Water Pearl Mussel
Amenity and art	1	Medium	50%	Town centre - large number of stakeholders
Contaminated land	3	Medium	50%	Unknown
Archaeology	3	Medium	50%	Unknown
Other	1	Very Low	10%	None
External Influences				
Political	3	Medium	50%	Default risk value
Economic	2	Medium	50%	Default risk value
Legislation / Regulations	1	Medium	50%	Default risk value
Multiple river users / stakeholders	2	High	70%	Large number of stakeholders and interferences
Flood events during construction	3	Medium	50%	History of flooding
Other	1	Very Low	10%	None
	68	50%		
Weighting to apply: 0.524				Minimum Optimism Bias: 10% Maximum Optimism Bias: 70% Calculated Optimism bias: 41%

1. Walls

Select Wall Type from Dropdown	Comments	Length of Wall	Height of Wall		Rate	Capital Cost of Wall	Maintenance Costs Estimate	PV Rate	PV Cost
		(m)	Min 0.6m	Max 3.0m	(€/m)	(€)	Select H/L	(€/m)	PVC * Length (€)
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		59.682	2.25		€ 5,072.46	€ 302,734.58	Average	€ 8.43	€ 503.12
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		31.113	1.10		€ 2,060.26	€ 64,100.84	Average	€ 8.43	€ 262.28
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		30.652	1.70		€ 3,525.91	€ 108,076.26	Average	€ 8.43	€ 258.40
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		19.932	2.00		€ 4,308.93	€ 85,885.59	Average	€ 8.43	€ 168.03
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		17.719	1.10		€ 2,060.26	€ 36,505.73	Average	€ 8.43	€ 149.37
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		35.327	1.50		€ 3,003.90	€ 106,118.79	Average	€ 8.43	€ 297.81
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		15.418	1.10		€ 2,060.26	€ 31,765.07	Average	€ 8.43	€ 129.97
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		19.896	1.80		€ 3,786.92	€ 75,344.52	Average	€ 8.43	€ 167.72
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		36.016	1.60		€ 3,264.91	€ 117,588.86	Average	€ 8.43	€ 303.61
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		33.745	1.70		€ 3,525.91	€ 118,981.90	Average	€ 8.43	€ 284.47
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		8.697	1.40		€ 2,742.89	€ 23,854.95	Average	€ 8.43	€ 73.32
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		21.583	4.80		€ 12,860.47	€ 277,567.59	Average	€ 8.43	€ 181.94
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		12.781	4.90		€ 13,165.89	€ 168,273.18	Average	€ 8.43	€ 107.74
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		18.101	4.40		€ 11,638.82	€ 210,674.35	Average	€ 8.43	€ 152.59
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		17.754	4.90		€ 13,165.89	€ 233,747.13	Average	€ 8.43	€ 149.67
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		40.935	2.30		€ 5,225.17	€ 213,892.19	Average	€ 8.43	€ 345.08
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		5.105	1.80		€ 3,786.92	€ 19,332.22	Average	€ 8.43	€ 43.04
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		42.862	2.00		€ 4,308.93	€ 184,689.35	Average	€ 8.43	€ 361.33
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		22.785	2.30		€ 5,225.17	€ 119,055.42	Average	€ 8.43	€ 192.08
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		3.68	1.90		€ 4,047.92	€ 14,896.36	Average	€ 8.43	€ 31.02
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		24.183	2.30		€ 5,225.17	€ 126,360.20	Average	€ 8.43	€ 203.86
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		23.76	2.30		€ 5,225.17	€ 124,149.96	Average	€ 8.43	€ 200.30
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		3.898	1.80		€ 3,786.92	€ 14,761.41	Average	€ 8.43	€ 32.86
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		3.612	1.90		€ 4,047.92	€ 14,621.10	Average	€ 8.43	€ 30.45
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		21.283	1.40		€ 2,742.89	€ 58,377.02	Average	€ 8.43	€ 179.42
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		53.115	1.40		€ 2,742.89	€ 145,688.84	Average	€ 8.43	€ 447.76
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		51.475	1.40		€ 2,742.89	€ 141,190.49	Average	€ 8.43	€ 433.93
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		30.158	1.90		€ 4,047.92	€ 122,077.29	Average	€ 8.43	€ 254.23
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		4.499	1.80		€ 3,786.92	€ 17,037.34	Average	€ 8.43	€ 37.93
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		31.409	2.20		€ 4,919.75	€ 154,524.56	Average	€ 8.43	€ 264.78
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		45.402	2.00		€ 4,308.93	€ 195,634.03	Average	€ 8.43	€ 382.74
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		59.278	2.00		€ 4,308.93	€ 255,424.74	Average	€ 8.43	€ 499.71
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		24.217	2.20		€ 4,919.75	€ 119,141.69	Average	€ 8.43	€ 204.15
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		5.566	1.70		€ 3,525.91	€ 19,625.23	Average	€ 8.43	€ 46.92
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		76.399	1.90		€ 4,047.92	€ 309,257.34	Average	€ 8.43	€ 644.04
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		74.546	1.90		€ 4,047.92	€ 301,756.54	Average	€ 8.43	€ 628.42
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		74.995	2.00		€ 4,308.93	€ 323,148.19	Average	€ 8.43	€ 632.21
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		72.918	2.00		€ 4,308.93	€ 314,198.54	Average	€ 8.43	€ 614.70
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		76.438	2.50		€ 5,835.99	€ 446,091.49	Average	€ 8.43	€ 644.37
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		75.031	2.50		€ 5,835.99	€ 437,880.25	Average	€ 8.43	€ 632.51
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		132.878	1.10		€ 1,965.89	€ 261,224.07	Average	€ 8.43	€ 1,120.16
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		20.538	1.10		€ 2,060.26	€ 42,313.60	Average	€ 8.43	€ 173.14
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		24.043	1.10		€ 2,060.26	€ 49,534.81	Average	€ 8.43	€ 202.68
Retaining Wall, Urban with sheet piling, <100m in length (€/m)		85.419	1.10		€ 2,060.26	€ 175,985.26	Average	€ 8.43	€ 720.08
							Average		
							Average		
							Average		
							Average		
Capital Cost						€ 6,683,088.85	Total PV Cost		€ 13,393.94
							Total Cost		€ 6,696,482.79

2. Embankments

Select Embankment from Dropdown	Comments	Imported Material	Length of Embankment	Height of Embankment		Rate	Capital Cost of Embankment	Maintenance Costs Estimate	PV Rate	PV Cost
		Select Yes/No	(m)	Min 1.0m	Max 3.0m	(€/m)	(€)	Select H/L	(€/m)	PVC * Length (€)
Rural clay embankment (€/m) < 100m		Yes	22.227	2.70		€ 467.40	€ 10,388.98	Average	€ 70.68	€ 1,571.05
Rural clay embankment (€/m) < 100m		Yes	39.27	2.00		€ 301.03	€ 11,821.56	Average	€ 70.68	€ 2,775.69
Rural clay embankment (€/m) < 100m		Yes	26.285	3.00		€ 538.71	€ 14,159.88	Average	€ 70.68	€ 1,857.88
Rural clay embankment (€/m) < 100m		Yes	37.115	1.50		€ 219.85	€ 8,158.77	Average	€ 70.68	€ 2,623.37
Rural clay embankment (€/m) 100 - 1,000m		Yes	183.873	1.00		€ 127.85	€ 23,507.63	Average	€ 70.68	€ 12,996.56
Rural clay embankment (€/m) < 100m		Yes	74.661	1.10		€ 154.91	€ 11,565.42	Average	€ 70.68	€ 5,277.21
Rural clay embankment (€/m) < 100m		Yes	20.811	1.00		€ 138.67	€ 2,885.85	Average	€ 70.68	€ 1,470.97
Rural clay embankment (€/m) < 100m		Yes	37.965	2.50		€ 419.87	€ 15,940.33	Average	€ 70.68	€ 2,683.45
Rural clay embankment (€/m) < 100m		Yes	75.279	1.10		€ 154.91	€ 11,661.16	Average	€ 70.68	€ 5,320.89
Rural clay embankment (€/m) 100 - 1,000m		Yes	117.846	1.40		€ 190.52	€ 22,452.21	Average	€ 70.68	€ 8,329.62
Rural clay embankment (€/m) < 100m		Yes	30.484	1.70		€ 252.32	€ 7,691.84	Average	€ 70.68	€ 2,154.68
Rural clay embankment (€/m) < 100m		Yes	19.045	1.10		€ 154.91	€ 2,950.18	Average	€ 70.68	€ 1,346.14
Rural clay embankment (€/m) 100 - 1,000m		Yes	105.861	1.10		€ 143.52	€ 15,192.72	Average	€ 70.68	€ 7,482.50
Rural clay embankment (€/m) < 100m		Yes	8.273	1.00		€ 138.67	€ 1,147.21	Average	€ 70.68	€ 584.75
Rural clay embankment (€/m) < 100m		Yes	88.236	1.30		€ 187.38	€ 16,533.53	Average	€ 70.68	€ 6,236.72
								Average		
								Average		
								Average		
								Average		
								Average		
Capital Cost						€ 176,058.28	Total PV Cost		€ 62,711.50	
							Total Cost		€ 238,769.79	

3. Demountable Barrier

Select Demountable Barrier Span from Dropdown	Comments	Length of Wall	With Ground Beam Installation	Height	Additional Costs	Wall Length for Maintenance	Rate	Cost of Wall	PV Maintenance Rate	PV Maintenance Rate	PV Costs
		(m)	Select Yes/No	Select (mm)	Select	Select	(€/m)	(€)	(€/m)	(€/m)	(€)
Capital Cost								€ 0.00	Total PV Cost		€ 0.00
									Total Cost		€ 0.00

3a. Flood Gate

3a. Flood Gate		No. of Flood Gates	Height Select (m)	Width Select (m)	Rate (€/gate)	Cost of Flood Gate (€)	PV & Event Rate (€/gate)	PV Costs (€)
Select Flood Gate from Dropdown	Comments							
Lift Hinge Gate		2	1.2	Double 2x3m	€ 31,600.00	€ 63,200.00	€ 0.00	€ 0.00
Capital Cost						€ 63,200.00	Total PV Cost	€ 0.00
							Total Cost	€ 63,200.00
Overall Capital Cost						€ 63,200.00	Overall PV Cost	€ 0.00
							Overall Cost	€ 63,200.00

4. In-Channel Excavation

Select Excavation Type from Dropdown	Comments	Urban or Rural	Volume of Excavation	Rate	Cost of Excavation
		Select	Min 100m³ Max 1,000m³ (m³)	(€/m³)	(€)
Total Cost				€ 0.00	

Volume of Dredging		Rate	Cost of Dredging
Dredging (m³)		Select a Rate from Dropdown (€/m³)	(€)
Total Cost		€ 0.00	

Total Excavation Costs € 0.00

5. Excavation on Land

Select Excavation Type from Dropdown	Comments	Volume of Excavation	Rate	Cost of Excavation
		(m³)	(€/m³)	(€)

Summary

UoM	21	Optimism Bias	44.24%
AFA	Kenmare	Site Investigation Estimate	€ 50,000.00
Option	2 - Storage & Flood Defences	Preliminaries	17%
Description	Storage & Flood Defences	Design Fees	13%
		Compensation and Land Acquisition	15%
		Archaeology and Environmental	15%
		Art Allowance	€ 25,500.00

Element Reference	Element	Capital Costs	PV O&M Costs	Total Costs
1	Walls	€ 1,226,072.60	€ 7,236.92	€ 1,233,309.52
2	Embankments	€ 69,116.15	€ 31,372.33	€ 100,488.47
3	Demountable Walls and Gates	€ 63,200.00	€ 2,262.08	€ 65,462.08
4	In-Channel Excavation	€ 0.00	€ 0.00	€ 0.00
5	Excavation on Land	€ 0.00	€ 0.00	€ 0.00
6	Weirs	€ 0.00	€ 0.00	€ 0.00
7	Weir Removal	€ 0.00	€ 0.00	€ 0.00
8	Bridges	€ 0.00	€ 0.00	€ 0.00
9	Bridge Underpinning	€ 0.00	€ 0.00	€ 0.00
10	Culverts	€ 0.00	€ 0.00	€ 0.00
11	Sluice Gates	€ 30,273.39	€ 46,365.04	€ 76,638.43
12	Road Raising	€ 42,227.61	€ 0.00	€ 42,227.61
13	Individual Property Protection	€ 0.00	€ 0.00	€ 0.00
14	Hydrometric Gauging Stations	€ 0.00	€ 0.00	€ 0.00
15	Flood Forecasting	€ 0.00	€ 0.00	€ 0.00
16	Pumping Stations	€ 0.00	€ 0.00	€ 0.00
17	Channel Maintenance	€ 0.00	€ 0.00	€ 0.00
18	Bank Protection	€ 0.00	€ 0.00	€ 0.00
19	Manhole Sealing	€ 0.00	€ 0.00	€ 0.00

€ 1,430,889.76	€ 87,236.36	€ 1,518,126.11
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Basic Construction Costs	€ 1,430,889.76
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Preliminaries	€ 243,251.26
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Optimism Bias	€ 740,561.20
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Construction Costs (Excl VAT)	€ 2,414,702.22
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Design Fees	€ 313,911.29
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Σ Construction Costs and Fees	€ 2,728,613.51
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Other Items

Allowance for Archaeology and Environmental Mitigation Measures	€ 362,205.33
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Allowance for Compensation and Land Acquisition	€ 362,205.33
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Site Investigation	€ 50,000.00
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Art Allowance	€ 25,500.00
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NPV Operation & Maintenance	€ 87,236.36
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Optimism Bias - NPV O&M	€ 38,589.26
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Σ Other Items	€ 925,736.28
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Option Cost for Cost Benefit Analysis	€ 3,654,349.79
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CFRAM Unit Cost Development Project					
Optimism Bias Calculator					
Prepared by:	AEP	Date:	December 2013		
Site Reference:		Site Name:	Kenmare	2 - Storage & Flood Defences	

Project risk components that influence total project cost	Weight 1-3 (3 being a higher weight)	Risk value (0-100%) 0% = no risk 100% = risk expected and not mitigated		Key:	Default weighting defined by OPW for all CFRAM projects
					Default risk value defined for all CFRAM projects
					Automated function cell (no input required)
					User defined - risk value, comments, justification
Procurement	Weight	Select from Dropdown		Comment/justification	
Complexity of Contract Structure	1	Medium	50%	Default risk value	
Late Contractor Involvement in Design	2	Medium	50%	Default risk value	
Poor Contractor Capabilities	1	Medium	50%	Default risk value	
Government Guidelines	1	Medium	50%	Default risk value	
Dispute & Claims Occurred	3	Medium	50%	Default risk value	
Information Management	1	Medium	50%	Default risk value	
Budgeting	2	Medium	50%	Default risk value	
Other	1	Medium	50%	Default risk value	
Project Specific					
Design Complexity	2	High	70%	Large scheme with storage area, flood walls, gates, embankments, road raising and pump stations	
Degree of Innovation	2	Medium	50%	Standard and proven methods	
Technology	2	High	70%	Storage area controls, pump stations and associated equipment required	
Services	3	Medium	50%	Unknown - town centre with large amount of services expected	
Ground conditions	3	High	70%	Unknown - risk associated with large storage area	
Health and Safety	3	Medium	50%	Large scale scheme but no unusual risks associated with works	
Other	1	Medium	50%	Storage area, surface water drainage and pump stations	
Client Specification					
Inadequacy of the Business Case	3	Medium	50%	Default risk value	
Large No. of Stakeholders	2	Very High	90%	High number of stakeholders including critical stakeholders associated with storage area	
Funding Availability	2	Medium	50%	Default risk value	
Project Management Team	1	Medium	50%	Unforeseeable	
Poor Project Intelligence	2	Medium	50%	Potential risk - same for all AFAs	
Other	1	Very Low	10%	None	
Environment					
Public Relations	2	Very High	90%	High number of stakeholders and interferences including storage area	
Site Characteristics	2	Medium	50%	Presence of invasive non-native species unknown	
Environmental Impact	3	Very High	90%	Potential for environmental impacts - Fresh Water Pearl Mussel in storage area	
Permits / Consents / Approvals	2	High	70%	Number of species of conservation importance present - Fresh Water Pearl Mussel	
Amenity and art	1	Medium	50%	Town centre - large number of stakeholders	
Contaminated land	3	High	70%	Unknown - risk associated with storage area	
Archaeology	3	Medium	50%	Unknown	
Other	1	Medium	50%	Specific risks associated with storage area	
External Influences					
Political	3	Medium	50%	Default risk value	
Economic	2	Medium	50%	Default risk value	
Legislation / Regulations	1	Medium	50%	Default risk value	
Multiple river users / stakeholders	2	High	70%	Large number of stakeholders and interferences	
Flood events during construction	3	Medium	50%	History of flooding	
Other	1	Very Low	10%	None	
	68		55%		
Weighting to apply: 0.571				Minimum Optimism Bias:	10%
				Maximum Optimism Bias:	70%
				Calculated Optimism bias:	44%

1. Walls

2. Embankments

3. Demountable Barrier

3a. Flood Gate

4. In-Channel Excavation

Total Excavation Costs € 0.00

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Property Type	Comments	Select		(€)	(€)	(€)	(€)
Detached							
Semi-Detached							
Terraced							
Flat							
Residential average							
Shop							
Office							
				Capital Cost	€ 0.00	PV Cost	€ 0.00
						Total Cost	€ 0.00

14. Hydrometric Gauging Stations

		Number of Units	Maintenance Select H/L	Rate	Capital Cost of Units	PV Rate	PV Costs
Hydrometric Gauging Station	Comments			(€)	(€)	(€)	(€)
				Capital Cost	€ 0.00	PV Cost	€ 0.00
						Total Cost	€ 0.00

15. Flood Forecasting

		Signage Select Yes/No	Maintenance Select	Number of Units	Rate	Cost of Construction	PV Cost	PV Cost
Category	Comments				(€)	(€)	(€)	(€)
				Capital Cost	€ 0.00	PV Cost	€ 0.00	€ 0.00
						Total Cost	€ 0.00	

16. Pumping Stations

		Number of Units	Rate	Capital Cost	Operation Cost	Running Cost	PV Cost
Pumpstation Capacity	Comments		(€)	(€)	(€)	(€)	(€)
0.02 m3/s							
0.05 m3/s							
0.1 m3/s							
0.5 m3/s							
1.0 m3/s							
2.0 m3/s							
3.0 m3/s							
				Capital Cost	€ 0.00	PV Cost	€ 0.00
						Total Cost	€ 0.00

17. Channel Maintenance

		Length of Channel	Rate	Maintenance Costs
Channel Type	Comments	(m)	(€)	(€)
			Total Cost	€ 0.00

18. Bank Protection

	Fluvial/Coastal Select	Maintenance Select	Length	Rate	Cost of Construction	PV Rate	PV Cost
Description of Bank Protection	Fluvial	High	(m)	(€/m)	(€)	(€)	(€)
				Capital Cost	€ 0.00	PV Cost	€ 0.00
						Total Cost	€ 0.00

19. Manhole Sealing

		No. of Manholes	Rate	Cost of Construction
Manhole Type	Comments		(€)	(€)
			Total Cost	€ 0.00

Summary

UoM	21	Optimism Bias	41.41%
AFA	Kenmare	Site Investigation Estimate	€ 50,000.00
Option	3 - Conveyance & Flood Defences	Preliminaries	14%
Description	Conveyance & Flood Defences	Design Fees	13%
		Compensation and Land Acquisition	10%
		Archaeology and Environmental	15%
		Art Allowance	€ 36,157.20

Element Reference	Element	Capital Costs	PV O&M Costs	Total Costs
1	Walls	€ 2,007,243.95	€ 11,358.24	€ 2,018,602.19
2	Embankments	€ 0.00	€ 29,392.94	€ 29,392.94
3	Demountable Walls and Gates	€ 63,200.00	€ 2,262.08	€ 65,462.08
4	In-Channel Excavation	€ 0.00	€ 0.00	€ 0.00
5	Excavation on Land	€ 0.00	€ 0.00	€ 0.00
6	Weirs	€ 0.00	€ 0.00	€ 0.00
7	Weir Removal	€ 0.00	€ 0.00	€ 0.00
8	Bridges	€ 0.00	€ 0.00	€ 0.00
9	Bridge Underpinning	€ 0.00	€ 0.00	€ 0.00
10	Culverts	€ 0.00	€ 0.00	€ 0.00
11	Sluice Gates	€ 0.00	€ 0.00	€ 0.00
12	Road Raising	€ 42,227.61	€ 0.00	€ 42,227.61
13	Individual Property Protection	€ 0.00	€ 0.00	€ 0.00
14	Hydrometric Gauging Stations	€ 0.00	€ 0.00	€ 0.00
15	Flood Forecasting	€ 0.00	€ 0.00	€ 0.00
16	Pumping Stations	€ 130,200.00	€ 208,972.48	€ 339,172.48
17	Channel Maintenance	€ 0.00	€ 0.00	€ 0.00
18	Bank Protection	€ 0.00	€ 0.00	€ 0.00
19	Manhole Sealing	€ 0.00	€ 0.00	€ 0.00
		€ 2,242,871.56	€ 251,985.73	€ 2,494,857.30
		Basic Construction Costs		€ 2,242,871.56
		Preliminaries		€ 314,002.02
		Optimism Bias		€ 1,058,846.47
		Construction Costs (Excl VAT)		€ 3,615,720.05
		Design Fees		€ 470,043.61
		Σ Construction Costs and Fees		€ 4,085,763.66

Other Items

Allowance for Archaeology and Environmental Mitigation Measures	€ 542,358.01
Allowance for Compensation and Land Acquisition	€ 361,572.01
Site Investigation	€ 50,000.00
Art Allowance	€ 36,157.20
NPV Operation & Maintenance	€ 251,985.73
Optimism Bias - NPV O&M	€ 104,351.74
Σ Other Items	€ 1,346,424.69

Option Cost for Cost Benefit Analysis € 5,432,188.34

CFRAM Unit Cost Development Project					
Optimism Bias Calculator					
Prepared by:	AEP	Date:	December 2013		
Site Reference:		Site Name:	Kenmare	3 - Conveyance & Flood Defences	

Project risk components that influence total project cost	Weight 1-3 (3 being a higher weight)	Risk value (0-100%) 0% = no risk 100% = risk expected and not mitigated		Key:	Default weighting defined by OPW for all CFRAM projects
					Default risk value defined for all CFRAM projects
					Automated function cell (no input required)
					User defined - risk value, comments, justification
Procurement	Weight	Select from Dropdown		Comment/justification	
Complexity of Contract Structure	1	Medium	50%	Default risk value	
Late Contractor Involvement in Design	2	Medium	50%	Default risk value	
Poor Contractor Capabilities	1	Medium	50%	Default risk value	
Government Guidelines	1	Medium	50%	Default risk value	
Dispute & Claims Occurred	3	Medium	50%	Default risk value	
Information Management	1	Medium	50%	Default risk value	
Budgeting	2	Medium	50%	Default risk value	
Other	1	Medium	50%	Default risk value	
Project Specific					
Design Complexity	2	High	70%	Large scheme with walls, flood gates, embankments, road raising, pump stations and foul sewer diversion	
Degree of Innovation	2	Low	30%	Standard and proven methods	
Technology	2	Medium	50%	Pump stations and associated equipment required	
Services	3	High	70%	Unknown - town centre with large amount of services expected	
Ground conditions	3	Medium	50%	Unknown	
Health and Safety	3	Medium	50%	Large scale scheme but no unusual risks associated with works	
Other	1	Medium	50%	Surface water drainage and pump stations	
Client Specification					
Inadequacy of the Business Case	3	Medium	50%	Default risk value	
Large No. of Stakeholders	2	High	70%	High number of stakeholders	
Funding Availability	2	Medium	50%	Default risk value	
Project Management Team	1	Medium	50%	Unforeseeable	
Poor Project Intelligence	2	Medium	50%	Potential risk - same for all AFAs	
Other	1	Very Low	10%	None	
Environment					
Public Relations	2	High	70%	High number of stakeholders and interferences	
Site Characteristics	2	Medium	50%	Presence of invasive non-native species unknown	
Environmental Impact	3	High	70%	Potential for environmental impacts	
Permits / Consents / Approvals	2	High	70%	Number of species of conservation importance present - Fresh Water Pearl Mussel	
Amenity and art	1	Medium	50%	Town centre - large number of stakeholders	
Contaminated land	3	Medium	50%	Unknown	
Archaeology	3	Medium	50%	Unknown	
Other	1	Very Low	10%	None	
External Influences					
Political	3	Medium	50%	Default risk value	
Economic	2	Medium	50%	Default risk value	
Legislation / Regulations	1	Medium	50%	Default risk value	
Multiple river users / stakeholders	2	High	70%	Large number of stakeholders and interferences	
Flood events during construction	3	Medium	50%	History of flooding	
Other	1	Very Low	10%	None	
	68		50%		
Weighting to apply: 0.524				Minimum Optimism Bias:	10%
				Maximum Optimism Bias:	70%
				Calculated Optimism bias:	41%

1. Walls

2. Embankments

3. Demountable Barrier

3a. Flood Gate

4. In-Channel Excavation

5. Excavation on Land

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Semi-Detached							
Terraced							
Flat							
Residential average							
Shop							
Office							
Capital Cost				€ 0.00	PV Cost	€ 0.00	
					Total Cost	€ 0.00	

14. Hydrometric Gauging Stations

		Number of Units	Maintenance Select H/L	Rate	Capital Cost of Units	PV Rate	PV Costs
Hydrometric Gauging Station	Comments			(€)	(€)	(€)	(€)
Capital Cost				€ 0.00	PV Cost	€ 0.00	
					Total Cost	€ 0.00	

15. Flood Forecasting

		Signage Select Yes/No	Maintenance Select	Number of Units	Rate	Cost of Construction	PV Cost	PV Cost
Category	Comments				(€)	(€)	(€)	(€)
Capital Cost					€ 0.00	PV Cost	€ 0.00	
						Total Cost	€ 0.00	

16. Pumping Stations

		Number of Units	Rate	Capital Cost	Operation Cost	Running Cost	PV Cost
Pumpstation Capacity	Comments		(€)	(€)	(€)	(€)	(€)
0.02 m3/s							
0.05 m3/s							
0.1 m3/s		1	€ 130,200.00	€ 130,200.00	€ 80,429.30	€ 17,873.18	€ 98,302.48
0.5 m3/s							
1.0 m3/s							
2.0 m3/s							
3.0 m3/s							
Capital Cost				€ 130,200.00		PV Cost	€ 208,972.48
				Total Cost		Total Cost	€ 339,172.48

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17. Channel Maintenance

		Length of Channel	Rate	Maintenance Costs
Channel Type	Comments	(m)	(€)	(€)
Total Cost				€ 0.00

18. Bank Protection

	Fluvial/Coastal Select	Maintenance Select	Length	Rate	Cost of Construction	PV Rate	PV Cost
Description of Bank Protection			(m)	(€/m)	(€)	(€)	(€)
	Fluvial	High					
Capital Cost				€ 0.00	PV Cost	€ 0.00	
					Total Cost	€ 0.00	

19. Manhole Sealing

		No. of Manholes	Rate	Cost of Construction
Manhole Type	Comments		(€)	(€)
Total Cost				€ 0.00

Summary

UoM	21	Optimism Bias	41.41%
AFA	Kenmare	Site Investigation Estimate	€ 50,000.00
Option	4 - Flow Diversion & Flood Defences	Preliminaries	8%
Description	Flow Diversion & Flood Defences	Design Fees	13%
		Compensation and Land Acquisition	10%
		Archaeology and Environmental	15%
		Art Allowance	€ 0.00

Element Reference	Element	Capital Costs	PV O&M Costs	Total Costs
1	Walls	€ 2,910,419.91	€ 11,240.28	€ 2,921,660.19
2	Embankments	€ 172,234.81	€ 61,079.87	€ 233,314.69
3	Demountable Walls and Gates	€ 63,200.00	€ 2,262.08	€ 65,462.08
4	In-Channel Excavation	€ 0.00	€ 0.00	€ 0.00
5	Excavation on Land	€ 0.00	€ 0.00	€ 0.00
6	Weirs	€ 0.00	€ 0.00	€ 0.00
7	Weir Removal	€ 0.00	€ 0.00	€ 0.00
8	Bridges	€ 0.00	€ 0.00	€ 0.00
9	Bridge Underpinning	€ 0.00	€ 0.00	€ 0.00
10	Culverts	€ 1,247,967.08	€ 365,472.75	€ 1,613,439.82
11	Sluice Gates	€ 0.00	€ 0.00	€ 0.00
12	Road Raising	€ 42,227.61	€ 0.00	€ 42,227.61
13	Individual Property Protection	€ 0.00	€ 0.00	€ 0.00
14	Hydrometric Gauging Stations	€ 0.00	€ 0.00	€ 0.00
15	Flood Forecasting	€ 0.00	€ 0.00	€ 0.00
16	Pumping Stations	€ 130,200.00	€ 208,972.48	€ 339,172.48
17	Channel Maintenance	€ 0.00	€ 0.00	€ 0.00
18	Bank Protection	€ 0.00	€ 0.00	€ 0.00
19	Manhole Sealing	€ 0.00	€ 0.00	€ 0.00
		€ 4,566,249.42	€ 649,027.45	€ 5,215,276.87
		Basic Construction Costs		€ 4,566,249.42
		Preliminaries		€ 365,299.95
		Optimism Bias		€ 2,042,241.62
		Construction Costs (Excl VAT)		€ 6,973,791.00
		Design Fees		€ 906,592.83
		Σ Construction Costs and Fees		€ 7,880,383.83

Other Items

Allowance for Archaeology and Environmental Mitigation Measures	€ 1,046,068.65
Allowance for Compensation and Land Acquisition	€ 697,379.10
Site Investigation	€ 50,000.00
Art Allowance	€ 0.00
NPV Operation & Maintenance	€ 649,027.45
Optimism Bias - NPV O&M	€ 268,773.72
Σ Other Items	€ 2,711,248.92

Option Cost for Cost Benefit Analysis € 10,591,632.75

CFRAM Unit Cost Development Project					
Optimism Bias Calculator					
Prepared by:	AEP	Date:	December 2013		
Site Reference:		Site Name:	Kenmare	4 - Flow Diversion & Flood Defences	

Project risk components that influence total project cost	Weight 1-3 (3 being a higher weight)	Risk value (0-100%) 0% = no risk 100% = risk expected and not mitigated		Key:	
				<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #ADD8E6; border: 1px solid black; margin-right: 5px;"></div> <div style="font-size: 0.8em;">Default weighting defined by OPW for all CFRAM projects</div> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #FFDAB9; border: 1px solid black; margin-right: 5px;"></div> <div style="font-size: 0.8em;">Default risk value defined for all CFRAM projects</div> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></div> <div style="font-size: 0.8em;">Automated function cell (no input required)</div> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #FFDAB9; border: 1px solid black; margin-right: 5px;"></div> <div style="font-size: 0.8em;">User defined - risk value, comments, justification</div> </div>	
Procurement	Weight	Risk score		Comment/justification	
Complexity of Contract Structure	1	Medium	50%	Default risk value	
Late Contractor Involvement in Design	2	Medium	50%	Default risk value	
Poor Contractor Capabilities	1	Medium	50%	Default risk value	
Government Guidelines	1	Medium	50%	Default risk value	
Dispute & Claims Occurred	3	Medium	50%	Default risk value	
Information Management	1	Medium	50%	Default risk value	
Budgeting	2	Medium	50%	Default risk value	
Other	1	Medium	50%	Default risk value	
Project Specific					
Design Complexity	2	High	70%	Large scheme with walls, flood gates, embankments, road raising, pump stations and flow diversion	
Degree of Innovation	2	Low	30%	Standard and proven methods	
Technology	2	Medium	50%	Pump stations and associated equipment required	
Services	3	High	70%	Unknown - town centre with large amount of services expected	
Ground conditions	3	Medium	50%	Unknown	
Health and Safety	3	Medium	50%	Large scale scheme but no unusual risks associated with works	
Other	1	Medium	50%	Surface water drainage, pump stations and flow diversion	
Client Specification					
Inadequacy of the Business Case	3	Medium	50%	Default risk value	
Large No. of Stakeholders	2	High	70%	High number of stakeholders	
Funding Availability	2	Medium	50%	Default risk value	
Project Management Team	1	Medium	50%	Unforeseeable	
Poor Project Intelligence	2	Medium	50%	Potential risk - same for all AFAs	
Other	1	Very Low	10%	None	
Environment					
Public Relations	2	High	70%	High number of stakeholders and interferences	
Site Characteristics	2	Medium	50%	Presence of invasive non-native species unknown	
Environmental Impact	3	High	70%	Potential for environmental impacts	
Permits / Consents / Approvals	2	High	70%	Number of species of conservation importance present - Fresh Water Pearl Mussel	
Amenity and art	1	Medium	50%	Town centre - large number of stakeholders	
Contaminated land	3	Medium	50%	Unknown	
Archaeology	3	Medium	50%	Unknown	
Other	1	Very Low	10%	None	
External Influences					
Political	3	Medium	50%	Default risk value	
Economic	2	Medium	50%	Default risk value	
Legislation / Regulations	1	Medium	50%	Default risk value	
Multiple river users / stakeholders	2	High	70%	Large number of stakeholders and interferences	
Flood events during construction	3	Medium	50%	History of flooding	
Other	1	Very Low	10%	None	
	68	50%			
Weighting to apply: 0.524				Minimum Optimism Bias:	10%
				Maximum Optimism Bias:	70%
				Calculated Optimism bias:	41%

Detached							
Semi-Detached							
Terraced							
Flat							
Residential average							
Shop							
Office							
Capital Cost				€ 0.00	PV Cost	€ 0.00	
					Total Cost	€ 0.00	

14. Hydrometric Gauging Stations

		Number of Units	Maintenance Select H/L	Rate	Capital Cost of Units	PV Rate	PV Costs
Hydrometric Gauging Station	Comments			(€)	(€)	(€)	(€)
				Capital Cost	€ 0.00	PV Cost	€ 0.00
					Total Cost	€ 0.00	

15. Flood Forecasting

		Signage Select Yes/No	Maintenance Select	Number of Units	Rate	Cost of Construction	PV Cost	PV Cost
Category	Comments				(€)	(€)	(€)	(€)
				Capital Cost	€ 0.00	PV Cost	€ 0.00	
						Total Cost	€ 0.00	

16. Pumping Stations

		Number of Units	Rate	Capital Cost	Operation Cost	Running Cost	PV Cost
Pumpstation Capacity	Comments		(€)	(€)	(€)	(€)	(€)
0.02 m3/s							
0.05 m3/s							
0.1 m3/s		1	€ 130,200.00	€ 130,200.00	€ 80,429.30	€ 17,873.18	€ 98,302.48
0.5 m3/s							
1.0 m3/s							
2.0 m3/s							
3.0 m3/s							
				Capital Cost	€ 130,200.00	PV Cost	€ 208,972.48
					Total Cost	Total Cost	€ 339,172.48

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17. Channel Maintenance

		Length of Channel	Rate	Maintenance Costs
Channel Type	Comments	(m)	(€)	(€)
			Total Cost	€ 0.00

18. Bank Protection

	Fluvial/Coastal Select	Maintenance Select	Length	Rate	Cost of Construction	PV Rate	PV Cost
Description of Bank Protection			(m)	(€/m)	(€)	(€)	(€)
	Fluvial	High					
				Capital Cost	€ 0.00	PV Cost	€ 0.00
						Total Cost	€ 0.00

19. Manhole Sealing

		No. of Manholes	Rate	Cost of Construction
Manhole Type	Comments		(€)	(€)
			Total Cost	€ 0.00

Summary

UoM	21	Optimism Bias	41.41%
AFA	Kenmare	Site Investigation Estimate	€ 50,000.00
Option	5 - Conveyance, Flow Diversion & Flood Defences	Preliminaries	10%
Description	Conveyance, Flow Diversion & Flood Defences	Design Fees	13%
		Compensation and Land Acquisition	10%
		Archaeology and Environmental	15%
		Art Allowance	€ 38,000.00

Element Reference	Element	Capital Costs	PV O&M Costs	Total Costs
1	Walls	€ 1,726,349.12	€ 5,720.40	€ 1,732,069.52
2	Embankments	€ 0.00	€ 27,343.58	€ 27,343.58
3	Demountable Walls and Gates	€ 63,200.00	€ 2,262.08	€ 65,462.08
4	In-Channel Excavation	€ 0.00	€ 0.00	€ 0.00
5	Excavation on Land	€ 0.00	€ 0.00	€ 0.00
6	Weirs	€ 0.00	€ 0.00	€ 0.00
7	Weir Removal	€ 0.00	€ 0.00	€ 0.00
8	Bridges	€ 0.00	€ 0.00	€ 0.00
9	Bridge Underpinning	€ 0.00	€ 0.00	€ 0.00
10	Culverts	€ 1,247,967.08	€ 365,472.75	€ 1,613,439.82
11	Sluice Gates	€ 0.00	€ 0.00	€ 0.00
12	Road Raising	€ 42,227.61	€ 0.00	€ 42,227.61
13	Individual Property Protection	€ 0.00	€ 0.00	€ 0.00
14	Hydrometric Gauging Stations	€ 0.00	€ 0.00	€ 0.00
15	Flood Forecasting	€ 0.00	€ 0.00	€ 0.00
16	Pumping Stations	€ 130,200.00	€ 208,972.48	€ 339,172.48
17	Channel Maintenance	€ 0.00	€ 0.00	€ 0.00
18	Bank Protection	€ 0.00	€ 0.00	€ 0.00
19	Manhole Sealing	€ 0.00	€ 0.00	€ 0.00
		€ 3,209,943.81	€ 609,771.28	€ 3,819,715.09
		Basic Construction Costs		€ 3,209,943.81
		Preliminaries		€ 320,994.38
		Optimism Bias		€ 1,462,223.82
		Construction Costs (Excl VAT)		€ 4,993,162.01
		Design Fees		€ 649,111.06
		Σ Construction Costs and Fees		€ 5,642,273.07

Other Items

Allowance for Archaeology and Environmental Mitigation Measures	€ 748,974.30
Allowance for Compensation and Land Acquisition	€ 499,316.20
Site Investigation	€ 50,000.00
Art Allowance	€ 38,000.00
NPV Operation & Maintenance	€ 609,771.28
Optimism Bias - NPV O&M	€ 252,517.05
Σ Other Items	€ 2,198,578.83

Option Cost for Cost Benefit Analysis € 7,840,851.90

CFRAM Unit Cost Development Project						
Optimism Bias Calculator						
Prepared by:	AEP	Date:	December 2013			
Site Reference:		Site Name:	Kenmare	5 - Conveyance, Flow Diversion & Flood Defences		

Project risk components that influence total project cost	Weight 1-3 (3 being a higher weight)	Risk value (0-100%) 0% = no risk 100% = risk expected and not mitigated		Key:							
				<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #ADD8E6; border: 1px solid black; margin-right: 5px;"></div> <div style="font-size: 0.8em;">Default weighting defined by OPW for all CFRAM projects</div> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #FFDAB9; border: 1px solid black; margin-right: 5px;"></div> <div style="font-size: 0.8em;">Default risk value defined for all CFRAM projects</div> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></div> <div style="font-size: 0.8em;">Automated function cell (no input required)</div> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #FFFFE0; border: 1px solid black; margin-right: 5px;"></div> <div style="font-size: 0.8em;">User defined - risk value, comments, justification</div> </div>							
Procurement	Weight	Risk score		Comment/justification							
Complexity of Contract Structure	1	Medium	50%	Default risk value							
Late Contractor Involvement in Design	2	Medium	50%	Default risk value							
Poor Contractor Capabilities	1	Medium	50%	Default risk value							
Government Guidelines	1	Medium	50%	Default risk value							
Dispute & Claims Occurred	3	Medium	50%	Default risk value							
Information Management	1	Medium	50%	Default risk value							
Budgeting	2	Medium	50%	Default risk value							
Other	1	Medium	50%	Default risk value							
Project Specific											
Design Complexity	2	High	70%	Large scheme - walls, gates, embankments, road raising, pump stations, foul sewer and flow diversion							
Degree of Innovation	2	Low	30%	Standard and proven methods							
Technology	2	Medium	50%	Pump stations and associated equipment required							
Services	3	High	70%	Unknown - town centre with large amount of services expected							
Ground conditions	3	Medium	50%	Unknown							
Health and Safety	3	Medium	50%	Large scale scheme but no unusual risks associated with works							
Other	1	Medium	50%	Surface water drainage, pump stations and flow diversion							
Client Specification											
Inadequacy of the Business Case	3	Medium	50%	Default risk value							
Large No. of Stakeholders	2	High	70%	High number of stakeholders							
Funding Availability	2	Medium	50%	Default risk value							
Project Management Team	1	Medium	50%	Unforeseeable							
Poor Project Intelligence	2	Medium	50%	Potential risk - same for all AFAs							
Other	1	Very Low	10%	None							
Environment											
Public Relations	2	High	70%	High number of stakeholders and interferences							
Site Characteristics	2	Medium	50%	Presence of invasive non-native species unknown							
Environmental Impact	3	High	70%	Potential for environmental impacts							
Permits / Consents / Approvals	2	High	70%	Number of species of conservation importance present - Fresh Water Pearl Mussel							
Amenity and art	1	Medium	50%	Town centre - large number of stakeholders							
Contaminated land	3	Medium	50%	Unknown							
Archaeology	3	Medium	50%	Unknown							
Other	1	Very Low	10%	None							
External Influences											
Political	3	Medium	50%	Default risk value							
Economic	2	Medium	50%	Default risk value							
Legislation / Regulations	1	Medium	50%	Default risk value							
Multiple river users / stakeholders	2	High	70%	Large number of stakeholders and interferences							
Flood events during construction	3	Medium	50%	History of flooding							
Other	1	Very Low	10%	None							
	68	50%									
Weighting to apply:				0.524	<table border="1" style="font-size: 0.8em;"> <tr> <td>Minimum Optimism Bias:</td> <td>10%</td> </tr> <tr> <td>Maximum Optimism Bias:</td> <td>70%</td> </tr> <tr> <td>Calculated Optimism bias:</td> <td>41%</td> </tr> </table>	Minimum Optimism Bias:	10%	Maximum Optimism Bias:	70%	Calculated Optimism bias:	41%
Minimum Optimism Bias:	10%										
Maximum Optimism Bias:	70%										
Calculated Optimism bias:	41%										

1. Walls

2. Embankments

3. Demountable Barrier

3a. Flood Gate

4. In-Channel Excavation

Total Excavation Costs € 0.00

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Detached							
Semi-Detached							
Terraced							
Flat							
Residential average							
Shop							
Office							
Capital Cost				€ 0.00	PV Cost	€ 0.00	
					Total Cost	€ 0.00	

14. Hydrometric Gauging Stations

		Number of Units	Maintenance Select H/L	Rate	Capital Cost of Units	PV Rate	PV Costs
Hydrometric Gauging Station	Comments			(€)	(€)	(€)	(€)
				Capital Cost	€ 0.00	PV Cost	€ 0.00
					Total Cost	€ 0.00	

15. Flood Forecasting

		Signage Select Yes/No	Maintenance Select	Number of Units	Rate	Cost of Construction	PV Cost	PV Cost
Category	Comments				(€)	(€)	(€)	(€)
				Capital Cost	€ 0.00	PV Cost	€ 0.00	
						Total Cost	€ 0.00	

16. Pumping Stations

		Number of Units	Rate	Capital Cost	Operation Cost	Running Cost	PV Cost
Pumpstation Capacity	Comments		(€)	(€)	(€)	(€)	(€)
0.02 m3/s							
0.05 m3/s							
0.1 m3/s		1	€ 130,200.00	€ 130,200.00	€ 80,429.30	€ 17,873.18	€ 98,302.48
0.5 m3/s							
1.0 m3/s							
2.0 m3/s							
3.0 m3/s							
				Capital Cost	€ 130,200.00	PV Cost	€ 208,972.48
					Total Cost	Total Cost	€ 339,172.48

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17. Channel Maintenance

		Length of Channel	Rate	Maintenance Costs
Channel Type	Comments	(m)	(€)	(€)
			Total Cost	€ 0.00

18. Bank Protection

	Fluvial/Coastal Select	Maintenance Select	Length	Rate	Cost of Construction	PV Rate	PV Cost
Description of Bank Protection			(m)	(€/m)	(€)	(€)	(€)
	Fluvial	High					
				Capital Cost	€ 0.00	PV Cost	€ 0.00
						Total Cost	€ 0.00

19. Manhole Sealing

		No. of Manholes	Rate	Cost of Construction
Manhole Type	Comments		(€)	(€)
			Total Cost	€ 0.00

CFRAM Unit Cost Development Project

Method	Complex Forecast for Catchment		
Prepared by:	T. Donovan	Date:	26/02/2016
Checked by:	B. O'Connor	Date:	26/02/2016

Project reference	SWCFRAM	Project name:	Bantry AFA (Mealagh River)
Base date for estimates (year 0)	Feb-2016	Construction Price Index (CPI)	1.000
Scaling factor (e.g. €m, €k, €)	€	Method Factor - to take into account particular site issues /constraints	1.00

This sheet should only be used when assessing single method options as double counting may occur when method costs are added. Costing of complex forecasting over a catchment will depend on the number of gauges, type of forecast model and degree of existing forecast systems (hardware/software). Indicative costs for each element of a forecast model are provided. Appraisers must enter the units required to generate a total cost.

Single Method Capital Cost Tool for complex forecast

Specification, site survey and administration	Typical Rate (€)		Quantity	Unit	Rate (€)	Total cost (€)	Comment/justification
	Lower	Upper					
Specification and procurement of system	€2,000	€4,000	No.	1	€3,000	€3,000	
Site visit to determine gauge locations	€2,000	€4,000	No.	1	€2,000	€2,000	
Warning area survey			No.			€0	
Gauging and telemetry							
Raingauges	€3,000	€4,000	No.	3	€3,500	€10,500	
River gauges	€4,000	€5,000	No.	3	€4,500	€13,500	
Forecast model set-up, calibration, configuration and testing							
Hydrological model build and calibration (PDM/routing)	€10,000	€35,000	No.	1	€15,000	€15,000	
Testing and configuration of system	€2,000	€5,000	No.	1	€2,000	€2,000	
Reporting	€3,000	€5,000	No.	1	€3,000	€3,000	
Forecasting system development							
Purchase of development of forecasting platform and licence costs	€40,000	€120,000	No.	1	€40,000	€40,000	
Computer hardware and backup systems	€5,000	€15,000	No.	1	€5,000	€5,000	
Web viewable forecast system (web server, licence, set up costs)	€60,000	€130,000	No.	1	€60,000	€60,000	
Design and plan of training package							
Design, preparation and documentation	€3,000	€8,000	No.	1	€5,000	€5,000	
Delivery and facilitation of training	€2,000	€4,000	No.	1	€2,000	€2,000	
Public awareness campaign							
% of full time equivalent at €30,000/year for year 1	N/A	N/A	%			€0	
Total costs						€161,000	
Apply update to unit rate (CPI) if appropriate (cell N15)						€161,000	
Enter appropriate preliminaries estimate (%) if applicable						0%	
Enter other applicable costs (€)						0	
Total capital cost (€)						€161,000	
Consider amendments based on site issues/constraints (cell N16)						€161,000	
Total capital cost (€)						€161,000	

Operation and Maintenance Cost Tool

	Typical Rate (€)		Quantity	Unit	Rate (€)	Total cost (€)
	Lower	Upper				
Raingauge maintenance and telemetry	€1,000	€2,000	No.	3	1000	€3,000
River gauge maintenance and telemetry	€1,000	€5,000	No.	3	1000	€3,000
Data (GPRS/GSM) costs	€200	€1,500	No.	1	200	€200
Forecasting management software shell maintenance	€5,000	€20,000	No.	1	5000	€5,000
Forecast model updates and re-calibration	€1,000	€2,000	No.	1	1000	€1,000
Hardware and backup system maintenance	€1,000		No.	1	1000	€1,000
Total O&M cost (€)						€13,200

Other costs

Other costs (user defined - consider the need for additional longer term or intermittent costs)	€0
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Total PV Cost

Total PVC costs (see PVC calculator below)	€442,707
Optimism bias rate (from external sheet)	44%
Total Cost including Optimism Bias	€637,499

Whole life cost and Pvc analysis - for Complex Forecast for Catchment

Enter applicable costs (enabling, capital and O&M)

Enter year of capital works (all other costs start after this year)

Enter 'other' costs and frequency (e.g. replacement costs) if applicable

Enabling costs assume to start in year 0 (amend manually if required)

Enabling cost (€) (if applicable, may be sunk cost)	
Year of capital works (year)	0
Capital cost (€)	€161,000.0
Annual maintenance cost (€)	€13,200.0
Other cost (€)	€0.0
Other works frequency (years)	

Key

	Information
	Calculation
	Cost Input

Discount rate:		4.0%	Present Value Factor: 22.341		Total PVC (€k): 442707	
Cash sum		0	161000	646800	0	807800 442707
		Cost Elements				TOTALS:
year	Discount Factor	Enabling	Capital	Maint.	Other	Cash PV
0	1.000	0	161000			161000.0 161000.0
1	0.962			13200		13200.0 12692.3
2	0.925			13200		13200.0 12204.1
3	0.889			13200		13200.0 11734.8
4	0.855			13200		13200.0 11283.4
5	0.822			13200		13200.0 10849.4
6	0.790			13200		13200.0 10432.2
7	0.760			13200		13200.0 10030.9
8	0.731			13200		13200.0 9645.1
9	0.703			13200		13200.0 9274.1
10	0.676			13200		13200.0 8917.4
11	0.650			13200		13200.0 8574.5
12	0.625			13200		13200.0 8244.7
13	0.601			13200		13200.0 7927.6
14	0.577			13200		13200.0 7622.7
15	0.555			13200		13200.0 7329.5
16	0.534			13200		13200.0 7047.6
17	0.513			13200		13200.0 6776.5
18	0.494			13200		13200.0 6515.9
19	0.475			13200		13200.0 6265.3
20	0.456			13200		13200.0 6024.3
21	0.439			13200		13200.0 5792.6
22	0.422			13200		13200.0 5569.8
23	0.406			13200		13200.0 5355.6
24	0.390			13200		13200.0 5149.6
25	0.375			13200		13200.0 4951.5
26	0.361			13200		13200.0 4761.1
27	0.347			13200		13200.0 4578.0
28	0.333			13200		13200.0 4401.9
29	0.321			13200		13200.0 4232.6
30	0.308			13200		13200.0 4069.8
31	0.296			13200		13200.0 3913.3
32	0.285			13200		13200.0 3762.8
33	0.274			13200		13200.0 3618.0
34	0.264			13200		13200.0 3478.9
35	0.253			13200		13200.0 3345.1
36	0.244			13200		13200.0 3216.4
37	0.234			13200		13200.0 3092.7
38	0.225			13200		13200.0 2973.8
39	0.217			13200		13200.0 2859.4
40	0.208			13200		13200.0 2749.4
41	0.200			13200		13200.0 2643.7
42	0.193			13200		13200.0 2542.0
43	0.185			13200		13200.0 2444.2
44	0.178			13200		13200.0 2350.2
45	0.171			13200		13200.0 2259.8
46	0.165			13200		13200.0 2172.9
47	0.158			13200		13200.0 2089.3
48	0.152			13200		13200.0 2009.0
49	0.146			13200		13200.0 1931.7

CFRAM Unit Cost Development Project

Method	Complex Forecast for Catchment		
Prepared by:	T. Donovan	Date:	26/02/2016
Checked by:	B. O'Connor	Date:	26/02/2016

Project reference	SWCFRAM	Project name:	Durrus AFA
Base date for estimates (year 0)	Feb-2016	Construction Price Index (CPI)	1.000
Scaling factor (e.g. €m, €k, €)	€	Method Factor - to take into account particular site issues /constraints	1.00

This sheet should only be used when assessing single method options as double counting may occur when method costs are added. Costing of complex forecasting over a catchment will depend on the number of gauges, type of forecast model and degree of existing forecast systems (hardware/software). Indicative costs for each element of a forecast model are provided. Appraisers must enter the units required to generate a total cost.

Single Method Capital Cost Tool for complex forecast

Specification, site survey and administration	Typical Rate (€)		Quantity	Unit	Rate (€)	Total cost (€)	Comment/justification
	Lower	Upper					
Specification and procurement of system	€2,000	€4,000	No.	1	€3,000	€3,000	
Site visit to determine gauge locations	€2,000	€4,000	No.	1	€2,000	€2,000	
Warning area survey			No.			€0	
Gauging and telemetry							
Raingauges	€3,000	€4,000	No.	3	€3,500	€10,500	
River gauges	€4,000	€5,000	No.	4	€4,500	€18,000	
Forecast model set-up, calibration, configuration and testing							
Hydrological model build and calibration (PDM/routing)	€10,000	€35,000	No.	1	€15,000	€15,000	
Testing and configuration of system	€2,000	€5,000	No.	1	€2,000	€2,000	
Reporting	€3,000	€5,000	No.	1	€3,000	€3,000	
Forecasting system development							
Purchase of development of forecasting platform and licence costs	€40,000	€120,000	No.	1	€40,000	€40,000	
Computer hardware and backup systems	€5,000	€15,000	No.	1	€5,000	€5,000	
Web viewable forecast system (web server, licence, set up costs)	€60,000	€130,000	No.	1	€60,000	€60,000	
Design and plan of training package							
Design, preparation and documentation	€3,000	€8,000	No.	1	€5,000	€5,000	
Delivery and facilitation of training	€2,000	€4,000	No.	1	€2,000	€2,000	
Public awareness campaign							
% of full time equivalent at €30,000/year for year 1	N/A	N/A	%			€0	
Total costs						€165,500	
Apply update to unit rate (CPI) if appropriate (cell N15)						€165,500	
Enter appropriate preliminaries estimate (%) if applicable						0%	
Enter other applicable costs (€)						0	
Total capital cost (€)						€165,500	
Consider amendments based on site issues/constraints (cell N16)						€165,500	
Total capital cost (€)						€165,500	

Operation and Maintenance Cost Tool

	Typical Rate (€)		Quantity	Unit	Rate (€)	Total cost (€)
	Lower	Upper				
Raingauge maintenance and telemetry	€1,000	€2,000	No.	3	1000	€3,000
River gauge maintenance and telemetry	€1,000	€5,000	No.	4	1000	€4,000
Data (GPRS/GSM) costs	€200	€1,500	No.	1	200	€200
Forecasting management software shell maintenance	€5,000	€20,000	No.	1	5000	€5,000
Forecast model updates and re-calibration	€1,000	€2,000	No.	1	1000	€1,000
Hardware and backup system maintenance	€1,000		No.	1	1000	€1,000
Total O&M cost (€)						€14,200

Other costs

Other costs (user defined - consider the need for additional longer term or intermittent costs)	€0
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Total PV Cost

Total PVC costs (see PVC calculator below)	€468,549
Optimism bias rate (from external sheet)	44%
Total Cost including Optimism Bias	€674,710

Whole life cost and Pvc analysis - for Complex Forecast for Catchment

Enter applicable costs (enabling, capital and O&M)

Enter year of capital works (all other costs start after this year)

Enter 'other' costs and frequency (e.g. replacement costs) if applicable

Enabling costs assume to start in year 0 (amend manually if required)

Enabling cost (€) (if applicable, may be sunk cost)	
Year of capital works (year)	0
Capital cost (€)	€165,500.0
Annual maintenance cost (€)	€14,200.0
Other cost (€)	€0.0
Other works frequency (years)	

Key

	Information
	Calculation
	Cost input

Discount rate:		4.0%	Present Value Factor: 22.341		Total Pvc (€k): 468549	
Cash sum		0	165500	695800	0	861300 468549
		Cost Elements				TOTALS:
year	Discount Factor	Enabling	Capital	Maint.	Other	Cash PV
0	1.000	0	165500			165500.0 165500.0
1	0.962			14200		14200.0 13653.8
2	0.925			14200		14200.0 13128.7
3	0.889			14200		14200.0 12623.7
4	0.855			14200		14200.0 12138.2
5	0.822			14200		14200.0 11671.4
6	0.790			14200		14200.0 11222.5
7	0.760			14200		14200.0 10790.8
8	0.731			14200		14200.0 10375.8
9	0.703			14200		14200.0 9976.7
10	0.676			14200		14200.0 9593.0
11	0.650			14200		14200.0 9224.0
12	0.625			14200		14200.0 8869.3
13	0.601			14200		14200.0 8528.2
14	0.577			14200		14200.0 8200.1
15	0.555			14200		14200.0 7884.8
16	0.534			14200		14200.0 7581.5
17	0.513			14200		14200.0 7289.9
18	0.494			14200		14200.0 7009.5
19	0.475			14200		14200.0 6739.9
20	0.456			14200		14200.0 6480.7
21	0.439			14200		14200.0 6231.4
22	0.422			14200		14200.0 5991.8
23	0.406			14200		14200.0 5761.3
24	0.390			14200		14200.0 5539.7
25	0.375			14200		14200.0 5326.7
26	0.361			14200		14200.0 5121.8
27	0.347			14200		14200.0 4924.8
28	0.333			14200		14200.0 4735.4
29	0.321			14200		14200.0 4553.3
30	0.308			14200		14200.0 4378.1
31	0.296			14200		14200.0 4209.7
32	0.285			14200		14200.0 4047.8
33	0.274			14200		14200.0 3892.1
34	0.264			14200		14200.0 3742.4
35	0.253			14200		14200.0 3598.5
36	0.244			14200		14200.0 3460.1
37	0.234			14200		14200.0 3327.0
38	0.225			14200		14200.0 3199.1
39	0.217			14200		14200.0 3076.0
40	0.208			14200		14200.0 2957.7
41	0.200			14200		14200.0 2843.9
42	0.193			14200		14200.0 2734.6
43	0.185			14200		14200.0 2629.4
44	0.178			14200		14200.0 2528.3
45	0.171			14200		14200.0 2431.0
46	0.165			14200		14200.0 2337.5
47	0.158			14200		14200.0 2247.6
48	0.152			14200		14200.0 2161.2
49	0.146			14200		14200.0 2078.0