

# **Appendices**





## Appendix A. – Data Register

Register o	f all inco	ming doc	uments and drawi	ngs														Ha	crowE	<u> Barry</u>
Sort by Data_ID before entering a new data item	Has data been superseded?		Description	Enter person (if available)	Enter Organisation (if available)	Drawing / Document / Photo / GIS etc.		Software / File extension	Can be a range of drawings if in digital format	Server location / Cabinet & file number	Online Location/Sharepoint Location if Applicable - Hyperlink	Halcrow Barry person		OPW / other organisation/ person	Halcrow person that data is sent to		Change to copy if you have copied the original and returned it			
Data_ID	Superseded	Category	Name of data item	Data available from	Data available from	Type of data	Hard / Digital	File format	File name / Drawing No.	File location	File Location	Requested by	Date requested	Request sent to	Received by	Date received	Original / copy	Quality Check to be carried out by	Quality Checked	Quality Check carried out by
1	N	Hydrology	Matt River Catchment Study, Balbriggan, Co. Dublin	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	001.FCC.Matt River Catchment Study Balbriggan Co. Dublin.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Matt River Report	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
2	N	Flood Risk	Mayne Stream Improvement Scheme	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	002.FCC.Mayne Stream Improvement Scheme.PM	n P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Mayne Stream Improvement Scheme	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
3	N	Hydrology	Effects of extreme weather conditions on FCC area 5.11.200 - 6.11.2000	00 Patrick Marshall (JBB)	JBB	Document	Hard	pdf	003.FCC.Effects of extreme weather conditions on 5.11.2000 6.11.2000	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Effects of extreme weather conditions on FCC_	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
4	N	Flood Risk	Assessment reports on severe flooding (09/11/2000)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	004.FCC.Assessment reports on severe flooding 09.11. 2000.Pf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- M Eng\Reports\Incoming FCC	Assessment of Reports on Flooding	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
5	N	Flood Risk	Mill Stream Flood Prevention Skerries (May 1983)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	005.FCC.Mill Stream Flood Prevention Skerries May 1983.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Mill Stream Flood Prevention	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
6	N	Hydrology	Report on Flooding in Fingal County Nov 2004	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	006.Report on Flooding in Fingal County Nov 2004.PM	P :\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Report on Flooding in Fingal Nov 2004	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		Keshav Bhattarai	Y	External Report
7	N	Flood Risk	Flooding in Nov 2002 Report	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	007.Flooding in Nov 2002 Report.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Flooding in Nov 2002	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
8	N	Hydrology	Report on Flooding in North Dublin Nov 14th & 15th 2002	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	008.Report on Flooding in North Dublin Nov 14 & 15th 2002.PM	P :\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk th Assessment and Management Study\Civil- EngiReports\Incoming FCC	Not Available	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
9	N	Flood Risk	Letter from member of public concerning flooding in Nov 2002	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	009.Letter from member of public concerning flooding in Nov 2002.PI	ar P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- M Eng\Reports\Incoming FCC	Letter from member of Public concerning Flooding	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
10	N	Flood Risk	Flooding Report 14/15th Nov 200	02 Patrick Marshall (JBB)	JBB	Document	Hard	pdf	010.Flooding Report 14.15th Nov 2002.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Flooding Report 14th & 15th Nov 2002	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
11	N	Hydrology	Mayne River Catchment Study	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	011.Mayne River Catchment Study.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- EngiReports\Incoming FCC	Mayne River Catchment	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
12	N	Hydrology	Mayne River Flood Study (Oct 2002)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	012.Mayne River Flood Study Oct 2002.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Mayne River Flood Study (Oct 2002)	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
13	N	Hydrology	Design of upgrading Kealy's Stream (Feb 1997)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	013. Aer Rianta Design of upgrading Kealy's Stream Feb 1997.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Design of upgrading Kellys stream	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
14	N	Flood Risk	Trotting Track Lands, Portmarnock, Flood assessment for the River Sluice (Aug 2005)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	014.Portmarnock Flood assessment for the Rive Sluice (Aug 2005).PM	d P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk er Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Portmarnock, Flood Assessment for the River Sluice	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
15	N	Hydrology	Balgriffen report on flood extent assessment for River Mayne	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	015.Balgriffen report or flood extent assessmen for River Mayne.PM	h P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk t Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Balgriffen report on flood assessment for the River Mayne	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
16	N	Hydrology	Mayne River and Baldoyle Flood Relief Scheme	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	016.Mayne River and Baldoyle Flood Relief Scheme.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Mayne River and Baldoyle Flood Relie Scheme	f Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
17	N	Hydrology	Grange Development, Flood exer assessment River Mayne (Oct 2003)	nt Patrick Marshall (JBB)	JBB	Document	Hard	pdf	017.Grange Development, Flood exent assessment Rive Mayne (Oct 2003).PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Grange Development, Flood Extent assessent River Mayne	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
18	N	Hydrology	Baldoyle Flood Relief Scheme, Supplementary Report 1 (May 1987)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	018.Baldoyle Flood Relief Scheme 1, Supplementary Report (May 1987).PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Baldoyle Flood Relief Scheme, Supplementary Report 1	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
19	N	Hydrology	Baldoyle Flood Relief Scheme, Supplementary Report 2 (March 1992)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	019.Baldoyle Flood Relief Scheme, Supplementary Report (March 1992).PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Baldoyle Flood Relief Scheme Report	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
20	N	Flood Risk	Baldoyle Flooding Report (June 1993)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	020.Baldoyle Flooding Report (June 1993).PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Baldoyle Flooding Report	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
21	N	Hydrology	Baldoyle Flood Relief Scheme (Prelim Report May 1987)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	021.Baldoyle Flood Relief Scheme (Prelim Report May 1987).PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Baldoyle Flood Relief Scheme	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
22	N	Hydrology	Baldoyle Flood Relief Scheme (Revised Prelim Report Vol. 1 June 1996)	Patrick Marshall (JBB)	JBB	Document	Hard	pdf	022.Baldoyle Flood Relief Scheme (Revised Prelim Report Vol. 1 June 1996).PM	d P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Baldoyle Flood Relief Scheme	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
23	N	Hydrology	Baldoyle Flood Relief Scheme ( Revised Prelim Report Vol. 2 Jur 1996)	ne Patrick Marshall (JBB)	JBB	Document	Hard	pdf	023.Baldoyle Flood Relief Scheme (Revised Prelim Report Vol. 2 June 1996).PM	d P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil- Eng\Reports\Incoming FCC	Baldoyle Flood Relief Scheme	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		External Repor	t Y	External Report
24	N	Mapping	Meath County Boundary	Patrick Marshall (JBB)	JBB	GIS Data	Digital		024.Meath county boundary.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\CD 1\County	County Boundary - Meath	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08				

Register o	of all incon	ning do	cuments and drawi	ngs														Ha	<u>crow</u> E	Jarry
Sort by Data_ID before entering a new data item	Has data been superseded?		Description	Enter person (if available)	Enter Organisation (if available)	Drawing / Document / Photo / GIS etc.		Software / File extension	Can be a range of drawings if in digital format	Server location / Cabinet & file number	Online Location/Sharepoint Location i Applicable - Hyperlink	f Halcrow Barry person		OPW / other organisation/ person	Halcrow person that data is sent to		Change to copy if you have copied the original and returned it			
Data_ID	Superseded	Category	Name of data item	Data available from	Data available from	Type of data	Hard / Digital	File format	File name / Drawing No.	File location	File Location	Requested by	Date requested	Request sent to	Received by	Date received	Original / copy	Quality Check to be carried out by	Quality Checked	Quality Check carried out by
25	Y	Mapping	Corine Land Cover Data for Mea	th Patrick Marshall (JBB)	JBB	GIS Data	Digital		025.Corine Land Cover Data for Meath.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-EnglMeath County Council Information submitted\CD 1\Corine_LandCover	Corine Land Use	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08				
26	Y	GIS	Geo Directory for Meath	Patrick Marshall (JBB)	JBB	GIS Data	Digital		026.Geo Directory.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-EnglMeath County Council information submitted\CD 1\GeoDirectory	Geo Directory	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		мсс	Y	MCC
27	N	GIS	Record of Protected Structures ir Meath	<sup>1</sup> Patrick Marshall (JBB)	JBB	GIS Data	Digital		027.Record of Protected Structures in Meath.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng/Meath County Council information submitted\CD 1\RPS	RPA	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		мсс	Y	MCC
28	N	GIS	ERBD Data For Meath	Patrick Marshall (JBB)	JBB	GIS Data	Digital		028.ERBD Data For Meath.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-EnglMeath County Council information submitted\CD 1\ERBD	ERBD DATA	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		ERBD	Y	ERBD
29	N	GIS	Lake infromation for Meath	Patrick Marshall (JBB)	JBB	GIS Data	Digital		029.Lake infromation for Meath.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-EnglMeath County Council information submitted\CD 1\Lakes	Lakes in Meath	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		мсс	Y	MCC
30	N	GIS	OPW Data for Meath - Benefit Scheme shape file, Bridge file, Channel File, Channel Drainage District, Channel Scheme, Channel District, Embankment Drainage District, Extension Scheme Shapefile	Patrick Marshall (JBB)	JBB	GIS Data	Digital		030.OPW Data for Meath .PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Givil-EngtMeath County Council information submitted/CD 1\OPW	OPW Data	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		Keshav Bhattarai	?	?
31	N	GIS	Orthographical mapping of Meat (CD 2,6,7, 8,9,10,11,12,13,14,15	h Patrick Marshall (JBB)	JBB	GIS Data	Digital		031.Orthographical mapping of Meath (CD 2,6,7,8,9,10,11,12,13, 14,15).PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study(Civil-Eng/Meath County Council information submitted	Available on request	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		Patrick Marshal	Y	Patrick Marsha
32	N	GIS	Planning Data for Meath	Patrick Marshall (JBB)	JBB	GIS Data	Digital		032.Planning Data for Meath.PM	P/Y8 Projects/Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Eng/Meath County Council information submitted/CD 3/Planning_Dat	Planning Data for Meath	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		MCC	Y	MCC
33	N	GIS	DTM 50M for Meath	Patrick Marshall (JBB)	JBB	GIS Data	Digital		033.DTM 50M for Meath.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-EnglMeath County Council information submitted\CD 3	DTM 50	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		Keshav Bhattarai		
34	N	GIS	OSI Mapping v1000, v5000 for Meath	Patrick Marshall (JBB)	JBB	GIS Data	Digital		034.OSI Mapping v1000 v5000 for Meath.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Engl/Meath County Council information submitted\CD 4	Available on request	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		Patrick Marshal		
35	N	GIS	V2500 R50,000 for Meath	Patrick Marshall (JBB)	JBB	GIS Data	Digital		035.V2500 R50,000 for Meath.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Engl/Meath County Council information submitted\CD 5	Available on request	Scott Baigent	23/05/08	Amanda O'Brien (MCC)	Patrick Marshall	04/06/08		Patrick Marshal		
36	N	GIS	Flood photo's from 2002 (Fingal Co Co)	Patrick Marshall (JBB)	JBB	Photos	Digital	.jpg	036.Flood photo's from 2002 (Fingal Co Co).PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\2002 Flood Photos		Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		FCC	Y	FCC
37	Y	GIS	Corine from Fingal Co Co	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	037.Corine from Fingal Co Co.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Corine	Corine Land Use	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		FCC	Y	FCC
38	N	GIS	Drainage Network from Fingal Co Co	<sup>0</sup> Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	038.Drainage Network for Fingal Co Co.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Drainage network	Drainage Network	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		FCC	Y	FCC
39	N	GIS	Fingal DTM	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	039.Fingal DTM.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\DTM	DTM	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		Patrick Marshal		
40	N	GIS	GDSDS Storm Reports (Fingal C Co)	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	040.GDSDS Storm Reports (Fingal Co Co).PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\GDSDS Storm Reports		Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		FCC	Y	FCC
41	Superseded	GIS	Geo Directory for Fingal	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	041.Geo Directory for Fingal.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Geodirectory	Geodirectory	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		Patrick Marshal	Y	Patrick Marsha
42	N	GIS	LAPS for Fingal	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	042.LAPS for Fingal.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Counci\LAPs	LAP's for Fingal	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		Keshav Bhattarai		
43	Superseded	Mapping	Orthographical mapping of Finglas	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	043.Orthographical mapping of Finglas.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council/Orthos	Available on request	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08		Keshav Bhattarai		
44	N	GIS	Protected Structures in Finglas	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	044.Protected Structure in Finglas.PM	S     P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk     Assessment and Management Study\Civil-Eng\Fingal     County Council\Protected Structures		Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08				
45	N	GIS	Rivers in Finglas	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	045.Rivers in Finglas.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Rivers		Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08				
46	N	GIS	WWTP in Finglas	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	046.WWTP in Finglas.PM	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\WWTP	WWTP Locations	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08				

Register o	f all incon	ning do	cuments and drawi	ings														Ha	<b>crowE</b>	<u>Sarry</u>
Sort by Data_ID before entering a new data item	Has data been superseded?		Description	Enter person (if available)	Enter Organisation (if available)	Drawing / Document / Photo / GIS etc.		Software / File extension	Can be a range of drawings if in digital format	Server location / Cabinet & file number	Online Location/Sharepoint Location if Applicable - Hyperlink	f Halcrow Barry person		OPW / other organisation/ person	Halcrow person that data is sent to		Change to copy if you have copied the original and returned it			
Data_ID	Superseded	Category	Name of data item	Data available from	Data available from	Type of data	Hard / Digital	File format	File name / Drawing No.	File location	File Location	Requested by	Date requested	Request sent to	Received by	Date received	Original / copy	Quality Check to be carried out by	Quality Checked	Quality Check carried out by
47	N	GIS	Mapinfo Files extracted from FE FRAMS Tender	M Scott Baigent (JBB)	JBB	GIS Data	Digital	tab	FEMFRAM_Tender_File s_MapInfo.zip	Sharepoint\04-Mapping data\FEM FRAM Tender Drawings\		Not Applicable	Not Applicable	Not Applicable	Scott Baigent	01/03/08		Scott Baigent	Y	Scott Baigent
48	N	GIS	Shapefiles extracted from FEM FRAMS Tender	Scott Baigent (JBB)	JBB	GIS Data	Digital	tab	FEMFRAM_Tender_File s_Shapefile.zip	Sharepoint\04-Mapping data\FEM FRAM Tender Drawings\		Not Applicable	Not Applicable	Not Applicable	Scott Baigent	01/03/08		Scott Baigent	Y	Scott Baigent
49	N	Mapping	Underground Structures	Patrick Marshall (JBB)	JBB	Drawing	Digital	tab	Map of Underground Structures in Study Area.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-EnglMeath County Council information submitted\Map of Underground Structures	Under Ground Information	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	25/06/08		мсс		
50	N	Flood Risk	Underground Structures	Patrick Marshall (JBB)	JBB	MS Excel	Digital	xls	Map of Underground Structures in Study Area.xls	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Eng/Meath County Council information submitted\Map of Underground Structures	Fingal and East Meath Flood Risk Assessment and Management Study Sshared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	25/06/08		Keshav Bhattarai		
51	N	Hydrology	River DWF's	Patrick Marshall (JBB)	JBB	MS Excel	Digital	xls	River DWF's.xls	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\River DWF's	River DWF's	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
52	N	Hydrology	Matt River Catchment Study	Patrick Marshall (JBB)	JBB	PDF	Digital	pdf	Matt River Catchment Study.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC\Matt River\Matt River	Matt River Report	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
53	N	Flood Risk	IPPC Discharges from Fingal County Council	Patrick Marshall (JBB)	JBB	MS Excel	Digital	xls	IPPC Discharges from Fingal County Council.XLS	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Engl/Fingal County Council\IPPC DISCHARGES FROM FCC	IPPC Discharges from FCC	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
54	N	Hydrology	SeaDefenceConverted	Patrick Marshall (JBB)	JBB	MDB FILE	Digital	mdb	SeaDefenceConverted.N DB	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
55	N	Hydrology	GDSDS S1001 Mayne	Patrick Marshall (JBB)	JBB	Drawing/Documen t/GIS data	Digital	tab/pdf	GDSDS S1001 Mayne.zip	P-\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\GDSDS \$1001 Mayne.zip	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
56	N	GIS	PS - FCC	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	PS.TAB	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Extra	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	04/06/08				
57	N	Flood Risk	Flooding Problem at Entrance to Balleally Landfill Final Report	Patrick Marshall (JBB)	JBB	PDF Document	Digital	pdf	Flooding Problem at Entrance to Balleally Landfill Final Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meeth Flood Risk Assessment and Management Study\Givil- EnglReports\Incoming FCC\Belleally Landfill	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
58	N	Sampling Report	Balleally	Patrick Marshall (JBB)	JBB	PDF Document	Digital	pdf	Balleally.pdf	P-\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC\Belleally Landfill	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
59	N	GIS DATA	Discovery Series for Fingal	Patrick Marshall (JBB)	JBB	GIS Data	Digital	tab	Discovery.zip	P-\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-CAD\Discovery Series	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	30/05/08		Keshav Bhattarai		
60	N	Flood Risk	15158 Phase 5E Drainage	Patrick Marshall (JBB)	JBB	PDF Document	Digital	pdf	15158 Phase 5E Drainage.zip	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
61	N	Flood Risk	14988 Phase 6 Drainage Strateg	y Patrick Marshall (JBB)	JBB	pdf	Digital	pdf	14988 Phase 6 Drainage Strategy.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil- Eng\Reports\Incoming FCC	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
62	N	Flood Risk	Portmarnock Rezoning-Flood Assessment for the River Sluice	Patrick Marshall (JBB)	JBB	pdf	Digital	pdf	Portmarnock Rezoning- Flood Assessment for the River Sluice.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area > Matt River	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
63	N	Hydrology	Matt River Catchement Study	Patrick Marshall (JBB)	JBB	pdf	Digital	pdf	Matt River Catchement Study.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- EnglReports\Incoming FCC\Matt River	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area > Matt River	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
64	N	Hydrology	Matt River Regional Attenuation Facility Consultation Document	Patrick Marshall (JBB)	JBB	pdf	Digital	pdf	Matt River Regional Attenuation Facility Consultation Document.pdf	P-\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Reports\Incoming FCC\Matt River	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	29/05/08		Keshav Bhattarai		
65	N	Flood Risk	Map of Underground Structures Study Area	in Patrick Marshall (JBB)	JBB	pdf	Digital	pdf	Map of Underground Structures in Study Area.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civii-Eng/Meath County Council information submitted\Map of Underground Structures	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area > Meath Co Council - Uploaded Files	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	27/06/08		Keshav Bhattarai		
66	N	Flood Risk	Map of Underground Structures Study Area	in Patrick Marshall (JBB)	JBB	excel	Digital	excel	Map of Underground Structures in Study Area.xls	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\Map of Underground Structures	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area > Meath Co Council - Uploaded Files	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	27/06/08		Keshav Bhattarai		
67	N	Sewerage Scheme Info	Stamullin Gormanston Mosney sewerage scheme	Patrick Marshall (JBB)	JBB	excel/Word	Digital	excel/word	Stamullin Gormanston Mosney sewerage scheme	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area > Meath Co Council - Upoaded Files	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		

Register o	of all incor	ming documents	s and drawings														Hal	crowE	<b>Barry</b>
Sort by Data_ID before entering a new data item	Has data been superseded?	Description	Enter person (if available)	Enter Organisation (if available)	Drawing / Document / Photo / GIS etc.		Software / File extension	Can be a range of drawings if in digital format	Server location / Cabinet & file number	Online Location/Sharepoint Location if Applicable - Hyperlink	f Halcrow Barry person		OPW / other organisation/ person	Halcrow person that data is sent to		Change to copy if you have copied the original and returned it			
Data_ID	Superseded	Category Name of da	ata item Data available from	Data available from	Type of data	Hard / Digita	I File format	File name / Drawing No.	File location	File Location	Requested by	Date requested	Request sent to	Received by	Date received	Original / copy	Quality Check to be carried out by	Quality Checked	Quality Check carried out by
68	N	National Urban Wastewater Study	ment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Trim Catchment Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
69	N	National Urban Wastewater Study	nment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Slane Catchment Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
70	N	National Urban Wastewater Study	hment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Navan Catchment Report .pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
71	N	National Urban Wastewater Study	hment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Meath Catchment Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study(Civil-Eng)Meath County Council information submitted/National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
72	N	National Urban Wastewater Laytown Ca Study	tchment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Laytown Catchment Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
73	N	National Urban Wastewater Study	ment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Kells Catchment Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
74	N	National Urban Wastewater Study	n Catchment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Dunshauglin Catchment Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
75	N	National Urban Wastewater Duleek Cate Study	chment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Duleek Catchment Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
76	N	National Urban Wastewater Athboy Cate Study	chment Report Patrick Marshall (JBB	) JBB	pdf	Digital	pdf	Athboy Catchment Report.pdf	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted'National urban wast water study	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - te Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
77	N	Flood Mornington and flood a Alleviation Final Prelim	district surface water leviation scheme - inary Report	) JBB	pdf	Digital	pdf	Mornington district surface water and flood alleviation scheme.pdf	P-1Y8 Projects/Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Eng/Meath County Council information submitted/Mornington district surface water and flood alleviation scheme	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area > Meath Co Council - Upoaded Files >National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
78	N	Flood Mornington Alleviation Drawings	district surface water leviation scheme - Patrick Marshall (JBB	) JBB	.dwg	Digital	.dwg	5295-00-01.dwg, 5295- 00-02.dwg, 5295-00- 03.dwg, 5295-00- 06.dwg, 5295-00- 06.dwg, 5295-00- 06.dwg, 5295-00- 08.dwg, 5295-00- 10.dwg, 5295-00- 11.dwg, 5295-00- 11.dwg, 5295-00- 11.dwg, 5295-00- 11.dwg, 5295-00- 11.dwg, 5295-00- 11.dwg, 5295-00- 18.dwg, 5295-00- 18.dwg, 5295-00- 18.dwg, 5295-00- 20.dwg	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\Mornington district surface water and flood alleviation scheme	Fingal and East Meath Flood Risk Assessment and Management Study - Shared Documents > 02 - Information Holding Area > Meath Co Council - Upoaded Files - National urban waste water study	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15/07/08		Keshav Bhattarai		
79	N	Flood Risk Fingal East Rateable Va	Meath_Flood Risk _ Patrick Marshall (JBB aluations	) JBB	xls	Digital	xls	Fingal East Meath_ Flood Risk _ Rateable Valuations.xls	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted	Fingal and East Meath Flood Risk Assessment and Management Study >Shared Documents > 02 - Information Holding Area > Meath Co Council - Uppaded Files	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15.07.08		Keshav Bhattarai		
80	N	Sewerage Dunshaugh Scheme Info network,2-tr	lin sewerage scheme,1. runk main,3-WWTW	) JBB	xls	Digital	xls	SUB1202.DOC,NETWO RK.DWG, TRUNK.DWG,WWTW.E WG	P:Y8 Projects/Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-EnglMeath Ocunty Council information submitted/Dunshaughlin sewerage scheme, 1-network,2-trunk main,3-WWTW DAYD Restant/V8100 - Civil Engl Study Civil	Assessment and Management Study Shared Documents > 02 - Information Holding Area > Meath Co Council - Upoaded Files	Scott Baigent	23/05/08	Ruth Woods (FCC)	Patrick Marshall	15.07.08		Keshav Bhattarai		
81	N	Mapping Dunshaugh Plan	lin Area Development Patrick Marshall (JBB	) JBB	drawing	Hard	pdf		Assessment and Management Study/Civil-Eng/Meath County Council information submitted	MCC website			downloaded from MCC website	Patrick Marshall			Keshav Bhattarai		
82	N	GIS/Mapping DAFF - NE	coastal flood outlines Keshav Bhattarai (JBI	3) JBB	GIS Data	Digital	GIS		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Dept of Marine_DAFF\DAFF data_16.07.08		Keshav Bhattarai		Jim Casey (DAFF)	Anne Marie Conibear	08.07.2008		DAFF	Y	DAFF
83	N	Hydrometric Hydrology stations at t neighbourin	c data of the EPA he FEM FRAM and Keshav Bhattarai (JBI g catchments	3) JBB	xls	Digital	xis		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Hydrometri Data\EPA\	c	Keshav Bhattarai	28.07.2008	Rebecca Quinn (EPA)	Keshav Bhattarai	06.08.2008		Keshav Bhattarai		
84	N	Hydrology Description OPW statio	of hydrometric data of Keshav Bhattarai (JBI	3) JBB	xls	Digital	xls		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Hydrometri Data\OPW\ Email_080719CFRAMData	c	Keshav Bhattarai	19.07.2008	Peter Newport (OPW	) Keshav Bhattarai	08.08.2008		Keshav Bhattarai		
85	N	Hydrometrie Hydrology stations at t neighbourin	c data of the OPW he FEM FRAM and g catchments	3) JBB	xls	Digital	xis		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Hydrometri Data\OPW\OPW Inst Data	c	Keshav Bhattarai	19.07.2008	Kenneth Freehill (OPW)	Keshav Bhattarai	12.08.2008		Keshav Bhattarai		
86	N	Flood Risk Ballybough Photograph	al Flooding Archival Keshav Bhattarai (JBI	3) JBB	jpeg	Digital	jpeg		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\BrendanPLynch		Anne Marie Conibear		BrendanPLynch	Anne Marie Conibear	20.08.2008		Keshav Bhattarai		
87	N	Hydrology Rainfall dat Hydrology the FEM FF neighbourin	a at the stations within RAMS area and at g catchments	3) JBB	xlx	Digital	xls		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Rainfall Da	ta	Keshav Bhattarai	28.07.08	Ann-Marie Hickey (MetEireann)	Keshav Bhattarai	21.08.2008		Keshav Bhattarai		

Register o	f all inco	ming do	cuments and drawing	ngs														Hale	crowB	arry
Sort by Data_ID before entering a new data item	Has data been superseded?		Description	Enter person (if available)	Enter Organisation (if available)	Drawing / Document / Photo / GIS etc.		Software / File extension	Can be a range of drawings if in digital format	Server location / Cabinet & file number	Online Location/Sharepoint Location if Applicable - Hyperlink	Halcrow Barry person		OPW / other organisation/ person	Halcrow person that data is sent to		Change to copy if you have copied the original and returned it			
Data_ID	Superseded	Category	Name of data item	Data available from	Data available from	Type of data	Hard / Digital	File format	File name / Drawing No.	File location	File Location	Requested by	Date requested	Request sent to	Received by	Date received	Original / copy	Quality Check to be carried out by	Quality Checked	Quality Check carried out by
88	N	Flood Risk	August 08 Flooding	Patrick Marshall (JBB)	JBB	pdf	Digital	pdf		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council Information submitted		Patrick Marshall		Joe Mc Garvey	Patrick Marshall	16.09.2008		Keshav Bhattarai		
89	N	Hydrology	AMS data of station 8011 - River Nanny at Duleek	Keshav Bhattarai (JBB)	JBB	xls	Digital	xls		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Hydrometri Data\OPW\AMS_OPW website	c	Keshav Bhattarai		www.opw.ie/hydro	Keshav Bhattarai	25.09.2008		Keshav Bhattarai		.
90	N	Flood Risk	Flooding at Townland of Ballough Ballystrane and Baldrumman, Lusk, Co. Dublin from 1982 to date.	, Keshav Bhattarai (JBB)	OPW	Unbound report/letter	Hard			P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-EngiReview of Historic Floods\Flood Reports		Keshav Bhattarai		OPW / other organisation/ person	Keshav Bhattarai	26.09.2008		Keshav Bhattarai		
91	N	Soil and Subsoil data	The soil and sub-soil GIS data layers	Keshav Bhattarai (JBB)	EPA	Document/CD	Digital	various		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil- EnglEnvironmental Protection Agency/EPA Soil Maps		Scott Baigent		EPA		06.10.2008		Keshav Bhattarai		
92	N	GIS/Mapping	NPWS area (NHA & SAC area)	Patrick Marshall (JBB)	JBB	GIS Data	Digital	GIS		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\NPWS_Areas\NPWS Areas	NPWS AREAS	Anne Marie Conibear		Gavin Poole (OPW)	Anne Marie Conibear	06.10.2008		NPWS	Y	NPWS
93	N	Hydrology	AMS data of Griffin River at Luca (Stn 9002)	<sup>n</sup> Keshav Bhattarai (JBB)	JBB	xls	Digital	xls		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Hydrometri Data\EPA	c	Keshav Bhattarai		Rebecca Quinn (EPA)	Keshav Bhattarai	06.10.2008		Keshav Bhattarai		
94	N	Report	Local Government Reform Practice 2007	Anne Marie Conibear (JBB)	JBB	Report	Digital	word		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\SEA		Anne Marie Conibear		Denise Treacy (FCC)	Anne Marie Conibear	09.10.2008		Keshav Bhattarai		
95	N	Drawing/repo	rt Basement Information FCC	Patrick Marshall (JBB)	JBB	Doc/drawing	Digital	pdf		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Eng/Fingal County Council/Basement Information FCC		Patrick Marshall		Denise Treacy (FCC)	Patrick Marshall	13.11.2008		Keshav Bhattarai		
96	N	Hydrology	Estimation of Point Rainfall Frequency - Technical Note 61	Keshav Bhattarai (JBB)	JBB	pdf	Digital	pdf		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works		Keshav Bhattarai		Met Eireann website www.met.ie	Keshav Bhattarai	13.11.2008		Keshav Bhattarai		
97	N	Hydrology	FSU DDF Curve	Keshav Bhattarai (JBB)	JBB	GIS/xls	Digital	GIS/xls		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works		Keshav Bhattarai		John Martin	Keshav Bhattarai	13.11.2008		Keshav Bhattarai		.
98	N	Hydrology	Hydrometric data of the Cuckoo River	Keshav Bhattarai (JBB)	JBB	xlx	Digital	xls		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Hydrometri Data\Dublin Airport_FCC	c	Keshav Bhattarai		Denise Treacy (FCC)	Keshav Bhattarai	17.11.2008		Keshav Bhattarai		
99	N	GIS/Mapping	DAFF - NE coastal flood outlines and NE coastal erosion risk maps	Keshav Bhattarai (JBB)	JBB	GIS Data	Digital	GIS		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-EnglDept of Marine_DAFF\DAFF data_27.11.2008		Keshav Bhattarai		Jim Casey (DAFF)	Keshav Bhattarai	27.11.2008		DAFF	Y	DAFF
100	N	Hydrometric Station	Report on Fingal Hydrometric Station - 6th August 2008	Keshav Bhattarai (JBB)	JBB	Report/GIS map	Digital	Report/GIS		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council/Fingal Hydrometric Stations		Keshav Bhattarai		Denise Treacy (FCC)	Keshav Bhattarai	27.11.2008				
101	N	SEA/Pre- Screening	SEA Pre-Screening Statement / SEA Pre-Screening Design Tree	Anne Marie Conibear (JBB)	JBB	Report	Digital	Report		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\SEA\OPW Data		Anne Marie Conibear		Gavin Poole (OPW)	Anne Marie Conibear	09.12.2008				
102	N	Flood Study	Hydrological study for town centre_Kinsealy	Keshav Bhattarai (JBB)	JBB	Report	Digital	Report		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Eng/Fingal County Council/Flood Study_Sluice River		Keshav Bhattarai		Denise Treacy (FCC)	Keshav Bhattarai	18.12.2008		Keshav Bhattarai		
103	N	Mapping	Six Inch Map of the Fingal Area	Patrick Marshall (JBB)	JBB	GIS/maps	Digital	GIS/scanned maps		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Six Inch Maps - FCC		Keshav Bhattarai		FCC/MCC	Patrick Marshall	22.12.2008				
104	N	Mapping	Six Inch Map of the Meath Area	Patrick Marshall (JBB)	JBB	GIS/maps	Digital	GIS/maps		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council\Six Inch Maps - MCC		Keshav Bhattarai		FCC/MCC	Patrick Marshall	07.01.2009				
105	N	GIS	Regional Primary Schools Meath	Patrick Marshall (JBB)	JBB	Shape file	Digital	Map Info Table		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-EnglMeath County Council information submitted\CD 1		Patrick Marshall		FCC/MCC	Patrick Marshall	15/07/08		ERBD	?	?
106	N	GIS	Small Stream Bisk Score	Patrick Marshall (JBB)	JBB	Shape File	Digital	Map Info Table		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-EnglMeath County Council information submitted\CD 1		Patrick Marshall		FCC/MCC	Patrick Marshall	15/07/08		?	?	?
107	N	GIS/HYDROI OGY	- Study Area Floods	Patrick Marshall (JBB)	JBB	Shape file	Digital	Map Info Table		\//ETRAMFS01\projects\/Y8 Projects\/Y8122 - Fingal-East_ Meath Flood Risk Assessment and Management Study\Cik EnglOffice of Public Works\Floodmaps_29Jan08_Sent by Gavin Poole	<u>/il-</u> Study Area Floods	Keshav Bhattarai		OPW	Keshav Bhattarai	29/01/09		OPW	Y	OPW
108	N	Hyrology	EIA of Mornington Stream	Keshav Bhattarai (JBB)	JBB	Report	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk, Assessment and Management Study/Civil-Eng/Office of Public Works\Table of Content of EIA of Mornington River Scheme.pdf	EIA on Mornington Stream	Keshav Bhattarai		OPW	Keshav Bhattarai	03/02/09		OPW	Y	OPW
109	N	SEA	Point Pressure Shapefiles for National Abstractions	Corinna Simpson	Halcrow	Shape file	Digital	Map Info Table		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\SEA	National Abstractions	Corinna Simpson	30/01/09	Dublin City Council	Corinna Simpson	05/02/09		DCC	Y	DCC
110	N	Hydrology	Climate Change in Ireland: Refining the Impacts for Ireland; STRIVE Report Series No. 12	Keshav Bhattarai (JBB)	JBB	Report	Hard			Climate Change in Ireland: Refining the Impact for Ireland STRIVE Report Series No. 12	Climate Change in Ireland STRIVE Report 12_2008	Keshav Bhattarai		EPA/NUI Maynooth		03/03/09		NA	?	
111	N	GIS	Development Boundary MCC	Patrick Marshall (JBB)	JBB	Shape file	Digital	Map Info Table		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\Development Boundary MCC	Development Boundary_	Patrick Marshall		MCC	Patrick Marshall	09/02/09		MCC		

Register of	of all incor	ning do	cuments and drawi	ngs														Hal	<b>crow</b> E	Jarry
Sort by Data_ID before entering a new data item	Has data been superseded?		Description	Enter person (if available)	Enter Organisation (if available)	Drawing / Document / Photo / GIS etc.		Software / File extension	Can be a range of drawings if in digital format	Server location / Cabinet & file number	Online Location/Sharepoint Location if Applicable - Hyperlink	<sup>f</sup> Halcrow Barry person		OPW / other organisation/ person	Halcrow person that data is sent to		Change to copy if you have copied the original and returned it			
Data_ID	Superseded	Category	Name of data item	Data available from	Data available from	Type of data	Hard / Digital	File format	File name / Drawing No.	File location	File Location	Requested by	Date requested	Request sent to	Received by	Date received	Original / copy	Quality Check to be carried out by	Quality Checked	Quality Check carried out by
112	N	GIS	Development Boundary FCC	Patrick Marshall (JBB)	JBB	Shape file	Digital	Map Info Table		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Development Boundary FCC	Development Boundary	Patrick Marshall		FCC	Patrick Marshall	09/02/09		FCC		
113	Superseded	GIS	Geo Directory of Meath	Patrick Marshall (JBB)	JBB	JBB	Digital	Map Info Table	GDir_08_Q4	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-EnglMeath County Council information submitted\Geo-Directory - March 09	Meath Geo-Directory	Patrick Marshall		Colin Murtagh(D3D)	Pttrick Marshall	13/03/2009		НВ		Sergio Herbon
114	N	Survey	Ward River Channel survey	Patrick Marshall (JBB)	JBB	JBB	Digital	AutoCad/Ascii File/Photos/ Key Plan	Multiple	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Channel Survey Data\Ward River	Ward River_	Patrick Marshall		Amber O Brien(MCC)	Patrick Marshall	13/03/2009		Meath County Council/An Pos	:	
115	Superseded	GIS	Geo Directory of Fingal	Patrick Marshall (JBB)	JBB	JBB	Digital	DBF FILE		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council	Fingal Geo-Directory	Patrick Marshall		Denise Treacy (FCC)	Patrick Marshall	26/03/09	-			
116	N	Report	Irish Coastal Protection Strategy Study Phase II: Dalkey Island to Omeath, Aug 2008	Keshav Bhattarai (JBB)	JBB	Report	Digital	Report		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Dept of Marine_DAFFICPSS Report Aug 08	Temporarily uploaded to the SharePoint and deleted	Keshav Bhattarai	22/04/08	Jim Casey (DAFF)	Keshav Bhattarai	24/04/08		NA		
117	N	GIS	River catchments + River sub Basins	Keshav Bhattarai (JBB)	JBB	Data	Digital	CD	GIS	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\Environmental Protection Agency\Cachment Subcatchment Boundaries 12May09		Keshav Bhattarai	06/05/09	EPA	Keshav Bhattarai	12/05/09		NA		
118	N	Mapping	Dublin Airport Environs Surface Water System	Keshav Bhattarai (JBB)	JBB	Data	Hard	Drawubg		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Dublin Airport Drainage Arrangement		Keshav Bhattarai	22/04/09	Denise Treacy (FCC)	Keshav Bhattarai	15/05/09		NA		
119	N	Data	Tidal Data at Dublin Port	Keshav Bhattarai (JBB)	JBB	Data	Digital	Data		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\Tidal Data		Keshav Bhattarai	28/04/09	Gavin Poole (OPW)	Keshav Bhattarai	27/05/09				
120	N	Data	Tidal Data at Clogherhead	Keshav Bhattarai (JBB)	JBB	Data	Digital	Data		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\Tidal Data		Keshav Bhattarai	28/04/09	Gavin Poole (OPW)	Keshav Bhattarai	09/06/09				
121	N	Report	Broadmeadow Estuary and Malahide Survey Report	Keshav Bhattarai (JBB)	JBB	Data	Digital	Report/drawing		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study(Civil-Eng/Fingal County Council/Malahide Estuary Survey Report_16Jun09	https://narc/wwarry.securespsnes.co m/femframs/Shared%20Documents/0 2%20- %20Information%20holding%20area/ Malahide%20Estuary%20Survey%20F eport_16Jun09.rar	Keshav Bhattarai	09/06/09	Denise Treacy	Keshav Bhattarai	16/09/09		NA		
122	N	Data	DAFF LIDAR Data extract at the three esturies of FEM FRAMS (Portmarnock, Malahide & Rogerstown)	Keshav Bhattarai (JBB)	JBB	Data	Digital	CD	GIS	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\LIDAR DATA at Estuaries	https://halcrowbarry.securespsiles.co m/femframs/Shared%20Documents/0 2%20- %20Information%20holding%20area/L IDAR%20DATA%20at%20Estuaries.ra r	L Keshav Bhattarai	09/06/09	Gavin Poole (OPW)	Keshav Bhattarai	29/06/09		NA		
123	N	Report	Mornington Preliminary Report 2004 & Mornington FSR Addendum 2007	Keshav Bhattarai (JBB)	JBB	Report	Digital	Report		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\Mornington Scheme		Keshav Bhattarai		Gavin Poole (OPW)	Keshav Bhattarai	29/06/09		NA		
124	N	Data	FSU DDF Curve (GIS layers)	Keshav Bhattarai (JBB)	JBB	Data	Digital	Data	GIS	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works		Keshav Bhattarai		Gavin Poole (OPW)	Keshav Bhattarai	06/07/09		NA		
125	N	Report	Mayne River Drainage Aera	Keshav Bhattarai (JBB)	JBB	Report	Digital	Report		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civii-Eng\Fingal County Council\Mayne River Drainage Area_13Jul09		Keshav Bhattarai		Denise Treacy	Keshav Bhattarai	13/07/09		NA		
126	N	Data	FSU-SAAR Curve (GIS Layer)	Keshav Bhattarai (JBB)	JBB	Data	Digital	GIS	GIS	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works		Keshav Bhattarai	14/07/09	Gavin Poole (OPW)	Keshav Bhattarai	28/07/09				
127	N	Report	Mornington EIS Report	Keshav Bhattarai (JBB)	JBB	Report	Digital			P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\Mornington Scheme		Keshav Bhattarai		Gavin Poole (OPW)	Keshav Bhattarai	16/09/09		NA		
128	N	Drawign	Mornington Drawing	Keshav Bhattarai (JBB)	JBB	Drawiong	Digital			P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Givil-Eng\Office of Public Works\Mornington Scheme		Keshav Bhattarai		Gavin Poole (OPW)	Keshav Bhattarai	29/09/09		NA		
129	N	Data	LiDAR DTM at Brookside Stream (additional data) - 3 files	Keshav Bhattarai (JBB)	JBB	Data	Digital	GIS	GIS	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil- Eng\LIDAR\LiDAR_Brookside Stream		Keshav Bhattarai		Gavin Poole (OPW)	Keshav Bhattarai	22/10/09				
130	N	Data	Fingal Coastal Data from the OPW	Patrick Marshall (JBB)	JBB	Data	Digital	GIS		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal Coastal DAS		Anne Marie Conibear		Aidan Harney (OPW)	Anne Marie Conibear	10/11/09				
131	N	Data	Complete set of Channel Survey Data from D3D	Patrick Marshall (JBB)	JBB	Data	Digital	Autocad, Photos and Txt Files	Various	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Eng/Channel Survey Data\D3D Delivered Data\Channel Survey		Anne Marie Conibear		Colin Murtagh(D3D)	Patrick Marshall	25/11/09		Yes	Yes	Various (Modelling Team)
132	N	Data	Defence Asset Survey	Patrick Marshall (JBB)	JBB	Data	Digital	Autocad	Various	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study(Civil-Eng(Channel Survey Data\D3D Delivered Data\DAS Survey		Anne Marie Conibear		Colin Murtagh(D3D)	Patrick Marshall	25/11/09		Yes	Yes	Rebecca Allen
133	N	Data	Estuary Survey	Patrick Marshall (JBB)	JBB	Data	Digital	Autocad	Various	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Channel Survey Data\D3D Delivered Data\Estuary Survey		Anne Marie Conibear		Colin Murtagh(D3D)	Patrick Marshall	25/11/09		Yes	Yes	Sergio Herbon (Halcrow BA)
134	N	Data	Query - COPY of list attached to query	Patrick Marshall (JBB)	JBB	Data	Digital	XLS	Query - COPY of list attached to query.xls	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\Information		Anne Marie Conibear		Aidan Harney (OPW)	Anne Marie Conibear	27/11/09		No		AMC
135	N	Drawing/Data	Duleek Flood Alleviation Scheme (4 drawings, one data set)	Keshav Bhattarai (JBB)	JBB	Drawing/Data	Digital	PDF	Various	P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\Duleek Flood Alleviation Scheme		Keshav Bhattarai		Shane Hayes (OPW)	Keshav Bhattarai	14/01/10		No		

### Register of all incoming documents and drawings

Sort by Data_ID before entering a new data item	Has data been superseded?		Description	Enter person (if available)	Enter Organisation (if available)	Drawing / Document / Photo / GIS etc.		Software / File extension	Can be a range of drawings if in digital format	Server location / Cabinet & file number	Online Location/Sharepoint Location if Applicable - Hyperlink	f Halcrow Barry person		OPW / other organisation/ person	Halcrow person that data is sent to		Change to copy if you have copied the original and returned it			
Data_ID	Superseded	Category	Name of data item	Data available from	Data available from	Type of data	Hard / Digital	File format	File name / Drawing No.	File location	File Location	Requested by	Date requested	Request sent to	Received by	Date received	Original / copy	Quality Check to be carried out by	Quality Checked	Quality Check carried out by
136	N	Report	Duleek Floo Relief Shceme, Preliminary Report, August 1996	Keshav Bhattarai (JBB)	JBB	Report	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\Duleek Flood Alleviation Scheme		Keshav Bhattarai		Shane Hayes (OPW)	) Keshav Bhattarai	18/01/10		No		
137	N	Report	Nanny River Duleek Certified Drainage Scheme Performance Report 2001	Keshav Bhattarai (JBB)	JBB	Report	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\Duleek Flood Alleviation Scheme		Keshav Bhattarai		Shane Hayes (OPW)	) Keshav Bhattarai	18/01/10		No		
138	N	Report	Dublin Coastal Flooding Protection Project, Volume 1 - Main Report, April 2005 and Appendices	Keshav Bhattarai (JBB)	JBB	Report	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civii-Eng/Fingal County Counci\DCFPP_Dublin Coastal Flooding Protection Project		Keshav Bhattarai	19.01.2010	Main report downloaded from the www.floodmaps.ie, Appendices received from FCC	e Keshav Bhattarai	25/01/10		No		
139	N	Report	100127 Bealleally Stream Lusk Queries from Fingal	Patrick Marshall (JBB)	JBB	Report and drawings	Digital	PDF and .Doc		P\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Channel Survey Data\Query for the Council		Patrick Marshall	14.01.2010	Denise Treacy(FCC	Patrick Marshall	27.01.2010		no		
140	N	Drawings	Bracken River Culvert	Patrick Marshall (JBB)	JBB	Drawings	Hard			Y8122/Box File		Patrick Marshall	08.02.2010	Denise Treacy(FCC	Patrick Marshall	10.02.2010		No		
141	N	Report	ICPSS NE WP 2_3_4a	Anne Marie Conibear (JBB)	JBB	Reports/Drawings	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Dept of Marine_DAFF\CPSS NE Coast_19Feb10		Keshav Bhattarai		Gavin Poole (OPW)	Anne Marie Conibear	19.02.2010				
142	N	Drawings	Feb 02 flood outline at Dublin Coastal Area	Keshav Bhattarai (JBB)	JBB	Drawing/PDF	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Dublin City Council/Feb02 Flood Extent		Keshav Bhattarai	08.03.2010	Tony Maguire, DCC	Keshav Bhattarai	10.03.2010		No	NA	NA
143	N	Report	Ballyboghill flood study for a private developer	Keshav Bhattarai (JBB)	JBB	Report Extract	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-EnglFingal County Council\Flood Study_Ballyboghill River		Keshav Bhattarai	15.03.2010	Denise Treacy, FCC	Keshav Bhattarai	15.03.2010		No		
144	N	VDO CDs	Nov 2002 flooding aerial photography (2 VCDs)	Keshav Bhattarai (JBB)	JBB	CDs	Digital	CDs		Y8122/Box File		Anne Marie Conibear		A Harney, OPW	Anne Marie Conibear	23.03.10		No		
145	N	Photographs/ rawing	D Sluice River at rear of St. Annes Park	Patrick Marshall (JBB)	JBB	PDF	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\Sluice River		Keshav Bhattarai	30.03.2010	Denise Treacy	Patrick Marshal	11.05.2010		No	NA	NA
146	N	Drawings	Gaybrook Stream - SW drawings and flood study report on Gaybrook Stream - Development at Bnavinstown East, Drinan	Anne Marie Conibear (JBB)	JBB	drawing/report	Hard			Y8122/Box File		Anne Marie Conibear	30/04/10	Denise Treacy	Anne Marie Conibear	17.05.2010		No		
147	N	Data Files	GIS shape file of the Nursing Homes, Hospitals, Health Centers and clinics in the Fingal/Meath area	Patrick Marshall (JBB)	JBB	XLS	Digital					Patrick Marshall	24/02/10	Carmel Cudden		26/04/10		No		
148	N	Data Files	Salmanoid Waters	Patrick Marshall (JBB)	JBB	Shape file	Digital	SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\ERBD Data\salmonid_waters		Patrick Marshall	24/02/10	Gracjan Fil(CDM)/ Desmond Boghan(DCC)	Patrick Marshall	25/02/10		No		
149	N	Data Files	Waterbody classifications	Patrick Marshall (JBB)	JBB	Shape file	Digital	SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\ERBD Data\WB_Classifications		Patrick Marshall	24/02/10	Gracjan Fil(CDM)/ Desmond Boghan(DCC)	Patrick Marshall	25/02/10		No		
150	N	Data Files	Shell Fish areas in the Project Catchment	Patrick Marshall (JBB)	JBB	Shape file	Digital	SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\ERBD Data\Shellfish Areas		Patrick Marshall	16/06/10	Gracjan Fil(CDM)/ Desmond Boghan(DCC)	Patrick Marshall	16/06/10		No		
151	N	Report	Irish Coastal Protection Strategy Study Phase III: Dalkey Island to Omeath, August 2008	Patrick Marshall (JBB)	JBB	PDF	Digital	.pdf		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study/Civil-Eng/Dept of Marine_DAFFVirish Coastal Protection Strategy Study Phase III Dalkey Island to Omeath, August 2008		Kevin Daly		DAFF	Kevin Daly	11/02/10		No		
152	N	Data Files	Fish Barrier to Fish movement as i.e. sluice gates, weirs, dams etc. in the Fingal/Meath area	Patrick Marshall (JBB)	JBB	Shape file	Digital	SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\ERFB\Fish Barriers		Patrick Marshall	23/03/10	Brian Beckett(ERFB)	Patrick Marshall	31/03/10		No		
153	N	Data Files	Road Network Fingal	Patrick Marshall (JBB)	JBB	Shape file	Digital	SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\153 Road Network\OSI_Data_Update.zip P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk		Patrick Marshall		Claire McIntyre	Patrick Marshall	14/05/10		No		
154	N	Data Files	Corine Land Cover Ireland 2006	Patrick Marshall (JBB)	JBB	Shape file	Digital	Metafiles		Assessment and Management Study/Civil- Eng/Environmental Protection Agency/154 Corine Land Cover 2006 Also in Box File		Kevin Daly		Aisling McElwain(EPA)	Kevin Daly	19/04/10		No		
155	N	Data Files	Fingal County Geo-Directory	Patrick Marshall (JBB)	JBB	Database	Digital	MBD		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\155 2010 GeoDirectory		Patrick Marshall	25/02/10	Claire McIntyre	Patrick Marshall	25/02/10		No		
156	N	Data Files	Section 4 Discharge Licences	Patrick Marshall (JBB)	JBB	Shapefile	Digital	SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County CoundilSection 4 AND 16 Licences Discharges GIS Layer1156 S4 Discharges		Patrick Marshall	11/06/10	Claire McIntyre	Patrick Marshall	02/07/10		No		
157	N	Data Files	Section 16 Discharge Licences	Patrick Marshall (JBB)	JBB	Shapefile	Digital	SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County CoundiNsection 4 AND 16 Licences Discharges GIS Layer\157 Section 16 Discharges		Patrick Marshall	11/06/10	Claire McIntyre	Kevin Daly	02/07/10		No		
158	N	Data Files	Drinking Water Areas and WTWs	Patrick Marshall (JBB)	JBB	Database	Digital	gdbtable		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\158 Drinking Water Areas		Patrick Marshall	11/06/10	Denise Treacy	Patrick Marshall	02/07/10		No		
159	N	Data Files	Bathing Waters	Patrick Marshall (JBB)	JBB	Layer Data	Digital	.LYR		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\159 Bathing Waters		Patrick Marshall	12/06/10	Denise Treacy	Patrick Marshall	07/07/10		No		
160	N	Drawing/Data	1_1000 Mapping Additional from DCC	Patrick Marshall (JBB)	JBB	Drawing	Digital	.DWG		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council\160 1_1000 Mapping Additional from DCC		Patrick Marshall	29/01/10	Claire McIntyre/Denise Treacy	Patrick Marshall	08/07/10		No		

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Sort by Data_ID before entering a new data item	Has data been superseded?		Description	Enter person (if available)	Enter Organisation (if available)	Drawing / Document / Photo / GIS etc.		Software / File extension	Can be a range of drawings if in digital format	Server location / Cabinet & file number	Online Location/Sharepoint Location Applicable - Hyperlink	if Halcrow Barry person		OPW / other organisation/ person	Halcrow person that data is sent to		Change to copy if you have copied the original and returned it			
Data_ID	Superseded	Category	Name of data item	Data available from	Data available from	Type of data	Hard / Digital	File format	File name / Drawing No.	File location	File Location	Requested by	Date requested	Request sent to	Received by	Date received	Original / copy	Quality Check to be carried out by	Quality Checked	Quality Check carried out by
161	N	GIS DATA	Development Area within FEMFRAMS_Region	Patrick Marshall (JBB)	JBB	GIS	Digital	SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council information submitted\161 Development Areas within FEMFRAMS region		Paul Dunne	11/08/10	Denise Treacy/ Stephen Kavanagh	Paul Dunne	11/08/10				
162	N	Report	Arterial Drainage Cost Benefit Inf	o Patrick Marshall (JBB)	JBB	Document	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Office of Public Works\162 OPW Arterial Drainage Benifit Cost Info		Paul Dunne	unknown	Aidan Harney (OPW)	Paul Dunne	28/07/10				
163	N	GIS/Mapping	Ortho Mapping for Fingal	Patrick Marshall (JBB)	JBB	GIS	Digital	PDF		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council163 Ortho Mapping 2010		Patrick Marshall		Denise Treacy	Patrick Marshall	15/09/10				
164	N	CAD data	Survey data of the FEM FRAMS original scope (in two Discs)	Keshav Bhattarai (JBB)	JBB	CAD	Digital	Discs		Box File		Keshav Bhattarai		D3D	Keshav Bhattarai	07/05/10		Patrick Marshal	I	
165	N	CAD data	Survey data of the Matt River Additional Stream near Balbrigga	an Keshav Bhattarai (JBB)	JBB	CAD	Digital			P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Channel Survey Data\D3D Delivered Data\Channel Survey\Matt Stream Additional Stream		Keshav Bhattarai		D3D	Keshav Bhattarai	04/11/10		Halcrow_BA		
166	N	GIS DATA	Record Protected Structures, RP: & RMP	S AM Conibear (JBB)	JBB	GIS		SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council/Protected Structures and RMP/Feb 2009		Corinna Morgan	24/02/09	FCC - Stephen Gaughran	Corinna Morgan	27/02/09		Corinna Morgar	1	
167	N	GIS DATA	Sensitive Landscape, Landscape Charater Assessment	AM Conibear (JBB)	JBB	GIS		SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council/Sensitive Landscape		Corinna Morgan	24/02/09	FCC - Stephen Gaughran	Corinna Morgan	27/02/09		Corinna Morgar		
168	N	GIS DATA	Sensitive Landscape, Landscape Charater Assessment	AM Conibear (JBB)	JBB	GIS		SHP		P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council/Landscape		Corinna Morgan	24/02/09	MCC - Steven Kavanagh	Corinna Morgan	22/04/09		Corinna Morgar	1	
169	N	GIS DATA	Archaeology, SMR	AM Conibear (JBB)	JBB	GIS				P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Meath County Council/SMR		Corinna Morgan	18/02/09	MCC - Amanda O'Brien	Corinna Morgan	19/02/09		Corinna Morgar	1	
170	N	SEA	EPA SEA Scoping Submission & EPA Supplementary Scoping Submission	Corinna Morgan	Halcrow Barry	Pdf files		PDF		swin-fs- 04:\consulting\we\Environmental_Assessment\Projects\WB FFRM Fingal East Meath\Incoming Documents		Corinna Morgan		Denise Tracey (FCC)	Corinna Morgan	03/07/09		Corinna Morgar	1	
171	N	SEA	GPZ/NVZ Definitions Document	Corinna Morgan	Halcrow Barry	Pdf files		PDF		swin-fs- 04:\consulting\we\Environmental_Assessment\Projects\WB FFRM Fingal East Meath\Incoming Documents		Corinna Morgan		Michael Owens, EPA	Corinna Morgan	23/03/09		Corinna Morgar	1	
172	N	SEA	ERBD Water Management Units	Corinna Morgan	Halcrow Barry	Jpeg		JPEG		swin-fs- 04:\consulting\we\Environmental_Assessment\Projects\WB FFRM Fingal East Meath\Incoming Documents		Corinna Morgan	26/02/09	Ray Earle & Desmond Boyhan	Corinna Morgan	13/03/09		Corinna Morgar	1	
173	N	CAD data	Re-issue of survey data of the Matt River Additional Stream nea Balbriggan	ar Keshav Bhattarai (JBB)	JBB	CAD	Digital			P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Channel Survey Data\D3D Delivered Data\Channel Survey\Matt Stream Additional Stream		Keshav Bhattarai		D3D	Keshav Bhattarai	10/12/10		Halcrow_BA		
174	N	CAD data	D3D response to queries on re- issued survey data of the Matt River Additional Stream	Keshav Bhattarai (JBB)	JBB	xls	Digital			P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Channel Survey Data\D3D Delivered Data\Channel Survey\Matt Stream_Additional Stream		Keshav Bhattarai	14/12/10	D3D	Keshav Bhattarai	15/12/10		Halcrow_BA		
175	N	Floodmap	SAFER Coastal maps - Dublin Coastal area	Keshav Bhattarai (JBB)	JBB		Digital			P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council		Anne Marie Conibear	Jan 2011	FCC	Anne Marie Conibear	21/01/11		NA		
176	N	Report	Extract from SAFER report & options map	AM Conibear (JBB)	JBB	adobe	Digital			P:\Y8 Projects\Y8122 - Fingal-East Meath Flood Risk Assessment and Management Study\Civil-Eng\Fingal County Council		Anne Marie Conibear	Jan 2011	FCC	Anne Marie Conibear	18/01/11		NA		
177	N	Drawings	Drawings for culvert at Moylarage Balbriggan	<sup>h,</sup> Keshav Bhattarai (JBB)	JBB			hard copy		Box File		Patrick Marshall		FCC	Patrick Marshall	22/10/09		N/A		
178	N																			
179	N																			
180	N																			
181	N																			
182	N																			
183	N																			
184	N																			
185	N																			



## Appendix B. Stage 1 Summary Results

- B1 Ballyboghill and Lusk
- B2 Broadmeadow and Ward
- B3 Coastal
- B4 Mayne and Sluice
- B5 Nanny and Delvin



## B1 Ballyboghill and Lusk

### Summary of measures carried forward to Stage 2 for Ballyboghill and Lusk AU

Key Measure not carried forward

		Assessment units	
Measures	Ballyboghill and Lusk AU	IRR (WWTW in Ballyboghill area APSR)	IRR (M1 at Staffordstown)
Baseline – Do nothing (assuming any current maintenance and management regime continues)		Carried forward as baseline	
Do minimum	•		
1 Reduce existing activities			
2 Proactive maintenance	Regular inspectio	n of channels and structures and removal of bloc	ckages where necessary.
	· · ·		- · ·
Non-structural / minor & localised modifications			
3 Develop a flood forecasting and warning system (FFWS)			
4 Targeted public awareneos and education compaign	Provision of information to the public		
4 Targeteu public awareness and education campaign	on flood risk		
r had beland an			
5 Individual property flood proofing (IPPP)	Installation of off the shelf		
	commerciany available products		
6 Sediment management			
7 Land management			
Structural measures			
8 Sustainable Lirban Drainage Systems (SLIDS)			
9 Rehabilitation improvement of existing defences			
10 Improvement in channel conveyance			
11 Provision of permanent flood walls/embankments/rock armour/revetments		Construction of flood defence embankments	Construction of flood defence embankments
12 Provision of domountable flood defenses			
13 Use of overland floodways (e.g. allowing flooding of roads in a controlled manner)			
14 Flow diversion (full diversion / bypass channel, flood relief channel, etc.)		Construction of flow diversion channels to	Construction of flow diversion channels to
		increase capacity in the river system and divert	increase capacity in the river system and
		flood water	divert flood water
15 Flood storage reservoirs			
16 Beach Recharge/sand dunes			
17 Groynes			
18 Breakwater			
19 Managed realignment			
20 Hoal barrier/ Hoal barriage			
21 10000000 01 0.000019 03500			



### B2 Broadmeadow and Ward

#### Summary of measures carried forward to Stage 2 for Broadmeadow and Ward AU

Key Measure not carried forward

		Assessment units	
Measures	Broadmeadow Ward AU	Ratoath area APSR	IRRs (Waste Water Pumping Station in Ashbourne and WWTW at Owens Bridge)
Baseline – Do nothing (assuming any current maintenance and management regime continues)		Carried forward as baseline	
Do minimum			
d Deduce eviation estivities			
Reduce existing activities			
2 Proactive maintenance	Regular inspection of channels and structures and removal of blockages where necessary.	Regular maintenance of flood embankment in Ratoath.	Regular inspection of channels and structures and removal of blockages where necessary.
Non-structural / minor & localised modifications			
3 Develop a flood forecasting and warning system (FFWS)	Develop a FFWS for the Broadmeadow River		Develop a FFWS for the Broadmeadow River (pumping station in Ashbourne area APSR)
4 Targeted public awareness and education campaign	Provision of information	ion to the public on flood risk	
5 Individual property flood proofing (IPFP)	Instal	lation of off the shelf commercially availab	e products
6 Sediment management			
7 Land management			
Structural measures			
8 Sustainable Urban Drainage Systems (SUDS)			
9 Rehabilitation, improvement of existing defences			
10 Improvement in channel conveyance		Improving channel conveyance by replacing a bridge on the Broadmeadow River at the R125 Ratoath Road	
11 Provision of permanent flood walls/embankments/rock armour/revetments	Construction of flood defence embankments to provide protection to clusters of residential properties at Rowelstown East area APSR and at Newtown	Construction of flood defence embankments to protect two at risk properties	Construction of flood defence embankments to protect the IRR.
12 Provision of demountable flood defences			
13 Use of overland floodways (e.g. allowing flooding of roads in a controlled manner)			
14 Flow diversion (full diversion / bypass channel, flood relief channel, etc.)			
15 Flood storage reservoirs			
17 Grovnes			
18 Breakwater			
19 Managed realignment			
20 Tidal barrier/Tidal barrage			
21 Relocation of existing assets			



## **B3** Coastal

### Summary of measures carried forward to Stage 2 for the Coastal AU

Кеу	Measure not carried forward	]						
Measures		Assessment units						
		Coastal AU	Portmarnock and Malahide areas APSR	Swords area APSR	Rush area APSR	Skerries area APSR	Laytown, Bettystown and Coastal area	IRR (WWTW) Julianstown area APSR
Baseline – Do nothing (a	ssuming any current maintenance and management regime continues)	Carried forward as baseline	1	1	1	1	Alon	
Do minimum								
1	Reduce existing activities							
2	Proactive maintenance	Regular inspe	ction and maintenance of river channels an	d structures including culverts and bridges	and removal of blockages where necessar	y. Regular inspection and maintenance of c	oastal defences including walls embankme	nts and flap valves .
Non-structural / minor &	localised modifications							
3	Develop a flood forecasting and warning system (FFWS)				Develop a combined tidal and fluvial FF	WS		
	Targeted public awareness and education campaign			Provision of informat	ion to the public on flood risk			
Ę	Individual property flood proofing (IPFP)			Installation of off the shel	f commercially available products			
6	Sediment management							
7	Zand management							
Structural measures			1					
	Queteinstelle Liebern During og Queterner (QUDQ)							
			Pekekiliteting and mining evicting accest			Debelaities and relation existing exected		
	Hehabilitation, improvement of existing defences		Rehabilitating and raising existing coastal defences at Strand Road (including rehabilitation of flapped outfall) and Malahide town centre			Hehabilitating and raising existing coastal defences at Harbour Road to reduce tidal flood risk		
10	Improvement in channel conveyance			Widening and deepening of the Gaybrook Stream to reduce fluvial flood risk to properties on housing development at Aspen near Kinsaley.	Replacing culvert on West Rush Stream along Shore Road with a larger capacity culvert	A) Replacing culverts under roads and railway with larger capacity culverts to and widening channel through park to reduce fluvial flood risk to properties at Miller lane and Sherlock Park. B) Culverting the watercourse along the alignment of Miller Lane and Sherlock Park.		
11	Provision of permanent flood walls/embankments/rock armour/revetments	Construction of flood defence embankments to provide protection to cluster of residential properties at The Burrows	Construction of flood defence embankments and walls to protect at risk properties in Malahide town centre and Strand Road.	Construction of flood defence embankments and walls to protect properties at risk from tidal flooding in Swords town centre	Construction of flood defence embankments and walls to protect at risk properties along the coast and from West Rush stream		Construction of flood defence embankments to protect properties at risk from fluvial and tidal flooding	Construction of flood defence embankments to protect the IRR.
12	Provision of demountable flood defences		Construction of demountable flood defences to protect at risk properties in Malahide town centre				Construction of demountable flood defences to protect at risk properties along the coast and from the Nanny River	
13	Use of overland floodways (e.g. allowing flooding of roads in a controlled manner)					Lowering road levels and raising kerb levels along Miller lane and Sherlock Park to allow controlled flooding and reduce fluvial flood risk to properties.		
14	Flow diversion (full diversion / bypass channel, flood relief channel, etc.)							
15	Flood storage reservoirs					Construction of storage reservoir to the west of railway embankment to provide flood storage upstream of Skerries Area APSR to reduce fluvial flood risk to properties		
16	Beach Recharge/sand dunes							
17	Breakwater							
19	Managed realignment							
20	Tidal barrier/Tidal barrage	Polooption of 1 isolated wind						
2		residential property to the east of the Sluice River estuary.						



## B4 Mayne and Sluice

### Summary of measures carried forward to Stage 2 for the Mayne and Sluice AU

Key Measure not carried forward

		Assessment units	
Measures	Mayne and Sluice AU	St Margaret's, Dublin Airport, Belcamp and Balgriffin areas APSR	IRR. Approximately 100m of N32 at risk near Bewleys Airport Hotel in Clonshaugh.
Baseline – Do nothing (assuming any current maintenance and management regime continues)		Carried forward as baseline	
Do minimum			
1 Reduce existing activities			
2 Proactive maintenance	Regular inspection of	channels and structures and removal of bl	ockages where necessary.
Non-structural / minor & localised modifications			
3 Develop a flood forecasting and warning system (FFWS)		FFWS along the Mayne River to	provide advance flood warning
4 Targeted public awareness and education campaign	Provision of information	on to the public on flood risk	
5 Individual property flood proofing (IPFP)		Installation of off the shelf commercially available IPFP	
6 Sediment management			
7 Land management			
Structural measures			
8 Sustainable Urban Drainage Systems (SUDS)			
9 Rehabilitation, improvement of existing defences			
10 Improvement in channel conveyance	Improving the capacity of culverts a	t 2 locations; Balgriffin and Streamstown	
11 Provision of permanent flood walls/embankments/rock armour/revetments	Construction of floo	od defence embankments at Balgriffin, Stre	amstown and the IRRs.
12 Provision of demountable flood defences			
13 Use of overland floodways (e.g. allowing flooding of roads in a controlled manner)			
14 Flow diversion (full diversion / bypass channel, flood relief channel, etc.)			
15 Flood storage reservoirs			
16 Beach Recharge/sand dunes			
17 Groynes			
18 Breakwater			
19 Ivianaged realignment			-
21 Relocation of existing assate			4
21 Helocation of existing assets			



## B5 Nanny and Delvin

#### Summary of measures carried forward to Stage 2 for the Nanny and Delvin AU

Key Measure not carried forward

		Assessme	nt units
Measu		Nanny, and Delvin All	IBB (I Itility asset)
Recolin	Do nothing (accuming any ourrant maintananae and management regime continues)	Carried forward	
Dasein		Carried forward	as baseline
Do min			
	t Reduce existing activities		
	2 Proactive maintenance	Regular inspection of channels and structures a	and removal of blockages where necessary.
Non-str	ructural / minor & localised modifications		
:	3 Develop a flood forecasting and warning system (FFWS)	Develop a FFWS for the Nanny River	
4	4 Targeted public awareness and education campaign	Provision of information to the public on flood risk	
	5 Individual property flood proofing (IPFP)	Installation of off the shelf commercially available IPFP products	Installation of off the shelf commercially available IPFP products
6	6 Sediment management		
	7 Land management		
Structu	iral measures		
5	Sustainable Urban Drainage Systems (SUIDS)		
	Rehabilitation, improvement of existing defences	Raising existing defence embankment in Duleek area APSR to a higher standard of protection.	
1(	Improvement in channel conveyance		
1.	Provision of permanent flood walls/embankments/rock armour/revetments	Construction of flood defence embankments to provide protection to clusters of residential properties at Beaumont Bridge	Construction of flood defence embankments to protect the IRR.
12	2 Provision of demountable flood defences		
1:	3 Use of overland floodways (e.g. allowing flooding of roads in a controlled manner)		
14	4 Flow diversion (full diversion / bypass channel, flood relief channel, etc.)		Construction of flood diversion channel to protect the IRR.
15	5 Flood storage reservoirs		
16	6 Beach Recharge/sand dunes		
1.	7 Groynes		
18	B Breakwater		
19	Managed realignment		
2	The Incar Damage	Relocate 2 isolated residential properties away from flood risk area; 1 at Athcarne and 1 near Julianstown	



## Appendix C. Stage 2 Summary Results

## **Assessment Units**

Catchment Scale

FEM FRAM Study area Development (Meath County Council (MCC)) and enhancement (Fingal County Council (FCC)) of a proactive maintenance regime targeting potential culvert blockage locations property flood proofing

Targeted public awareness	and education	campaign a	and <b>individual</b>	pro

						Scale										
	Nanny and Delvin		Ballyboghil and Lusk	Broadm	eadow and Ward	Mayne an	nd Sluice				Coastal					
De	velop a fluvial <b>FFWS</b> for the <b>N</b>	anny River		Develop a fluvial <b>FFW</b>	S for the Broadmeadow River	Develop a fluvial <b>FFWS</b>	for the Mayne River.	Develop a combined fluvial and tidal FFWS. FFWS would be required for the Irish Sea along the Meath and Fingal coastline and for the following rivers: Mill Stream, Rush West Stream, Ward River, Gaybrook Stream and Sluice River (consideration has bee given to the proposed FFWS in other analysis units e.g. Nanny-Delvin AU).								
								Regular inspection and maintenance of coastal defences along the coast including walls embankments and flap valves .								
							APSR \ Localise	d Scale								
Duleek Area APSR	Beaumont Bridge*	Athcarne and Julianstown	* Glebe South*	Ratoath area APSR	Rowelstown East area APSR Newtown*	St Margaret's, Dublin Airport, Belcamp and Balgriffin areas	Streamstown*	Portmarnock and Malahide areas APSR	Swords area APSR	Rush area APSR	Skerries area APSR	Laytown, Bettystown and Coastal area APSR	The Burrows*	Sluice River estuary*		
Raising existing defence embankment t a higher standard of protection.	Construction of <b>flood</b> defence embankments to provide protection to cluster of residential properties.	Relocate 2 residential properties (1 in Athcarne an 1 in Julianstown) away from flood risk area.	d <b>Relocate</b> one property away from flood risk zone*	Improving channel conveyance by replacing a bridge on the Broadmeadow River at the R125 Ratoath Road, replacing a culvert along a tributary of the Broadmeadow with a larger capacity culvert and construction of flood defence embankments	Construction of flood Construction of flood defence <b>embankments</b>	Improving channel conveyance by replacing existing culverts with larger capacity culverts together with construction of flood defence embankments (Balgriffin).	Improving channel conveyance by replacing existing culverts with larger capacity culverts together with construction of flood defence walls.	Rehabilitating and raising existing coastal defences at Strand Road (including rehabilitation of flapped outfall) and construction of flood defence embankment.	Widening and deepening of the Gaybrook Stream to reduce fluvial flood risk to properties at Aspen near Kinsaley.	Construction of flood defence embankments and walls and replacing culvert along Shore Road to protect at risk properties along the coast and from West Rush stream.	Rehabilitating and raising existing coastal defences at Harbour Road to reduce tidal flood risk.	Construction of flood defence embankments to protect properties at risk along the coast and from the Nanny River.	Construction of flood defence embankments to provide protection to cluster of residential properties.	Relocation of 1 residential properties to the east of the Sluice River estuary.		
								Construction of flood defence embankments and walls to protect at risk properties at Strand Road.	Construction of flood defence <b>walls</b> to protect properties at risk from tidal flooding in <b>Swords town centre.</b>		Replacing culverts under roads and railway with larger capacity culverts and widening and deepening channels through park to reduce fluvial flood risk to properties at Miller Lane and Sherlock Park.	Construction of <b>demountable</b> <b>defences</b> together with <b>flood walls</b> and <b>embankments</b> to protect at risk properties along the coast and from the Nanny River.				
								Construction of flood defence embankments and walls to protect at risk properties in Malahide town centre.			Constructing a <b>flow diversion</b> <b>channel</b> to run in a culvert under the railway and roads at Miller lane and Sherlock Park to reduce fluvial flood risk to properties at <b>Miller Lane and</b> <b>Sherlock Park.</b>					
								Construction of flood defence walls and embankments along with rehabilitating and raising ofexisting coastal defences in Malahide town centre.			Lowering road levels and raising kerb levels along Miller Lane and Sherlock Park to allow controlled flooding along this road and reduce fluvial flood risk to properties.					
								Construction of <b>demountable</b> flood defences along with <b>embankments</b> to protect at risk properties in <b>Malahide town centre.</b>			Construction of <b>storage reservoir</b> to the west of railway embankment to provide flood storage upstream of Skerries Area APSR to reduce fluvial flood risk to properties along <b>Miller</b> Lane and Sherlock Park.					
											Construction of <b>storage reservoir</b> to the west of railway embankment to provide flood storage upstream of Skerries Area APSR along with <b>replacing culverts</b> under roads and railway with larger capacity culverts to reduce fluvial flood risk to properties along <b>Miller Lane and</b> <b>Sherlock Park.</b>					
	Stamullin area APSR		Ballyboghil area APSR	Ashbourne area APSR	Owens Bridge area APSR	N32 at Clo	IRRs				WWTW Julianstown area APSR					
Construction o	f flood defence <b>embankment</b> f	to protect <b>utility asset.</b>	Construction of flood defence embankment to protect WWTW.	Construction of flood defence embankments to protect Waste Water Pumping Station.	Construction of flood defence embankments to protect WWTW.	Construction of flood defence <b>en</b> at Clons	nbankments to protect the N32 shaugh.			Co	onstruction of flood defence embankme	nts				
Construction	of flood <b>diversion channel</b> to	protect utility asset.	Construction of flood diversion channel to protect WWTW.													

Localised flood risk management options for properties at risk outside of an APSR



## Appendix D. Stage 3 Guidance

- D1 Local Weightings Guidance
- D2 Stage 3 Scoring Guidance



## D1 Local Weightings Guidance

### Stage 3 - Local Weighting

## Halcrow Barry

Core crite	ria	Objective		Sub-objective	Local weighting criteria
1	Technical	a	Ensure flood risk management options		Local weighting of 5 applied
			are operationally robust		
		b	Minimise health and safety risk of flood risk management options	Reduce and where possible eliminate health and safety risks associated with the construction of flood risk	Local weighting of 5 applied
				management options	Land to characterize a fill and the state
				Heduce and where possible eliminate health and safety risks associated with operation of flood risk	Local weighting of 5 applied
		с	Ensure flood risk managed effectively	Ensure flood risk management options are adaptable	Local weighting of 5 applied
2	Economic	а	Minimise economic risk	Minimise economic risk	5 = where annual average damages exceed €5 million
					4 = where annual average damages are between €1 million and €4.99 million
					3 = where annual average damages are between €0.5 million and
					2 = where annual average damages are between €0.1 million and
					1 = where annual average damages are less than €0.1 million
		b	Minimise risk to infrastructure	Minimise risk to transport infrastructure	5 = where major transport infrastructure at risk, e.g. motorway.
		č			national rail route, national airport.
					4 = where significant transport routes are at risk, e.g. National
					3 = where regionally important infrastructure routes are at risk,
					Regional road network, regional airports.
					road network
					1 = Where flood risk is likely to result in negligible impact, e.g.
					0 = No transport infrastructure at risk.
				Minimise risk to utility infrastructure	5 = where major utility infrastructure assets at risk, e.g. large power
					station, WWTW and WTP serving population equivalent (p.e) greater
					4 = Where significant infrastructure assets at risk, e.g. WWTW and
					WTP serving a p.e greater than 100,000.
					3 = Where medium infrastructure assets at risk, e.g. WW I W and WTP serving a population equivalent greater than 5000
					2 = Where locally important infrastructure assets at risk, e.g. WWTW
					and WTP with p.e greater than 500
					with p.e less than 500
					0 = No infrastructure assets at risk.
		с	Manage risk to agricultural land		5 = where the area of agricultural land (not benefiting from FRM measures) at risk is greater than 500 bectares
					4 = where the area of agricultural land (not benefiting from FRM
					measures) at risk is between 100 and 500 hectares
					measures) at risk is between 50 and 99 hectares
					2 = where the area of agricultural land (not benefiting from FRM
					measures) at risk is between 5 and 49 hectares
					measures) at risk is less than 5 hectares
	<b>A</b>				0 =where no agricultural land is at risk
3	Social	а	Minimise risk to human health and life	Minimise risk to human health and life	5 = Where the number of residential properties at risk of flooding is greater than 500
					4 = Where the number of residential properties at risk of flooding is
					between 250 and 499
					between 100 and 249
					2 = Where the number of residential properties at risk of flooding is
					between 10 and 49 1 = Where the number of residential properties at risk of flooding is
					less than 10
				Minimon rick to high vulnerability properties	0 = Where no residential properties are at risk of flooding
				winninse risk to high vulnerability properties	flooding is greater than 25
					4 = Where the number of high vulnerability properties at risk of
					3 = Where the number of high vulnerability properties at risk of
					flooding is between 6 and 10
					2 = Where the number of high vulnerability properties at risk of flooding is between 2 and 5
					7 = Where the number of high vulnerability properties at risk of
					flooding is equal to 1
		b	Minimise risk to community	Minimise risk to social infrastructure	5 = where the number of high value social infrastructure assets
		-			(hospitals, schools, universities, fire stations, etc.) at risk of flooding
					is greater than 25 or where social infrastructure assets of major
					4 = Where the number of high value social infrastructure assets at
					risk of flooding is between 11 and 25 or where social infrastructure
					asset or significant importance is at risk (i.e. regional hospital)
					risk of flooding is between 6 and 10 or where social infrastructure
					asset of medium importance is at risk (i.e. local hospital)
					2 = where the number of high value social infrastructure assets at
					asset of minor/local importance is at risk (i.e. local Garda station)
					1 = Where the number of high value social infrastructure assets at risk of flooding is equal to 1

### Stage 3 - Local Weighting

## **HalcrowBarry**

Core criter	ia	Objective		Sub-objective	Local weighting criteria
					0 = Where no social infrastructure assets are at risk.
				Minimise risk to employment	5 - where the number of commercial buildings at risk of flooding is
					areater than 500
					greater than 500
					4 = where the number of commercial buildings at risk is between 100
					and 500
					3 = where the number of commercial buildings at risk is between 50
					and 99
					2 = where the number of commercial buildings at risk is between 10
					and 49
					1 where the number of commercial buildings at rick is less than 10.
					I = where the number of commercial buildings at risk is less than To
					0 = Where no commercial buildings are at risk
		с	Minimise risk to, or enhance, social	Minimise risk to flood-sensitive social amenity sites	5 = where the number of social amenity sites is greater than 25
			amenity		4 = where the number of social amenity sites is between 11 and 25
					3 = where the number of social amenity sites is between 6 and 10
					2 – where the number of social amonity sites is between 2 and 5
					z = where the number of social amenity sites is between z and 5
					1 = where the number of social amenity sites is equal to 1
					0 = where no social amenity sites are at risk.
4	Environmental	а	Support the objectives of the WFD	Prevent deterioration, and where possible improve,	5 = where the Water Framework Directive applies to waterbodies
				ecological status / potential of water-bodies	within the AU
				Prevent deterioration, and where possible improve	0 = where no waterbodies within the ALL are identified under the
				chamical status / patential of water badies	Water Framework Directive
			Made to the state of the state	chemical status / potential of water-bodies	water i famework Directive
		b	Minimise risk of environmental pollution	Minimise risk to potential sources of pollution	5 = where there are licensed sites with high pollution potential at risk
			1		0 = where there are no licensed sites with pollution potential at risk
			1		
		с	Avoid damage to, and where possible	Avoid damage to, and where possible enhance,	5 = where an internationally important site (e.g. SAC/SPA/Ramsar) is
			enhance, the flora and fauna of the	internationally and nationally designated sites of nature	present and potentially affected
			study area	conservation importance	4 = where a nationally important site (NHA) is present and
				· · · · · · · · · · · · · · · · · · ·	notentially affected
					2 where legally protected encodes/encodes of concentration concern
					s = where regarily protected species/species of conservation concern
					are present/likely to be present and potentially affected
					2 = where a site of local importance is present and potentially
				Avoid damage to or loss of, and where possible	1 = where there are no designated sites or known records of legally
				enhance, habitate supporting legally protected species	protected species/species of conservation concern, but habitate are
				enhance, habitats supporting legally protected species	protected species/species of conservation concern, but habitats are
				and other known species and habitats of conservation	present that could be affected
				concern	
				Avoid damage to or loss of existing riverine, wetland	0 = no sites, habitats or species present that could be affected
				and coastal habitats and where possible create new	
				habitat to maintain a naturally functioning system	
		4	A second statement of the second s	Maintain a maintain a matarany randoning option	E
		a	Avoid damage to, and where possible	Maintain existing, and where possible create new,	5 = where there are designated waters (e.g. under EU Shellfish
			enhance, fisheries within the study area	habitat supporting fisheries and maintain upstream	Waters Directive; EU Freshwater Fish Directive)
				access	4 = waterbody supports substantial salmonid fisheries/shellfisheries
					and is of national value for fishing/angling
					and is of national value for histing/arging
					3 = waterbody supports substantial fisheries/shellfisheries and is of
					regional value for fishing/angling
					2 = waterbody supports fisheries/shellfisheries and is of local value
					for fishing/angling
				Ensure no adverse effects on designated Shellfish	1 = fisheries could be present but unlikely given the modified nature
				Watere	of the channel/presence of barriers to movement: no known
				Waters	or the channel/presence of barners to movement, no known
			1		anging/nshing activities
					0 = no fisheries or angling areas present
		е	Protect, and where possible enhance,	Protect, and where possible enhance, landscape	5 = landscape designated as a internationally/nationally important
			landscape character and visual amenity	character, including designated highly sensitive	landscape and potentially affected
			within the study area	landscapes, within the catchment	4 = landscape character type designated at a county level as bigbly
			l		sensitive and/or exceptional/high value and notentially affected
					2 landesans absenter time designated at a sound lavel as
			1		o = ranoscape character type designated at a county level as
					moderate sensitivity and/or medium value; protected views present
			1		that could be affected
					2 = landscape character type designated at a county level as low
			1		sensitivity and/or low value and potentially affected
					1 = no specific landscape sensitivity/value, but landscape
			1		features/viewe are important at a legal level and extentially effected
					reatures/views are important at a local level and potentially affected
			1	Protect, and where possible enhance, important views	U = no specific landscape designation, and no landscape
			1	within the catchment	value/sensitivity
		f	Avoid damage to or loss of features of	Avoid damage to or loss of known buildings, structures	5 = internationally important feature(s) (i.e. World Heritage Site)
			cultural beritage importance, their	and areas of cultural beritage importance, including	present and potentially affected
			container mentage importance, their	their potting and baritage upber within the study of	A potionally important facture(a) (a a Matianal Manumenta)
			setting and nentage value within the	men setung and nentage value, within the study area	+ = nationally important reature(s) (e.g. National Monuments) present
			study area		and potentially affected
			1		3 = 5 or more sites/features listed on the RMP/RPS/SMR are present
			1		and potentially affected
			1		2 = less than 5 sites/features listed on the RMP/RPS/SMR are
			1		present and potentially affected
					1 - where policities/features are at rick from flooding, but may be
					in = where no sites/reatures are at risk from hooding, but may be
			1		indirectly affected by the proposed works (e.g. setting)
I			1		0 = no sites/features at risk



## D2 Stage 3 Scoring Guidance

#### Stage 3 - Scoring

## Halcrow Barry

Objective		Score			Descriptio	011									
					Technical										
1a	Level of operational risk of option i.e. mechanical or human intervention required	5	No mechanical or human intervention	or	accessible most of the time	or	Not reliant of telemetry or forecasting	or	No future maintenance requirements over life of option ( say 50yrs)						
	(e.g. lengths/numbers of demountables, pumps etc)	3	Limited mechanical or human intervention (say 25% reliant)	or	Inaccessible in flood conditions	or	Reliant on simple mechanical controls	or	Limited future maintenance requirements over life of option						
		1	Medium mechanical or human intervention (say 50% reliant)	or	Restricted tidal access	or	Reliant on real time telemetry, not forecasted or modelled	or	Medium future maintenance requirements over life of option						
		0	Significant mechanical or human intervention (say 75% reliant)	or	Difficult or long access (journey length > 2 hours)	or	Reliant on flood forecast certainty Beliant on flood forecast certainty yet certainty not available	or	Regular future maintenance required (say every 5 years)						
16	Health and cafety risk of EDM antions	-1	No health and acteur rick to construction workers		No boolth and sofety risk to exerctory of EDM entions	or	Ne construction works corried out	0	Significant maintenance requirements						
10	Health and salety lisk of Philliphions	5	No riealth and safety risk to construction workers	0I	No health and safety lisk to operators of Philo options	01	No construction works carried out								
		3	Limited health and safety risk to construction workers	or	Limited health and safety risk to operators of FRM options	or	Minor works to flood defence intrastructure away from river cha	nnei, a	and minimal manual handling heeded						
		1	Medium health and safety risk to construction workers	or	Medium health and safety risk to operators of FRM options	or	Works away from river channel, and avoiding trafficked areas w	ith all f	heavy items able to be lifted mechanically						
		0	Significant health and safety risk to construction workers	or	Significant health and safety risk to operators of FRM options	or	Working in proximity to river channels, or near heavily trafficked	routes	s, near services requiring diversion, large amounts of items						
		-1	Very significant health and safety risk to construction workers	or	Very significant health and safety risk to operators of FRM options	or	Extensive in channel working, requiring heavy plant, diving, BA	confine	ed space entry ,hot works, extensive service clashes						
1c	Level of adaptability of FRM option to	5	Already meeting requirements of HEFS												
	future flood risk	3	Exceeds requirements of MRFS and adaptable to HEFS												
		1	Meets requirements of MRFS and adaptable to HEFS												
		0	ts current requirements and adaptable to MRFS												
		-1	meets requirements of current risk and not adaptable												
	1		Frances of a second secon												
20	Minimico oconomio rick	5	All economic damages removed		Lonomo										
20	Within the economic tisk	3	Significant reduction in economic damages												
		1	Limited reduction in economic demages												
			Ne increase in economic damages												
		1	Retential for limited increases in accommin demograph												
		-1	Potential for increase in economic damages												
		-5	Potential rightficant increase in economic damages												
Ob	Minimine rick to transport infrastructure	-5	All transport routes (read, roll, pavingtion) pretected from the risk of fly	odina											
20	Minimise lisk to transport initiastructure	2	Air transport routes (road, rail, navigation) protected from the risk of his	ansport routes (road, rail, navigation) protected from the risk of flooding.											
			Flood risk reduced to a significant number of transport routes	od risk reduced to a significant number of transport routes											
			In Journa Reduced to a minited number of target provided in the second s												
		1	Potential for impacts on a limited number of transport routes (either di	roothy	r indiractly)										
		-1	Potential for impacts on a number of transport routes (either directly of	r indire	eth)										
		-3	Potential for impacts on a number of transport foules (either directly of	r diroo	cuy).										
20	Minimine rick to utility infrastructure	-5	All utility infracts on a significant number of transport routes (enne		banges etc) protected from the rick of flooding										
20	Minimise risk to utility intrastructure	2	All utility infrastructure assets (power stations, www rws, w rws, telec	om ex	changes etc) protected from the risk of hooding.										
			Flood risk reduced to a significant number of utility infrastructure asset	5.											
		0	T lood tisk reduced to a limited flamber of utility intrastructure assets.	lina											
		1	Potential for impacts on a limited number of utility infrastructure assets	iniy.	r directly or indirectly)										
		-1	Potential for impacts on a number of utility infrastructure assets (eithe	direct	v or indirectly).										
		-5	Potential for impacts on a significant number of utility infrastructure as	cote (a	ther directly or indirectly)										
20	Manage risk to agricultural land not	5	All agricultural land not benefiting from EBM measures (non-irrigated a	arahla	and pastures land with complex cultivation and land principally occupied	by are	ass of natural vegetation) protected from the risk of flooding								
20	benefiting from FBM measures	3	Flood risk reduced to a significant area of agricultural land not benefiti	na fror	and, pastales, land with complex calification and rand principally occupied	by art	sas of natural vegetation) protected from the fisk of hooding.								
	benefiting from Frite includings	1	Flood risk reduced to a significant area of agricultural land not benefiting	rom F	RM measures										
		0	No increase in the area of agricultural land at risk of flooding not benefiting	fitina fi	om EBM measures										
		-1	Potential for impacts on a limited area of agricultural land not benefitir	a from	EBM measures (either directly or indirectly)										
		-3	Potential for impacts on an area of agricultural land not benefiting from	FRM	measures (either directly or indirectly)										
		-5	Potential for impacts on a significant area of agricultural land not bene	fitina f	om EBM measures (either directly or indirectly)										
		Ű		inting i	Social										
20	Minimise risk to human health and life	5	All residential properties protected from the rick of flooding. All high w	Inorah	lity proportion protocted from risk of flooding										
0a	within the flat to harrian fleath and the	3	Flood risk reduced to a significant number of residential properties and	to hic	h vulnerability properties										
		1	Flood risk reduced to a limited number of residential properties and hi	h vulr	erability properties										
		0	No increase in the number of residential properties at risk of flooding	and hih	vulnerability properties										
		-1	Potential for impacts on a limited number of residential properties (eith	or dire	ctly or indirectly) and high yulnerability properties										
		-3	Potential for impacts on a number of residential properties (either dire	ctly or	ndirectly) and high vulnerability properties										
		-5	Potential for impacts on a significant number of residential properties	aithar	directly or indirectly) and high vulnerability properties										
3b	Minimise risk to community	5	All birds value social infrastructural assets, commercial businesses and	lindus	rial premises protected from the risk of flooding										
	Within the contracting	3	Flood risk reduced to a significant number of high-value social infrastr	ictural	assets, commercial businesses and industrial premises										
		1	Flood risk reduced to a significant humber of high-value social infrastructu	rol oci	ets, commercial businesses and industrial premises.										
		0	No increase in the number of high-value social infrastructural assets of	omme	rcial businesses and industrial premises at risk of flooding										
		-1	Potential for impacts on a limited number of high-value social infrastru	ctural	assets, commercial businesses and industrial premises (either directly or in	ndirec									
		-3	Potential for impacts on a number of high-value social infrastructural a	ssets	commercial businesses and industrial premises (either directly or indirectly	v)	(1)- (1)-								
		-5	Potential for impacts on a significant number of high-value social infra	structu	ral assets, commercial businesses and industrial premises (either directly of	or indi	rectly)								
30	Minimise risk to or enhance social	5	All flood sensitive social amenity sites protected from the risk of flood	na	a access, commendar backhooded and inductival promided (clinic) directly (	27 m.ui									
~~	amenity	3	Flood risk reduced to a significant number of flood sensitive social am	enitv s	tes										
		1	Flood risk reduced to a limited number of flood sensitive social ameni	v sites											
		0	No increase in the number of flood sensitive social amenity sites at ris	k of flo	oding.										
		-1	Potential for impacts on a limited number of flood sensitive social ame	nity si	es (either directly or indirectly).										
		-3	Potential for impacts on a number of flood sensitive social amenity site	es (eith	er directly or indirectly).										
1	1		Potential for impacts on a significant number of flood consitive social	monit	( citos ( cithor directly or indirectly)										

Objective	Objective		Description
			Environmental
4a	Support the objectives of the WFD	5	Significant contribution of flood risk management measures to the achievement of good ecological status/potential by 2015.
		3	Contribution of flood risk management measures to the achievement of good ecological status/potential by 2015.
		1	Potential to provide opportunities to aid the achievement of good ecological status/potential by 2015.
		0	Provide no constraint associated with flood management measures to the achievement of good ecological status/potential by 2015.
		-1	Potential constraint to the achievement of good ecological status as proposed works over short stretches of river/estuary.
		-3	Potential constraint to the achievement of good ecological status as proposed works over longer stretches of river/estuary.
		-5	Significant constraint to the achievement of good ecological status.
4b	Minimise risk of environmental pollution	5	Potentially polluting sites protected from flooding
		3	Potential for a moderate reduction in flood risk to potentially polluting sites.
		1	Potential for a minor reduction in flood risk to potentially polluting sites.
		0	No positive or negative change in risk to potentially polluting sites.
		-1	Potential for a minor increase in flood risk to potentially polluting sites.
		-3	Potential for a moderate increase in flood risk to potentially polluting sites.
		-5	Potential for a significant increase in flood risk to potentially polluting sites.
4c	Avoid damage to, and where possible	5	Improvement in conservation status of designated sites; increase in population sizes and/or extent of suitable habitat supporting target species; and/or, increase in extent of riverine, wetland and coastal habitats.
	enhance, the flora and fauna of the study	3	Potential for habitat enhancement within designated sites.
	area	1	Potential for localised habitat enhancement.
		0	No deterioration in the conservation status of designated sites; no net decrease in population sizes of and/or loss of extent of suitable habitat supporting target species; and/or, no net loss of or permanent damage to existing riverine, wetland and coastal habitats.
		-1	Potential for impacts on designated sites and their features, and/or damage to and/or loss of existing riverine, wetland and coastal habitats and associated species, although limited by the already modified nature of the channel/shoreline or by the localised nature of the option.
		-3	Potential for impacts on designated sites and their features, and/or damage to and/or loss of existing riverine, wetland and coastal habitats and associated species.
		-5	Potential for a significant affect on designated sites which may lead to deterioration of the conservation status; significant loss of habitats and associated species.
4d	Avoid damage to, and where possible	5	Increase extent of suitable habitat for fisheries and improve existing upstream access; increase length of waterside accessible for fishing; and/or, improve classification of shellfish waters.
	enhance, fisheries within the catchment	3	Potential for enhancement of recreational fishing areas and fisheries habitat.
		1	Potential for enhancement of recreational fishing areas.
		0	No net loss of suitable habitats for fisheries and provide no new upstream barriers to fish movement; maintain existing length of waterside accessible for fishing; and/or no deterioration in classification for shellfish waters.
		-1	Potential loss of/disturbance to riverine/estuarine habitat and dependent fisheries.
		-3	Localised loss and widespread disturbance to riverine/estuarine habitat and associated fisheries.
		-5	Significant loss of suitable habitat for fisheries; potential for deterioration in classification for shellfish waters, significant loss of waterside accessible for fishing.
4e	Protect, and where possible enhance,	5	Contribute to existing or new areas of attractive, vibrant, accessible and safe waterway corridors within urban areas; and/or, improvement to visual amenity into/from designated areas.
	landscape character and visual amenity	3	Opportunities identified to enhance visual amenity and landscape character in the wider area.
	within the catchment	1	Opportunities identified to enhance visual amenity and landscape character in the local area.
		0	No adverse impacts on landscape character; and/or, no deterioration in quality of views into/from designated areas.
		-1	Adverse change in local landscape character, although severity of impact reduced by use of demountables or low height of defences, impact is temporary, the fact that existing defences already exist in this area or landscape is designated as being of low sensitivity.
		-3	Adverse change in local landscape character within a landscape designated as being of medium to high sensitivity.
		-5	Significant adverse change in landscape character across a wide area; significant change in views into/from landscapes designated as being of medium to high sensitivity.
4f	Avoid damage to or loss of features of	5	Enhance the physical context and structure of water-based heritage features; reduce flood risk to features sensitive to the impacts of flooding; and/or, contribute to the understanding of context of water-based features listed on the RMP.
	cultural heritage importance, their setting	3	Risk to a number of heritage features reduced.
	and heritage value within the catchment	1	Risk to a limited number of heritage features reduced.
1		0	No impact on heritage features; and/or, no increase in flood risk to features sensitive to the impacts of flooding.
1		-1	Potential for impacts on a limited number of heritage features (either directly or indirectly).
1		-3	Potential for impacts on a number of heritage features (either directly).
1	1	-5	Potential for impacts on a significant number of heritage features (either directly).



## Appendix E. Stage 3 Summary Results

- E1 Broadmeadow and Ward
- E2 Coastal
- E3 Mayne and Sluice
- E4 Nanny and Delvin
- E5 FEM FRAM Study area



### E1 Broadmeadow and Ward

4. Stage 3 MCA AU scale

							Options					
				Baseline	Broadmeadow & Ward AU Option 1							
				-	Develop a fluvial FFWS for the Broadmead	dow River						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning systems (FFWS) in mathematical computer models to predict flood water disseminate flood hazard data to people at risk. Furthe viability of various flood forecasting options are rep Preliminary Options Report. Flood forecasts would through a dedicated website and messaging service t warning to communities. A FFWS for the Broadmeadow River would provide warning to residential and commercial properties in R (9), Ashbourne area APSR (3), Rowelstown east a properties in rural areas along the watercourse (3) Ashbourne.	Weighted						
					Comments	Score Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	Some mechanical and human intervention required for the fluvial flood forecasting & warning system. Computer models and rainfall/flow gauges would require regular maintenance. Option reliant on certainty of flood warning system, therefore just meets minimum target.	0 0			0			0
Technical -	B) Minimise Health and Safety risk of flood risk management options.	5	5	n/a	Limited health and safety risk to construction workers involved with the installation of the gauges (2 flow and 5 TBR) for the flood forecasting & warning system as only limited work adjacent to river channels.	3 75			0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	n/a	FFWS Models are continuously improved and become more robust over time as more information becomes available from flood events. Option will continue to be operational in MRFS/HEFS conditions, therefore meets aspirational target.	5 125			0			0
	Technical Total Score/ Weighted Score					8 200		0	0		0	0
	A) Minimise economic risk	25	1	Average annual damages of €45,114	This option is likely to result in a limited reduction in damages (~20%), thus partly exceeding the minimum target and scoring 1.	1 25			0			0
iomic	B) Minimise risk to transport infrastructure	5	3	Approximately <b>0.5km of Regional (R)</b> roads at risk for the 1% AEP fluvial event. (approx. 90m of R roads at risk in Ratoath area APSR and 80m of R roads at risk in Rowelstown East area APSR)	Option would have no impact on the transport infrastructure at risk. Meeting minimum target as no increase in risk to transport infrastructure.	0 0			0			0
Economic	C) Minimise risk to utility infrastructure	10	2	1 Waste Water Pumping Station (Castle Street Pumping Station in Ashbourne area APSR) at risk 1 Waste Water Treatment Works in Owens Bridge APSR at risk. Risk assessed for the 0.1% AEP fluvial event.	Option would have no impact on the number of utility infrastructure assets at risk. Meeting minimum target as no increase in risk to utility infrastructure.	0 0						
	D) Minimise risk to agricultural land.	5	4	<b>150 hectares of agriculture land</b> not benefitting from flood defences at risk of flooding (1% AEP fluvial event). This represents approximately 1% of the total agricultural land in the AU.	Option would have no impact on the agricultural land at risk. Meeting minimum target as no increase in risk to agricultural land.	0 0			0			0
	Economic Total Score/ Weighted Score					1 25		0	0		0	0

4. Stage 3 MCA AU scale

							Options									
				Baseline	Broadmeadow & Ward AU Option 1											
				-	Develop a fluvial FFWS for the Broadmead	low Rive	er									
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning systems (FFWS) in mathematical computer models to predict flood water disseminate flood hazard data to people at risk. Furthe viability of various flood forecasting options are rep Preliminary Options Report. Flood forecasts would through a dedicated website and messaging service t warning to communities. A FFWS for the Broadmeadow River would provide warning to residential and commercial properties in R (9), Ashbourne area APSR (3), Rowelstown east a properties in rural areas along the watercourse (3) Ashbourne.	volve the levels an r informa ported on be disser o provide e advancu atoath ar area APS and the	use of to tools to tion on the ninated advance e flood rea APSR R (2), IRR in									
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score			
	A) Minimise risk to human health and life.	30	2	18 residential properties at risk with 9 at risk in Ratoath area APSR, 3 at risk in Ashbourne area APSR, 2 at risk in Rowelstown East area APSR and 1 at risk in Owens Bridge area APSR (1% AEP fluvial event). No high vulnerability properties at risk from flooding.	Option would not reduce flood risk to residential properties. Number of properties located in at risk areas would remain the same. Therefore, just meeting minimum target.	0	0			0			0			
Social	B) Minimise risk to community.	10	0	No <b>non-residential building</b> at risk (1% AEP fluvial event). No large commercial business parks at risk. No <b>high-value social infrastructural assets</b> at risk	N/A	0	0			0			0			
	C) Minimise risk to, or enhance, social amenity.	5	2	The following flood sensitive social amenity sites are at risk for the 1% AEP fluvial event: <b>1 sports club house</b> at Swords AFC <b>3 golf courses</b> at Ashbourne, Owens Bridge and Corrstown	Option would have no impact on the number of social amenity sites at risk. Meeting minimum target as no increase in risk to social amenity sites.	0	0			0			0			
	Social Total Score/ Weighted Score					0	0		0	0		0	0			
	A) Support the objectives of the WFD.	5	5	AU contains 25 river water bodies (27 in WMU): 4 = high status; 1 = good status; (i.e. no deterioration allowed); 5 = moderate status; 12 = poor status; 3 = bad status (i.e. improvements in status required). The RBMP reports that problems constraining achievement of good status include high nutrients, low ecological rating and dredging; with the principal causes identified as agriculture (diffuse pollution) and wastewater and industrial discharges (septic tank pollution). The measures directly relevant to the FEM FRAMS (physical modifications - morphological pressures) relate to the need for compliance with legal requirements (EIA, Planning & Development Regulations etc) and to ensure compliance with OPW Environmental Drainage Maintenance Guidance Notes	No contribution nor constraint to the achievement of WFD objectives as there will be no physical works within or modification to the river channels or adjacent land. Meeting minimum target.	0	0			0			0			
	B) Minimise risk of environmental pollution	15	5	The following are at risk for the 1% AEP fluvial event: <b>1 Waste Water Pumping Station</b> (Castle Street Pumping Station in Ashbourne area APSR); <b>1 Waste Water Treatment Works</b> in Owens Bridge APSR; <b>8 waste management</b> <b>permit sites</b> at risk; 3 along the Broad Meadow River and 5 along the Ward River. The following are present in the AU: <b>4 Section 4 licences</b>	No positive or negative change in flood risk to potentially polluting sites within the AU as no intervention involved. Meeting minimum target.	0	0			0			0			
tal	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	5	There are no internationally or nationally <b>designated nature conservation sites</b> within the AU. Approximately 1km downstream of the AU boundary are the Malahide Estuary SAC/pNHA and the Broadmeadow-Swords Estuary SPA/Ramsar site. This area comprise intertidal sandflats, mudflats, sultarshes, and sand dunes, which support internationally important wintering populations of Brent geese as well as nationally important populations of a further 12 waterfowl species. Changes in the catchment, which alter the Hooding regime and freshwater input into the estuary could potentially affect the nature, extent and character of intertidal habitat for which the site is designated, with impacts on associated designated waterbird populations. There are 31 sites listed on Meath County Council's Wetland Inventory within the AU, including a significant stretch of both the Broadmeadow and Ward rivers. Within the AU, the Broadmeadow and Ward rivers primarily run through rural areas and, although modified in stretches, are likely to be of biodiversity interest. All rivers and their floodpalins in the AU support or have the potential to support legally species or other species of conservation conc (e.g. otter, kingfisher, bats, Altantic salmon), a detailed distribution information is not availab	No impacts on potentially sensitive riverine habitats, flora and fauna (located within or outside designated nature conservation sites) as there will be there will be no physical works within or modification to the river channels or adjacent land. Meeting minimum target.	0	0			0			0			

4. Stage 3 MCA AU scale

								Options					
				Baseline	Broadmeadow & Ward AU Option 1								
				-	Develop a fluvial FFWS for the Broadmead	dow Rive	er						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning systems (FFWS) in mathematical computer models to predict flood water disseminate flood hazard data to people at risk. Furthe viability of various flood forecasting options are rep Preliminary Options Report. Flood forecasts would I through a dedicated website and messaging service to warning to communities. A FFWS for the Broadmeadow River would provide warning to residential and commercial properties in Ri (9), Ashbourne area APSR (3), Rowelstown east a properties in rural areas along the watercourse (3) Ashbourne.	volve the levels ai r informa ported or be disse o provide e advance atoath a area APS and the	e use of nd tools to ation on the minated e advance ce flood rea APSR SR (2), IRR in						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
Environmen	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	3	The Broadmeadow and Ward rivers and other streams within the AU support or are capable of supporting salmonid species and are likely to provide salmonid spawning or nursery areas. These watercourses are also likely to support brook, river and/or sea lamprey. There are no isheries designations within the AU (e.g. Salmonid Waters). There are known areas of angling activity along both rivers, although the location of popular angling areas are not known. <b>1 weir</b> on the Ward River near Owens Bridge presents a barrier to fish movement (migratory salmon).	No impacts on fisheries or angling activity as there will be no physical works within or modification to the river channels. Meeting minimum target.	0	0			0			0
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	4	The Meath area of the AU falls within <b>The Ward Lowlands</b> landscape character type, classified as being of high sensitivity. For the Fingal area of the AU comprises the <b>Low lying Agricultural</b> and <b>Rolling Hills</b> landscape character types, both of which are classified as being of modest value and medium sensitivity). In the east of the AU, the R125 (approx 2.8km) and R108 (approx 1.5km) are designated <b>Important Views'</b> (Fingal County Council designation).	No change in landscape character and visual amenity as there will be there will be no physical works within or modification to the river channels. Meeting minimum target.	0	0			0			0
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	3	Within the AU, <b>13 sites on the SMR/RPS/RMP are at risk.</b> Four sites on the RPS, including Owens Bridge and Rowelstown Bridge, and two unknown sites. Two sites unique to RMP (graveyard and an unclassified site). One site unique to SMR, a Crannog north of Dunshaughlin The remaining six sites are within the SMR/RPS/RMP datasets and includes three bridges (Roganstown Bridge, Knocksedan Bridge and a bridge at Balheary Demesne/Lissenhall Great). There is one ACA present in the AU, Rowelstown ACA, of which approximately 0.8ha is at risk of flooding (representing approximately 10% of the total ACA).	There will be no positive or negative change in risk to, or impacts on, SMR/RPS/RMP features (through either direct impacts or impacts on setting) and the ACA as there will be there will be no physical works as a result of this option. Meeting minimum target.	0	0			0			0
	Environmental Total Score/ Weighted Score					0	0		0	0		0	0
Total Sco	ore/ Total Weighted Score					9	225		0	0		0	0

5. Stage3 APSR

						Optio	ons						
				Baseline	Ratoath area APSR Option 1								
					Improving channel conveyance by replacing a bridge on the Broadmo R125 Ratoath Road and replacing a culvert on a tributary of the Broa	eadow R admeado	iver at the ow River.						
Objectives		Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	<ul> <li>This option involves replacing 2 structures where the existing capacity of insufficient to convey large flows and results in surcharging and spilling of option is slightly amended from the option proposed at Stage 2 following to option. The modelling indicates that the proposed embankments identified required.</li> <li>Modelling results indicate that a rectangular concrete culvert of 2m high by sufficient to reduce flood risk at the R125 crossing. This culvert can convert which equates to the 1% AEP MRFS 95% left flow without surcharging. culvert on the Broadmeadow River tributary is also designed to convey the 95% left flow without surcharging. The dimensions for this culvert are 0.5m 109m in length and has a capacity of 0.6m3/s. Due to the sizing of the culfood extent will be significantly reduced.</li> <li>The BCR for this option is 0.9 based on this option providing protection of fluvial event. The BCR for the 0.1% AEP event is 0.94. Modelling results option will have negligible impact on water levels upstream and downstreat location for this option. Changes in water levels upstream and downstreat location for this option. Changes in water levels are localised (i.e. along a river) to the location of the proposed option. Option results in a decrease to tributary (cross section 4Bax322In).</li> <li>The results of the modelling indicate that existing overland flood flow path this option. These existing overland flow paths (northwards across the R1 from the tributary) are as a result of capacity problems at existing structu flooding of properties at Ratoath. The option prevents these overland flow increasing the capacity of the structures.</li> <li>The capacity of the existing culvert on the Broadmeadow tributary results the culvert and attenuation of floodwater on surrounding farm land. The capacity as part of this option will prevent flooding of surrounding land an increasing the capacity as part of this option will prevent flooding of surrounding land an increasing the capacity a</li></ul>	f the stru f lood wa he model at stage y 4m wide y a flow The repla high by 1 rerts the indicate an of the 0.4km str n water la r (cross s Broadm s are mo 25 and s re and le bw paths in surch increased d remove	citures is aters. The lling of this a 2 are not e would be of 17m3/s icement EP MRFS Im wide by 0.1% AEP 1% AEP 1% AEP 1% AEP 1% AEP 1% AEP 1% AEP that this proposed retch of the evels. The section leadow diffied with outhwards red to the through parging of d culvert p this flood						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	Increased channel conveyance provided for by replacing existing structures with larger capacity culverts. The option is not dependent on human/mechanical intervention to operate. However, limited future maintenance will be required to ensure culverts are kept free from blockage.	3	75			0			0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	n/a	Significant amount of construction works involved in this option with demolishing of existing structures and installation of new culverts in the watercourse. Therefore significant health and safety risk to construction workers. However, limited health and safety risk to operators once construction complete. Therefore overall just exceeding minimum target.	1	25			0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	n/a	New culverts to be designed to the 1% AEP MRFS 95%ile flow. MRFS 1% AEP 95%ile flow is greater than HEFS 1% AEP flow therefore, culverts meet requirements of HEFS. Therefore, achieving aspirational target.	5	125			0			0
	Technical Total Score/ Weighted Score					9	225		0	0		0	0
	A) Minimise economic risk	25	1	Average annual damages of €26,047	Option will reduce damages resulting from a 1% AEP event to 0 and will also reduce some damages occurring from a 0.1% AEP event.	3	75			0			0
						Optio	ns						
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				Baseline	Ratoath area APSR Option 1								
				-	Improving channel conveyance by replacing a bridge on the Broadm R125 Ratoath Road and replacing a culvert on a tributary of the Bro	eadow Ri admeado	iver at the ow River.						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	<ul> <li>This option involves replacing 2 structures where the existing capacity of insufficient to convey large flows and results in surcharging and spilling of option is slightly amended from the option proposed at Stage 2 following is option. The modelling indicates that the proposed embankments identifier required.</li> <li>Modelling results indicate that a rectangular concrete culvert of 2m high b sufficient to reduce flood risk at the R125 crossing. This culvert can convert which equates to the 1% AEP MRFS 95%ile flow without surcharging. culvert on the Broadmeadow River tributary is also designed to convey t 95%ile flow without surcharging. The dimensions for this culvert are 0.5m 109m in length and has a capacity of 0.6m3/s. Due to the sizing of the cultor flood extent will be significantly reduced.</li> <li>The BCR for this option is 0.9 based on this option providing protection fluvial event. The BCR for the 0.1% AEP event is 0.94. Modelling result option will have negligible impact on water levels are localised (i.e. along a river) to the location of the proposed option. Option results in a decrease maximum decrease in water levels is 0.7m on the Broadmeadow River 4Ba19221U - directly upstream of the R125 crossing) and 0.9m on the tributary) are as a result of capacity problems at existing structu flooding of properties at Ratoath. The option prevents these overland flood flow path this option. These existing culvert on the Broadmeadow River flooding of properties at Ratoath. The option prevents these overland flood in creasing the capacity of the structures.</li> <li>The capacity of the existing culvert on the Broadmeadow tributary result the culvert and attenuation of floodwater on surrounding farm land. The capacity as part of this option will prevent flooding of surrounding land arm plain attenuation.</li> </ul>	of the struc of flood wa he modell d at stage y 4m wide ey a flow of The replace high by 1, verts the 0 up to the s indicate am of the 0.4km struct in water lever for (cross so b Broadme as are mood 25 and so ure and lead ow paths in s in surch, increased d remove	ctures is taters. The ling of this 2 are not would be of 17m3/s cement F MRFS m wide by 0.1% AEP that this proposed etch of the evels. The ection eadow dified with buthwards ad to the through arging of d culvert this flood						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
iomic	B) Minimise risk to transport infrastructure	5	3	Approximately 90m of Regional roads at risk in Ratoath area APSR.	The 90m of regional road at risk in Ratoath is protected by this option up to the 1% AEP event. There is likely to be some residual flooding for the 0.1% AEP although the extent of flooding will be reduced due to the increased capacity of the culverts. Partly achieving aspirational target.	3	45			0			0
Econ	C) Minimise risk to utility infrastructure	10	0	No utility assets at risk	N/A	0	0			O			0
	D) Minimise risk to agricultural land.	5	1	2.7 hectares of agriculture land not benefiting from flood defences at risk of flooding (1% AEP fluvial event).	This option results in a reduction in flood risk to agricultural land due to the increased flow through the culverts. Approximately 2ha of agricultural land (>70% of at risk land) will be protected from the 1% AEP event. There will also be some reduction in risk from the 0.1% AEP event. Therefore, partly achieving aspirational target.	3	15			0			0
	Economic Total Score/ Weighted Score					9	135		0	0		0	0
	A) Minimise risk to human health and life.	30	1	<b>9 residential properties</b> at risk in Ratoath area APSR No <b>high vulnerability properties</b> at risk from flooding.	This option fully protects properties at risk up to the 1% AEP event and provides reduction in risk from the 0.1% AEP event. Therefore, partly achieving aspirational target.	3	90			0			0

						Optio	ns						
				Baseline	Ratoath area APSR Option 1								
				-	Improving channel conveyance by replacing a bridge on the Broadm R125 Ratoath Road and replacing a culvert on a tributary of the Bro	eadow Ri admeado	iver at the ow River.						
	Objectives		Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	<ul> <li>This option involves replacing 2 structures where the existing capacity of insufficient to convey large flows and results in surcharging and spilling of option is slightly amended from the option proposed at Stage 2 following to option. The modelling indicates that the proposed embankments identified required.</li> <li>Modelling results indicate that a rectangular concrete culvert of 2m high b sufficient to reduce flood risk at the R125 crossing. This culvert can convise which equates to the 1% AEP MRFS 95%ile flow without surcharging. The dimensions for this culvert are 0.5m 109m in length and has a capacity of 0.6m3/s. Due to the sizing of the culfood extent will be significantly reduced.</li> <li>The BCR for this option is 0.9 based on this option providing protection fluvial event. The BCR for the 0.1% AEP event is 0.94. Modelling results option will have negligible impact on water levels are localised (i.e. along a river) to the location of the proposed option. Option results in a decrease maximum decrease in water levels is 0.7m on the Broadmeadow River tributary (cross section 4Bax322In).</li> <li>The results of the modelling indicate that existing overland flood flow path this option. These existing overland flow paths (northwards across the R1 from the tributary) are as a result of capacity problems at existing structuflooding of properties at Ratoath. The option prevents these overland flow in creasing the capacity of the structures.</li> </ul>	of the struct of flood way the model d at stage y 4m wide ey a flow vert the repla hore the high by 1 verts the high by 1 verts the s indicate am of the 0.4km str r (cross s e Broadmo the s are moo up and so the and so t	ctures is aters. The ling of this a 2 are not e would be of 17m3/s accement EP MRFS m wide by 0.1% AEP that this proposed etch of the evels. The section eadow dified with outhwards ad to the through						
					The capacity of the existing culvert on the Broadmeadow tributary result the culvert and attenuation of floodwater on surrounding farm land. The capacity as part of this option will prevent flooding of surrounding land an plain attenuation.	s in surch increased d remove	earging of d culvert e this flood						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
Social	B) Minimise risk to community.	10	0	No <b>non-residential building</b> at risk (1% AEP fluvial event). No large commercial business parks at risk. No <b>high-value social infrastructural assets</b> at risk	N/A	0	0			0			0
	C) Minimise risk to, or enhance, social amenity.	5	0	No flood sensitive social amenity sites at risk	N/A	0	0			0			0
	Social Total Score/ Weighted Score					3	90		0	0		0	0
	A) Support the objectives of the WFD.	5	5	The APSR contains three river water bodies: 1 = good status; (i.e. no deterioration allowed); 2 = bad status (i.e. improvements in status required). The RBMP reports that problems constraining achievement of good status include high nutrients, low ecological rating and dredging; with the principal causes identified as agriculture (diffuse pollution) and wastewater and industrial discharges (septic tank pollution). The measures directly relevant to the FEM FRAMS (physical modifications - morphological pressures) relate to the need for compliance with legal requirements (EIA, Planning & Development Regulations etc) and to ensure compliance with OPW Environmental Drainage Maintenance Guidance Notes	Improved channel conveyance will be achieved by replacing the existing hard structures with new replacement hard structures within the channel. This has potential for both opportunities and constraints to improving the status of the river water bodies. Overall, meeting minimum target.	0	0			0			0
	B) Minimise risk of environmental pollution	15	0	There are no potentially polluting sites at risk within the APSR (1% AEP fluvial event). There are also no waste management permit sites at risk. There are no Section 4 or Section 16 licenses present in the APSR.	N/A	0	0			0			0

						Option	ıs						
				Baseline	Ratoath area APSR Option 1								
				-	Improving channel conveyance by replacing a bridge on the Broadmo R125 Ratoath Road and replacing a culvert on a tributary of the Bro	eadow Ri admeado	ver at the w River.						
	Objectives		Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	<ul> <li>This option involves replacing 2 structures where the existing capacity of insufficient to convey large flows and results in surcharging and spilling of option is slightly amended from the option proposed at Stage 2 following to option. The modelling indicates that the proposed embankments identified required.</li> <li>Modelling results indicate that a rectangular concrete culvert of 2m high by sufficient to reduce flood risk at the R125 crossing. This culvert can convert which equates to the 1% AEP MRFS 95% lef flow without surcharging. The dimensions for this culvert are 0.5m 109m in length and has a capacity of 0.6m3/s. Due to the sizing of the culfood extent will be significantly reduced.</li> <li>The BCR for this option is 0.9 based on this option providing protection of fluvial event. The BCR for the 0.1% AEP event is 0.94. Modelling results option will have negligible impact on water levels are localised (i.e. along a river) to the location of the proposed option. Option results in a decrease in maximum decrease in water levels is 0.7m on the Broadmeadow River 4Ba19221U - directly upstream of the R125 crossing) and 0.9m on the tributary) are as a result of capacity problems at existing structuford this option. These existing overland flow paths (northwards across the R1 from the tributary) are as a result of capacity of the structures.</li> <li>The capacity of the existing culvert on the Broadmeadow tributary results the culvert and attenuation of floodwater on surrounding farm land. The capacity as part of this option will prevent flooding of surrounding land an plain attenuation.</li> </ul>	f the struc f flood wa he modell d at stage / 4m wide y a flow of The replace e 1% AE high by 11 verts the 0 up to the 1 of the 1	tures is lers. The ng of this 2 are not would be f 17m3/s rement P MRFS n wide by 1% AEP hat this proposed tch of the vels. The ection adow						
	-				Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
nental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	3	<ul> <li>There are no designated nature conservation sites within the APSR. Approximately 20km downstream are the Malahide Estuary SAC/pNHA and the Broadmeadow-Swords Estuary SPA/Ramsar site.</li> <li>The stretch of the Broadmeadow River flowing through the APSR is listed on Meath County Council's Wetland Inventory.</li> <li>26 hectares of a Potential Top Wetland Site (large bog complexes) are at risk of flooding to the east of Dunshaughlin area APSR.</li> <li>Within the APSR, the river primarily runs through rural areas and, although modified along short stretches, is likely to be of biodiversity interest. The river and other channels within the APSR, and their floodplain, support or have the potential to support legally protected species or conservation concervation concervation, each extension, although detailed distribution information is not available.</li> </ul>	Localised loss of/disturbance to terrestrial and riverine habitats and species beneath and potentially adjacent to, the footprint of the new structures Any changes in flow regime and water levels of the river will be localised and are therefore unlikely to affect designated nature conservation sites approximately 20km downstream. There is potential for increased flow to promote pool formation with increased habitat diversity for aquatic flora and fauna. Just failing minimum target.	-1	-30			0			0
Environmental	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	3	The Broadmeadow river and other streams within the APSR support or are capable of supporting salmonid species and are likely provide salmonid spawning or nursery areas. These watercourses are also likely to support brook, river and/or sea lamprey. There are no fisheries designations within the APSR (e.g. Salmonid Waters). There are known areas of angling activity along the Broadmeadow River, which potentially fall within the APSR. There are no known barriers to fish movement on the watercourses within the APSR.	Potential loss of/disturbance to fish habitat and potential disruption to angling activity in the vicinity of the two new structures during the construction period. Changes in flow speeds have the potential to affect local fish habitat, but the increased flow and water levels are likely to be dissipated before reaching areas of sensitivity downstream (20km downstream). There may be some improvements to fisheries as a result of improved channel conveyance, however, overall, there may be a net loss of habitat in the footprint or adjacent to the structures. Just failing minimum target.	-1	-15			0			0
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	4	The primary landscape character area of this APSR is The Ward Lowlands (high sensitivity), though there are also small areas which fall within the <b>South East</b> <b>Lowlands (sensitivity unknown)</b> and <b>Central Lowlands</b> (medium sensitivity) character areas. There are no designated 'Important Views' in this APSR.	Potential for temporary change in landscape character and visual amenity during the construction works, though any impacts would be localised. It is assumed that any above- ground structures would be designed appropriately with the surrounding landscape. Just failing minimum target.	-1	-20			0			0

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				Baseline	Ratoath area APSR Option 1								
				-	Improving channel conveyance by replacing a bridge on the Broadmea R125 Ratoath Road and replacing a culvert on a tributary of the Broad	dow Riv Imeadov	ver at the w River.						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	<ul> <li>This option involves replacing 2 structures where the existing capacity of t insufficient to convey large flows and results in surcharging and spilling of f option is slightly amended from the option proposed at Stage 2 following the option. The modelling indicates that the proposed embankments identified a required.</li> <li>Modelling results indicate that a rectangular concrete culvert of 2m high by 4 sufficient to reduce flood risk at the R125 crossing. This culvert can convey which equates to the 1% AEP MRFS 95%le flow without surcharging. The culvert on the Broadmeadow River tributary is also designed to convey the 95%ile flow without surcharging. The dimensions for this culvert are 0.5m high 109m in length and has a capacity of 0.6m3/s. Due to the sizing of the culve flood extent will be significantly reduced.</li> <li>The BCR for this option is 0.9 based on this option providing protection up fluvial event. The BCR for the 0.1% AEP event is 0.94. Modelling results in option will have negligible impact on water levels upstream and downstream location for this option. Changes in water levels are localised (i.e. along a 0.river) to the location of the proposed option. Option results in a decrease in maximum decrease in water levels is 0.7m on the Broadmeadow River (4Ba19221U - directly upstream of the R125 crossing) and 0.9m on the E tributary (cross section 4Bax322ln).</li> <li>The results of the modelling indicate that existing overland flood flow paths this option. These existing overland flow paths (northwards across the R122 from the tributary) are as a result of capacity problems at existing structures flooding of properties at Ratoath. The option prevents these overland flow increasing the capacity of the structures.</li> <li>The capacity of the existing culvert on the Broadmeadow tributary results in the culvert and attenuation of floodwater on surrounding farm land. The in capacity as part of this option will prevent flooding of surrounding land and plain attenuation.</li> </ul>	he struc lood wate modellia at stage - a flow o e replace 1% AEI gh by 1n rts the 0 ho to the 1 molicate to of the p 4km stree cross se Broadme are mode a and lea p paths to n surcha creased remove to	tures is ters. The ing of this 2 are not 2 are not 4 f 17m3/s mode by 17m3/s mode by 2 mode by 2 mode by 2						
					Comments	Score	Score	Comments	Score	Score	Comments	Score	Weighted Score
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area 5 0 No sites on SMR/RPS/RMP at risk. No ACA designated within				N/A	0	0			0			0
	Environmental Total Score/ Weighted Score					-3	-65		0	0		0	0
Total Scor	e/ Total Weighted Score					18	385		0	0		0	0
Total Scor	re/ Total Weighted Score less Environmental					21	450.0		0.0	0		0.0	0

							0	ptions				
				Baseline	Rowelstown East area APSR Option 1							
				-	Construction of flood defence embankments at R area APSR.	owelstow	vn East					
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves the construction of a flood defer along the left bank of the Broadmeadow tributary in R bank flows along the left bank results in flooding of A total of 170m of embankment is required with an a 0.85m above ground level including a 0.5m fr The BCR for this option is 2.2 based on this option pr up to the 1% AEP fluvial event. Modelling results indicate that this option will have ne water levels upstream and downstream of the locatio option. Changes in water levels are localised to th proposed option (within 120m upstream and 240m d embankment). The option results in an increase in w maximum increase of 0.32m (cross section 44 The results of the modelling indicate that an existing of path is modified with this option. The option prev flow path by creating a barrier to out of bank flows, hc cause the diversion of overland flows into other areas. of significant natural floodplain storage affected b	nce emba. owelstow. of 2 prope- verage he reeboard. oviding pr gligible in n of the p. e vicinity o powertant fi Bap205U) overland flow coadmeao nd results ents this o pwever it o There are op this opt	nkment n. Out of rties. eight of rotection npact on roposed of the m of the s with a lood flow path low River s in the poverland does not no areas tion.					
					Comments	Score	Weighted Score	Comments Score	Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	No human or mechanical intervention is required for operation of this option. Some future maintenance will be required to ensure the embankments retain their flood defence function as designed. Partly achieving aspirational target.	3	75		0			0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	n/a	Construction works are located close to the river channel and close to the R125, therefore significant health and safety risk to construction workers. Health and safety risk to operators/maintenance workers would be very limited. Overall, exceeding minimum target.	1	25		0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	n/a	Option is designed to protect up to the 1% AEP but can be adapted to the MRFS at additional cost by increasing height/length of embankments. Meeting minimum target.	0	0		0			0
	Technical Total Score/ Weighted Score					4	100	0	0		0	0
	A) Minimise economic risk	25	1	Average annual damages of €7,603	This option protects the at risk properties up to the 1% AEP event. There will be residual flooding from the 0.1% AEP event but flood damages will be reduced. Partly achieving aspirational target.	3	75					0
iomic	B) Minimise risk to transport infrastructure	5	3	Approximately <b>80m of Regional (R) roads</b> at risk in Rowelstown East area APSR	The R125 is protected by this option up to the 1% AEP. There will be some residual flooding for the 0.1%AEP although the extent of flooding will be reduced. Partly achieving aspirational target.	3	45		0			0

							0	ptions				
				Baseline	Rowelstown East area APSR Option 1							
				-	Construction of flood defence embankments at F area APSR.	lowelsto	vn East					
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	<ul> <li>This option involves the construction of a flood defealong the left bank of the Broadmeadow tributary in Floating the left bank flows along the left bank results in flooding of A total of 170m of embankment is required with an a 0.85m above ground level including a 0.5m f</li> <li>The BCR for this option is 2.2 based on this option prup to the 1% AEP fluvial event.</li> <li>Modelling results indicate that this option will have new water levels upstream and downstream of the location option. Changes in water levels are localised to the proposed option (within 120m upstream and 240m of embankment). The option results in an increase in water increase of 0.32m (cross section 4.1)</li> <li>The results of the modelling indicate that an existing of path is modified with this option. An existing over (northwards across agricultural land and joining the B upstream of the confluence of the tributary) exists a flooding of properties in this location. The option previous path by creating a barrier to out of bank flows, ho cause the diversion of overland flows into other areas. of significant natural floodplain storage affected of the storage a</li></ul>	nce emba owelstow of 2 prope tverage h reeboard. oviding p oviding p e vicinity ownstreal ater level Bap205U) overland f land flow roadmaac nd results ents this owever it There are oy this op	nkment n. Out of ties. eight of otection npact on roposed of the n of the s with a ood flow path ow River in the overland does not no areas ion.					
-	1				Comments	Score	Weighted Score	Comments Score	Weighted Score	Comments	Score	Weighted Score
Eco	C) Minimise risk to utility infrastructure	10	0	No <b>utility assets</b> at risk	N/A	0	0					
	D) Minimise risk to agricultural land.	5	2	5.4 hectares of agriculture land not benefiting from flood defences at risk of flooding (1% AEP fluvial event).	This option results in a reduction in flood risk to agricultural land due to the proposed embankments. Approximately 2.4ha of agricultural land (<50% of at the risk land) will be protected from the 1% AEP event. There will also be some reduction in risk from the 0.1% AEP event. Therefore, exceeding minimum target.	1	10		0			0
	Economic Total Score/ Weighted Score					7	130	0	0		0	0
	A) Minimise risk to human health and life.	30	1	2 residential properties at risk in Rowelstown East area APSR No high vulnerability properties at risk from flooding.	This option fully protects properties at risk up to the 1% AEP event and provides reduction in risk from the 0.1% AEP event. Therefore, partly achieving aspirational target.	3	90		0			0
Social	B) Minimise risk to community.	10	0	No <b>non-residential building</b> at risk (1% AEP fluvial event). No large commercial business parks at risk. No <b>high-value social infrastructural assets</b> at risk	N/A	0	0		0			0
	C) Minimise risk to, or enhance, social amenity.	5	0	No flood sensitive social amenity sites at risk	N/A	0	0		0			0
	Social Total Score/ Weighted Score					3	90	0	0		0	0

							0	ptions					
				Baseline	Rowelstown East area APSR Option 1								
				-	Construction of flood defence embankments at F area APSR.	owelsto	wn East						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves the construction of a flood defen- along the left bank of the Broadmeadow tributary in Fl bank flows along the left bank results in flooding of A total of 170m of embankment is required with an a 0.85m above ground level including a 0.5m f The BCR for this option is 2.2 based on this option pr up to the 1% AEP fluvial event. Modelling results indicate that this option will have ne water levels upstream and downstream of the locatio option. Changes in water levels are localised to th proposed option (within 120m upstream and 240m d embankment). The option results in an increase in w maximum increase of 0.32m (cross section 44 The results of the modelling indicate that an existing over (northwards across agricultural land and joining the B upstream of the confluence of the tributary) exists a flooding of properties in this location. The option prev flow path by creating a barrier to out of bank flows, h cause the diversion of overland flows into other areas. of significant natural floodplain storage affected i	nce emba owelstow of 2 prope verage h reeboard oviding p gligible in n of the p e vicinity ownstrea ater leve Bap205U verland land flow oroadmea nd result ents this owever it There are op this op	Inkment In. Out of Inties. eight of rotection mpact on roposed of the m of the s with a ). flood flow path dow River s in the overland does not e no areas tion.						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Support the objectives of the WFD.	5	5	The APSR contains three river water bodies, all of which are classified as being of poor status. The RBMP reports that problems constraining achievement of good status include high nutrients, low ecological rating and dredging; with the principal causes identified as agriculture (diffuse pollution) and wastewater and industrial discharges (septic tank pollution). The measures directly relevant to the FEM FRAMS (physical modifications - morphological pressures) relate to the need for compliance with legal requirements (EIA, Planning & Development Regulations etc) and to ensure compliance with OPW Environmental Drainage Maintenance Guidance Notes	Potential to constrain the achievement of WFD objectives as introduction of a flood defence embankment along the Broadmeadow River on an unmodified section of the river could present a hydromorphological pressure. However, the length of the embankment (170m) in relation to the length of the river is considered to be short. Just failing minimum target.	-1	-25			0			O
	B) Minimise risk of environmental pollution	15	5	There are no potentially polluting sites at risk within the APSR (1% AEP fluvial event). There are <b>two waste management permit sites</b> at risk along the Broadmeadow River within the APSR. There are no Section 4 or Section 16 licenses present in the APSR.	No positive or negative change in flood risk to potentially polluting sites within the APSR as options involves works downstream of the sites. Meeting minimum target.	0	0			0			0
invironmental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	5	There are no internationally or nationally <b>designated nature conservation sites</b> within the APSR. Approximately 6km downstream are the Malahide Estuary SAC/pNHA and the Broadmeadow-Swords Estuary SPA/Ramsar site. Within the APSR, the river primarily runs through rural areas and, although modified along short stretches, is likely to be of biodiversity interest. The river and other channels within the APSR, and their floodplain, support or have the potential to support legally protected species or other species of conservation concern (e.g. otter, kingfisher, bats, Atlantic salmon), although detailed distribution information is not available.	Potential for impacts on designated nature conservation sites downstream (e.g. potential changes in frequency and duration of flooding). However, given that the embankment provides protection during a 1% AEP flood event (1 in 100 chance in any given year) and the distance of the conservation sites from the proposed works, the frequency of any impact is anticipated to be low. Will require further consideration during the Appropriate Assessment. Localised loss of/disturbance to terrestrial habitats and species beneath, and potentially adjacent to, the footprint of the flood defence embankment. Impact on riverine/marginal habitats/species.	-1	-50			0			0
ш	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	3	The Broadmeadow river and other streams within the APSR support or are capable of supporting salmonid species and are likely provide salmonid spawning or nursery areas. These watercourses are also likely to support brock, river and/or sea lamprey. There are no fisheries designations within the APSR (e.g. Salmonid Waters). There are known areas of angling activity along the Broadmeadow River, which potentially fall within the APSR. There are no known barriers to fish movement on the watercourses within the APSR.	Potential disturbance to riverine habitat, dependent fisheries and potential disturbance to angling activity during construction period, although no works would be required directly within the watercourse. The construction of new flood defence embankments may constrain angling access if present within the vicinity of the works, although they could present opportunities for enhancement. Overall, just failing minimum target.	-1	-15			0			0

							0	ptions					
				Baseline	Rowelstown East area APSR Option 1								
				-	Construction of flood defence embankments at R area APSR.	owelsto	vn East						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves the construction of a flood defer along the left bank of the Broadmeadow tributary in R bank flows along the left bank results in flooding of A total of 170m of embankment is required with an a 0.85m above ground level including a 0.5m fi The BCR for this option is 2.2 based on this option pr up to the 1% AEP fluvial event. Modelling results indicate that this option will have ne water levels upstream and downstream of the locatio option. Changes in water levels are localised to th proposed option (within 120m upstream and 240m d embankment). The option results in an increase in w maximum increase of 0.32m (cross section 44 The results of the modelling indicate that an existing of path is modified with this option. An existing over (northwards across agricultural land and joining the Bi upstream of the confluence of the tributary) exists a flooding of properties in this location. The option prev flow path by creating a barrier to out of bank flows, ho cause the diversion of overland flows into other areas. of significant natural floodplain storage affected b	ace emba owelstow of 2 prope verage h reeboard. oviding p gligible ir n of the p e vicinity ownstrea. Bap205U; overland f vand flow oadmeace nd results ents this owever it There are oy this op	nkment n. Out of rties. eight of rotection npact on roposed of the m of the s with a lood flow path low River s in the overland does not n o areas tion.						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	3	The landscape character of this APSR is classified as <b>Rolling Hills with Tree Belts,</b> classified as being of medium sensitivity. There are no designated 'Important Views' in this APSR.	Likely change in local landscape character and visual amenity, resulting from the introduction of a new flood defence embankment to a height of 0.85m (170m length). As the surrounding landscape is classified as being of medium sensitivity, the changes will result in the option just failing the minimum target.	-1	-15			0			0
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	2	Within the APSR, a <b>single site unique to RPS</b> (description unknown) and <b>two sites</b> <b>unique to RMP</b> (graveyard and an unclassified site) are known to be at risk of flooding. 0.8ha of an <b>ACA at risk</b> at Rowelstown representing approximately 10% of the total ACA.	All three sites could potentially experience a reduction in flood risk on completion of the new flood defence embankment. Further, the historical setting of each of the sites would be unlikely to be affected by the option, due to the nature and scale of the embankment. The embankment would be located outside of the designated ACA so its setting would not be affected. Exceeding minimum target.	1	10			0			0
	Environmental Total Score/ Weighted Score					-3	-95		0	0		0	0
Total Scor	re/ Total Weighted Score					11	225		0	0		0	0
Total Scor	re/ Total Weighted Score less Environmental					14	320		0.0	0		0.0	0











Location	Plan :	
TRA HAMPINI TRANSPORT	Cantiste Vin 4 14 14 14 15 14 14 14 14 14 14 14 14 14 14	
	u Area defended by option	
	Embankments	
Risk to C	ritical Infrastructure	
U		
7		
2	Emergency response/governance	
*	Airport	
++++	Railway line	
	Motorway	
	National	
	Regional	
Risk to H	High yulperablity sites	
Distant A		
RISK to th	Potential pollution sources	
	Protected areas	
	CSAC, SAC, SPA, NHA and pNHA sites	
Risk to C	Cultural Heritage	
_	10 % AEP Flood Extent	
	(1 in 10 chance in any given year) 1 % AEP Flood Extent	
	(1 in 100 chance in any given year)	
	(1 in 1000 chance in any given year)	
	Modelled River Centreline	
USER NOTE : USERS OF THES THEIR DERIVAT CONDITIONS OF THIS MAP DOES	SE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF TION, LIMITATIONS IN ACCURACY AND GUIDANCE AND USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE	_
	Halcrow Barry	
	Tramway House	
	Dublin 6 Tel: +353-1-4975716	
Clients:	N N	_
Fingal Count Comhairís Conta		
Project : FEM FRA	MS	
Map : Rowelst	town East area APSR	
Figure By :	Kevin Daly Date : 07 Oct 2010	_
Checked By	Clare Dewar Date : 07 Oct 2010	_
Approved By	y: Anne-Marie Conibear Date: 07 Oct 2010	_
Rowelst	own/CURS/001	
Drawing Sca	ale : 1:2,500 Plot Scale : 1:1 @ A3	_



# E2 Coastal

# 4. Stage 3 MCA AU scale

							C	Options				
				Baseline	Coastal AU Option 1			Coastal AU Option 2				
				-	Develop a combined fluvial and tidal FFWS. FFWS we the Irish Sea along the Meath and Fingal coastline au rivers: Mill Stream, Rush West Stream, Ward River, and Sluice River (consideration has been given to a Nanny River and Mayne River as part of the Nanny the Mayne and Sluice AU respective	ould be re nd for the Gaybrool fluvial FF and Delvin y).	equired for following k Stream WS on the n AU and	Regular inspection and maintenance of coastal defence walls, embankments and flap valves.	s including			
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning involves the use of math models to predict flood water levels and tools to disser data to people at risk. Further information on the viabil forecasting options are reported on in the Preliminary O, forecasts would be disseminated through a dedicat messaging service to provide advance warning to com that a FFWS is implemented on the Nanny River and M other AU options, the BCR for this option is appi Through the Irish Coastal Protection Strategy Study (IC. tidal-surge forecasting capability has been developed ar The system is a purely tidal-surge forecasting model option would be developed to generate a combined fluv. The installation of new tidal tidal gauges may be requi accuracy of the forecasting system.	nematical d ninate floo ity of vario tions Reg ed websitk munities. <i>X</i> ayne river oximately PSS), low- ound the li and as par ial and tid red to impl	computer d hazard us flood ort. Flood e and ssuming as part of 2. rresolution rish Coast. t of this al FFWS. rove the	The BCR for this option is 0.4 for the 0.5% AEP tidal event. BCR, this option is not considered any further.	Given the low			
					Comments	Score	Weighted Score	Comments Scor	Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	Some mechanical and human intervention required for the fluvial and tidal flood forecasting & warning system. Computer models and rainfall/flow/tidal gauges would require regular maintenance. Option reliant on certainty of flood warning system, therefore just meets minimum target.	0	0		0			0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	n/a	Medium health and safety risk to construction workers involved with the installation of the gauges (6 flow and 18 TBR) for the flood forecasting & warning system as majority of work away from river channels .	1	25		0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	n/a	Option will continue to be operational in MRFS/HEFS conditions, therefore meets aspirational target.	5	125		0			0
	Technical Total Score/ Weighted Score					6	150	0	0		0	0
	A) Minimise economic risk	25	3	Average annual damages of €546,213	This option is likely to result in a limited reduction in damages, thus partly exceeding the minimum target and scoring 1.	1	75		0			0
nomic	B) Minimise risk to transport infrastructure	5	3	No rail at risk Approximately 2.5km of Regional (R) roads at risk (approx. 350m at risk in Laytown Bettystown and coastal area APSR, 50m at risk in Julianstown area APSR, 170m in Skerries area APSR, 120m in Swords area APSR and 1km in Portmarnock and Malahide areas APSR)	Option would have no impact on the transport infrastructure at risk. Meeting minimum target as no increase in risk to transport infrastructure.	0	0		0			0
Ecor	C) Minimise risk to utility infrastructure	10	2	1 WWTW at risk in Julianstown area APSR	Option would have no impact on the number of utility infrastructure assets at risk. Meeting minimum target as no increase in risk to utility infrastructure.	0	0		0			0
	D) Minimise risk to agricultural land.	5	4	Approximately <b>320 hectares of agriculture land</b> not benefitting from flood defences at risk of flooding. This represents approximately 7% of the total agricultural land in the AU.	Option would have no impact on the agricultural land at risk. Meeting minimum target as no increase in risk to agricultural land.	0	0		0			0
	Economic Total Score/ Weighted Score					1	75	0	0		0	0
	A) Minimise risk to human health and life.	30	3	<ul> <li>182 residential properties at risk (10 at risk in Laytown Bettystown and Coastal area APSR, 1 at risk in Balbriggan area APSR, 73 in Skerries area APSR, 29 in Rush area APSR, 22 in Swords area APSR and 46 in Portmarnock and Malahide areas APSR).</li> <li>0 high vulnerability properties at risk</li> </ul>	Option would not reduce flood risk to residential properties. Number of properties located in at risk areas would remain the same. Therefore, just meeting minimum target.	0	0		0			0
Social	B) Minimise risk to community.	10	5	<ul> <li>53 non-residential buildings at risk including 1 at risk in Laytown Bettystown and coastal area APSR, 5 at risk in Babriggan area APSR, 6 in Skerries area APSR, 1 in Rush area APSR, 14 in Swords area APSR and 16 in Portmarrock and Malahide areas APSR). 1 retail park at risk (Airside Retail Park) in Swords area APSR.</li> <li>1 high-value social infrastructural asset at risk, a fire station in Swords</li> </ul>	Option would not reduce flood risk to non-residential buildings. Number of properties located in at risk areas would remain the same. Therefore, just meeting minimum target.	0	0		0			0
	C) Minimise risk to, or enhance, social amenity.	5	5	<ul> <li>4 golfcourses at risk: 1 golfcourse at Beaverstown, Donabate; 1 golfcourse at Malahide Point and 2 golfcourses in Portmarnock (1 at Beechmount and 1 at Portmarnock Strand)</li> <li>3 holiday home (mobile home park) ar risk: 1 near Donabate, 1 near Burrow Beach and 1 in Rush.</li> </ul>	Option would have no impact on the number of social amenity sites at risk. Meeting minimum target as no increase in risk to social amenity sites.	0	0		0			0
	Social Total Score/ Weighted Score					0	0	• • • • • • • • • • • • • • • • • • •	0		0	0

#### 4. Stage 3 MCA AU scale

							(	Options					
				Baseline	Coastal AU Option 1			Coastal AU Option 2					
				-	Develop a combined fluvial and tidal FFWS. FFWS w the Irish Sea along the Meath and Fingal coastline au rivers: Mill Stream, Rush West Stream, Ward River, and Sluice River (consideration has been given to a Nanny River and Mayne River as part of the Nanny the Mayne and Sluice AU respective	ould be re nd for the Gaybroo fluvial FF and Delvi ly).	equired for following k Stream WS on the n AU and	Regular inspection and maintenance of coastal de walls, embankments and flap valve	efences i es.	ncluding			
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning involves the use of math models to predict flood water levels and tools to disser data to people at risk. Further information on the viabil forecasting options are reported on in the Preliminary O, forecasts would be disseminated through a dedicat messaging service to provide advance warning to com- that a FFWS is implemented on the Nanny River and M other AU options, the BCR for this option is appi Through the Irish Coastal Protection Strategy Study (IC tidal-surge forecasting capability has been developed ar The system is a purely tidal-surge forecasting model option would be developed to generate a combined fluv The installation of new tidal tidal gauges may be requi accuracy of the forecasting system.	nematical di minate floo otions Reg ed websiti munities. A ayne river roximately PSS), low- ound the li and as pau rial and tid red to imp	computer bd hazard bus flood bort. Flood e and Assuming as part of 2. -resolution rish Coast. t of this lal FFWS. rove the	The BCR for this option is 0.4 for the 0.5% AEP tidal e BCR, this option is not considered any fu	vent. Givu ırther.	en the low			
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Support the objectives of the WFD.	5	5	The AU contains 8 river waterbodies: 1 = high status; 2 = good status; (no deterioration required); 1 = moderate status; 3 = poor status; 1 = bad status (improvements required). The RBMP reports that problems constraining achievement of good status include high nutrients (phosphorus), low oxygen saturation, low ecological rating and dredging; with the principal causes identified as agriculture and wastewater. The AU contains 4 transitional (i.e. estuarine) waterbodies: Nanny Estuary, Rogerstown Estuary, Broadmeadow Water, Mayne Estuary, all are of moderate status/potential (i.e. improvements required). To the north, the AU borders the Boyne Estuary transitional waterbody; also of moderate status/potential. The RBMP reports that the problems constraining achievement of good status or potential relate to pollution pressures.from agriculture, adargenous substances, and wastewater and industrial discharges. The Broadmeadow Water waterbody is designated as a heavily modified water body (HMWP) because of the presence of the causeway for the Dublin-Belfast railway line, but risks have been identified relating to physical modifications and morphology for all waterbodies. The basic measures directly relevant to the FEM FRAMS (physical modifications - morphological pressures) for all waterbodies. The AU contains 4 coastal waterbodies: Boyne Estuary Plume Zone and Northwestern Irish Sea (HA08) = high status (i.e. improvements required), i.e. on prevention if the probacial modification of these waterbodies have been identified as moderate frause (i.e. improvements required). Nore of these waterbodies and Northwestern Irish Sea (HA08) = high status (i.e. improvements required), i.e. on proteinal required). Nore of these waterbodies have been identified as morphological for all waterbodies. Boyne Estuary Plume Zone and Northwestern Irish Sea (HA08) = high status (i.e. moderations in equired). Nore of these waterbodies have been identified for the Roger status (i.e. morpeotements required). Nore of these waterbodies have been	No contribution nor constraint to the achievement of WFD objectives as there will be no physical works within or modification to the river channels, estuaries or coastline. Meeting minimum target.	0	O			0			0
	B) Minimise risk of environmental pollution	15	5	The following are at risk in the AU: 1 Waste Water Treatment Works in Julianstown 13 Waste Management Permit Sites based on issued licences : Jalong the Delvin River, 1 along the Bracken river, 3 along Baleally Stream, 1 along the Lisenhall Stream, 1 along Jone's Stream and 6 in coastal areas. The following are present in the AU: 6 Section 4 and 15 Section 16 licences.	No positive or negative change in flood risk to potentially polluting sites within the study area as there will be no physical works within or modification to the river channels, estuaries or coastine, beyond standard maintenance activities. Meeting minimum target.	0	0			0			0
umental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	5	The Coastal AU contains numerous designated nature conservation sites including: Boyne Coast and Estuary SAC/pNHA; Boyne Estuary SPA; River Nanny Estuary and Shore SPA; Laytown Dunes and Nanny Estuary SAIA (Laytown dunes at risk from flooding); Loughskinny Coast pNHA; Rogerstown Estuary SAC/SPA/Ramas rislepNHA; Malinde Estuary SAC/pNHA; Roderstown SPA/Ramsar site; Baldoyle Bay SAC/SPA/Ramsar site/pNHA; Sluce River Marsh pNHA (100% at risk). Also, Skerries Islands SPA and Ireland's Eye SAC/SPA are located offshore, just outside the Coastal AU boundary. Howth Head SAC and Howth Head Coast SPA are located adjacent to the southern end of the AU boundary. There are 21 sites listed on Meath Countly Council's Wetland Inventory, and 92 sites listed on the Coastal Inventory present within the AU. Rivers, estuaries and coast are also important for European protected species (e.g. Atlantic salmon, otter). All rivers/estuaries within the AU, together with their floodplains, support or have the potential to support legally protected species or other species of distribution information is not available.	No impacts on potentially sensitive riverine, estuarine and coastal habitats or species (located within or outside designated nature conservation sites) as there will be no physical works or modifications within or adjacent to the river channels, estuaries or coastline. Meeting minimum target	0	0			0			0
Enviro	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	5	All rivers and streams within the AU support or are capable of supporting salmonid species such as salmon, brown trout and sea trout, and are likely to provide salmonid spawning or nursery areas. Some watercourses within the AU area are also likely to support brook, river and/or sea lamprey. In the AU, estuaries provide spawning, nursery and feeding habitats for a range of fish species, particularly bass, sand goby, grey muliet, flounder and sprat. In addition, important migratory fish species, namely salmon, sea trout, eels and lampreys, pass through on their way to or from their spawning grounds. A tidal flex on the Mayne River and a weir on the Sluice River present a <b>potential barrier to upstream fish movement</b> (salmonids). Many of the rivers in the AU are popular with anglers, who enjoy both game and coarse fishing. Along the coast, recreational sea fishing is also very popular, key locations are Portmamock, the Malahide Estuary, the Rogerstown Estuary, Skerries and Balbriggan. Just south of the AU boundary, Howth Harbour is the biggest commercial fishing harbour. There are <b>Shellifeh Waters</b> at Malahide and Balbriggan/Skerries, designated under the EU Shellifish Waters Directive.	No impacts on fisheries/shellfisheries (including designated areas) or angling activity as there will be there will be no physical works within or modification to the river channels, estuaries or coastline. Meeting minimum target.	0	0			0			0

# 4. Stage 3 MCA AU scale

							(	Options					
				Baseline	Coastal AU Option 1			Coastal AU Option 2					
				-	Develop a combined fluvial and tidal FFWS. FFWS w the Irish Sea along the Meath and Fingal coastline au rivers: Mill Stream, Rush West Stream, Ward River, and Sluice River (consideration has been given to a Nanny River and Mayne River as part of the Nanny the Mayne and Sluice AU respective	ould be re nd for the Gaybrook fluvial FFV and Delvir y).	quired for following Stream VS on the AU and	Regular inspection and maintenance of coastal def walls, embankments and flap valves	ences i s.	ncluding			
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning involves the use of math models to predict flood water levels and tools to disser data to people at risk. Further information on the viabil forecasting options are reported on in the Preliminary O, forecasts would be disseminated through a dedicat messaging service to provide advance warning to com- that a FFWS is implemented on the Nanny River and M other AU options, the BCR for this option is appi Through the Irish Coastal Protection Strategy Study (IC. tidal-surge forecasting capability has been developed ar The system is a purely tidal-surge forecasting model option would be developed to generate a combined fluv. The installation of new tidal tidal gauges may be requi accuracy of the forecasting system.	nematical d ninate flood tity of vario titons Rep ed website munities. A ayne river oximately PSS), low- ound the Ir and as par rial and tida and tida to impr	omputer I hazard Is flood ort. Flood and ssuming as part of 2. resolution ish Coast. of this IJ FFWS. ove the	The BCR for this option is 0.4 for the 0.5% AEP tidal ev BCR, this option is not considered any fur	ent. Give ther.	en the low			
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	4	The Meath area of the AU comprises two landscape characters types: <b>Coastal Plains</b> and <b>Nanny Valley;</b> both of which are of regional importance and are classified as being of high sensitivity. The Fingal area of the AU comprises five landscape character types: <b>Coastal, Estuary</b> (both classified as being of exceptional value and high sensitivity). <b>High Lying Agricultural</b> (high value, high sensitivity), <b>Low Lying Agricultural</b> (modest value, low sensitivity), and Rolling Hills (modest value, medium sensitivity). Fingal County Council also designates <b>Important Views</b> ; these are distributed throughout the AU, both on the coast and inland.	No change in landscape character or visual amenity as there will be no physical works within or modification to the river channels, estuaries or coastline. Meeting minimum target.	0	o			0			0
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	3	29 sites on SMR/RPS/RMP at risk. 20 sites on RPS including: Knocknagin Viaduct, Gormanstown; a converted mill building, Julianstown; a former mill house, Julianstown; a lime klin, Julianstown; a cast-iron rai/way bridge, Laytown; a motte, Laytown; a single-storey former house, Laytown; a three-storey hotel, Laytown; 12 other sites (no details available). 2 sites on SMR, a Tidemill at Lissenhall Great and a Ritual Site - Holy Well at Rush. 2 sites on SMR, a Tidemill at Lissenhall Great and a Ritual Site - Holy Well at Rush. 2 sites on RMP; the remains of a castle at Stephenstown; and an unknown feature near Donabate. The remaining 5 sites are on the SMR/RPS/RMP datasets and include: 2 Tide Mills (in Ballymadrough and Kilcrea); a Ritual Site - Holy Well (in Burrow); and 2 bridges (Lissenhall Great and Mill Bridge in Swords). Parts of 5 ACAs at risk: <0.5ha of Julianstown ACA at risk (c.22% of the total ACA), 0.1ha of Skerries ACA at risk (c.1% of the total ACA), 0.5ha of Portraine ACA at risk (c.1% of the total ACA), 0.1ha of Bawn & St Sylwesters Villas ACA at risk (c.1% of the total ACA) and <0.1ha of Malahide Castle Demesne ACA at risk (<1% of the total ACA).	There will be no positive or negative change in risk to or impacts on SMR/RPS/RMP features (through either direct impacts or impacts so setting) and ACAs as there will be there will be no physical works within or modification to the river channels, estuaries or coastline, . Meeting minimum target.	0	0			0			0
	Environmental Total Score/ Weighted Score					0	0		0	0		0	0
Total Sco	re/ Total Weighted Score					7	225		0	0		0	0

					Options			
		Baseline	Portmarnock and Malahide areas APSR: Strand Road Option 1	Portmarnock and Malahide areas APSR: Strand Road Option 2	Portmarnock and Malahide areas APSR: Malahide Town Centre Option 3	Portmarnock and Malahide areas APSR: Malahide Town Centre Option 4	Portmarnock and Malahide areas APSR: Malahide Town Centre Option 5	Portmarnock and Malahide areas APSR: Malahide Town Centre Option 5a
	t weighting)		Rehabilitating and raising existing coastal defences at Strand Road (including rehabilitation walls and flapped outfall) and construction o flood defence embankment.	Replacement of flapped outfall on Sluice River and construction of f flood defence embankments and walls to protect at risk properties a Strand Road.	Construction of flood defence embankments and walls to protect at risk properties in Malahide town centre.	Construction of flood defence walls and embankments along with rehabilitating and raising of existing coastal defences in Malahide town centre.	Construction of permemant and demountable flood defences along with rehabilitating defences in Malahide to protect at risk properties in Malahid town centre.	Construction of permemant and demountable flood defences along with e rehabilitating defences in Malahide to protect at risk properties in Malahide town centre.
Objectives	al Weighting i Weighting i Weighting would be different to overal APSR		This option involves rehabilitating (i.e. strengthening and raising) 0.5km existing walls which run along side the F106 at Strand Road. Option also involves rehabilitating of the flapped gates on the Suice River at Portmanock Bridge and the construction of a flood embankment on the le bank of the Suice River upstream of Portmanock Bridge. The BCR for thi option is 1 for the 1% AEP fluvial event and 0.5% AEP fludal event. Need to include details of condition of existing defences where available. T existing flood walls and their foundations would be strengthened using structural engineering works to allow walls to provide sufficient flood defen	This option involves the construction of approximately 0.6km of flood embankments along the R106 at Strand Road and on the left bank of the Sulice River upstream of Portmannock Bridge. The BCR for this option is 2. Tor the 1% AEP Invite event and 0.5% AEP Itidal event. The The flooped gates on the Sulice River at Portmannock Bridge. The BCR for this option is 2. Tor the 1% AEP Invite event and 0.5% AEP Itidal event. The flooped gates on the Sulice River are the propagation of high tides upstream of Portmannock Bridge. Theses gates would be replaced with new flapped gates as part of this option.			This option involves the construction of approximately 0.5km of demountable defences along the coast road to the weat of the milway line and 50m of of foo- wall is in Malahiel town centre. The option involves raising a shot action of fin locating us to the 0.5% AEP event. If the costs of a tidal FFW3 are involved alo with its option, the BCR is 0.6. Assuming that a fluvial and tidal fluvial FFW3 is implemented at the Coastal AU scale this option receives a BCR of 1.0 and the assessment proceeds on this basis. The demountable defences to the vest of the railway line prevent flooding of number of properties along this coast road and out of the flow path of flood wal under the railway underpass and into Malahide town centre. The demountable flood defences to structure.	This option involves the construction of 60m of of flood walls and raising of a d short section of flood wall (poproximately 10m) in Malahide town centre. It also on includes the construction of a demountable flood defence across the railway di underpass to prevent the propagation of flood valters along the coast road meastward into Malahide town centre. The option provides protections against tide s flooding up to the 0.5% ACP tidal event. If the costs of a tidal FFWS are included along with this option, the EOR 1: 3.1. Assuming that a fluvial and tidal fluvial FFWS is implemented at the Coastal AU scale this option received a BCR of 6.8 and the assessment proceeds on this basis. et A demountable defence across the railway underpass on the coast road would cut off the flow path of flood valter under the railway underpass and into Malahide town centre.
	Baseline option assumes continuation of any existing maintenance regime in the study area maintenance regime in the study						The average height of demountable defences above ground level would be 1.2: mounted to a permanent wall 0.3m in height. Some localised road raising would be required at the westem actremity of the defences to ensure flooding does no propagate along the coast road behind the defences. There would be no impact on water levels in the Broadmeadow estuary with thi option. The construction of the flood embankment and revetments along the coast road prevents flooding along the coast road, under the railway underpass and into Malahide town centre. There are no areas of significant natural floodplain stores affected by this option.	This option would limit the movement of people and traffic prior to and during a d flood event. Additional investigations would be required to determine if the railway enhankment would prevent the ingress of water exatwards into Makihide fown centre. This option does not prevent flood risk to properties along the coast road s There would be no impact on water levels in the Broadmaedow estuary with this option. The use of a demountable flood defence at the railway underpass prevents flooding under the allway underpass and into Makihide town centre. There are no areas of significant natural floodplain storage affected by this option prevents flooding under the allway underpass and into Makihide town centre. There are no areas of significant natural floodplain storage affected by this option prevents flooding under the allway underpass and into Makihide town centre. There are no areas of significant natural floodplain storage affected by this option prevents flooding under the allway underpass and into Makihide town centre. There are no areas of significant natural floodplain storage affected by this option prevents flooding under the allway underpass and into the storage affected by this option prevents flooding under the allway underpass and into the storage affected by this option prevents flooding under the allway underpass and into the storage affected by this option prevents flooding under the allway underpass and into the storage affected by this option prevents flooding under the allway underpass and the storage affected by this option prevents flooding under the allway underpass and the storage affected by the option prevents flooding under the allway underpass and the storage prevents flooding the storage affected by the option prevents flooding under the storage prevents flooding the storage prevents flood
			of significant natural floodplain storage affected by this option.	no areas of significant natural floodplain storage affected by this option.				
A) Ensure Ploof Risk Management options are operationally robust.	5 5	e na	Comments Score mechanical intervention (operation of larged gates) is required for operation of this option. Some future maintenance will be required to ensure the definesc retain their flood definesc. The structure of ensure the definesc retain their flood definesc. Access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to floog date will be restricted by faid cycle. Overall are access to flood date access to flood date access to flood date access to flood date. Define the flood date access to flood date access to flood date. Define the flood date access to flood date access to flood date. Define the flood date access to flood date access to flood date. Define the flood date access to flood date access to flood date. Define the flood date access to flood date access t	Comments         Score         Hypothypothypothypothypothypothypothypoth	Comments Score Weighted Score	Comments Score Weighted Score	Comments         Score         Weighted Score           A significant proportion of proposed option requires human intervention for erection of demonstrative defences. Protoina aluo reliant on food forest certainty for ensure times. Some future maintenance will be required to ensure wateremaintening relation testic horis (rod defences. Incredio alu Demonstrational defences. Incredio aluo Demonstrative defences. Incred	Comments         Score         Weighted Score           A significant proportion of proposed option requires human intervention for erection of demountable defence. Option also relation of hold orecase cheratry to ensure waitie/enablements relatin herr flood defence functions and optimised optimised in the second optimised opti
B) Minimise Health and Safety risk of flood risk management options.	5 5	- na	exceeding minimum target.  Rehabilitation works are located close to the Skilce river channel and estuary and along the R106, Reefbre significant health and safety risk to construction works. Health and safety risk to amaintenance works of embankments would be limbd, maintenance of targets gates works to be shull be the Slice river estuary at low tide. Develar, meeting target workers to be slice river estuary at low tide. Develar, meeting	cycle. Overall exceeding minimum target. Construction works are located dose to the Slucke river channel and estuay and along the R100, therefore significant health and adlety risk to construction works. Health and addry risk to maintenice works of orthAnimenia would be limited, maintenance of flagped gates would require works to its of sluce river estuay at too fide		0	designed. Meeting minimum target. Construction works are located along the cosal and near busy roads in Makhine town cente, therefore significant health and adely risk to construction workers. Also, significant health and aeter risk to operators responsible for maintenance and exection of demouslable defenses along the cosal and in the	designed. Weeting minimum target. Construction works are located along the coast and near bosy roads in Mahahe town certice, herefore significant health and addery risk to construction workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination thealth and addery risk to construct workers. Alse, anglination theat theat addery risk to construct workers. Alse, anglination thea
C) Ensure flood risk managed effectively and sustainable into future.	5 5	• na	minimum taget. Option is designed to protect up to the 0.5% AEP but can be adapted to the MRFS at additional cost by further improving the existing detences. Flapped gates work operate for MRFS and HRFS conditions but only a small element of overall option. Meeting minimum target.	Overall, Reeling minimum target. Option is designed to protect up to the 0.5 K. AEP but can be adapted to the NHOFS and NHSS and	0	•	town centre. Overaal, meeting minimum target. Option is design to protect up to the 0.5% AEP but can be adapted to the MIR'S at additional cost by increasing heightlength of value/simehaniment and demountable defences. Meeting minimum target.	bivin certre. Uverali, meeting minimum taiget. Option is design to protect up to the 0.5% AEP but can be adapted to the MIR'S at additional cost by increasing heightengtin of value/maharimenta and demountable defences. Meeting minimum target.
Technical Total Score/ Weighted Score			1 25	1 25	0 0		0 0	0 0
A) Minimise economic risk	25 2	Average annual damages of 4151,339. AAD at Stand read is 634,797 and the AAD at Metahole is 6110,311	This option protects the at risk properties on Strand Road up to the 0.5% AEP event. There will be residual flooding from the 0.1% AEP event but flood damages in the Potmarnook flood cell will be significantly reduced. Partially achieving aspirational larget.	This option protects the at risk properties on Strand Road up to the 0.5% AEP event. There will be residual flooting from the 0.1% AEP event but flood damages in the Portmanrock flood cell will be significantly reduced. Partialy achieving asprational target.	0	•	This option protects the at risk properties in Mathide bown centre up to the 0.5% AEP event. There will be residual flooring from the 0.1% AEP event but flood damages will be significantly reduced in the Mathide box centre flood cell. Partly achieving aspirational target.	This option protects the at risk properties in Matahide town centre up to the 0.5% AEP event. There will be residual flooding from the 0.1% AEP event but flood damages will be significantly exclude in the Matahide cum centre flood cell. Partly achieving septrational target.
B) Minimise risk to transport infrastructure	5 3	No rail at risk. Approximately Nom of reads at risk (10.55 km of the R100 at Strand Road and 0.35km o secondary roads in Matahioa)	The R100 is protected by this option up to the 1% AEP. There will be some residual floating for the 0 1%AEP although the extent of floating will be reduced. Parity activering asprational larget.	The R100 is posteriad by this option up to the 15. AEP. There will be some residual flooting for the 0.1%AEP although the extent of flooding will be reduced. Partly achieving aspirational larget.	0		This option will protect the secondary reads at risk in Malahile town centre up to the 0.5% AEP event and will reclose flood risk 3 30 from the 0.1% AEP event. Party achieving appraicional target	The option will protect the secondary roads at risk in Matahiae two certains up to the 0.5% AEP event and will reduce food risk from the 0.1% AEP event. Parity actieving aspirational larges.
C) Minimise risk to utility infrastructure	10 0	- No utility assets at risk	NA 0 0	NA D O	0	0	NA 0 0	NA 0 0
D) Minimise risk to agricultural land.	5 2	Approximately <b>38 hectanes of agriculture land</b> not benefiting from flood defences at its of flooding	This option reduces the Bood risk to approximately 0.2ha of agricultural land (<1% of total area). As benefit is to such a timy percentage of land assume meeting minimum target.	This option reduces the flood risk to approximately 0.2ha of apricultural land (<1% of total area). As benefit is to such a tiny percentage of land assume meeting minimum target.	•	0	This option has no impact on agricultural land 0 0	This option has no impact on agricultural land 0 0
Economic I otal Score/ Weighted Score			6 120 101011					
A) Minimise risk to human health and life.	30 2	44 residential properties at risk in Portmamock and Malahide areas APSR (17 at risk + Strand Road, Portmamock and 22 at risk in Malahide town centre) . No high vulnerability properties at risk from flooding.	This coins fully protects programs on Strand Read at risk up to the 0.5% AEP event and provides reduction in risk from the 0.1% AEP eventin the Portmamock flood cell. Therefore, parity active/ing appraidowal target.     100	This color fully protecting screenters on Strand Relat at risk up to the 0.5% KEP event in a provides reduction in risk from the 0.1% KEP 1 60 event in the Portmarnood, flood celt. Therefore, parity active/ing aspirational target.	0		This option Mily protects properties in Malaride town centre at risk up to the OS/K AEP event and provides a garillicant reduction in risk from the 0.1% AEP event in the Malaride town centre flood cell. Therefore, exceeding minimum target.	This option fully protects properties in Matalhick town centre at risk up to the OS-K&Pervent and provides a significant reduction in risk from the 0.1% AEP event in the Malahide town centre flood cell. Therefore, exceeding minimum target.
B) Minimise risk to community.	10 2	16 non residential buildings at risk. (1 at risk at Strand Road - Strand centre and 15 a risk in Mathole). No high-value social infrastructural assets at risk	This option fully pretected 1 non-residential property on Share Road at Mix up bits the Share Peerst and provides enduction in its forms in 0.1% AEP event in the Portmamock flood cell. Therefore, parity achieving aspirational larget.     3	This spice fully protects in conventioned property on Strand Base at disk to the De VSK AP event and provider exclusion in relation at the 0.1% AEP event in the Portmancok food cell. Therefore, party achieving aspirational target.			This option fully protects the 15 non-residential properties in Mathide bown certex of tak to pib to bo% AEP event 3 00 in the Mathide bown certex fload of therefore, party achieving approximational target.	This cipicon fully protects the 15 non-residential properties in Mahadie show care it at risk pice host 5% AEP event and a provides significant reduction in risk from the 0.1% AEP event in the Mahadie how care the loca care. Therefore, party achieving applications target.
C) Minimise risk to, or enhance, social amenity.	5 0	No flood sensitive social amenity sites at risk	N/A 0 0	NA 0 0	•		NA 0 0	NA 0 0
row core weighted acore		The APSR contains two river waterbodies , one of which is classified as being of high						
A) Support the objectives of the WFD.		All of the strateging on each of classified as being of post stable (improvement includes in hystores) (includes), the varyous national includes in hystores (includes), the design with the principal causes letterfield as agriculture and waterback design with the principal causes letterfield as agriculture and waterback layers of stable vargeschild; (in antitratesticol of la ASR as filled as a stable and layers of stable vargeschild; (in antitratesticol of la ASR as filled as a stable design of a basely model as all to be stable and the stable stable and layers of stable vargeschild; (in antitratesticol of la ASR as filled as a stable design of a basely model as all to be stable). The stable stable and design of a basely model as all to be stable and the stable stable and design of a basely model as all to be stable. The stable stable and design of a basely model as all to be stable and the stable stable proteins constaining all thermer (in good stable priority) for the stable and design of the stable stable stable and the stable stable and the stable design of the stable stable stable stable stable stable and the stable stable design of the stable stable stable stable stable stable stable and design of the stable stable stable stable stable stable stable stable and stable to be stable stable stable stable stable stable stable stable stable to the design and the stable stable stable stable stable stable stable stable stable to the stable stable stable stable stable stable stable stable stable stable to stable stable stable stable stable stable stable stable stable stable proteines constable stable stable stable stable stable stable stable stable proteines constable stable stable stable stable stable stable stables at the stable stable stable stable stable stable stable stable stables approxements (stable stable stable stable stable stables). The approxement stable stable stable stable stable stables approxements (stable stables) are stables at the stable stable stable stables at the stable stables stables at	Potential constant to the advecement of WFD objectives as the new second that raising the wall will require the looping of the defines to be increased, potentially presenting an additional indicomplication pressure through advancing the line. This option has been assessed as just being minimum target.	Potential constraint to the achievement of WFD objectives as the proposed embankments could oreside a new morphological pressure and will, by the number, ceate a new barrier between the new start and start to floodplan. The option a considered to be just failing minimum angut.	0	0	New shuctures situated along an already modified sitetch of coastine. Therefore, no contribution nor constraint to the 0 0 o achievement of VPD objectives. Meeting minimum target.	New structures situated along an already modified shelch of coastine. Therefore, no contribution no constraint to the 0 0 achievement of VMPD objectives. Meeting minimum larget.
B) Minimise risk of environmental pollution	15 5	No VMIP sizes at risk in the APSR. Three Section 16 Increase are protect in the APSR (one at Stand Read and two in Malahide). There are no Section 4 Increase present.	No change in risk articipated to result from implementation of this o o	No change in risk anticipated to result from implementation of this option. Meeting minimum target.	0	o	No change in risk anticipated to result from implementation of 0 0	No change in risk anticipated to result from implementation of 0 0

								Options									
				Baseline	Portmarnock and Malahide areas APSR: Strand Road Option 1	Portmarnock and Malahide areas APSR: Stra Option 2	nd Road	Portmarnock and Malahide areas APSR: Malahide Option 3	Fown Centre	Portmarnock and Malahide areas APSR: Ma Option 4	ahide Town Centre	Portmarnock and Malahide areas APSR Option 5	Malahide Town	Centre	Portmarnock and Malahide areas APSR: I Option 5a	Malahide Town	n Centre
			( weighting)		Rehabilitating and raising existing coastal defences at Strand Ro (including rehabilitation walls and flapped outfall) and constructio flood defence embankment.	oad Replacement of flapped outfall on Sluice River and on of flood defence embankments and walls to protect at a Strand Road.	construction of isk properties	of s at properties in Malahide town centre.	to protect at risk	Construction of flood defence walls and emb rehabilitating and raising of existing coastal town centre.	ankments along w defences in Malahi	th Construction of permemant and demountab e rehabilitating defences in Malahide to protect town centre.	e flood defence: at risk propertie	s along with s in Malahide	Construction of permemant and demountable rehabilitating defences in Malahide to protect a town centre.	flood defence t risk propertie	s along with as in Malahide
	Objectives	Giobal Weighting	Local Weighting 4PSR if local weighting would be different to overal APSF	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves rehabilitating (i.e. strengthening and raising) 0.5kr existing walls which run along side the R106 at Strand Road. Option a involves rehabilitating of the flapped gates on the Stuice River at Portmarnock Rirdge and the construction of a flood embankment on the bank of the Stuice River upstream of Portmarnock Bridge. The BCR for option is 1 for the 1% AEP fluvial event and 0.5% AEP lidal event. Need to include details of condition of existing defences where available existing flood walls and their foundations would be strengthened usis structural engineering works to allow walls to provide sufficient flood de function up to the 0.5% AEP tidal event.	This option involves the construction of approximately embankments along the R106 at Strand Road and on the Suice River system on Portmarnock Bridge. Option The BCR for this option is 2.7 for the 1% AEP Invial eve tidal event. It has the RCR for this option is 2.7 for the 1% AEP Invial eve tidal event. The flapped gates on the Sluice River prevent the pro- tides upstream of Portmanock Bridge. Theses gates we with new flapped gates as part of this opti- tion of the source River at the pro- tide supstream of Portmanock Bridge. Theses gates we with new flapped gates as part of this opti- tion of the source River at the source River at the pro- tide supstream of Portmanock Bridge. These at the source with new flapped gates as part of this opti-	0.6km of flood te left bank of th also involves mamock Bridge. Int and 0.5% AE bagation of high ould be replaced on.	d the i.e. EF F the BCR for this option is 0.7 for the 0.5% AEP tidal event. G 06 option is not considered any further.	ven the low BCR, ti	11 The BCR for this option is 0.7 for the 0.5% AEP ti BCR, this option is not considered a	dal event. Given the ry further.	This option involves the construction of approx defences along the coast road to the west of the wals in Malaintie town centre. The option involves floading up to the 0.5% AEP event. If the costs implemented at the Coast IA U scale this option assessment proceeds on to The demountable defences to the west of the ro- number of properties along flust coast road and or under the railway underpass and into Malaintie flood defences would be mounted to a perma mounted to a permanent wall 0.3m in height. Sc mounted to a permanent wall 0.3m in height. Sc	mately 0.5km of of railway line and d is raising a short provides protect a tidal FFWS are fluvial and tidal fi receives a BCR i vis basis. ilway line preven it off the flow pati hown centre. The nent flood defence to set to assure floo as to assure flood	demountable 60m of of flood section of flood ion against tidd included along luvial FFWS is of 1.0 and the t flooding of a h of flood wate demountable e structure. would be 1.2m d raising would	This option involves the construction of 60m of short section of flood wall (approximately 10m) in includes the construction of a demonstrate flood provide the construction of a demonstrate flood pestwards into Malahide twom centre. The option flooding up to the 0.5% AEP idal event. If the cost along with this option, the BOR is 1.3. Assuming FFWS is implemented at the Coastal AU scale this and the assessment proceeds or A demountable defence across the railway under cut off the flow path of flood water under the railwa town centre. This option would limit the movement of people a flood event. Additional investigations would be regi	f flood walls an Malahide town defence acros vaters along the rovides protecti s of a tidal FFW that a fluvial ar option receive n this basis. Dass on the coa y underpass an und traffic prior to virted to determin	d raising of a centre. It also s the railway coast road ion against tild /S are include nd tidal fluvial d a BCR of 6.8 nst road would id into Malahid to and during a line if the railwa
			or flood cells within /		The napped gales in the Suice Preve of a Forkinariook Entropy Ervent in propagation of high tides upstream of this bridge. These gales would replaced with new flapped gales as part of this option. 120m of floor embankments are required upstream of Portmanock Bridge. The aver height of these embankments is 0.6m and provides protection up to the AEP fluvial event and 0.5% AEP tidal event.	to protect up to the 0.5% AEP event. The average h embankments is 0.8m on the left bank downstream of PA and 1.4m on the right bank downstream of Portmarnock et 1% required with an average height of 0.6m. These would up to the 1% AEP fluvial event and 0.5% AEP to the the time of th	eight of these ortmarnock Bridg Bridge. Upstreau mbankment are provide protection dal event.	dge aan re Ion			be required at the vesterin externing on the defer propagate along the coast road be There would be no impact on water levels in the option. The construction of the flood embankment and the construction of the flood embankment and	the defences. Broadmeadow es	stuary with this	embankment would prevent the ingless to water e- centre. This option does not prevent flood risk to p. There would be no impact on water levels in the B option. The use of a demountable flood defeno prevents flooding under the railway underpass ar There are no areas of significant natural floodplain	roperties along roadmeadow e e at the railway id into Malahide storage affecte	stuary with this or underpass e town centre.	
			(s econd column f		Hydrauic modeling indicates that there is no impact on water reveis upstream of downstream of Strand Road. The results of the modelling indicate that an existing overland flood flow is modified with this option. The construction of the flood embankment is the left bank of the Suice River prevents an existing overland flow pa (westwards through Hazel Grove and across the R106). There are no a of significant natural floodplain storage affected by this option.	<sup>IS</sup> Hydraulic modelling indicates that there is no impact upstream or downstream of Strand Road with th w path the results of the modelling indicate that an existing on along path is modified with this option. The construction of the along the left bank of the Stuice River prevents an exist path (westwards through Hazel Grove and across the f no areas of significant natural floodplain storage affect	on water levels is option. rerland flood flow flood embankme ing overland flow 2106). There are ad by this option	s ow ment ow re on.			prevents thooding along the coast road, under Malahide town centre. There are no areas of sign affected by this oph	ne railway underp ificant natural floo n.	aass and into odplain storage				
					Comments Score Weigi	ghted Comments	Score Weighted Score	ed Comments Score	Weighted Score	Comments	Score Weighted Sc	ore Comments	Score	Weighted Score	Comments	Score	Weighted Score
Environmental	C) Avoid damage to, and where possi enhance, the flore and fauna of the study	sle area 10	5	<ul> <li>Bedrop Ray BACSPARPENDEN includes at the suntem extend of the APEP. The top contrast ingle associations of denders, modifies, and submarks, and expansion iterationship includes the intermediate production. Charges as well as individually includes the flooting abuse service and another includes. Charges as the association is monitored to accurate the intermediate production. The abuse of the intermediate abuse service and the intermediate and the intermediate and the intermediate abuse service and the intermediate and the intermediate and the intermediate abuse service and the intermediate and the intermediate and the intermediate abuse service and the intermediate and the intermediate and the intermediate abuse service and the intermediate and the intermediate and the intermediate abuse service and the intermediate and the intermediate and the intermediate abuse service and the intermediate and the intermediate and the service intermediate abuse service and the intermediate and the intermediate and the intermediate abuse service and the intermediate and the intermediate and the intermediate and the abuse service and the intermediate and the intermediate and the intermediate and the abuse service and the intermediate and the intermediate and the intermediate and the abuse service and the intermediate and the intermediate and the intermediate and the abuse service and the intermediate and the intermediate and the intermediate and the abuse service and the intermediate intermediate a</li></ul>	The example wall to be reased in Socialed on the boundary of Balaxyie Balax	The existing wait look trained is located within statologie stay SACSFAVeNA. Permanent direct loss of qualifying habitat in bopinnt of works, with proteinal associated in the interpretation to during constraints and the state of the state of the state of the state of the state of the state of the state of the the state states and Portmanness Ohide will enter the estates directly, this resulting in a temporery drange to the patient of feestwater in the state of the state of the states directly, this resulting is a temporery drange to the patient of feestwater in the states of the states of the states of the regular patient of feestwater inflow. Reptacement of the flagstate will prevent saltne waiter entering the river, thereby leaking to a gradual charge in conditions is a method on the flagstate will prevent saltne waiter entering the required flagstaturates to be a possible impact on the first, coalised of offstaturates to be restrict in an extend the states and associated species, and possible transfer in the states of the states of the states of the states of a states of the states of the states of the states of a states of the states of the states of the states of a states of the states of the states of the states of the states of a states of the states of the states of the states of a states of the states of the states of the states of a states of the states of the states of the states of the states of a states of the states of t	-3 -150		·		o	Despite being located within the Malahide Estuary SACpNH boundary, the new enhankmentidemountable defences are in anticipated to have any direct impact on SAC interest Returns though there is the potential for distinctions to SAP And the second second second second second second second for second second second second second second second during the construction period. Just failing minimum target.	ч	-50	Despite being located within the Matahide Estuary SAC/pNHA boundary, the new embankment/demountable defences are or anticipated to have any direct impact on SAC interest features. Though these is the potential for databatic to SAPA and though these is the potential for databatic to SAPA and for locationed temporary disturbances. There inabitativences during the construction period. Just failing minimum target.	-1	-50
	D) Avoid damage to, and where possi enhance, fisheries within the study an	olo 5 a 5	5	All ners and ristoms with the APSR support or an assisted in supporting automoting denotes and its same, howe has all sources in a dark all only intermediate sparsing or nursery areas. Some subcrocurses with the AJ area are also likely to approximate provide sparsing, nursery and technip habitatis is a range of this spaces. The estimates provide sparsing, nursery and technip habitatis is a range of this spaces in the denote and the space of the space of the space of the space fact backets, many setting of the space of the space of the space is the species, many stantine, set for the space of the space of the spaces is the species, many stantine, set for the space of the space of the species is the species of the space of the species of the specie	Potential for negative impacts on faheries during in-channel works (e.g., neplacement of flag gate) due to loss of habitat and potential disturbance assulted with changes in hutching etc. Also potential for localised disruption to angling access. Just failing minimum target.	Potential for negative impacts on faitheres during in channel works (e.g., replacement of flag gates) due to losa of habitat and potential disturbance socialide with charges to hutdivity or. Also potential for localised disruption to negring scene. Just flaing minimum target.	-1 -25		D		0	Less of / distributes to estuarrise habitist and associated fasherias is unlikely during construction of the enhancementicipation defines and the wall be no works within the water Isedf. No disruption to anging anticipated. Meeting minimum target.	0	0	Los of / databases to estuarine habits and associated metabases to entry construction of the estuarties of the second s	0	0
	E) Protect, and where possible enhance landscape character and visual amenity v the study area	xe, rithin 5	•	The APSR talls within three lanckape character areas/Cosstal, Estaury (both classified as being of high sensitivity and exception avia), and owe typical Approximate (assified as being of low sensitivity and modest value). The R106 along the peaks and anothern boundaries of the APSR, fronting the Pertinamosk-Pening Deport. 2014 and that lost Easting logand. A Similar Sensitivity of designated an 'Important' View' (Fingal County Council designation).	Atthough flood defence structures already exail in this area, raising of the defences in the highly ensative landscape, adongside a raised which is designated as an 'important I Veri', is likely to cause a deterioration in landscape character and permanent adverse change in visual amenty- Party failing minimum target.	Although flood defence structures already exist in this area, the introduction of additional structures in a highly sensitive landscape, alongaide a road which a desirated 'important' level, is anticipated to result in a deterioration in landscape character and permanent adverse change in visual amenity. Partly failing minimum target.	-3 -60		o		0	Localised change in visual amenity in an area which is designated an Important Veev, and potential deterioration in local landscape character, due to the introduction of new flood defence structures. However, due to the the short length of defences and use of demountables, option considered to be just failing minimum target.	-1	-20	Localised change in visual amently in an area which is designated an "important View", and potential defencionation in local landscape character, due to the introduction of new flood defences structures. However, due to the the short length of defences and use of demountables, option considered to be just failing minimum target.	-1	-20
	F) Avoid damage to or loss of features cultural heritage importance, their setting heritage value within the study area	of and 5	2	1 Site on RPS at risk (value of site unknown) Less than 0.1 hoctares of Malahdio Cavilo Somesse ACA at risk, which represents less than 1% of the total ACA.	This option will not reduce the level of flood risk at this sile. Also, due to the nature of the works and their location in relation to the instructual site the option will not affect the historical setting of the site. Meeting minimum target.	Option will not reduce the level of flood risk at this site. Nor, due to the nature of the works and their location in relation to the historical setting of the site. Meeting site, will the option affect the historical setting of the site. Meeting minimum larget.	0 0		O		o	Option will not reduce the level of flood risk at this sile. Nor, due to the nature of the works and their location in relation to the historical site, will the option affect the historical setting of the site. Meeting minimum target.	O	O	Option will not reduce the level of flood risk at this site. Nor, due to the nature of the works and their location in relation to the historical site, will the option affect the historical setting of the site. Meeting minimum target.	0	D
<u> </u>	Environmental Total Score/ Weig Score	nted			-8 -26	260	-8 -260	0	0		0 0		-2	-70		-2	-70
Total Sco	e/ Total Weighted Score				s 9/	85	3 -25	0	0		0 0		10	350		10	350

				5					Options					
				overal AP	Baseline	Swords area APSR: Aspen Option 1			Swords area APSR: Town Cer Option 2	ntre				
				would be allferent to	-	Widening the Gaybrook Stream to reduce flu properties at Aspen near Kinsal	vial flood ey.	risk to	Construction of flood defence walls to protect from tidal flooding in Swords town	t propertion centre.	es at risk			
	Objectives	Global Weighting	Local Weighting	na column for nooa ceils within APSH ri rocal weighting) weighting)	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves increasing the channel capac Gaybrook stream along a 200m length at Aspen. BCR of 3.6 for the 1% AEP fluvial event. Hydraulic that the top width of the channel would need to L average of 2m while the bottom width of the chann widened by an average of 1m between surveye 3Ga2306 and 3Ga2128. These channel modificati AEP fluvial event in bank with a 0.3m freeboard ( levels are 0.3m below top of bank The results of the hydraulic modelling show that th water levels locally with an average decrease in w along the 200m length of widened channel. Downst widening, there is a negligible increase in water le the modelling indicate that no existing overland modified with this option and that there are no ar natural floodplain storage affected by the	ity by wide This optio modelling ee widenece el would n d cross se scons contain i.e. 1% AE (). his option n tater levels ream of th vels. The r flood flow p eas of sign is option.	ning the n has a indicates by an sed to be citons the 1% P water nodifies of 0.3m e channel soults of soults of ificant	This option involves the construction of flood wall the Ward River upstream of Mill Bridge in Sword BCR for this option is 0.3 for the1% AEP fluvial BCR, this option is not considered an	s on the rig Is town cei vent. Give y further.	iht bank oi htre. The n the low	F		
				(secc		Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	-	n/a	Increased channel conveyance provided for by widening and deeping the river channel. The option is not dependent on human/mechanical intervention to operate. However, limited future maintenance will be required to the channel capacity is retained. Exceeding minimum target.	3	75			0			0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	-	n/a	Works will be required in the river channel, therefore significant health and safety risk to construction workers. However, limited health and safety risk to operators once construction complete. Therefore overall just exceeding minimum target.	1	25			0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	-	n/a	The increased channel capacity will convey the MRFS flow, therefore partly achieving aspirational target.	1	25			0			0
	Technical Total Score/ Weighted Score						5	125		0	0		0	0
	A) Minimise economic risk	25	1		Average annual damages of €67,136. AAD at Appen is €4,305 and the AAD in Swords town centre is €52,606. The remaining damages occur in other localised areas within Swords APSR.	Option will reduce damages to properties in Aspen resulting from a 1% AEP event to 0 and will also reduce damages occurring from a 0.1% AEP event in the Aspen flood cell. Therefore, partly achieving aspirational target.	n / 3	75			0			0
mic	B) Minimise risk to transport infrastructure	5	3	1	No rall at risk Approximately <b>120m of roads</b> at risk, including approximately 20m of the R125 and short lengths of secondary and tertiary roads.	This option prevents flood risk to the local roads in the Aspen flood cell for the 1% AEP and reduces flood risk from the 0.1% AEP event. Therefore exceeding minimum target.	3	15			0			0
Econd	C) Minimise risk to utility infrastructure	10	0	-	No <b>utility assets</b> at risk	NA	0	0						
	D) Minimise risk to agricultural land.	5	2	-	Approximately <b>12 hectares of agriculture land</b> not benefiting from flood defences at risk of flooding.	This option has no impact on the risk to agricultural land. Therefore, meeting minimum target.	0	0			0			0
	Economic Total Score/ Weighted Score						6	90		0	0		0	0
	A) Minimise risk to human health and life.	30	2	1	13 residential properties at risk including 9 at Aspen and 0 in Swords town centre. The remaining 4 residential properties at risk are in isolated areas around Swords APSR No high vulnerability properties at risk from flooding.	This option fully protects properties at risk in Aspen up to the 1% AEP event and the 0.1% AEP event (contained within the larger channel but with reduced freeboard). It has no impact on the other at risk residential properties in the APSR. Therefore, partly achieving aspirational target.	3	90			0			0
Social	B) Minimise risk to community.	10	2	0	14 non residential properties at risk in Swords area APSR including 0 at Aspen and 6 in Swords town centre. 4 non-residential properties in 1 retail park at risk (Airside Retail Park) in Swords area APSR. <ol> <li>1 high-value social infrastructural asset at risk, a fire station in Swords.</li> </ol>	This option has no impact on any of the properties at risk.	0	0			0			0

				œ					Ontions					
			ifferent to overal AP	o overal APS	Baseline	Swords area APSR: Aspen Option 1			Swords area APSR: Town Centr Option 2	e				
				would be different to	-	Widening the Gaybrook Stream to reduce fluv properties at Aspen near Kinsale	ial flood y.	l risk to	Construction of flood defence walls to protect from tidal flooding in Swords town o	propertie entre.	es at risk			
	Objectives	Global Weighting	Local Weighting	nd column for flood cells within APSR If local weighting weighting)	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves increasing the channel capacit Gaybrook stream along a 200m length at Aspen. BCR of 3.6 for the 1% AEP fluvial event. Hydraulic that the top width of the channel would need to b average of 2m while the bottom width of the channe widened by an average of 1m between surveyed 3Ga2306 and 3Ga2128. These channel modificatio AEP fluvial event in bank with a 0.3m freeboard (i. levels are 0.3m below top of bank, The results of the hydraulic modelling show that th water levels locally with an average decrease in we along the 200m length of widened channel. Downstr widening, there is a negligible increase in water leve the modelling indicate that no existing overland fl modified with this option and that there are no are natural floodplain storage affected by this	y by wide This option modelling widene l would r cross sums conta	ening the on has a g indicate. d by an need to be ections in the 1% EP water modifies is of 0.3m he channe results of path is unificant	This option involves the construction of flood walls the Ward River upstream of Mill Bridge in Swords BCR for this option is 0.3 for the1% AEP fluvial ev BCR, this option is not considered any	on the rig town cei ent. Give further.	ht bank of tre. The n the low			
				(seco		Comments	Score	Weighte Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	C) Minimise risk to, or enhance, social amenity.	5	0	-	No flood sensitive social amenity sites at risk	N/A	0	0			0			0
	Social Total Score/ Weighted Score						3	90		0	0		0	0
	A) Support the objectives of the WFD.	5	5		The APSR contains four river waterbodies: one – high status (to be maintained), two – moderate status, one – poor status (improvement required). The RBW reports that problems constraining achievement of good status include high mutients (phosphorus), low oxygen saturation, low ecological rating and dredging, with the principal causes identified as agriculture and wastewate. At the eastern extent of the APSR is the Broadmeadow Water, a transitional (i.e. estuarine) and heavily modified water body (HIMWB) classified as moderate potential The RBW reports that the problems constraining achievement of good potential relate industrial discharges. The back measure action was in the FBM FRAMS (physical modifications – morphological pressures) for all waterbodies relate to the new for compliance with legal requirements (FLA, Planning & Development Regulations etc.) Additional measures have been identified for the Broadmeadow Water (as a HMWB) relating to further investigate the risks result	Through changing the morphology of the channel, this option has the potential to constrain to the achievement of WFD objectives. Due to uncertainty, the precatiunary principle has been applied, and option has been assessed as just failing minimum target.	-1	-25			0			0
	B) Minimise risk of environmental pollution	15	0		No WMP sites at risk. 7 Section 16 licenses present (6 of which are located along the Ward and Broadmeadow Rivers in Swords town and 1 on the Gaybrook Stream). 2 Section 4 licenses present ( located in Swords town along the Ward and Broadmeadow Rivers).	No change in risk anticipated to result from implementation of this option. All Section 4 and Section 16 licenses are held in locations outside of the area anticipated to experience a change in water level. Thus, no risk to water quality anticipated. Meeting minimum target.	0	0			0			0
Environmental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	5		The Broadmeadow River flows into the Broadmeadow-Swords Estuary SPA/Ramsar sit and Malahide Estuary SAC/pNHA at the eastern extent of this APSR. This area comprises intertidal sandflats, mudflats, saltmarshes, and sand dunes, which support internationally important wintering populations of Beret geese as well as nationally important populations of a further 12 waterfowl species. Changes in the catchment, which after the flooding regime and restwards rigout into the estatury could potentially affect the nature, extent and character of intertidal habitat for which the site is designated, with impacts on associated designated waterbird populations. The rivers and their floodplain within the AU support or have the potential to support legally protected species or other species of conservation concern (e.g. otter, kinglisher bats, Atlantic salmon), although detailed distribution information is not available. This assessment will be revisited following completion of the Appropriate Assessment.	The area of works is located approximately 2km upstream of Broadmeadow - Swords Esuary SPA/Ramsar site and Malahide Estuary SAC/pNHA. Due to the nature and location of works, no impact on these designated sites is anticipated to arise as a result of the works. Widening of the channel will result in a direct loss of riverine and marginal habitats along this stretch, and species which these support. However, the widened channel would be expected to re colonise with riverine vegetation and fauna, although the composition of this is unknown. Due to uncertainty, the precautionary principle has been applied, and option has been assessed as just failing minimum target.	-1	-50			0			0
	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	3		All rivers and streams within the APSR support or are capable of supporting salmonid species such as salmon, brown trout and sea trout, and are likely to provide salmonid spawning or nursery areas. Some watercourses within the APSR area are also likely to support trook, river and/or sea lamprey. There is the potential for angling activity along the Gaybrook Stream in the APSR. There are no fisheries designations within the APSR (e.g. Salmonid Waters), nor are there any known barriers to fish movement.	Likely loss of/or disturbance to riverine habitat and dependent fisheries during the widening of the Gaybrook Stream. The works will result in a temporary loss of angling access along this stretch, if there is any in the vicinity, although they could present opportunities for enhancement. Just failing minimum target.	-1	-15			0			0
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	4		The APSR falls within the following three landscape character areas; <b>Estuary</b> (classified as being of exceptional value and high sensitivity), <b>Low Lying Agricultural</b> (modest value and low sensitivity) and <b>Rolling Hills</b> (modest value and medium sensitivity). Fingal County Council also designates "Important Views". Within the APSR, short stretches fronting onto the Ward River are designated 'Important Views'.	The proposed works are located within an area of low sensitivity. Potential for temporary change in landscape character and visual amenity during the construction works, although in the long term, no change to visual amenity or local landscape character anticipated, assuming that there will be no loss of significant landscape elements (i.e mature trees) where widening is proposed. Just failing minimum target.	-1	-20			0			0
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	2		3 Sites on RPS/RMP at risk. Two sites on RPS (nature of sites unknown). The remaining site, a Mill site at Mill Bridge in Swords, is in both the RPS/RMP datasets. No ACA at risk.	The option will not reduce the level of flood risk at any of these sites or affect their historical setting. Meeting minimum target.	0	0			0			0
	Environmental Total Score/ Weighted Score						-4	-110		0	0		0	0
Total Scor	e/ Total Weighted Score						10	195		0	0		0	0

					Options								
				Baseline	Rush area APSR Option 1			Rush area APSR Option 1a					
					Construction of flood defence embankments and v culvert along Shore Road to protect at risk propert and from West Rush stream.	valls and ies along	l replacing g the coast	Construction of secondary culvert along Shore Roc properties at risk from fluvial flooding along the Wes	id to pro t Rush s	tect tream.			
	Objectives	Global Weighting	Local Weighting					This option would involve constructing a secondary culve existing culvert on the downstream end of the Rush We capacity of the existing structure is insufficient to convey results in surcharging and splitting of flood waters and flood The BCR for this option is 0.7 for the 1% AEP event and AEP event. As the culvert is sized for the 1% MRFRS 95%ill the 0.1% AEP fluvial flow without causing any flood dam. Modeling results indicate that a new circular culvert with a when combined with the capacity of the existing structure v to reduce fluvial flood risk in Rush. The combined culverts of 1.2 mS/s which equates to the 1% AEP MRFS 95%ill surcharging:	rt along : st Stream large flo ling of pr 0.9 for th e flow it d age to pr diamete vould be can conv e flow wi	ide the h. The ws and operties. e 0.1% can pass operty. r of 0.5m sufficient ey a flow thout			
				Baseline option assumes continuation of any existing maintenance regime in the study area	BCR for this option is 0.6 for the 1% AEP fluvial event event. Due to the low BCR, this option is not consic	t and 0.5%	% AEP tidal / further.	Modelling results indicate that this option will have some levels upstream and no impact downstream of the propose option. Changes in water levels are localised along a 0.3 off the source of the culter that. Option results in an ave 0.36m in water levels upstream of the cultert inlet. Then in water levels upstream of the cultert inlet. The the modelling indicate that existing overland are modified with this option. These existing overland the paths through increasing the capacity of the existing of the flooding of properties in Rush. The option prevents the paths through increasing the capacity of the cultert. There significant natural floodplain storage affected by th	impact o d locatio m stretc rage dec ximum c l flood flo v paths a ulvert ar se overla a are no is option	n water n for this h of the rease of lecrease w paths re as a d lead to and flow areas of			
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	na			0	Increased channel conveyance provided for by replacing the existing culver with a larger capacity culver. The option is not dependent on human/methanical intervention to operate. However, finaled tune maintenance will be required to ensure culverts are kept free from blockage.	3	75			O
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	nia			0	Significant amount of construction works involved in this option with demolshing of existing structures and installation of new culverts in the watercourse. Therefore significant health and safety risk to construction workers. However, limited health and safety risk to operations once construction complete. Therefore overall just exceeding minimum target.	1	25			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	na			0	New culverts to be designed to the 1% AEP MPFS 95% le flow, MRFS 1% AEP 95% le flow is greater than HEFS 1% AEP flow therefore, culverts meet requirements of HEFS.	5	125			o
	Technical Total Score/ Weighted Score					0.0	0		9	225		0	0
	A) Minimise economic risk	25	1	Average annual damages of €32,257.			0	Option will reduce damages resulting from a 1% AEP fluvial event to 0 and will also significantly reduce some damages occurring from a 0.1% fluvial AEP event. However, the option will not protect properties from the the 0.5% or 0.1% EP tidal events. Therefore exceeding minimum target.	1	25			0
iomic	B) Minimise risk to transport infrastructure	5	2	No rall at risk. Approximately 0.6km of secondary and letiary roads at risk			0	Option will reduce the risk of flooding to the transport infrastructure from a 1% AEP fluxial event to 0 and will also significantly reduce the risk from a 0.1% knowl AEP event. However, the option will not portect the roads at risk (including the Coast Road) from the 10.5% or 0.1% AEP tidal events. Therefore exceeding minimum target.	1	10			o
Ecol	C) Minimise risk to utility infrastructure	10	O	No utility assets at rick			0	NA	0	0			
	D) Minimise risk to agricultural land.	5	1	Approximately 4 hectares of agriculture land not benefiting from flood delences at risk of flooding.			0	This option has no impact on the flood risk to agricitural land	0	0			o
-	Economic Total Score/ Weighted Score					0.0	0		2	35		0	0
	A) Minimise risk to human health and life.	30	2	25 residential properties at risk No high vulnerability properties at risk from flooding			0	This option fully protects properties at risk up to the 1% AEP event and provides a vvery significant reduction in risk from the 0.1% AEP event. Therefore, partly achieving aspirational target.	3	180			0
Social	B) Minimise risk to community.	10	1	1 non residential building at risk No Mgh-value social infrastructural assets at risk			0	The non-residential building is at risk from tidal flooding and therefore is not protected by this option. Meeting minimum target.	0	0			0
	C) Minimise risk to, or enhance, social amenity.	5	1	1 mobile holiday home park at risk			0	The mobile home park at risk is located to the north of Rush adjacent to the Rush Town Stream and is not impacted on by this option.	0	0			0
<u> </u>	Social Total Score/ Weighted Score					0.0	0		3	180		0	0
	A) Support the objectives of the WFD.	5	5	This APSR contains one <b>river waterbody</b> (poor status i.e. improvement required). The RBMP exposts that problems constraining achievement of good status of this river strains and deciging, with the principal causes developed a strain of the APSR is a <b>transitional</b> and endering and deciging. With the principal causes developed a supercharacterization and waterboard to any another and the principal causes developed a supercharacterization and waterboard problems constraining betweeneet of poor status include high numerics (supercharacterization to or organ status) developed to the APSR is a <b>transitional</b> the APSR is at a background to the APSR is a transitional to any other status of the angle of the APSR is at the approximation to any other status of the angle of the APSR is at the approximation the APSR is at a background to the Koherneet mice hiss, (HADQ costal waterbody, which is of moderate status (a.e. improvements required. The RBMP reports that the problems costanding achievement of the Odd status primary relate to pollution pressures (although risk from phycial modifications have been identified for all measures (although risk from phycial modifications have been identified for all measures (although risk from phycial modifications have been identified for all measures (although risk from phycial modifications have been identified for all measures (although risk from phycial modifications have been identified for all measurements (ER). Physical his physical modifications are the physical measurements (ER) calcus and the physical measurements (ER) calcus and the strain relate to the need for compliance with egal measurements (ER) calcus and the strain relates to the need for compliance and the strain relates to the need for compliance background relates to the need for compliance background re			O	No contribution nor constraint to the achievement of WFD objectives as works will be within an already modified stretch of the channel. Meeting minimum target.	0	0			0
1	L												

								Options					
				Baseline	Rush area APSR Option 1			Rush area APSR Option 1a					
					Construction of flood defence embankments and w culvert along Shore Road to protect at risk properi and from West Rush stream.	ralls and ies along	replacing the coast	Construction of secondary culvert along Shore R properties at risk from fluvial flooding along the We	ad to pro st Rush s	otect tream.			
	Objectives	Global Weighting	Local Weghting	Baseline option assumes continuation of any existing maintenance regime in the study area	BCR for this option is 0.6 for the 1% AEP fluvial event event. Due to the low BCR, this option is not consid	This option would involve constructing a secondary culv existing culver on the downstream end of the Rush W capacity of the existing structure is insufficient to conver- results in surcharging and spilling of flood vaters and floo The BCR for this option is 0.7 for the 1% AFP event an AEP event. As the culver is sized for the 1% MFPS 95% the 0.1% AEP fluvial flow without causing any flood da Modelling results indicate that a new circular culvert with when combined with the capacity of the existing structure to reduce fluvial flood risk in Rush. The combined culvert: of 1.2 mS/s which equates to the 1% AEP MFPS 95% surcharging.	ert along gr est Strears (Jage Ridge of pr diding of pr le flow it ile flow it a diamete would be can convolution a diamete can convolution a diamete can convolution a diamete can convolution ile flow w r impact o de locatif would be can convolution ile flow w r impact o de locatif would be de locatif wou	side the n. The ws and operties. an pass operty. r of 0.5m sufficient rey a flow thout n water n for this h of the rease of tecrease we paths tre as a reas of and flow areas of					
					Comments Score Weighted		Comments	Score	Weighted Score	Comments	Score	Weighted Score	
	B) Minimise risk of environmental pollution	15	5	Within the APSR, there is <b>one WMP site at risk</b> , adjacent to Spout Road at the eastern weater of the toom. There are also two Section 16 licenses present within the APSR, in the centre of Rush.			0	The level of flood risk at the WMP site will not change as a result of the works. Both Section 16 licenses are held in locations outside of the area anticipated to experience a change in water level. Thus, no risk to water quality anticipated. Meeting minimum target.	0	0			0
Environmental	C) Avoid damage to, and where possible enhance, the flore and fauna of the study area	10	5	The Regenterine Editory ESPASIC-QNNA is located adory time southern boundary of the APSR. This erea comprises intervietal southals, meditis, satisfranche, and dand duras, which support immentionally import writering organizations of bernit genes as well as nationally important populations of a luther 16 waterlook species. Changes in the cathernes, which algorith after the locating genes and reshwater luttice be estables, the cathernes, which algorith after the locating genes and reshwater luttice be estables. Which after the location and being and being the location of the location of the location of the location of the rivers and their floodplains, and Regenstream Estables and estables the population of the location of the location of the location of concern (e.g. other, hundrich and Regenstream Estables and categories of conservation information is not available. The assessment will be revisited following completion of the Appropriate Assessment.			0	This option involves no works within or on the boundary of the Rogerstom Estuary SPA/SAC/DNHA (works are approximately 100m upstream of designated sites). During a 1% AEP flood event, freshwate that previously tilt the channel upstream of the esitiary culver will remain in-channel and thus enter the estuary directly, resulting in a temporary change to the pattern of theshwater input into the estuary. However, this will not affect the regular pattern of teshwater Norks to install nere vulver will be within a modified section of the channel so disturbance to fona and fauna will be negligible. Meeting minimum target.	0	0			0
	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	2	Aft nices and streame within the APSR stopport or an excellable of supporting saturation denotes such as accounts, howe host and the store, and see the hit to provide aliander sparwing or runsary areas. Some watercourses within the APSR area are also likely to asyport toork, invert and/or sea lamper. The estuary provides sparwing, nursery and feeding holdstats for a range of fah spaces, apprilation of the store and object of the sparse and station, important migratory fah spaces, namely salarion, sea hout, etcl and lampray, pass through on phartan station and object or multiple. There are an effective the sparses grounds the space of the sparse of the spaces, hough popular angling clocitics are unknown. There are no failented designations within the APSR tog. Satemid Waters), nor are the any low of markers to fail homements of shin moments.			0	Potential loss of disturbance to revrine habital and dependent fisheries during the installation of the new culvert, atthough works will be within an already modified stretch of the watercourse. No disruption to angling angling access anticipated, Just failing minimum target.	-1	-10			0
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	4	The AFSR fail generally with me Control biotocore ducator rate, the southwester bootsky of the AFSR, sistenet to Fourismon Essay, sub within the Stategy landscape character area. Biol hardscape character areas are classified as being of high entitivity and cocceptional values. Along the south-eastern bootsky of the AFSR, approximately time of the costal torotage is designed an 'mpotent Veron' by Fingl Covert, Court. Other locations receiving the same designation are: 30m and 1.2km of the R126, to the south-west and net of the AFSR respectively.			0	Temporary change to landscape character and visual amenity during works period only. In the long term, no impacts anticipated as no chang to above ground structures will result from the works. Meeting minimum target.	0	0			0
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	2	Two sites on SMR/RPS at risk. One site on the SMR is a Ribual Site - Holy Well and there is one site on the RPS (relate of site unknown). No ACA at risk.			0	The option will not reduce the level of flood risk or affect the historical setting at either of these sites. Meeting minimum target.	0	o			O
	Environmental Total Score/ Weighted Score					0	0		-1	-10		0	0

			Baseline	Skerries area APSR: Harbour Rd Option 1	Skerries area APSR: Miller Lane & Sher Option 2	lock Park	Skerries area APSR: Miller La Option 3	Options ne & Sherlock Pa	ırk	Skerries area APSR: Miller Lane Option 4	& Sherlock Park	k Skerries area APSR: Miller Lane & Sherlock Park Skerries area A Option 5				& Sherlock Park		
				Rehabilitating and raising existing coastal defences at Ha Road to reduce tidal flood risk.	Replacing culverts under roads and railway wil culverts and widening channel through park to r risk to properties at Miller Lane and She	h larger capacity educe fluvial flood lock Park.	Constructing a flow diversion channel railway and roads at Miller lane and Si flood risk to properties at Miller L	to run in a culver herlock Park to rea ane and Sherlock	t under the duce fluvial t Park.	Lowering road levels and raising kerb lev Sherlock Park to allow controlled flood reduce fluvial flood risk to	els along Miller Lane and ing along this road and properties.	Construction of storage reservoir to the we provide flood storage upstream of Skerries flood risk to properties along Miller La	t of railway em Area APSR to n ne and Sherloc	bankment to educe fluvial k Park.	Construction of storage reservoir to the we provide flood storage upstream of Skerri replacing culverts under roads and railway to reduce fluvial flood risk to properties alo	it of railway embankment i es Area APSR along with with larger capacity culver ng Millar Lane and Sherlo		
		be different to overal APSR weighting)			This option would involve replacing the existing of Dublin to Bellast railway line with new larger capa capacity of the existing outverts is insufficient to com embankment and surcharging of existing culverts results in spilling of tood waters along the F127 and Millor Lare and Sherotch Park. Hydraulic modelling not necessary to widen and deepen the channels in for this option is 1.3 or the 1% AEP fluvial event event. The existing culverts under the event. The existing culverts under the event. The existing culverts under the event. Under the company outverts. Hydraulic modelling indicati culverts would be required to convey the 1% AEP culverts would be required to convey the top converts and the	ulverts under the city culverts. The revey large flows and st of the railway This surcharging floods properties it is the park. The BCR nd 0.5% AEP tidal uplaced with three is that the following MRFS 95% ile flow						This option would involve the construction of floo the railway enbankment to store flood wai enbankment and control discharges during discharge does yet and railway. The BCR for this 2 storage ensanvoir embankments would - Storage enbankment / would be located to the alongside the R127. The enbankment wutu embankment A 100m embankment with an av- sorage embankment 2 would be located to the secondary raid which just her R127 near embankment would be into the existing railway e embankment would be into the existing railway e	wolve the construction of fload storage reservoirs upstream of markment to storage fload water upstream of the railway and control discharges during a fload event. The controlled to stored the quadry of the esting quadres under the read and railway. The BCH for the splotne is 2.7. reservoir emanhaments would be required as follows: event I would be located to the MII Stream tributary and run 112.7. The entabutanet would be induced as follows: 112.7. The entabutanet would be induced as follows: event I would be located to the MII Stream the existing railway 000m entabutanet would be induced to the MII Stream and run allogable a ad which joins the R127 near the railway underpass. The file into the existing railway embankment. A 60m entankment an average height of 0.9m would be required.					
Objectives	Giobal Weighting	or flood cells within APSR if local Weighting would	Baseline option assumes continuation of any existing maintenance regime in the study area	BOR for this option is 0.3 for the 1% AEP fluxed event and 0.5 ideal event. Due to the low BOR, this option is not considered an	- Culvert under the railway on main channel - Boi Culvert uncerpt 27m, Wolf 15m, Height 03 - Culvert uncerpt 27m, Wolf 15m, Height 03 - Culvert under the roadway into the park - Circular Culvert under the roadway into the park - Circular Culvert under the roadway into the parks - Circular Modelling result indicate that this option will have / parteam of the culverts (i.e. to the wast of the rail flood risk o agricultural and is reduced with wate Steam lowered by an average of 0.56m along a channel. Along the MB Sinsen ribulary (west embankment) wate embankment (i.e. 200m). the modelled reach (i.e. 200m).	section culvert: 2m xx section culvert: 1m ulvert: Length 80m. an impact on water d new culverts. vay embankment), levels in the bievels in the fuels 650m length of of the railway ge of 0.35m along	The BCR for this option is 0.8 for the 1%. BCR, this option is not cons	LEP fluvial event. G dered any further.	3iven the low	Hydraulic modelling indicates that this is no road levels along Millar Lane and Sheriock F and results in flood risk in other a	t a viable option. Lowering Tark creates new flow paths reas of Skerries.	Both options assume that the railway enbanks water. Additional investigations would be requi embankment would prevent the ingress of vase autom from toot reservoirs would be regulated of the existing culverts which run under Modelling results indicate that this option with upstream and downstream of the proposed stors reservoir embankments, flood risk to agricultur levels in the Mill Stream rising by an average of channel.	nent can be usee to determine westwards into the current ma. the railway and ave an impact or ge reservoirs. U Il land is increas 0.34m along a 6	d to impound if the railway Skerries. The ximum capacity road. water levels pstream of the ed with water 90m length of	Based on hydraulic modelling results, the pro are not significantly high to justify constru- combinision will agree capacity culverts unde combined gaton would have been conside embankments were significantly high. Option	xosed storage embankments ting the embankments in v the railway embankment. ed if the required storage not considered any further.		
		(second column			Downstream of the railway, the increased conveya culvers results in a rise in water levels along the M levels are raised by an average of 0.2 m taking 1.1 The raised by an average of 0.0 m taking 1.1 The results of the modelling indicate that existing or paths are modified with this option. These existing are as a result of capacity problems at the entran- culverts which results in food water spiling alon secondary roads at Millar Lane and Sherlock Park. these everland flow paths through increasing the culverts. This option also reduces flood plain store west of the railway endmandment. Replacing the treases the capacity in the change ambankom to the west of the railway embankom	nce capacity of the fill Stream. Water m of niver channel. t cross section by 0.44m. werland flood flow werland flood flow werland flow paths ze to the existing a the R127 and the option prevents capacity of the g on lands to the existing culverts ng the land flooded nt.						Along the Mill Stream tribudary level of the railway embanisment) water levels is informed a distributary be increased storage patient mesuls in radiative water levels and the railway. The microareast constraints and the railway of the microareast microareast constraints and the railway of the microareast constraints.           Comments         Boom         Weighted Store         Comments         Store						
				Comments Score	Weighted Score Comments	Score Weighted Score	Comments	Score	Weighted Score	Comments	Score Weighted Score	Comments	Score	Weighted Score	Comments	Score Weighted Scr		
A) Ensure Flood Risk Management options are operationally robust.	5	5.	ма		Increased channel converyance provided for by replacing existing structures with larger capacity culture. The option is not dependent on humanimuchanical intervention to operate. However, limited future maintenance will be required to ensure culverts are kept free from blockage.	3 75			o		o	Storage reservoirs to be designed to operate automatically (e.g. using hydrobrakes to control low), herefore no human/inebanical intervention to operation. The flood storage reservoirs would require limited maintenance over lifetime of option. Partially achieving aspirational target.	3	75		o		
B) Minimise Health and Safety risk of flood risk management options.	k 5	5 -	Na		Significant amount of construction works involved in this option with demolitizing of existing structures and installation of new culvers in the watercourse. Therefore significant health and attery risk to operators construct. Interventional: Therefore overall just exceeding minimum target.	1 25			O		0	Significnat health and safety risk to construction workers due to proximity of embankments to watercourses and the railways lime. Contractors involved in the construction of the reservoirs and the staff involved with the operation of the site would be working close to railway lines. Stratege reservoirs would be constructed to operate automatically, therefore no risk to operation of FMM potion. Needing minimum target.	1	25		0		
C) Ensure flood risk managed effectively and sustainable into future.	5	5 -	na		New collects to be designed to the 1% AEP MPRS 35% from MRPS 1% AEP Monitor from is greater than HEPS 1% AEP from therefore, collection of experimental appet.	5 125			D		0	Option is sustainable and adaptable to future risk. The flood storage reservoirs are capable of additional capacity to meet future flood risk needs. Meeting minimum target larget.	0	o		•		
Technical Total Score/ Weighted Score A) Minimise economic risk	25	1	Average annual damages (AAD) of CB,SBL AAD at Halbour Road GLIST. AAD at Structor, Park and Miller Lane (2710).		Colon would induce damages from the 1%0.0% AEP to 0 in the Deck ParkMer (are fixed on by presenting properties on the present of the park	9 <u>225</u> 3 75		0	0		0 0 0	Cption would reduce damages from the 114/0.5% AEP to 0 in the Shericok Park-Miller Lane flood call by protecting properties on Shericok Park and Miller Lane. There would all be damaged to be and the shericok part of the shericok partly achieving aspirational larget.	3	100		0 0 0		
B) Minimise risk to transport infrastructure	5	3 2	Ne nail at risk. Approximately 0.2km of Regional (R) sacks at risk (R127). Approximately 1.5km of secondary and tertiary roads at risk.	,	Option would protect the majority of at risk roads in the Sherlod Park/Miller Lane flood cell , including the regional roads at risk. There would still be reactual risk from the 0.1% event though the risk would be reduced. Thereice, party achieving apprairies target.	3 45			0		D	Option would protect the majority of at risk roads in the Sheriock Avail/Willer Lane flood cell including the regional reads. There would still be residual risk from the 0.1% event though the risk would be reduced. Therefore, partly achieving apprational target.	3	45		o		
C) Minimise risk to utility infrastructure	10	• •	No utility assets at risk		0 N/A	0 0			0		0	NA	0	0		0		
D) Minimise risk to agricultural land.	5	1 0	Approximately 4 hectares of agriculture land not benefiting from flood defences at risk of flooding		This option results in a reduction in flood risk to agricultural land due to the increased floor through the culvents. The majority of environment of the second reduction in risk from the 0.1 dis option. There will also be some reduction in risk from the 0.1 AEP event. Therefore, partly achieving appraidional larget.	3 15			0		D	This option increases the flood risk to the agricultural land to the west of the railway embankment by increasing the water leaves of the railway embands and the approximation of the significant area of agricultural land in the APSR and fails minimum target.	-5	-25		0		
A) Minimise risk to human health and life.	30	3 2	99 residential properties at risk (lockarly 10 at Harbour Pol and 40 in Sharbouk Packalitet Laws) No Ngh vulnerability properties at risk from flooding		This region fully protent properties at rule or Sherled Path and Miler Law up to the 'N'. AEP event and provides metachin in the     non the 0.1% AEP event. The option will also result in a notacion     non the 0.1% AEP event. The option will also result in a notacion     non the 0.1% AEP event. The option will also result in a notacion     non the 0.1% AEP event. The option will also result in a notacion	9 135 n 3 180		0	0		0	This option fully protects properties at risk on Sherlock Park and Miller Lane up to the 1% AEP event and provides reduction in risk met the 1.1% AEP event. The option park result in a reduction in risk from the 0.1% AEP. Therefore, partly achieving aspirational target.	3	180		•		
B) Minimise risk to community.	10	1 0	2 non residential properties at rick at Harbour Rd No high-value social infrastructural assets at rick		0 This option has no impact on non-residential properties in Skerries.	0 0			0		0	This option has no impact on non-residential properties in Skerries.	0	0		0		
C) Minimise risk to, or enhance, social amenity	r. 5	• .	No flood senalitive social amenity sites at risk		0 NA	0 0			O		0	NA	O	0		0		
Social Total Score/Weighted Score				0 Contraction of the contraction	0	3 180		0	0		0 0		3	180		0 0		
A) Support the objectives of the WFD.	5	5	This APSR obtains one where waterbady (good tatina). The APSR is also adjust to the Nuthersatin with Sas (HAID costant waterbady of indexte status (a. improvement inquived). The RHAP reports that the polariza- nationality adjustment of logo status privately waterbady to the second status of the second status of the second status of the second status the only measure disconditionation have been instituted to all waterbadies. The only measure discond status of the RHAP status of the all waterbadies interphological costs of the second status of the second status of the second method status of the second status of the second status of the second second status of the second status of the second status of the second second status of the second status of the second status of the second status (EIA, Planning & Development Regulations etc).		No contribution nor constraint to the achievement of WFD objectives as works will be within an already modified stretch of the channel. Meeting minimum target.	0 0			O		o	Potential constraint to the achievement of WED objectives as the proposed embankments could create a new morphological pressee, and will by their nature, create a new barrier between the river and its floopbain, Just failing minimum target.	-1	-25		o		
B) Minimise risk of environmental pollution	15	0	No potential sources of pollution at risk or present in this APSR		0 NA	0 0			o		0	NA	o	o		0		

									Options							
		Baseline	Skerries area APSR: Harbour Ro Option 1	d		Skerries area APSR: Miller Lane & Sherlock Park Option 2	k	Skerries area APSR: Mille Optio	r Lane & Sherlock n 3	Park	Skerries area APSR: Miller Lane & S Option 4	herlock Park	Skerries area APSR: Miller Li Option 5	ine & Sherlock P	Park	Skerries area AP
			Rehabilitating and raising existing coastal defe Road to reduce tidal flood risk.	ences at l	Harbour	Replacing culverts under roads and railway with larger c culverts and widening channel through park to reduce flux risk to properties at Miller Lane and Sherlock Park	capacity uvial flood rk.	Constructing a flow diversion char railway and roads at Miller lane an flood risk to properties at Mill	nel to run in a culv I Sherlock Park to er Lane and Sherlo	vert under the reduce fluvial ick Park.	Lowering road levels and raising kerb levels a Sherlock Park to allow controlled flooding reduce fluvial flood risk to prop	along Miller Lane along this road an perties.	and Construction of storage reservoir to the provide flood storage upstream of Skerr flood risk to properties along Mille	west of railway e les Area APSR to Lane and Sherl	embankment to o reduce fluvial ock Park.	Construction of storage rese provide flood storage ups replacing culverts under roa to reduce fluvial flood risk to
Runtificate announ	(excord column for food cels within APSR I cost weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	BCR for this option is 0.3 for the 1% AEP fluvial eve tidal event. Due to the low BCR, this option is not con	ent and 0.	5% AEP ny further.	This option would involve replacing the existing culverts und Dubin to Belfast railway tine with new larger capacity culver capacity of the existing culverts is instificent to convey large fi results in flood waters sponsing on land to the vest of the rai- results in spiller of lood waters algorithm to the set of the rai- net of the spinon is 1.3 for the 15.4 CPI fluxial emodeling incluses on necessary to worken and deepen the channels in the park. I- ther this option is 1.3 for the 15.4 CPI fluxial emodeling incluses and the spinon is 1.3 for the 15.4 CPI fluxial emodeling incluses and the spinon is 1.3 for the 15.4 CPI fluxial emodeling incluses the culverts would be required to convey the 1% ACPI MRFS 95% without survers. Wythat in condeling indicates that the culverts would be required to convey the 1% ACPI MRFS 95% without survers. Wythat in channels in the spin 2. Culvert under the railway on main channel - Box section on Length 27M. With 1.5M. Height 0.27M - Culvert under the railway on main channel - Box section on Length 27M. With 1.5M. Height 0.27M - Culvert under the railway on the inclusion of the proposed new cul- barries. A contrast is indicate that this option will have an impact 1.6 of rais to agricultural in a rise budget of the raik enbankment) water levels are reduced by an average of 0.5 channet. A contrast is not increased conveyance capaci- culvert mether the modeling indicate that the increased conveyance capaci- culvert mether is an arise in water levels and average of 0.5 channet. A contrast is a raise in water levels and the modeling the MI Stream enbankment) water levels are reduced by an average of 0.5 them coefficient with the option. These existing overland fi are as a result of apacity problems at the entrance to the e- itylatic are indicated with the option. These existing overland fi are as a result of apacity problems at the transmost the equivary the transmost of the railway enhankment. Replacing the lexits accontary reads at Miller Lane and Sherkook Fink. The option these ore	nder the rise. The flows and rise and always those and always opportent at at the shart is that its shart is that its the three opportent the three of the officient officient and the officient officient and the officient of the shart of the sexisting the officient the officien	The BCR for this option is 0.8 for the BCR, this option is not o	% AEP fluvial event	t. Given the low r.	Hydraulic modelling indicates that this is not a v road levels along Millar Lane and Sherlock Park and results in flood risk in other areas	iable option. Lower creates new how p of Skernes.	This option would involve the construction of the railway embartment to store flood embarkment and control discharges duri discharge dee not exceed the capacity of the Capacity of the BCR for 2 storage reservoir embarkment we storage the first 2.7. The embarkment we embarkment 1 would be located 1 alongside the first 2.7. The embarkment with a storage market and 2 would be located 1 alongside the first 2.7. The embarkment we embarkment 1 would be located to secondary road which joins the first 7 me embarkment would be into the existing railway with an average height of 0.9 bodies for the state of the storage of the and downstream of the proposed reservoir embarkments, flood risk to agricul diversity. The embarkment would be not the proposed reservoir embarkments, flood risk to agricul diversity. We increased alongs upstream raise channel. Mail Stream inbudray (sees 1 of the rainwoir water levels and storage langement mill along the MII Stream inbudray (sees 1 of the rainwoir water age of 0.0 first no rever channel. The maximum decement The residued of the rocated rainway free more and market poling along the first of the rainway mill along the MII Stream inbudray (sees 1 of the rainwoir diversity of the rocated in rever channel. The maximum decement rever channel. The reverse of the exist reverse reverse reverse reverse the reverse reverse reverse reverse revers	lood storage rese water upstream of a ga flood event. I de oksiling culvert is existing culvert is existing culvert in existing culvert in the option is 2.7 with the MIS Tream at the main culver of the MIS Tream events and the M	voirs upstream on the railway is under the road a local the road a local the road a local the road a local the road a local the road a local t	Based on hydraulic modelling are not significantly high t containation with larger capac embankments were significa
			Comments	Score	Weighted Score	Comments Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score Weighted	Score Comments	Score	Weighted Score	Comments
		A.											Due to the nature and location of this option, no impact of	n the		

the Skerries Islands SPA due to nature and I of works.

Iverts will be installed within an already modified section of channel so disturbance to flora and fauna will be negligible Meeting minimum target.

Potential for temporary impacts on fisheries and angling during the construction period, although the works will be undertaken within an already modified section of the waterocurse. Just failing minimum target.

Temporary adverse change in visual amenity, and potential deterioration in local landscape character, during construction period. However, on completion of works, there will be no long term impacts as there will be no change to above ground structures. Just failing minimum target.

Objectives

C) Avoid damage to, and where possible enhance, the flora and fauna of the study an

D) Avoid damage to, and where possible enhance, fisheries within the study area

E) Protect, and where possible enhance, landscape character and visual amenity within the study area

F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area

Environmental Total Score/ Weighted Score Total Score/ Total Weighted Score

Skarnes Islands EPA comprises three small, uninhabitid islands located bateven 0.5m and 1.5m off the coast of the APRR. There are no other internationally or nationally designated sites within or adjuent to the APRR. The coastal habitat within the APSR support or have the potential to support legal potential species or other species of conservation cocomer, atthough detailed distribution information in or a valiabitat

sment will be revisited following completion of the Appropriate As

coastline and islands support or are capable of supporting a variety of s Isla and shellful species. In and Skerries, off the coast of this APSR, are key locations for recreation and the sext coast of Ireland. Also, hrees and streams in the APSR he recreational use for anglers, though popular angling locations are unkno

re Shellfish Waters at Balbriggan/Skerries, designated under the EU Shell Waters Directive.

APSR fails within the **Casada** indexcase obtacence reak (of exceptional value) of a think are a risk from flooding. This layer to classified as level high sensitivity. Inclusion of the casada in the APSR are designated "Important Wave by Fing for Council appro. Solid of the RT38 th as source approx. Collider by the product approx. The approx. The approx. The casada in the APSR are easier based in the APSR are designed to the RT37 the product approx.

One site on RPS at risk (nature of site unknown).

tares of Skerries ACA at risk which represents less than 1% of the to



However, this option will result in the permanent loss of torreactin labelitas bornain the loogram, of the exclusion-memory exclusions and the loop of the loop of the loop of the loop of labels as atomagnet encoders as a result. Over takes and the effects on terminal options as a result. Over takes and the effects on terminal options as a result. Over takes and the effects on terminal options as a result. Over takes are an experimental takes and the loop of the takes and options which is no apport. Over, do be the terminal of options which is no apport. Over, do be the terminal of potions which is no apport. Over, do be the terminal of potions which is no apport. Over, do be the terminal of potions which is no apport. Over, do be the terminal enhancement, just exceeding minimum target.

Potential lossidisturbance to riverine habitat and dependent fisheries during construction of riveride embankments, the dam for the storage research and the research iself. Construction may constrain angling access if there is any in the vicinity although it could present opportunities for enhancement. Just failing minimum target.

Permanent adverse change in visual amenity resulting from the introduction of new flood defence structures, and potentially an adverse change to local landscape character (when storage reservoirs in use), within a highly sensitive landscape setting. Partly failing minimum target.

Option could potentially reduce the level of flood risk to this site. Due to its distance from the works, the historical setting of the site would not be affected. Exceeding minimum target.

50

-25

-60

10

325

-3

								Ontions					
			Baseline	Laytown, Bettystown and Coastal area Option 1	s APSR		Laytown, Bettystown and Coastal areas Option 2	APSR					
				-	Construction of flood defence embankments to p at risk along the coast and from the Nan	protect p ny River	operties	Construction of demountable flood defences to properties along the coast and from the Na	protect nny Riv	at risk er.			
					This option involves the construction of approximate embankments and 0.2km of flood defence walls on River Nanny along the R150 southwest of Laytown option is 1.2 for the 1% AEP fluvial event and 0.5%	ely 0.2km the left ba The BCI AEP tida	of flood ink of the R for this al event.						
	Objectives	àlobal Weighting	Local Weighting		Approximately 210m of flood defence walls are requised bank of the Nanny River. Where space is available, t been set back from the river bank. Along the R150 space to set the walls back from the river bank and constructed to the river bed level.	iired alon he flood v ), there is d these w	g the left valls have limited alls are						
		0		Baseline option assumes continuation of any existing maintenance regime in the study area	The average height of these walls is 1.0m above Immediately downstream of the railway bridge, app flood embankments is required along the left bank o This embankment is set back from the channel and height of 1.0m. Hydraulic modelling indicates that the water levels upstream or downstream of Laytown	the top of oximately f the Nan d has an a ere is no i with this	bank. 240m of ny River. average mpact on option.	The BCR for this option is 0.7 for the 1% AEP fluvia AEP tidal event. Given the low BCR, this option is any further.	l event a not con	nd 0.5% sidered			
					The results of the hydraulic modelling indicate that a flood flow path is modified with this option. The consi defence wall along the left bank of the River Nanny p overland flow path (eastwards along the R150 whic the railway bridge and into Laytown). There are no a natural floodplain storage affected by this	n existing truction of revents a h continu- areas of s option.	overland the flood n existing es under ignificant						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	No human or mechanical intervention is required for operation of this option. Some future maintenance will be required to ensure the embankments retain their flood defence function as designed. Partly achieving aspirational target.	3	75			0			0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	n/a	Construction works are located close to the river channel and close to the R150, therefore significant health and safety risk to construction workers. Health and safety risk to o operators/maintenance workers would be very limited. Overall, exceeding minimum target.	1	25			0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	n/a	Option is designed to protect up to the 0.5% AEP but can be adapted to the MRFS at additional cost by increasing height/length of embankments. Meeting minimum target.	0	0			0			0
	Technical Total Score/ Weighted Score					4	100		0	0		0	0
	A) Minimise economic risk	25	1	Average annual damages (AAD) of €47,205.	This option protects the at risk properties up to the 0.5% AEP event. There will be residual flooding from the 0.1% AEP event but flood damages will be reduced. Partly achieving aspirational target.	3	75			0			0
Economic	B) Minimise risk to transport infrastructure	5	3	<b>No rail</b> at risk Approximately <b>0.45km of Regional (R) roads</b> at risk (R150).	The R150 is protected by this option up to the 1% AEP. There will be some residual flooding for the 0.1%AEP although the extent of flooding will be reduced. Partly achieving aspirational target.	3	45			0			0
	C) Minimise risk to utility infrastructure	10	0	No utility assets at risk	NA	0	0			0			0
	D) Minimise risk to agricultural land.	5	2	Approximately <b>11 hectares of agriculture land</b> not benefitting from flood defences at risk of flooding.	This option has no impact on flood risk to agricultural land. Meeting minimum target.	0	0			0			0
	Economic Total Score/ Weighted Score					6	120		0	0		0	0
	A) Minimise risk to human health and life.	30	2	10 residential properties at risk No high vulnerability properties at risk from flooding.	This option fully protects properties at risk up to the 1% AEP event and provides reduction in risk from the 0.1% AEP event. Therefore, partly achieving aspirational target.	3	180			0			0
Social	B) Minimise risk to community.	10	1	1 non residential building at risk No high-value social infrastructural assets at risk	N/A	0	0			0			0
	C) Minimise risk to, or enhance, social amenity.	5	0	No flood sensitive social amenity sites at risk	N/A	0	0			0			0
	Social Total Score/ Weighted Score					3	180		0	0		0	0

								Options					
				Baseline	Laytown, Bettystown and Coastal area Option 1	s APSR		Laytown, Bettystown and Coastal areas Option 2	s APSR				
				-	Construction of flood defence embankments to p at risk along the coast and from the Nan	protect p ny River	roperties	Construction of demountable flood defences to properties along the coast and from the Na	o protec anny Ri	et at risk ver.			
		_			This option involves the construction of approximat embankments and 0.2km of flood defence walls on River Nanny along the R150 southwest of Laytown option is 1.2 for the 1% AEP fluvial event and 0.5%	ely 0.2km the left ba The BCI AEP tida	of flood ank of the R for this al event.						
	Objectives	Global Weighting	Local Weighting		Approximately 210th 01 flood defence waits are requestion of the Nanny River. Where space is available, t been set back from the river bank. Along the R15 space to set the walls back from the river bank an constructed to the river bed level.	he flood v 0, there is d these w	g the left valls have imited valls are						
				Baseline option assumes continuation of any existing maintenance regime in the study area	The average height of these walls is 1.0m above Immediately downstream of the railway bridge, appr flood embankments is required along the left bank or This embankment is set back from the channel an height of 1.0m. Hydraulic modelling indicates that th water levels upstream or downstream of Laytown	the top of oximately f the Nan d has an a ere is no i with this	f bank. 240m of ny River. average impact on option.	The BCR for this option is 0.7 for the 1% AEP fluvia AEP tidal event. Given the low BCR, this option is any further.	al event s not coi	and 0.5% nsidered			
					The results of the hydraulic modelling indicate that a flood flow path is modified with this option. The cons defence wall along the left bank of the River Nanny p overland flow path (eastwards along the R150 whic the railway bridge and into Laytown). There are no a natural floodplain storage affected by this	n existing truction of prevents a h continue areas of s option.	overland f the flood an existing es under ignificant						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Support the objectives of the WFD.	5	5	The APSR borders two transitional (estuarine) waterbodies: the Boyne Estuary to the north, and Nanny Estuary to the south. Both are classified as being of moderate status. The RBMP reports that the problems constraining achievement of good status relate to pollution pressures from agriculture, dangerous substances and wastewater and industrial discharges. The basic measures directly relevant to the FEM FRAMS (physical modificationsmorphological pressures) for all waterbodies relate to the need for compliance with head requirements (EIA Betterming & Beelsoneet Heavlations etc.)	Potential constraint to the achievement of WFD objectives as the proposed embankments could create a new morphological pressure. Just failing minimum target.	-1	-25			0			0
				The APSR also borders two coastal waterbodies: Boyne Estuary Plume Zone and Northwestern Irish Sea (HA08) = high status (i.e. no deterioration allowed).									
	B) Minimise risk of environmental pollution	15	0	No potential sources of pollution at risk or present in this APSR	N/A	0	0			0			0
	C) Avoid damage to, and where possible			The Boyne Coast and Estuary SAC/pNHA and the Boyne Estuary SPA is located alongside the northern boundary of the APSR, approximately 2km and 4km respectively from the mouth of the Nanny River. The Nanny River itself is designated as an SPA and in part, a pNHA. The River Nanny Estuary & Shore SPA covers the entire estuary and approximately 3km of shoreline to the north and south of the estuary. It is designated for seven non-breeding waterbird species, five of which occur in nationally important numbers.	Situated approximately 2km from the Boyne Coast & Estuary The new embankments will be situated within 50m of the SPA boundary, but set back at least 75m from the shore. As such, depending on the timing of the construction works, there is the potential for disturbance to roosting birds, which are designated interest features of the SPA.								
ental	enhance, the flora and fauna of the study area	10	3	This assessment will be revisited following completion of the Appropriate Assessment.	The new valls will be within the SPA boundary, and in places in the estuarine channel itself. As such, there will be permanent loss of estuarine habitat and disturbance to species beneath the footprint of the walls. In addition, there is potential for disturbance to the birds which are designated interest features of the SPA. Partly failing minimum target.	-3	-150						U
Environm				All rivers and streams within the APSR support or are capable of supporting salmonid species such as salmon, brown trout and sea trout, and are likely to provide salmonid spawning or nursery areas. Some watercourses within the APSR area are also likely to support brook, river and/or sea lamprey. The estuaries provide spawning, nursery and feeding habitats for a range of	Potential for loss/disturbance to estuarine habitat and associated								
	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	5	Itsh species, particularly bass, sand goby, grey mullet, flounder and sprat. In addition, important migratory fish species, namely salmon, sea trout, eels and lampreys, pass through on their way to or from their spawning grounds. There are no known barriers to fish movement within the APSR. There are Shellfish Waters at Balbriggan/Skerries, off the coastline of this APSR, designated under the EU Shellfish Waters Directive.	fisheries during the construction of the new flood defence structures within the river bed. Just failing minimum target.	-1	-25			0			0
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	4	The APSR fails within the <b>Coastal Plains</b> and <b>Nanny Valley</b> landscape character areas (of regional importance). Both of these landscape types are classified as being of high sensitivity.	Adverse change in visual amenity, and potentially local landscape character, resulting from introduction of new flood defence structures within a highly sensitive landscape setting. Partly failing minimum target.	-3	-60			0			D
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	2	2 moderate vulnerability sites on RPS at risk. These comprise: a detached double- pile four-bay single-storey former house, built c.1870, now in use as an office; and, a detached five-bay three-storey hotel, built c.1847, with return to rear. No ACAs at risk.	Both sites will experience a reduced level of flood risk following implementation of this option. However, being situated within 100m of a new embankment (1m high), there may be some change to their historical setting. Given the reduction in flood risk, and scale of the new defences, this option is considered to be meeting the minimum target.	0	0			0			0
	Environmental Total Score/ Weighted Score					-8	-260		0	0		0	0
Total Sco	re/ Total Weighted Score					5	140		0	0		0	0

























Locatio	on Plan :
ds ds	Douabate Douabate Malahide Kinstey Portmarr
FRM O	PTIONS MAP
Legei	nd
+	Demountable walls
	Floodwalls
	Improve existing defences
<b>Diak to</b> (	Area defended by option
	Utilities
2	Energency response/governance
>	Airport
+++13341++	Railway line
	Motorway
	National
	Regional
Risk to H	luman Health
	High vulnerablity sites
Risk to t	he Environment
	Protected areas
	cSAC, SAC, SPA, NHA and pNHA sites
Risk to C	Cultural Heritage
1.1	Cultural heritage sites
	10 % AEP Flood Extent (1 in 10 chance in any given year)
	0.5 % AEP Flood Extent (1 in 200 chance in any given year)
	0.1 % AEP Flood Extent
	(1 in 1000 chance in any given year) Modelled River Centreline
USER NOTE : USERS OF TH THEIR DERI CONDITIONS THIS MAP DO	IESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF VATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF ES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE
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*	
Fingal Co	anty Council and Three Gal
Project : FEM FR	AMS
Map : Portmarno	ock and Malahide areas APSR
Option 5 -	Malahide town centre
Checked E	Nevin Daily         Date : 04 Apr 2011           By : Clare Dewar         Date : 04 Apr 2011
Approved	By : Anne-Marie Conibear Date : 04 Apr 2011
Figure No. Malahi	de/CURS/T/005
Drawing S	cale : 1:3,000 Plot Scale : 1:1 @ A3

![](_page_70_Figure_0.jpeg)

Location Plan :         Image: Operation of the point of the poin
Eloodwalls Mal 5
Connecs
Emergency response/governance
Service Airport
+++++++++ Railway line
Motorway
National
Regional
Risk to Human Health
High vulnerablity sites
Risk to the Environment
Potential pollution sources Protected areas
cSAC, SAC, SPA, NHA and pNHA sites
Risk to Cultural Heritage
Cultural heritage sites
10 % AEP Flood Extent (1 in 10 chance in any given year)
0.5 % AEP Flood Extent
(1 in 200 chance in any given year)
(1 in 1000 chance in any given year)
Modelled River Centreline
LISED NOTE -
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Clients:
Final County Council
Froject : FEM FRAMS
Map : Portmarnock and Malahide areas APSR Option 5a - Malahide town centre
Figure By : Kevin Daly Date : 04 Apr 2011
Checked By : Clare Dewar Date : 04 Apr 2011
Approved By : Anne-Marie Conibear Date : 04 Apr 2011
Figure No. : Revision Malahide/CURS/T/005a
Drawing Scale : 1:3,000 Plot Scale : 1:1 @ A3

![](_page_71_Figure_0.jpeg)

![](_page_71_Figure_1.jpeg)
















Location	Plan : Malahide <sup>5</sup> Portmarnock <sup>1relan</sup> Eye
FRM OP	TIONS MAP
Legen	d
	Embankments
	Area defended by option
Risk to C	ritical Infrastructure
U	Utilities
*	Emergency response/governance
*	Airport
++++	Railway line
	Nativaly inte
	Notorway
	Regional
Risk to H	uman Health
	High vulnerablity sites
Risk to th	ne Environment
	Potential pollution sources
	Protected areas
	cSAC, SAC, SPA, NHA and pNHA sites
Risk to C	ultural Heritage
<b>1</b> -1	Cultural heritage sites
	10 % AEP Flood Extent (1 in 10 chance in any given year)
	0.5 % AEP Flood Extent (1 in 200 chance in any given year)
	0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
	Modelled River Centreline
USERS OF THES THEIR DERIVAT	SE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF TION, LIMITATIONS IN ACCURACY AND GUIDANCE AND " USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF
THIS MAP DOES	NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE
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Clients:	
Fingal Count Comhairle Centa	V Ceacel Research
Project : FEM FRA	MS
Map : Portmarnock	k and Malahide areas APSR 1 - Option 1
Figure By :	Kevin Daly Date : 17 Jan 2011
Checked By	Clare Dewar Date : 17 Jan 2011
Approved By Figure No. :	y : Anne-Marie Conibear Date : 17 Jan 2011
StrandR	d/CURS/T/001
Drawing Sca	ale : 1:2,500 Plot Scale : 1:1 @ A3



Location Plan :         Image: Strate in the strate in th
Replacement of flapped gate
Area defended by option
Risk to Critical Infrastructure
U Utilities
Emergency response/governance
Airport
National
Regional
Risk to Human Health
High vulnerablity sites
Risk to the Environment
Potential pollution sources
Protected areas
cSAC, SAC, SPA, NHA and pNHA sites
Cultural heritage
10 % AEP Flood Extent
0.5 % AEP Flood Extent
(1 in 200 chance in any given year) 0.1 % AEP Flood Extent
(1 in 1000 chance in any given year) Modelled River Centreline
USER NOTE : USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE
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Clients:
Final Comp Council Commer Contain Final Set
Project : FEM FRAMS
Map : Portmarnock and Malahide areas APSR Strand Road, Onting 2
Strand Road - Option 2 Figure By : Kevin Daly Date : 17 Jan 2011
Checked By : Clare Dewar Date : 17 Jan 2011
Approved By : Anne-Marie Conibear Date : 17 Jan 2011
StrandRd/CURS/T/002
Drawing Scale : 1:2,500 Plot Scale : 1:1 @ A3













# E3 Mayne and Sluice

							Op	tions				
				Baseline	Mayne & Sluice AU Option 1		-					
				-	Develop a fluvial FFWS for the Mayne Ri	ver						
	Objectives		Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning involves the use of mathe models to predict flood water levels and tools to disseminal to people at risk. Further information on the viability o forecasting options are reported on in the Preliminary Opt forecasts would be disseminated through a dedicated web service to provide advance warning to commu A FFWS for the Mayne River would provide advance fi properties at risk along the Mayne River in St Margaret's Belcamp and Balgriffin areas APSR.	matical cu te flood ha f various f ions Repo site and n inities. lood warn s, Dublin a	omputer azard data flood ort. Flood nessaging ing to Airport,					
					Comments	Score	Weighted Score	Comments Score	e Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	Some mechanical and human intervention required for the fluvial forecasting & warning system. Computer models and rainfall/flow gauges would require regular maintenance. Option reliant on certainty of flood warning system, therefore just meets minimum target.	0	0		0			0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	n/a	Limited health and safety risk to construction workers involved with the installation of the gauges (2 flow and 5 TBR) for the flood forecasting & warning system as only limited work adjacent to river channels .	3	75		0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	n/a	Option will continue to be operational in MRFS/HEFS conditions, therefore meets aspirational target.	5	125		0			0
	Technical Total Score/ Weighted Score					8.0	200	0	0		0	0
	A) Minimise economic risk	25	1	Average annual damages of €47,028	This option is likely to result in a limited reduction in damages (~20%), thus partly exceeding the minimum target and scoring 1.	1	25		0			0
0	B) Minimise risk to transport infrastructure	5	4	Approximately <b>0.1km of National Primary (NP)</b> roads and 0.6km of Regional (R) roads at risk	Option would have no impact on the transport infrastructure at risk. Meeting minimum target as no increase in risk to transport infrastructure.	0	0		0			0
Econom	C) Minimise risk to utility infrastructure	10	0	0 utility infrastructure assets at risk	N/A	0	0		0			0
	D) Minimise risk to agricultural land.	5	2	Approximately <b>31 hectares of agriculture</b> land not benefiting from flood defences at risk of flooding. This represents approximately 1.5% of the total agricultural land in the AU.	Option would have no impact on the agricultural land at risk. Meeting minimum target as no increase in risk to agricultural land.	0	0		O			0
	Economic Total Score/ Weighted Score					1.0	25	0	0		0	0
	A) Minimise risk to human health and life.	30	2	<ul> <li>28 residential properties including 1 in Kinsaley Lane area APSR and 19 in St Margarets, Dublin Airport, Belcamp, Balgriffin APSR at risk.</li> <li>0 high vulnerability properties at risk</li> </ul>	Option would not reduce flood risk to residential properties. Number of properties located in at risk areas would remain the same. Therefore, just meeting minimum target.	0	0		0			0
Social	B) Minimise risk to community.	10	2	<ul> <li>3 non-residential properties at risk including 1 in Kinsaley Lane area APSR and 2 in St Margarets, Dublin Airport, Belcamp, Balgriffin APSR.</li> <li>0 high-value social infrastructural assets at risk from flooding</li> </ul>	Option would not reduce flood risk to non-residential buildings. Number of properties located in at risk areas would remain the same. Therefore, just meeting minimum target.	0	0		0			0
	C) Minimise risk to, or enhance, social amenity.	5	2	1 Golf course at risk at Forrest Little Sports pitches at ALSAA sports complex near Dublin Airport	Option would have no impact on the number of social amenity sites at risk. Meeting minimum target as no increase in risk to social amenity sites.	0	0		0			0
	Social Total Score/ Weighted Score					0.0	0	0	0		0	0

							Opt	ions					
				Baseline	Mayne & Sluice AU Option 1								
				-	Develop a fluvial FFWS for the Mayne R	iver							
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning involves the use of mathe models to predict flood water levels and tools to dissemina to people at risk. Further information on the viability o forecasting options are reported on in the Preliminary Opt forecasts would be disseminated through a dedicated web service to provide advance warning to commu A FFWS for the Mayne River would provide advance f properties at risk along the Mayne River in St Margaret Belcamp and Balgriffin areas APSR.	matical cc te flood há f various I ions Repo site and n inities. lood warn s, Dublin J	omputer azard data lood ort. Flood nessaging ing to Airport,						
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
	A) Support the objectives of the WFD.	5	5	The Sluice River is classified as a "High" status river water body, which means that this highly sensitive and valuable status should be maintained and no deterioration allowed. The Mayne River is classified as a "Poor" status river water body, which means that measures are required to achieve "Good" status by 2027. The RBMP reports that problems constraining achievement of good status include high nutrients (phosphorus), oxygen demand, low ecological rating and inferior habitat, with the principal pressure within the WMU (which also includes the Santry River to the south of the study area/AU), wastewater and industrial discharges and diffuse pollution. The measures directly relevant to the FEM FRAMS (physical modifications - morphological pressures) relate to the need for compliance with legal requirements (EIA, Planning & Development Regulations etc) and to ensure compliance with OPW Environmental Drainage Maintenance Guidance Notes	No contribution nor constraint to the achievement of WFD objectives as there will be no physical works within or modification to the river channels and adjacent land. Meeting minimum target.	0	0			0			0
	B) Minimise risk of environmental pollution	15	5	Within the AU, there are 6 Waste Management Permit Sites at risk (1% AEP fluvial event), all of which are located along the Sluice River (note that the 6 sites refer to 6 separate licence numbers issued for one WMP site).           The following are present in the AU: 4 Section 4 licences and 18 Section 16 licences.	No positive or negative change in flood risk to potentially polluting sites within the AU as no intervention involved. Meeting minimum target.	0	0			0			0
ıvironmental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	5	<ul> <li>Within the AU boundary, Feltrim Hill pNHA (thought to be a geological site) is at risk from flooding. 16 hectares are at risk (1% AEP fluvial event) which represents 40% of the overall area of this pNHA.</li> <li>Approximately 1.5km downstream of the AU is the Baldoyle Bay SAC/SPA/Ramsar site/pNHA. The bay contains large areas of sandflats, mudflats and saltmarshes, and supports internationally important wintering populations of Brent geese as well as nationally important populations of a further seven waterfowl species. Changes in the catchment, which alter the flooding regime and freshwater input into the estuary could potentially affect the nature, extent and character of intertidal habitat for which the site is designated, with associated impacts on designated waterbird populations.</li> <li>The rivers and their floodplain within the AU support or have the potential to support legally protected species or other species of conservation concern (e.g. otter, kingfisher, bats, Atlantic salmon), although detailed distribution information is not available.</li> <li>This assessment will be revisited following completion of the Appropriate Assessment.</li> </ul>	No impacts are anticipated on potentially sensitive riverine habitats or associated fauna (located within or outside the designated nature conservation sites) as there will be no physical works within channels or modification to the river channels or adjacent land. Meeting minimum target.	0	O			0			0
ш	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	3	The Mayne and Sluice rivers and other streams within the AU are capable of supporting salmonid species and potentially provide salmonid spawning or nursery areas. There is also the potential that these watercourses may support brook, river and or sea lamprey. There are no fisheries designations within the AU (e.g. Salmonid Waters). There are known areas of angling activity along rivers in the AU, though the exact locations of popular angling areas are unknown. A sluice gate on the Sluice River provides a barrier to fish movement (migratory salmon).	No impacts on fisheries or angling activity as there will be no physical works within or modification to the river channels. Meeting minimum target.	0	0			0			0
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	3	The AU falls within the <b>Low Lying Agricultural</b> landscape character area, classified as being of modest value and medium sensitivity. Fingal County Council also designates 'Important Views'; though none are present within the AU.	No change in landscape character and visual amenity as there will be no physical works or modifications within or adjacent to the river channels in the Mayne sub-catchment. Meeting minimum target.	0	0			0			0
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	3	<ul> <li>6 Sites on SMR/RMP at risk (1% AEP fluvial event). 4 sites unique to RMP (a habitation site, a possible castle site and dwelling at Balgriffin Park and a MOND). The remaining 2 sites are unique to the SMR: a Ringfort - cashel at Feltrim and a building at Balgriffin Park.</li> <li>There is one ACA present in the AU; Abbeyville ACA, of which 5.4ha is at risk, representing approximately 15% of the total ACA.</li> </ul>	There will be no positive or negative change in risk to 6 sites on the SMR/RPS/RMP (through either direct impacts or impacts on setting) as there will be no physical works as a result of this option. Meeting minimum target.	0	0			0			0
	Environmental Total Score/ Weighted Score					0	0		0	0		0	0
otal Sco	re/ Total Weighted Score					9	225		0	0		0	0

								Options					
				Baseline	St Margaret's, Dublin Airport, Belcamp and Balgriffin ar Option 1	reas APSR		St Margaret's, Dublin Airport, Belcamp and Balgriffi Option 1a	in areas	APSR			
					Improving channel conveyance by replacing existing culver construction of flood defence embankments (Balg	ts togethei riffin).	with	Improving channel conveyance by replacing existing cul construction of flood defence embankments (E	lverts tog Balgriffin	jether with ).			
					This option involves the construction of a flood defence embankmen on the Mayne River tributary and the construction of embankments left bank of the Mayne River and tributary at Balgriffin. Hydraulic mov replacing existing culverts is not necessary as part of this option. The is 1.2 Modelling results indicate that the existing culverts under the RT development at Balgriffin are sufficient to accommodate the 1% A surchargring. An under capacity channel north of the RT23 results in I southwards across the RT23 and flooding the housing development flood water spilling south across the RT23.	Ihis option involves the construction of a flood defence embankment north of the H123 on the Mayne Fliver ributary and the construction of embankments and walls along the splacing existing culverts is not necessary as part of this option. The BCR for this option is 1.2 Modelling results indicate that the existing culverts under the R123 and the new development at Balgriffin. As sufficient to accommodate the 1% AEP event without curcharging. An under capacity channel north of the R123 results indicate rots pilling southwards across the R123 and flooding the housing development at Balgriffin. A 280m imbankment with an average height of 0.7m is required on the left bank of the Mayne Fliver and lio ributary to prevent out of bank fooding downstream. This embankment is link to ta flood wall on the Mayne Fliver, and in the left bank of the Mayne Fliver and lio ributary to prevent out of bank the left bank of the Mayne Fliver and lio ributary to prevent out of bank the left bank of the Mayne Fliver and lio ributary to prevent out of bank the left bank of the Mayne Fliver and lio the Mayne Fliver splan.			ankment Ibankmer iffin. The 3. Hydra. Ily. By re north of existing of as part of surcharg	north of the tts and walls option also ulic modelling moving this the R123 will vulverts at the this option as ing. The BCR			
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Further downstream, a 200m long embankment with an average required on the left bank of the Mayne River and its tributary to pr flooding downstream. This embankment is linked to a flood wall on th in length, with an average height of 2.4m (due to space constraints, the bed of the channel). Average height of this wall above ground le 0.6m.	A 280m embankment with an average height of 0.5m runnin, R123 is required to prevent flood water spilling south across downstream, a 200m long embankment with an average heigh the left bank of the Mayne River and its tributary to prevent downstream. This embankment is linked to a flood wall on the length, with an average height of 2.4m (due to space constrain the bed of the channel). The average height of this wall ab approximately 0.6m.	g east we s the R12 t of 0.7m out of bai e Mayne F nts, wall c ove groui	st along the 3. Further is required or hk flooding River, 50m in onstructed to hd level is	7				
					Modelling results indicate that this option will have some localised in upstream and downstream of the proposed location for this option. U water levels on the Mayne River tributary are raised by an average o stretch of the channel. Downstream of the R123, water levels on the tributary are raised by an average of 0.15m along 430 m of river chan the bridge at The Hollow, there are no changes in water in the stretch of the channel.	Modelling results indicate that this option will have some loca levels upstream and downstream of the proposed location for to the R123, water levels on the Mayne River ributary are lowe 0.12m along a 120m stretch of the channel. Downstream of the the Mayne River and its tributary are raised by an average of river channel. Downstream of the bridge at The Hollow, there a	lised imp his optior red by an R123, w 0.16m al re no cha	r					
					The results of the modelling indicate that existing overland flood flow with this option. These existing overland flow paths from the May (southwards across the R123) are as a result of capacity problems : bridge structure and lead to the flooding of properties at Balgriffin. It these overland flow paths through increasing the capacity of the stru- areas of significant natural floodplain storage affected by t	The results of the modelling indicate that existing overland modified with this option. These existing overland flow paths : tributary (southwards across the R123) are as a result of capaci- old stone bridge structure and lead to the flooding of propert option prevents these overland flow paths through increasing structures. There are no areas of significant natural floodplain s option.	flood flow from the f ity proble ties at Ba g the cap storage a	paths are Mayne River ms at existing Igriffin. The acity of the ffected by this	g s				
					Comments Score Weighted		Comments	Score	Weighted Scor	e Comments	Score	Weighted Score	
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	No human or mechanical intervention is required for operation of this option. Some future maintenance will be required to ensure the embankments and walls retain their flood defeno function as designed. Partly achieving aspirational target.	e 3	75	No human or mechanical intervention is required for operation of this option. Some future maintenance will be required to ensure the embankments and walls retain their flood defence function as designed. Partly achieving aspirational target.	3	75		-	0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	n/a	Construction works are located close to the river channel and close to the R123, therefore significant health and safety risk to construction workers. Health and safety risk to operators/maintenance workers would be very limited. Overall, exceeding minimum larget.	1	25	Demolition and construction works are located close to the river channel and close to the R123, therefore significant health and safety risk to construction workers. Health and safety risk to operators/maintenance workers would be very limited. Overall, exceeding minimum target.	1	25		-	0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	nia	Option is designed to protect up to the 1% AEP but can be adapted to the MRFS at additional cost by increasing heightlength of embankments and walls. Meeting minimum target.	0	0	Option is designed to protect up to the 1% AEP but can be adapted to the MRFS at additional cost by increasing heightlength of embankments and walls. Meeting minimum larget.	0	0			0
	Technical Total Score/ Weighted Score A) Minimise economic risk	25	1	Average annual damages (AAD) of €25,176. AAD at Balgriffin is €24866.	This option protects the at risk properties up to the 1% AEP event. There will be residual flooding from the 0.1% AEP event but flood damages will be reduced. Partly achieving aspirational target.	3	75	This option protects the at risk properties up to the 1% AEP event. There will be residual flooding from the 0.1% AEP event but flood damages will be reduced. Partly achieving aspirational target.	4	75		0	0
mic	B) Minimise risk to transport infrastructure	5	4	Approximately 0.1km of National Primary roads and 0.5km of Regional roads at risk.	The R123 is protected by this option up to the 1% AEP. There will be some residual flooding for the 0.1% AEP although the extent of flooding will be reduced. Parify achieving aspirationa target.	3	60	The R123 is protected by this option up to the 1% AEP. There will be some residual flooding for the 0.1% AEP although the extent of flooding will be reduced. Partly achieving aspirational target.	3	60			0
Econo	C) Minimise risk to utility infrastructure	10	0	0 utility infrastructure assets at risk	NA	0	0	N/A	0	0		-	
	D) Minimise risk to agricultural land.	5	1	Approximately 5 hectares of agriculture land not benefiting from flood delences at risk of flooding.	This option results in a small increase in flood risk to agricultural land upstream of the R123 due to the construction of the embankment. Therefore, just lailing minimum target.	-1	-5	This option results in an small increase in flood risk to agricultural land upstream of the R123 due to the construction of the embankment. Therefore, just failing minimum target.	-1	-5			0
	A) Minimise risk to human health and life.	30	2	19 residential properties at risk. O high vulnerability properties at risk	This option fully protects properties at risk up to the 1% AEP event and provides reduction risk from the 0.1% AEP event. Therefore, partly achieving aspirational target.	3	130	This option fully protects properties at risk up to the 1% AEP event and provides reduction in risk from the 0.1% AEP event. Therefore, partly achieving aspirational larget.	3	130		0	0
Social	B) Minimise risk to community.	10	1	2 non-residential properties at risk 0 high-value social infrastructural assets at risk from flooding	This option fully protects the non-residential properties at risk up to the 1% AEP event and provides reduction in risk from the 0.1% AEP event. Therefore, partly achieving aspirational target.	3	30	This option fully protects the non-residential properties at risk up to the 1% AEP event and provides reduction in risk from the 0.1% AEP event. Therefore, partly achieving aspirational target.	3	30			O
	C) Minimise risk to, or enhance, social amenity.	5	1	Sports pitches at ALSAA sports complex near Dublin Airport	Option would have no impact on sports pitches. Meeting minimum target. 0 0 Option would		Option would have no impact on sports pitches. Meeting minimum target.	0	0			0	
<u> </u>	Social Total Score/ Weighted Score					6	210		6	210		0	0
	A) Support the objectives of the WFD.	5	5	The APSR contains areas of three river waterbodies: 1 = high status; 2 = poor status. The RBMP reports that problems constraining achievement of good status include high nutrients (phosphorus), opgen domand, low ecological rating and referior habitat, with the principal pressure within the WMU (area) that also includes the Samiry River to the south of the study area/AU) are wastewater and industrial discharges and diffuse pollution.	Potential constraint to the achievement of WFD objectives as the proposed floodwalls could create a new morphological pressure. Just failing minimum target.	loodwalls could -1 -25 g		Potential constraint to the achievement of WFD objectives as the proposed floodwalls could create a new morphological pressure. Just failing minimum target.	-1	-25			0
	B) Minimise risk of environmental pollution	15	0	No Waste Management Permit Sites at risk. Six Section 4 and 17 Section 16 licenses granted in the APSR - these sites are not at risk of fooding	No sites at risk; no change anticipated. All Section 4 and Section 16 licenses are held in locations outside of the area anticipated to experience a change in water level. Thus, no risk to water quality anticipated. Meeting minimum target.	¢ 0	0	No sites at risk; no change anticipated. All Section 4 and Section 16 licenses are held in locations outside of the area anticipated to experience a change in water level. Thus, no risk to water quality anticipated. Meeting minimum target.	0	0			0

								Options					
				Baseline	St Margaret's, Dublin Airport, Belcamp and Balgriffin are Option 1	as APSR		St Margaret's, Dublin Airport, Belcamp and Balgriffi Option 1a	n areas A	PSR			
				-	Improving channel conveyance by replacing existing culverts construction of flood defence embankments (Balgri	together ffin).	with	Improving channel conveyance by replacing existing cul construction of flood defence embankments (B	verts tog algriffin).	ther with			
	Objectives Building Building				This option involves the construction of a flood defence embankments and walls along the flood kelence embankments and walls along the flood kelence embankments and walls along the flood kelence embankments and walls along the flood set to this option. The BCR for this option also and the key of the Mayne River and this approximation of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construction of a flood defence embankment and walls along the flood set to construct and the influence of the flood set to construct and height of embankments and walls along the flood set to construct and height of embankments and the flood set to construct and height of embankments and the flood set to construct and height of embankments and the flood set to construct and height of embankments and the flood set to construct and height of embankments and the flood set to construct and height of embankments and the flood set to construct and height of embankments and the flood set to construct and height of the flood set to construct and height of embankments and walls along the flood set to construct and height of embankmen								
	Objectives		Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Further downstream, a 200m long embankment with an average h required on the left bank of the Mayne River and its tributary to pre flooding downstream. This embankment is linked to a flood wall on the in length, with an average height of 2.4m (due to space constraints, w the bed of the channel). Average height of this wall above ground leve 0.6m.	eight of 0. vent out oi Mayne R. vall constri el is appro	7m is f bank iver, 50m ucted to ximately	A 280m embankment with an average height of 0.5m running R123 is required to prevent flood water spilling south across downstream, a 200m long embankment with an average height the left bank of the Mayne River and its tibulary to prevent downstream. This embankment is linked to a flood wall on the length, with an average height of 2.4m (due to space constrain the bed of the channel). The average height of this wall abo approximately 0.6m.	teast wes the R123 of 0.7m is out of ban Mayne R Mayne R ts, wall co ove ground	t along the Further required on flooding ver, 50m in nstructed to f level is			
					Modelling results indicate that this option will have some localised imp upstream and downstream of the proposed location for this option. Up water levels on the Mayne fliver tributary are raised by an average of stretch of the channel. Downstream of the R123, water levels on the k tributary are raised by an average of 0.15m along 430m of river chan the bridge at The Hollow, there are no changes in water le	act on wa stream of i 0.2m along Mayne Rive nel. Downs levels.	ter levels the R123, g a 250m er and its stream of	Modelling results indicate that this option will have some local levels upstream and downstream of the proposed location for th the R123, water levels on the Mayne River tributary are lower 0.12m along a 120m stretch of the channel. Downstream of the the Mayne River and its tributary are raised by an average of river channel. Downstream of the bridge at The Hollow, there at the Moyne River and the the stretch of the channel.	ised impa nis option. red by an R123, wa D.16m alo re no char	ct on water Upstream of average of ter levels on ng 430m of ges in water			
					The results of the modelling indicate that existing overland flood flow, with this option. These existing overland flow paths from the Mayn (southwards across the R122) area as result of capacity problems at bridge structure and lead to the flooding of properties at Balgriffin. T these overland flow paths through increasing the capacity of the struc- areas of significant natural floodplain storage affected by the	paths are e River trib e existing o ne option p tures. The is option.	modified outary old stone orevents re are no	The results of the modelling indicate that existing overland 1 modified with this option. These existing overland flow paths 1 tributary (southwards across the R123) are as a result of capaci- old stone bridge structure and lead to the flooding of propert option prevents these overland flow paths through increasing structures. There are no areas of significant natural floodplain s option.	lood flow rom the N ty probler es at Balg the capa torage aff	paths are ayne River is at existing riffin. The city of the ected by this	,		
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Score	Weighted Score
Environmental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	5	There are no Internationally or nationally designated nature conservation sites within the APSR, However, approximately 1.5km downstream is the Badoyle Bay SAC/SPA.Ramas relepNH4. This bay contains large areas of sandlats, multitas and satimashes, and supports internationally important writering populations of Erreit genes in the catchment, which after the flower and the satisfies and the satisfies of the satis	Comments Increased conveyance through this channel and the introduction of new flood embankments and a floodwall is likely to change the pattern of flow downstream of the APSH during a 1% APE flood event (1 in 100 chance in any given year), and possibly during a 1% APE flood event (1 in 10 chance). In particular, for Baldoyle Bay, NHA and Baldoyle Bay, SACISPA (agroups 1.5km downstream and Gm downstream of proposed works respectively), there is the potential for these sites to be affected by a change in free/sware input during a downstream of the APSICBA (agroups 1.5km downstream), and there is change in free/sware input during flow downst. However, any effect on these designated sites are expected to be localised. This assessment will be updated on completion of the Appropriate Assessment. Undertaking works within the channel is anticipated to result in disturbance to and potential loss of riverine and terrestrial hubitats and species, abeit localised, particularly given that these sections of the channel agare to be un-modified. Overall, option considered to be partly failing minimum target.	Score	Weighted Score	Comments  Increased conveyance through this channel and the introduction of new flood embackments and a floodwall is likely to change the pattern of flow downstream of the APSR to change the pattern of flow downstream of the APSR to change the pattern of flow downstream of the APSR to change the pattern of flow downstream of the APSR to change the pattern of flow downstream of the APSR to change the pattern of the pattern	-1	Weighted Score	Comments	Score	Weighted Score
Environmental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area D) Avoid damage to, and where possible enhance, fisheries within the study area	10	5	There are no internationally or nationally designated nature conservation sites within the APSR However, approximately 1.5km downstream is the Badoyle Bay Shamanbee, and supports internationally important withing populations of Brent genese as well an nationally important populations of a further seven waterford species. Changes as well an nationally important population of a further seven waterford species. Changes as well as nationally important populations of a further seven waterford species. Changes as well as nationally important populations of a further seven waterford species. Changes as well as nationally important populations. If the estary could potentially affect the nature, eather and other channels within the de is designated, with associated imports on designated waterbirp populations. There in the catcheness, support in how the potential to support legally protected species or other species of conversions (and the species) in the start of the channels within the APSR, and their floodplain, support or how the potential to support legally protected sation(). A support legally protected sation(). A started species of conversions (assisted as a subcough detailed in the support legally protected sation(). This assessment will be revisited to biologing completion of the Appropriate Assessment. <i>APSR</i> (e.g. Sational Waters). There are known areas of angling activity along invers in the APSR, though the exact <i>ACRSR</i> (e.g. Sational Waters). There are known areas of angling activity along invers in the APSR, though the exact <i>Contex of opputary</i> angling mates are unknown. A shulce gate on the Sluce River provides barrier to fails movement (migratory salmon).	Comments      Increased conveyance through this channel and the introduction of new flood embankments and a floodwall is likely to change the pattern of low downstream of the APSR during a 1% A2P flood event (1 in 100 chance in any given year), and possibly during a 10% A2P flood event (1 in 100 chance) in particular, for Baidoyle Bay SAC/SPA (approx 1.5km downstream and Zm downstream of proposed works respectively), have is the potential for these selies to the channel gape and the Appropriate Assessment will be updated on completion of the Appropriate Assessment will be updated on completion of the channel gape to be un-modified. Undertaking works within the channel gape to be un-modified. Overall, option considered to be localised. This assessment	-1	Veighted Score	Comments  Increased corveyance through this channel and the introduction of new flood embanisments and a floodwall is likely to change the pattern of flow downstream of the APSR during a 1% AEP flood event (1 in 100 chance in any given year), and pasteriolar, for Baddyne Bay pNHA and Baddyne Bay SAC/SPA (approx 1.5km potential for these sates to be affected by a change in the pattern of the Marport 1.5km potential for these sates to be affected by a change in the pattern of the Staves respectively, there is the potential lose of riverine and terrestrial habitats and appected to be localised. Undertaking works within the channel is anticipated to result in disturbance to and potential lose of riverine and terrestrial habitats and appected to be localised. Undertaking works within the channel is anticipated to be uncelled coalised. Undertaking works within the channel is anticipated to be uncelled. Detertial lose of the sate of the part of the sate of th	-1	-50	Comments	Score	Weighted Score
Environmental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area D) Avoid damage to, and where possible enhance, fisheries within the study area E) Protect, and where possible enhance. Iandscape character and visual amenity within the study area	10	5	There are no internationally or nationally designated nature conservation sites within the APSR. However, approximately 1:Sem downstream is the Badoyle Bay bad APSR. However, approximately 1:Sem downstream is the Badoyle Bay the APSR. However, approximately 1:Sem downstream is the Badoyle Bay the APSR. However, approximately 1:Sem downstream is the Badoyle Bay submaches, and supports instructured and important visual set of the Order populations of the estance of instruct abulat to which the estange source of the primary runs through rural areas in this APSR, and, although most are where and other channels within the APSR and their bodghan, support is have the potential to support legally protected species or other species of other species of the species and the structure of the APSR and their bodghan, support is have the potential to support legally protected species or other species of comercision (and the structure) and the APSR and their bodghan, support is a structure of the APSR and their bodghan, support of the the potential to support legally protected species or other species of comercision (and the APSR and their bodghan, support of the APSR and their bodghan, support the site of the potential that these waterocurses and the channels within the APSR and their bodghan support to the the potential that these waterocurses and the species of comercision (and the potential that these waterocurses and y apport brock, there are shown areas and angling activity along fixers in the APSR, though the exact factions of apportang fixers are unknown. A shuice gate on the Stuce River provides a barrier to fish movement (migratory salmon). The APSR falls within the Low Lying Agricultural landscape character area, classified as being of modest value and medium sensitivity. Fingal County Council also designations integrations and the APSR .	Comments           Increased conveyance through this channel and the introduction of new flood embankments and a floodwall is likely to change the pattern of flow downstream of the APSR during a 1% AEP flood event (1 in 100 chance in any given year), and possibly during a 10% AEP flood event (1 in 10 chance).           In particular, for Badyole Bay SACISPA (apport 1.5km downstream and 2km downstream) of proposed works respectively), there is the potential for these selics to be affected by a change in heritoxid respectively), there is the potential for these selics of these designations of proposed works respectively), there is the potential for these selics of these designations of proposed works respectively), there is the potential for these selics of these designations of proposed works respectively). The selication of the description of the Appropriate Assessment.           Undertaking works within the channel is anticipated to result in disturbance to and potential loss of riverine and terrestrial habitats and species, abeit localised, particularly given that these sections of the channel is part to be un-modified.           Overall, option considered to be partly failing minimum target.           Protential loss of disturbance to riverine habitat and dependent fisheries during the construction of the flood embankments and flood walls to the channel floor. Having reviewed aerial photographs of the works area, no impact on aging activity are estropated. Just failing minimum target.           Adverse change in visual amenity (though there are no Important Views present), and potentially local landscape setting [fieddime sensitivity]. Just failing minimum target.	-1 -1	-50 -10	Comments      Increased conveyance through this channel and the introduction of new flood embankments and a floodwall is likely to change the pattern of flow downstream of the APSR during a 1% AEP flood event (1 in 100 chance in any given year), and pattern of the APSR during a 1% AEP flood event (1 in 100 chance) in any given year), and pattern of the APSR during a 1% AEP flood event (1 in 100 chance). In particular, for Bardyne Bay pNHA and Baldyne Bay SAC/SPA Lapport 1.Sam potential for these sites to be affected by a change in the pattern of flextwer in put potential loss of riverine and terrestitul habitat and species, about localised. Undertaking works within the channel is anticipated to result in disturbance to and potential loss of riverine and terrestitul habitat and species, about localised, Diverall, option considered to be partly failing minimum target.  Potential loss of disturbance to riverine habitat and dependent fisherines during the channel fisherine same flood walls to the channel floor, and also during removal of the binding patients and flood walls to the channel floor, and also during tentosity was enticipated. Just Editing minimum target.  Adverse change in visual amenity (though there are no important Views present), flow flows any structure within a service interface, servicing from introduction of new flood derives structure within a service indicate, resulting from introduction of new flow derives during remove the structure indicates the structure within a service indicates, services and the structure within a service indicates, services and the structure within a service indicates, services and the structure indicates are and the indicate entry indicates and the structure within a service indicates, services and the indicates and the structure within a service indicates, services and the structure within a service indicates, services and the structure within a service indicates, services and the structure within service indiscoper services and the structure within a service in	-1 -1	-50 -10 -15	Comments      Comments	Score	Weighted Score 0 0 0 0
Environmental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area hence, the flora and fauna of the study area D) Avoid damage to, and where possible enhance, fisheries within the study area E() Protect, and where possible enhance, landiscape character and visual amenity within the study area F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	5	There are no internationally or nationally designated nature conservation sites within the APSR. However, approximately 1.5km downstream is the Badoyle Bay Soc.25P.Amana stephytik-Th key boy contains large aces of sardilatis, modified and as well as nationally important population of a further server waterforw species. Changes as well as nationally important population of a further server waterforw species. Changes as well as nationally important population of a further server waterforw species. Changes as well as nationally important population of a further server waterforw species. Changes as well as nationality important population of a further server waterforw species. Changes as well as nationality important populations. There inter primarily runs through rural areas in this APSR, and, although modified along that attentions, takes to be obliduations (mersent of the remained waterbrind population). There into a further species of conservation concern (e.g., or lock, kinglisher, baid, further server). This assessment, will be revisited following completion of the Appropriate Assessment. APSR (e.g. Samond Water). There are hown areas of angling activity along rivers in the APSR, though the exact locations of popular angling areas are unknown. A sluce gate on the Sluce River provides a barrier to faint mere serve, classified as being of modest value and medium sensitivity. Fingal County Council also designation faint, and classoode MOND). The remaining site, a building at Balgriffin Park, and classoode MOND). The remaining site, a building at Balgriffin Park, and classoode MOND). The remaining site, a building at Balgriffin Park, and classoode MOND). The remaining site, a building at Balgriffin Park, and classoode MOND). The remaining site, a building at Balgriffin Park, and classoode MOND). The remaining site, a building at Balgriffin Park, and classoode MOND). The remaining site, a building at Balgriffin Park, and classoode MOND). The remaining site, a building at Balgriffin Park, and classoode MOND). The	Comments           Increased conveyance through this channel and the introduction of new flood embankments and a flootwall is likely to change the pattern of flow downstream of the APSR auring a 1%. AEP flood event (1 in 100 chance in any given year), and possibly during a 10% AEP flood event (1 in 10 chance).           In particular, to Baldoyle Bay NNHA and Baldoyle Bay SAC/SPA (approx 1.5km downstream and 2km downstream of proposed works respectively), there is the potential to these sites be affected by a change in freshwater input during flood events. However, any effects on these designated sites are expected to be localized. This assessment will be updated on competion of the Appropriate Assessment.           Undertaking work within the channel appear to be un-modified. Overall, option considered to be partly failing minimum target.           Potential loss of/disturbance to niverine habitat and dependent fisheries during the construction of the flood embankments and flood walls to the channel floor. Having reviewed aerial pholographs of the works area, no impacts on angling activity are anticipated. Just failing minimum target.           Adverse change in visual amenity (though there are no Important Views present), and potentially local landscape character, resulting from introduction of new flood delence atuctures within a sensitive landscape setting (medium sensitivity). Just failing minimum target.           Balgriffin Park is located approximably 350m from the proposed works. Due to the height of the proposed embankmentival under 1m and the intervening wegetation and buildings, no effects on the historial setting of these features are anticipated.	Score -1 -1 -1 0	-50 -10 0	Comments           Increased conveyance through this channel and the introduction of new flood embankments and a floodwall is likely to change the pattern of flow downstream of the APSH during at 1% APE flood event (1 in 100 chance) in any given year), and posticular, for Baddyné Bay PMHA and Baddyné Bay SAC/SPA (apport 1.5m) and 200 change the Pattern of flow downstream of the APSH during at 1% APE flood event (1 in 100 chance).           In particular, for Baddyné Bay PMHA and Baddyné Bay SAC/SPA (apport 1.5m) and 200 chance (in 10 chance).           In particular, for Baddyné Bay PMHA and Baddyné Bay SAC/SPA (apport 1.5m) and 200 chance (in 10 chance).           In particular dy vert do down (1 in 10 chance).           In doritalia for these sites to be afficied by a change in the pattern of flewheater inquit. However, any effects on these designated sites are expected to be localised.           Undertaking works within the channel is antilopated to the localised bio particular by given that these section of the channel apper to be un-modified. Journal previous darai photographs of the works area, no construction of the Brood embankments and flood walls to the channel floor, and also during removal of the bridge. Harving reviewed areai photographs of the works area, no impacts on angling activity are anticipated. Just failing minimum target.           Adverse change in visual amenity (though there are no Important Views present), and defence attructure within a sensitive landscape setting frequent methody. Removal of the bridge may also result in a change to local landscape character, usut failing minimum target.           Balgriffin Park is localed approximately 350n from the proposed works. Due to hen height dublidings, no effects on the historical setting of thee leares are anti	-1 -1 -1	Weighted Score -50 -10 -15 0	Comments	Score	Weighted Score
Environmental	C) Avoid damage to, and where possible enhance, the flora and founs of the study area D) Avoid damage to, and where possible enhance, fisheries within the study area E) Protect, and where possible enhance, landscape character and visual amenty within the study area F) Avoid damage to or loss of features of cultural hertinge importance, their setting and hertinge value within the study area Environmental Total Score/ Weighted Score	5	5	There are no internationally or nationally designated nature conservation also within Source 2004 Annual Source 2004 Source 2	Comments           Increased conveyance through this channel and the introduction of new flood embankments and a floodwall is likely to change the pattern of low downstream of the APSH during a 1% AEP flood event (1 in 100 chance in any given year), and possibly during a 10% AEP flood event (1 in 100 chance) and possibly during a 10% AEP flood event (1 in 100 chance).           In definition of patients of the data of the posterilia of the AEP flood event (1 in 100 chance).         In the posterilia of the posterilia of the data of the posterilia of the flood event (1 in 10 chance).           In definition of poster data of the data of the posterilia of the second be affected by a thorage in freakwater ingut during flood events. However, any effects on these designated sites are expected to be localised. This assessment will be updated on completion of the Appropriate Assessment.           Undertaking works within the channel is anticipated to result in disturbance to and potential loss of rivenine and terrestrial habitats and species, abeit localised, particularly given that these sections of the channel appear to be un-modified potential loss of/disturbance to riverine habitat and dependent fisheries during the construction of the flood embankments and flood walls to the channel floor. Having reviewed aerial photographs of the works area, no imaccion angling adrivity are anticipated. Just failing minimum target.           Adverse change in visual amenity (though there are no Important Views present), and potentially local landscape character, resulting from introduction of new flood defence attructures within a sensitive landscape setting floodiem sensitivity. Just failing minimum target.           Balgriffin Park is located approximately 350m from the proposed works. Due to the height of the proposed mankinterival unoff the	Score -1 -1 -1 0	50 -10 -15 -100	Comments           Increased conveyance through this channel and the introduction of new flood embendments and a floodwall is likely to change the pattern of flow downstream of the APR during a 1% AFR flood event (1 in 100 chance) in any given year), and a floodwall is likely to change the pattern of flow downstream of the APR during a 1% AFR flood event (1 in 100 chance).           In particular, for Baldoyle Bay PMA and Baldoyle Bay SAC/SFA (approx 1.5M, or any second secon	-1 -1 -1 -1 -1 -1	Weighted Score -50 -10 -15 0 -100	Comments	Score	Weighted Score 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0















# E4 Nanny and Delvin

								Options				
				Baseline	Nanny and Delvin AU Option 1							
				-	Develop a fluvial FFWS for the Nanny	River						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning involves the use of mat models to predict flood water levels and tools to disser data to people at risk. Further information on the viable forecasting options are reported on in the Preliminar Flood forecasts would be disseminated through a dea messaging service to provide advance warning to A FFWS for the Nanny River would provide advance properties at risk along the Nanny River including pro area APSR and properties in rural areas along the	hematical minate flo ility of vari y Options licated we o commun e flood wa operties in e waterco	computer od hazard ious flood Report. bsite and ities. rning to n Duleek urse.					
					Comments	Score	Weighted Score			Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	Some mechanical and human intervention required for the fluvial forecasting & warning system. Computer models and rainfall/flow gauges would require regular maintenance. Option reliant on certainty of flood warning system, therefore just meets minimum target.	0	0		0			0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	n/a	Limited health and safety risk to construction workers involved with the installation of the gauges (2 flow and 5 TBR) for the flood forecasting & warning system as only limited work adjacent to river channels.	3	75		0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	n/a	Option will continue to be operational in MRFS/HEFS conditions, therefore meets aspirational target.	5	125		0			0
	Technical Total Score/ Weighted Score					8	200		0		0	0
	A) Minimise economic risk	25	1	Average annual damages of €95,311	This option is likely to result in a limited reduction in damages (~20%), thus partly exceeding the minimum target and scoring 1.	1	25		0			0
ic	B) Minimise risk to transport infrastructure	5	3	Approximately <b>1.5km of Regional (R.)</b> roads at risk for the 1% AEP fluvial event (50m of R roads at risk in Duleek area APSR)	Option would have no impact on the transport infrastructure at risk. Meeting minimum target as no increase in risk to transport infrastructure.	0	0		0			0
Econon	C) Minimise risk to utility infrastructure	10	2	1 utilities (ESB, GAS and EIRCOM utilities) at risk in Stamullen area APSR. Risk id for the 1% AEP fluvial event.	Option would have no impact on the number of utility infrastructure assets at risk. Meeting minimum target as no increase in risk to utility infrastructure.	0	0		0			0
	D) Minimise risk to agricultural land.	5	4	<b>485 hectares of agriculture l</b> and not benefiting from flood defences at risk of flooding (1% AEP fluvial event). This represents approximately 1.5% of the total agricultural land in the AU.	Option would have no impact on the agricultural land at risk. Meeting minimum target as no increase in risk to agricultural land.	0	0		0		0	0
	A) Minimise risk to human health and life.	30	2	15 residential properties at risk with 5 at risk in Duleek area APSR (1% AEP fluvial event)	Option would not reduce flood risk to residential properties. Number of properties located in at risk areas would remain the same. Therefore, just meeting minimum target.	0	0		0		0	0
Social	B) Minimise risk to community.	10	2	5 non-residential buildings at risk (1% AEP fluvial event).	Option would not reduce flood risk to non-residential buildings. Number of properties located in at risk areas would remain the same. Therefore, just meeting minimum target.	0	0		0			0

								Options				
				Baseline	Nanny and Delvin AU Option 1							
				-	Develop a fluvial FFWS for the Nanny	River						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning involves the use of mat models to predict flood water levels and tools to disser data to people at risk. Further information on the viabi forecasting options are reported on in the Preliminar Flood forecasts would be disseminated through a ded messaging service to provide advance warning to A FFWS for the Nanny River would provide advance properties at risk along the Nanny River including pro area APSR and properties in rural areas along the	hematica minate flo y Options licated we o commur e flood wa operties in e watercc	l computer od hazard ious flood : Report. obsite and hities. arning to n Duleek urse.					
					Comments	Score	Weighted Score			Comments	Score	Weighted Score
	C) Minimise risk to, or enhance, social amenity.	5	0	No social amenity sites at risk	N/A	0	0		0			0
	Social Total Score/ Weighted Score					0	0		0		0	0
	A) Support the objectives of the WFD.	5	5	AU contains the Nanny WMU and the Delvin AMU. The 13 river waterbodies within the Nanny WMU are of moderate (7) and poor (6) status which means that improvements in status are required. The RBMP reports that problems constraining achievement of good status include high nutrients (phosphorus), low oxygen saturation, low ecological rating and dredging; with the principal causes identified as agriculture, wastewater and industrial discharges and septic tanks. The 3 river waterbodies within the Delvin WMU are of moderate (1) and poor (2) status, which means that improvements in status are required. The RBMP reports that problems constraining achievement of good status include high nutrient concentration (phosphorus, ammonia), oxygen levels and low ecological rating; with the principal causes identified as agriculture and wastewater and industrial discharges. The RBMP also identifies a morphological risk from the dredging regime for flood risk management for both WMUs and the measures directly relevant to the FEM FRAMS (physical modifications - morphological pressure relate to the need for compliance with legal requirements (ELA, Planning and Development	No contribution nor constraint to the achievement of WFD objectives as there will be no physical works within or modifications to the Nanny River and its sub-catchment. Meeting minimum target.	0	0		0			0
	B) Minimise risk of environmental pollution	15	5	2 Waste Management Permit Sites along the Delvin River at Westown. 4 Section 4 licenses present in AU	No positive or negative change in flood risk to potentially polluting sites within the AU as no intervention involved. Meeting minimum target.	0	0		0			0
Environmental	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	5	There are <b>four proposed NHAs</b> within the AU boundary: <b>Duleek Commons</b> (calcareous marsh and fen system), <b>Thomastown Bog</b> (raised bog surrounded by wet woodland and wet grassland), <b>Balrath Woods</b> (mature woodland) and <b>Cromwell's Bush Fen</b> (wetland with fen communities in pastoral/arable setting). Of these pNHAs, only approximately 5.4 hectares of <b>Duleek Commons</b> may be subject to flooding (1% AEP fluvial event), which represents approximately 15% of the overall area of this pNHA. Given the nature of the predominantly wet habitats in this pNHA the risk of flooding is not considered a concern and may be beneficial to the site. Immediately outside of the AU boundary, to the east, the River Nanny flows into the <b>River Nanny Estuary &amp; Shore SPA</b> , and the <b>Laytown Dunes/Nanny Estuary proposed NHA</b> . This area is important for its (non breeding) bird populations, including five species in nationally important numbers. Changes in the cachrement, which alter the flooding regime and/or freshwater input into the estuary may affect the habitats upon which these populations rely. 71 sites listed on Meath County Council's Wetland Inventory are present within the AU. The rivers and their floodpial within the AU support or have the <b>potential to support legally protected species</b> or other species of conservation concern (e.g. otter, kingfisher, bats, Atlantic salmon), although detailed distribution information is not available.	No impacts on potentially sensitive riverine habitats and associated fauna (located within or outside designated nature conservation sites) as there will be there will be no physical works within or modification to the river channels or adjacent land within the Nanny sub-catchment. Meeting minimum target.	0	0		0			0
	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	3	The Nanny and Delvin rivers and other streams within the AU support or are capable of supporting salmonid species, which are sensitive to changes in physical and chemical conditions. They are also likely to provide salmonid spawning or nursery areas. These watercourses are also likely to support brook, river and/or sea lamprey. There is angling activity along rivers in the AU, though the exact locations of popular angling areas are unknown. There are no fisheries designations within the AU (e.g. Salmonid Waters) and no known barriers to fish movement.	No impacts on fisheries or angling activity as there will be no physical works or modification within or adjacent to the river channels in the Nanny sub-catchment. Meeting minimum target.	0	0		0			O
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	5	<ul> <li>The Meath area of the AU comprises the following five landscape characters types: Central Lowlands, Bellewstown Hills, Coastal Plains, Nanny Valley (all of regional importance), and Tara-Skryne Hills (international importance).</li> <li>To the south of the AU, land inside the Fingal County boundary falls within the High Lying Agricultural landscape character area (classified as being of high sensitivity).</li> <li>Fingal County Council also designates 'Important Views', which in the AU are concentrated around Garristown and along the R130 and R122.</li> </ul>	No change in landscape character and visual amenity as there will be no physical works or modifications within or adjacent to the river channels in the Nanny sub-catchment. Meeting minimum target.	0	0		0			0

								Options				
				Baseline	Nanny and Delvin AU Option 1							
				-	Develop a fluvial FFWS for the Nann	y River						
	Objectives	Global Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	Flood forecasting and warning involves the use of ma models to predict flood water levels and tools to diss data to people at risk. Further information on the via forecasting options are reported on in the Prelimina Flood forecasts would be disseminated through a de messaging service to provide advance warning A FFWS for the Nanny River would provide advance properties at risk along the Nanny River including p area APSR and properties in rural areas along to	athematical eminate flo bility of vari ny Options dicated we to commun to commun to flood wa roperties in he waterco	computer od hazard ious flood Report. bsite and ities. rning to n Duleek urse.					
					Comments	Score	Weighted Score			Comments	Score	Weighted Score
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	3	<ul> <li>Within the AU, 11 Sites on RPS/RMP/SMR at risk (1% AEP fluvial event). 3 sites on RPS including a two Arch Bridge at Arcarne, a Wayside Cross at Gaulstown and a Bridge - Old Mill Bridge. 1 site on RMP (class code WAMI) at Garristown. 1 site on SMR - a Ritual Site - Holy Well at Naul. The remaining 6 sites are within the SMR/RPS/RMP datasets and include 4 bridges (2 bridges at Prioryland; Beaumont Bridge at Beaumont and Naul Bridge, Naul), an Enclosure at Prioryland and a Ring Barrow at Abbeyland.</li> <li>Three ACAs are present in the AU: Naul ACA, Blascadden ACA, and Garristown ACA. Of these, only the Naul ACA is at risk of flooding; approximately 0.1ha is at risk, representing approximately 1% of the total ACA.</li> </ul>	There will be no positive or negative change in risk to, or impacts on SMR/RPS/RMP features (through either direct impacts or impacts on setting) and the ACA as there will be there will be no physical works as a result of this option. Meeting minimum target.	0	0		0			0
	Environmental Total Score/ Weighted Score					0	0	0	0		0	0
Total Scor	e/ Total Weighted Score					9	225	0	0		0	0

				(	Options						
			Baseline	Duleek area APSR Option 1			Duleek area APSR Option 1a				
			-	Raising existing defence embankment to a higher standard of p	rotection		Improving existing defences to protect all pro to the 1% AEP	perties up			
				This option involves raising existing flood defence embankments and walls in Dule up to the 0.1% AEP event. Hydraulic modelling indicates that new defences woul part of this option. The BCR for this option is 1.1 for the 0.1% AEP	ek to provide d also be rec event.	protection quired as					
	Objectives	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	The existing flood defences at Duleek include embankments, walls, a pumping maintenance works. Hydraulic modelling indicates that these defences provide pro of properties in Duleek up to 1% AEP event. The results from the hydraulic modul existing flood embankments would need to be raised by an average of 1.4m and walls would need to be raised by an average of 1.4m. This option assumes that e are structurally sound to allow them to be raised to a higher standard or Upstream of the bridge on the main street through Duleek, approximately 4 embankments are required along the left bank and 20m along the right bank of the average height of the embankments on the left bank is 1.2m and the average heig the right bank is 1m.	station and c otection to the elling indicate that the exist xisting flood of protection. Om of new flo Parmadan H ht of embank	hannel e majority e that the ting flood defences pod River. The kments on	This option involves improving the existing defe protect all propertis up to the 1% AEP. The BCF option is 0.3, therefore it was not considered any	nces to 3 for this 4 further.			
				Hydraulic modelling indicates that there is a negligible impact on water levels along this option. Along the Parmadan tributary, the construction of new defences an defences has an impact on water levels. Water levels are raised by an average c stretch of the river channel. The maximum increase in water levels is 0.93m. This on overland flow paths or significant natural flood plain storage as it involves mode defence scheme.	g the Nanny I d raising of e f 0.8m along option has n fying an exis	River with existing a 0.5km no impact ting flood					
				Comments	Score	Weighted Score	Comments Score	Weighted Score	Comments	Score	Weighted Score
	A) Ensure Flood Risk Management options are operationally robust.	5	n/a	Option is not reliant on human or mechanical intervention to operate. Limited maintenance will be required to ensure defences maintain their standard of protection. Overall exceeding minimum target.	3	75		0			0
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	n'a	Medium health and safety risk to construction workers due to location of defences adjacent to the watercourses. Limited health and safety risk to maintenance workers. Overall meeting minimum target.	1	25		0			0
	C) Ensure flood risk managed effectively and sustainable into future.	5 5	nia	Option meets the requirements of the MRFS and HEFS as the 0.1% AEP current scenario water level is higher than the 1% AEP MRFS and HEFS water levels. Meets aspirational target.	5	125		0			o
	Technical Total Score/ Weighted Score				9	225	0	0		0	0
	A) Minimise economic risk 2	5 1	Average annual damages (AAD) of €4915 Average annual damages (AAD) of €155296 for the 0.1% AEP event	Option will reduce the 0.1% damages to 0, therefore meeting aspirational target	5	125		0			o
mic	B) Minimise risk to transport infrastructure	i 3	Approximately 50m of R roads at risk (R152)	Option provides protection to the roads at risk up to the 0.1% AEP. Meeting aspirational target.	5	75		0			0
Econo	C) Minimise risk to utility infrastructure	0 0	No utility assets at risk	NA	0	0					
	D) Minimise risk to agricultural land.	2	Approximately 26 hectares of agriculture land not benefiting from flood defences at risk of flooding.	Option has not impact on agricultural land not benefiting from flood risk management measures	0	0		0			0
<u> </u>	Economic Total Score/ Weighted Score				10	200	0	0		0	0
	A) Minimise risk to human health and life. 3	0 1	5 residential properties at risk No high vulnerability properties at risk from flooding.	Option provides protection to 4 of the 5 residential properties at risk of flooding up to the 0.1% AEP. Partly achieving aspirational target.	3	90		0			0
Social	B) Minimise risk to community.	0 0	No non residential building at risk No high-value social infrastructural assets at risk	NA	0	0		0			0
	C) Minimise risk to, or enhance, social amenity.	; O	No social amenity sites at risk	N/A	0	0		0			0
L	Social Total Score/ Weighted Score				3	90	0	0		0	0
	A) Support the objectives of the WFD.	5	The APSR contains two river waterbodies, both of which are classified as being of poor status meaning that improvement in status is required. The RBMP reports that problems constraining achievement of good status include high nutrients (phosphorus), low orgen saturation, be veclogical rating and dredging; with the principal causes identified as agriculture, wastewater and industrial discharges and septic tarks.	Potential constraint to the achievement of WFD objectives as the new flood defence structures, together with the raised existing structures, could create a new morphological pressure. Just failing minimum target.	-1	-25		0			0
	L										

						Options						
		Baseline -			Duleek area APSR Option 1			Duleek area APSR Option 1a				
				-	Raising existing defence embankment to a higher standard of p	rotection		Improving existing defences to protect all prop to the 1% AEP	erties up			
		<b>b</b> ı	6		This option involves raising existing flood defence embankments and walls in Dulee up to the 0.1% AEP event. Hydraulic modelling indicates that new defences woul part of this option. The BCR for this option is 1.1 for the 0.1% AEP The existing flood defences at Duleek include embankments, walls, a pumping.	k to provide d also be req event. station and c	protection wired as hannel					
	Objectives	Global Weightir	Local Weightin	Baseline option assumes continuation of any existing	maintenance works. Hydraulic modelling indicates that these defences provide pro of properties in Duleek up to 1% AEP event. The results from the hydraulic mode existing flood embankments would need to be raised by an average of 1.4m and walls would need to be raised by an average of 1.4m. This option assumes that e are structurally sound to allow them to be raised to a higher standard of	tection to the elling indicate that the exist kisting flood of protection.	e majority that the ing flood defences	This option involves improving the existing defe	nces to			
				maintenance regime in the study area	Upstream of the bridge on the main street through Duleek, approximately 4 embankments are required along the left bank and 20m along the right bank of the average height of the embankments on the left bank is 1.2m and the average heig the right bank is 1m.	Om of new flo Parmadan I ht of embank	ood River. The ments on	protect all properties up to the 1% AEF. The BUH option is 0.3, therefore it was not considered any	further.			
				Hydraulic modelling indicates that there is a negligible impact on water levels along the Nanny River with this option. Along the Parmadan tributary, the construction of new defences and raising of existing defences has an impact on water levels. Water levels are raised by an average of 0.8m along a 0.5km stretch of the river channel. The maximum increase in water levels is 0.93m. This option has no impact on overland flow paths or significant natural flood plain storage as it involves modifying an existing flood defence scheme.								
					Comments	Score	Weighted Score	Comments Score	Weighted Score	Comments	Score	Weighted Score
	B) Minimise risk of environmental pollution	15	0	No potential sources of pollution at risk or present in this APSR	NA	0	. 0		0			0
	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	4	Within the APSR, Duleek Commons pNHA is designated for its calcareous marsh and fen system. Approximately 54 hectares is at risk to flooding, which represents 15% of the overall area of this pNHA. Given the wet nature of the habitats in this site, the risk of flooding is not considered a concern and may be beneficial to the site. The River Namy Estuary & Shore SPA, important for its (non breeding) bird populations, including five species in nationally important numbers, and Laytown Dunes/Namy Estuary pNHA are approximately 9km downstream of the APSR. 26 sites listed on Meath Countly Council's Wetland Inventory are present within the APSR. Within the APSR, the river primarily runs through nural areas and, although modified along within the APSR.	Provision of new embankments and raising of the existing embankments/walls, would only make a significant difference to the volume of water in the river during a 0.1% AEP flood event. This, combined with the distance of the works from the River Nanny Estuary & Shore SPA (approximately 9km) indicates that a significant effect on the SPA is unlikely. Potential for localised loss/disturbance of terrestrial habitat and species in the footprint of the new embankments or the construction works. Also, potential for loss of marginal habitats and associated supporting species on the Parmadan River.	-1	-40		0			0
ronmental				short stretches, is likely to be of blooklersity interest. I he never and other channes within the APSR, and their (Bodglain, support or have the potential to support legally protected species or other species of conservation concern (e.g., otter, kinglisher, bats, Atlantic salmon), although detailed distribution information is not available. This assessment will require updating upon completion of the Appropriate Assessment.	Just failing minimum target.							
Envi	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	3	The Nanny river and other streams within the APSR support or are capable of supporting salmonid species and are likely to provide salmonid spawning or nursery areas. These watercourses may also potentially support brook, river and/or sea lamprey. There is known angling activity along the Filver Marny, though the exact locations of popular angling areas are unknown. There are no fisheries designations within the APSR (e.g. Salmonid Waters) and no known barriers to fish movement.	Potential for localised loss of or disturbance to riverine habitat and dependent fisheries during construction of new flood dences, and potential for changes in turbidity and sediment dispersion/deposition. Ecological impacts associated with the raising of existing defences (depending on the increased base of defence required) are considered unlikely, assuming appropriate working practices are implemented. Potential for works to disrupt access for anglers during construction, although there is a potential for enhancement of facilities. Just failing minimum target.	-1	-15		0			0
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	3	The APSR falls within the <b>Central Lowlands</b> landscape character area (of regional importance). This landscape type is classified as being of medium sensitivity	Adverse change in visual amenity, and potentially a deterioration in local landscape character, resulting from the introduction of new flood defence structures (60m) and raising of existing defences by an average of 1.4m, within a sensitive landscape setting. Partly failing minimum target.	-3	-45		0			0
	F) Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	5	3	Four features on SMR/RPS at risk: three sites on SMR (two bridges at Prioryland and an enclosure at Prioryland), and one site on the RPS at risk (Ring Barrow at Abbeyland). Additional sites (not at risk) within immediate vicinity. No ACAs present.	There would be no change in flood risk to the four sites, although the introduction of new flood defence structures within their immediate vicinity would be expected to affect their historical setting. Further, a small number of additional heritage sites not identified as being at risk, would also experience a change in their historical setting. Just failing minimum target.	-1	-15		0			0
	Environmental Total Score/ Weighted Score					-7	-140	0	0		0	0
Total Sco	re/ Total Weighted Score					15	375	0	0		0	0













# E5 FEM FRAM Study area

							Ontions			
				Baseline	Study Area Option 1		Study Area Option 2			
					Development (Meath Co Co) and enhancement (Fingal Co. Co.) of a proac regime targeting potential culvert blockage locations	tive maintenance	Targeted public awareness and education campaign and individual proofing	property	flood	
	Objectives	Giobal Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves the development (Meath County Council (MCC)) and enhi County Council (FCC)) of a proactive maintenance regime targeting potential locations along the watercourses in the study area. FCC currently carries out approximately 20 locations at risk of flooding in Fingal. This involves the cleanin two to three week basis, with the frequency increased when heavy rain is for maintenance regime is carried out by MCC. This option would involve including as part of FCC proactive maintenance regime and setting out a proactive maint culverts in MCC. Proactive maintenance would involve removal of debris (veget at the entrance and exit of culverts on a regular basis (i.e. monthly) and in ad event. Option would also involve monitoring of culverts prone to blockages dur FCC currently uses weather forecast information to identify when a flood is lik opportunity to link this option to the FFWS identified for the following Analysis Ur and Ward. Nanny and Delvin, Mayne and Sluice and Casatal Hydraulic modelling indicates that properties in the following locations are at ri blockages (based on a compasion of flood maps for the 1% AEP fluvial event culverts bickage flood maps for the 1% AEP event): Swords, Dardistown, Balig- Bridge, Warbelstown, Ashbourne, Ratoath, Ballyboghil, Skerries and B The BCR for this option is 0.9 and is based on an assumed 10% reduction in eco on a review of flood maps for the with and without culvert blockages scenarios, likely to alter overland flood routes or impact on areas of significant natural floo	ancement (Fingal culvert blockage maintenance at og of screens on a ecast. A limited additional culverts ation, silt, rubbish) vance of a flood enance regime for ation, silt, rubbish) vance of a flood event. tely. There is an nits (Broadmeadow sk due to culvert against the 70% iffin, Portmarnock ettystown. Donomic risk. Based this option is not od plain storage.	The public awareness and education campaign is necessary to educate the of flooding to their properties and the protection methods available to them to damage from flood events (i.e. individual property flood proofing IPFP measus would be disseminated through the distribution of information leaflets, FEM and provision of public information leaflets, FEM protection to residential and commercial properties. Such products include fit barriers, air vent blocks and the installation of non return valves to service pi protection afforded by individual property protection is dependent on a nu including the uptake, advance warning of flood risk and depth of flooding. It this measure is only applicable when the depth of flooding at a property is un including the uptake, advance warning of flood risk and depth of flooding. The BCR for this option is 0.85 and is based on an assumed 20% reduction The benefits of the FWS are detailed in the following Analysis Units (Brc Ward, Nanny and Delvin, Mayne and Sluice and Coastal). The BCR for the combined with a FFWS is 3.	public of reduce, reduce, res). Infi FRAMS I fRAMS I frank frank pes. The provided of is assum rovided is option in econon rovided is option significan	the risk potential ormation website flood is, flood level of actors ed that 0.6m. mic risk. with a ow and when t natural	
					Comments	Score Weighted Score	Comments	Score	Weighted Score	Comments
	A) Ensure Flood Risk Management options are operationally robust.	5	5	n/a	Option is fully reliant on human intervention to be effective and therefore scores a -1 as it fails the minimum target of requiring no human/mechanical intervention.	-1 -25	A targeted public awareness campaign would require human intervention on a 5 yearly basis. Th process of individual property protection would also require human intervention in making the necessary adjustment to properties and in erecting defences prior to a flood event. Option 100% reliant on human intervention to be effective.	e , -1	-25	
Technical	B) Minimise Health and Safety risk of flood risk management options.	5	5	nia	Option requires opertaors/maintenance workers to clear debris etc from culvert entrances and river channels. Therefore, majority of work carried out in proximity to river channels. This results in a significant health and safety risk to workers and therfore this options scores 0	0 0	A targeted public awareness campaign would have no health and safety risk to construction work or operators. Individual property protection would have limited health and safety risk (especially installation of protection equipment) and potentially in the erection of protection in flood event.	n 3	75	
	C) Ensure flood risk managed effectively and sustainable into future.	5	5	n/a	Option meets the current flood risk requirements but is adaptable to meeting future risk as the proact maintenance regime can be improved to accommodate additional culverts at risk due to the MRFS	<sup>ve</sup> 0 0	Option is sustainable and adaptable to future risk at no cost for properties protected for current ri and where MRFS flood depth below 0.6m. Number of properties with flood depth < 0.6m for the 1%0.6% AEP MRFS is 1071 compared to 302 for 1%0.05% AEP current scenario. Therefore thi option does not fully meet the requirements of the MRFS but it is adaptable additional IPPP equipment could be pruchased and increased coverage would be required for the targeted publi awareness and education campaign. Overall meeting minimum target.	sk <sup>3</sup> O C	o	
	Technical Total Score/ Weighted Score					-1 -25		2	50	
	A) Minimise economic risk	25	3	Total average annual damages of €760,253 within study area (1% AEP fluvial0.5% AEP tidal event event).	This option will result in at least a limited reduction in average annual damages, thus exceeding the minimum target and scoring 1. The option will also prevent additional damages from occurring as a re of reducing the risk of blockage of culverts.	sult 1 75	Based on the current scenario, 93% of properties in the 1% AEP fluvial flood zone and 0.5% AEF tidal flood zone have a flood depth of <0.6m (75% in a 0.1% AEP). Option could prevent up 60.6 million worth of PV damages (1% AEP fluvial/0.5% AEP tidal) if IPFP was 100% successful at at properties whose flood depth is less than 0.6m. But assume only 10% of defences in place as no flood warning included in option. Targeted public awareness and education could reduce damages by ~5%. Therefore, limited reduction in damages and exceeding minimum target.	) e 1	75	
mic	B) Minimise risk to transport infrastructure	5	4	Total of <b>6.3km of Regional (R)</b> roads, <b>0.1km of National Primary (NP)</b> at risk within the study area (1% AEP fluvial/0.5% AEP tidal event).	This option will result in at least a limited reduction in baseline risk to the transport infrastructure at risi flooding, thus exceeding the minimum target and scoring 1. There would be a significant reduction i potential risk due to structure blockage, however this is not considered in the scoring.	n 1 20	Option would have no impact on transport infrastructure at risk. Meeting minimum target as optic would not result in an increase in transport infrastructure at risk.	<sup>n</sup> 0	0	
Econo	C) Minimise risk to utility infrastructure	10	5	3 WWTW (Ballyboghil area APSR, Owens Bridge APSR and Julianstown area APSR 1 Waste Water Pumping Station (Castle Street Pumping Station in Ashbourne area APSR) and 1 utilities asset (CSB, GAS and EIRCOM utilities) at risk within the study area (1% AEP fluvial/0.5% AEP tidal event event).	This option will result in at least a limited reduction in risk to the utility infrastructure at risk of flooding thus exceeding the minimum target and scoring 1. There would be a significant reduction in potential due to structure blockage, however this is not considered in the scoring.	, isk 1 50	Option would have no impact on the number of utility infrastructure assets at risk. Meeting minimu target as option would not result in an increase in utility infrastructure assets at risk.	m o	0	
	D) Minimise risk to agricultural land.	5	5	1316 hectares of agriculture landnot benefiting from flood defences at risk of flooding within the Sludy area. This represents approximately 13% of the total agricultural land in th study area ( 1% AEP fluvial0.5% AEP tidal event event).	This option will be focussed on preventing culvert blockages in locations where significant economic damage or significant disruption to utilities could occur. Therefore, it is unlikely there would be any reduction in risk to agricultural land. However, there will be no increase in risk to agricultural land. Therefore, option scores 0 as meets the minimum target.	0 0	Option would have no impact on the area of agricultural land at risk. Meeting minimum target as option would not result in an increase in area of agricultural land at risk	0	0	
	Economic Total Score/ Weighted Score					3 145		1	75	
	A) Minimise risk to human health and life.	30	4	Total of 248 residential properties at risk/within the study area (1% AEP fluvial/0.5% AEP tidal event event), 5 at risk in Balhycogil area APSR, 9 at risk in Rathoeth area APSR 2 at risk in Rowelstow East area APSR, 3 at risk in Rathoether area APSR APSR 0 wents Bridge area APSR, 1 in Kinsalay Lane area APSR, 19 in St. Margarets, Dublin Arport, Bekarn, Balgriffin APSR, 5 at risk in Dubekarea APSR, 10 at risk in Aramet Bethystown and coastal area APSR, 1 at risk in Balbriggen area APSR, 68 in Skernfes area APSR, 25 in flush area APSR, 1 in St. Not area APSR and 46 in Portmarnock and Malahide areas APSR. Remaining properties at risk are in rural areas outside of the APSR 0 high vulnerability properties at risk.	This option will result in at least a limited reduction in risk to the residential properties at risk of floodi thus exceeding the minimum target and scoring 1. The option will also prevent additional residentia properties from flooding as a result of minimising the risk of blockage of culverts.	9. 4 1 120	Option would reduce the flood damage to the residential properties targeted as part of the individ property protection. The targeted public awareness campaign would increase knowledge of flood but not necessarily reduce flood nst. The number of properties located in the flood risk area would remain the same. Meeting minimum target.	ual ng <sub>O</sub>	0	
Social	B) Minimise risk to community.	10	3	Total of 65 non-residential buildings at risk within the study area (1% AEP fluvial/0.5% AEP tidal event event) including 1 in Knsaley Lane area APSR, 19 in S1 Margarets. Dublin Arport, Belcamp, Balgriffin APSR, 1 in Laytown, Bettystown and coastal areas APSR, 19 a Balbriggan area APSR, 6 in Skernis eare APSR, 11 moush area APSR, 14 in Swords area APSR and 16 in Portmamock and Malahide areas APSR, 11 retail park at risk (Ariade Reta Park) in Swords area APSR. Remaining properties at risk are in rural areas outside of the APSR. 1 flood sensitive social infrastructure siteat risk, a firestation in Swords area APSR.	This option will result in at least a limited reduction in risk to the non-residential buildings at risk of flooding, thus exceeding the minimum target and scoring 1.	1 30	Option would reduce the flood damage to the non-residential properties targeted as part of the individual property protection. The targeted public awareness campaign would increase knowled of flooding but not necessarily reduce flood risk. The number of properties located in the flood risk area would remain the same. Meeting minimum target.	<sup>je</sup> 0	0	

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				Baseline	Study Area Option 1			Options Study Area Option 2				
					Development (Meath Co Co) and enhancement (Fingal Co. Co.) of a proac regime targeting potential culvert blockage locations	tive main	itenance	Targeted public awareness and education campaign and individual proofing	property	flood		
	Objectives	Giobal Weighting	Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves the development (Meath County Council (MCC)) and enh. County Council (FCC)) of a proactive maintenance regime targeting potential locations along the watercourses in the study area. FCC currently carries out approximately 20 locations at risk of flooding in Fingal. This involves the cleanin two to three week basis, with the frequency increased when heavy rain is for maintenance regime is carried out by MCC. This option would involve including as part of FCC proactive maintenance regime and setting out a proactive maint culverts in MCC. Proactive maintenance would involve removal of debris (veget at the entrance and exit of culverts on a regular basis (i.e. monthly) and in ad event. Option would also involve monitoring of culverts prone to blockages dur FCC currently uses weather forecast information to identify when a flood is lif opportunity to link this option to the FFWS identified for the following Analysis U and Ward, Nanny and Delvin, Mayne and Sluice and Coastal) Hydraulic modelling indicates that properties in the following locations are at n blockages (based on a comparison of flood maps for the 1% AEP fluvial event culvert blockage flood maps for the 1% AEP event): Swords, Dardistown, Balgy Bridge, Warbelstown, Ashbourne, Ratoath, Ballyboghil, Skerries and B The BCR for this option is 0.9 and is based on an assumed 10% reduction in co on a review of flood maps for the with and without culvert blockages scenarios, likely to alter overland flood routes or impact on areas of significant natural flo	ancement culvert bit maintena g of scree ecast. A li additional enance re ation, silt, vance of f additional ation, silt, vance of f ing a flooc rely. There its (Broac sk due to against th iffin, Portr ettystown. ponomic ris this optio od plain si	(Fingal cckage nce at ans on a mited culverts gime for rubbish) a flood d event. e is an imeadow culvert te 70% narmock k. Based n is not torage.	The public awareness and education campaign is necessary to educate the of flooding to their properties and the protection methods available to them th damage from flood events (i.e. individual property flood proofing IPFP meas would be disseminated through the distribution of information leaflets, FEM and provision of public information leaflets, FEM protection to residential and commercial properties. Such products to provide protection afforded by individual property protection is dependant on a nu including the uptake, advance warning of flood risk and depth of flooding. It this measure is only applicable when the depth of flooding at a property is The BCR for this option is 0.85 and is based on an assumed 20% reduction The benefits of this option would be significantly greater if the option was FFWS. Details of the FFWS are detailed in the following Analysis Units (Br Ward, Nanny and Delvin, Mayne and Sluice and Coastal). The BCR for this option would be significantly greater if the option was FFWS. Details of the resting overland flood routes or impact on areas of flood plain storage.				
					Comments	Score	Weighted Score	Comments	Score	Weighted Score	Comments	Τ
	C) Minimise risk to, or enhance, social amenity.	5	5	The following social amenity sites are at risk from flooding (1% AEP fluxial/0.5% AEP lida event event): 8 golf courses (Beechmount, Portmamock Strand, Forres Little, Roberstown near Ashbourne, Owens Bridge, Constown, Beaverstown near Donabate an Malahide Point): 9 tplich and put courses (Ring Common): 1 sports pitche (ALSA sports complex. , 3 holiday home/mobile home parks(Donabate, Rush and The Burrows).	This option will be focussed on preventing culvert blockages in locations where significant economic damage or significant disruption to utilities could occur. Therefore, it is unlikely there would be any reduction in risk to the social amenity sites at risk in this study area. However, there will be on increase risk to these social amenity sites. Therefore, option scores 0 as meets the minimum target.	0	0	Option would have no impact on social amenity sites at risk. Meeting minimum target as option would not result in an increase to the number of social amenity sites at risk.	0	0		
	Social Total Score/ Weighted Score					2	150		0	0		
	A) Support the objectives of the WFD.	5	5	The study area contains51 river waterbodies : 9 = high status; 3 = good status; (no deterioration required); 14 = moderate status; 23 = poor status; 3 = bad status (improvements required). The study area contains Harnstitoant (i.e. extuarine) waterbodies, all of which have been classified as being of moderate status. The study are contains 4 coastal waterbodies 2 = high status; 2 = moderate status. The study area contains 4 coastal waterbodies 2 = high status; 2 = moderate status. The study area contains 4 coastal waterbodies 2 = high status; 2 = moderate status. The study area contains 4 coastal waterbodies 2 = high status; 2 = moderate status. The study area collution presents from agriculture, comprove substances and vaterbodies as heavity modified vater body (HMMS) because of the presence of the causeval of model and have the basic measures directly relevant to the FLN FRAMS (byhadical modifications = morphological pressures) for all waterbodies relate to the need for compliance with legal requirements (E1, Planning 6 burve) burvel for BLN FRAMS (byhadinal measures have been identified Rogerstown Estuary, the Mayne Estuary and the Broadmeadow Water (as a HMWS) relating to tharties integrable the risks resulting from the physical modification of these waterbodies.	No contribution nor constraint to the achievement of WFD objectives as maintenance works will be confined to the existing drainage infrastructure within the river channels, estuaries and coastal water and will be of limited extent and scale. Meeting minimum target.	s 0	0	No contribution nor constraint to the achievement of WFD objectives as there will be no physica works within or modification to the river channels, estuaries or coastline. The only physical measures will be the installation of flood protection measures for individual properties located beyond the waterbodies. Meeting minimum target.	0	0		
	B) Minimise risk of environmental pollution	15	5	The following sites are at risk from flooding for the 1% AEP fluvial0.5% AEP Idal events4 WWTW (Ballyboghill area APSR, Owens Bridge APSR, Julianstown area APSR and Naul area APSR), 1 Waste Water Pumping Station (Casile Street Pumping Station in Asthoourne area APSR) and 35 Waste Management Permit States (2 along the Ballyoghill River, 1 along the Cortolt River and 3 on the Bracken River, 3 along the Bingodhill River, 1 along the Vian River, 6 along the Stute River, 3 along the Delvin River, 1 along the Bracken River, 3 along Baleally Steam, 1 along the Lisenhall stream, 1 along June's Steam and 6 in coastal areas). There are a total of 22 Section 4 licences and 34 Section 16 licences in the study area.	No positive or negative change in flood risk to potentially polluting sites as a result of the proposed maintenance works. Meeting minimum target. There is the potential for this option to result in at least a limited reduction in risk to the potentially polluting sites currently at risk of flooding, thus just exceeding the minimum target.	1	75	No positive or negative change in flood risk to potentially polluting sites within the study area a there will be no physical works within or modification to the river channels, estuaries or coastin Meeting minimum target.	s 6. O	0		
-	C) Avoid damage to, and where possible enhance, the flora and fauna of the study area	10	5	There are 13 internationally designated sites (SAC, CSAC, SPA, pSPA and Ramsar sites), including two sites offshore, and17 nationally designated sites (NHA, NNHA) within the study area. Sites located within the floodplain (1% AEP fluvial event) 0.5% AEP tidal event) flucidue. Bog of the Rings PNHA (22 A hecares at risk - 45% of overail area); Knock Lake pNHA; part of Rogerstown Estuary pNHA/SAC/SPA, Feltrim Hill pNHA at risk from flooding (16 hecares at risk - 45% of overail area); Siharia Woods pNHA; Tomatsow Woods pNHA; Duleek Commons pNHA at risk from flooding (5 sha at risk - 15% of overail area); Comwells Bush Fen pNHA; Boyne Costa and Estuary pNHA/SAC; Laykown Dunes and Namy Estuary pNHA (21 risk from flooding); Loughstimy Coast pNHA; Nonastow Risk PSARSAC; Malahide Estuary pNHA/SAC; Badoyle Bay pNHA; Ponastow River Mash pNHA (100% of site at risk) Outside the designated sites, there are areas of valuable habilat; indicated through their ricitation of Meath County Council's Welfand and Coastal Inventory, and Frigal County Council's Ecological Network. The rivers, estuaries and coastal waters within the study area support or have the potential to support legally protected species or other species of conservation concern. Aquatic species of particular nature conservation interest within the study area include the frastwater paelt mussel, grey seals, otters, ther river lamprey, and rossing bits; all or which are legally protected. The study area support or have the potential or support legally protected species or other species of conservation concern. Aquatic of which are legally protected. The Study area also contains a diverse range of birds, including dippers, curlew and kingfishers, invertebrates and fora (including eligrass beds in some of the estuaries).	Maintenance works within the river channels, estuaries andb regularly unblock culverts would have limited adverse impacts on the potentially sensitive riverine and estuaritmobiats, flora and fauna at these locations due to their temporary nature and localised scale. A changes to the urrent flooding tidal regime and hydrology are anticipated, except when the volume and speed of flows are tempora increased following the removal of blockages Meeting minimum target.	0 iy	0	No impacts on potentially sensitive riverine, estuarine and coastal habitats or species (located w or outside designated nature conservation sites) as there will be no physical works or modificati within or adjacent to the river channels, estuarise or coastilin. The nor physical reasures will the installation of flood protection measures for individual properties located beyond the waterboor and it is assumed that these will be installed in already modified areas. Meeting minimum targe	t bis be 0 j	0		
Environmenta	D) Avoid damage to, and where possible enhance, fisheries within the study area	5	4	The primary rivers (Nanny, Delvin, Broadmeadow, Ward, Baltyboghil, Brides, Bracken, Mayne, and Sluice), and other rivers and streams within the AU support or are capable of supporting astimonicit apocids, which are sensitive to changes in physical and chemical conditions. They are also likely to provide salmonid spawning or nursery areas. These watercourses are also likely to support torsoft, river and/or sea lampery. Many of the rivers in the study area are popular with anglers, who enjoy both game and coarse fishing. Along the coast, createral sea lamping is also very popular, key location for this being Portmarrock, the Malahide Estuary, the Rogenstown Estuary, Skerries and Babriggan. Just south of the study area coadway, Howth Harbori is the biggest commercial fishing harbour on the east coast, and the fifth largest in the country. The following is present in the study area <b>3 weirs</b> (1 weir on the Baltyboghi river, 1 weir or the Ward River near Owens Bridge. 1 impassable weir on the Calve River), I study of motorway culvet on the Codult River), 1 study of	Maintenance works within the river channels, estuaries and to regularly unblock culverts would have limited adverse impacts on potentially sensitive fisheries/shellfisheries at these locations due to the temporary nature and localised Set. No changes to the current flooding and tidal regime and hydroi are anticipated, except when the volume and speed of flows are temporarily increased following th removal of blockages, which could reduce any slower water areas that may have built up that fins co rest in. There would be no impact on angling activity as works would be limited to the locations of exis flow control structures. Meeting minimum target.	9y 9 n	0	No impacts on fisheries/shellfisheries (including designated areas) or angling activity as there will there will be no physical works or modifications within or adjacent to the river channels, estuarier coastline. The only physical measures will be the installation of flood protection measures for individual properties located beyond the waterbodies which will have no impact on fisherieteeting minimum target.	s or 0	0		

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				Baseline	Study Area Option 1			Study Area Option 2	
					Development (Meath Co Co) and enhancement (Fingal Co. Co.) of a proac regime targeting potential culvert blockage locations	tive mair	ntenance	Targeted public awareness and education campaign and individual property flood proofing	
	Objectives		Local Weighting	Baseline option assumes continuation of any existing maintenance regime in the study area	This option involves the development (Meath County Council (MCC)) and enha County Council (FCC)) of a proactive maintenance regime targeting potential locations along the watercourses in the study area. FCC currently carries out approximately 20 locations at risk of flooding in Fingal. This involves the cleanin two to three week basis, with the frequency increased when heavy rain is for maintenance regime is carried out by MCC. This option would involve including as part of FCC proactive maintenance regime and setting out a proactive maint culverts in MCC. Proactive maintenance would involve removal of debris (veget at the entrace and exit of culverts on a regular basis (i.e. monthy) and in ad- event. Option would also involve monitoring of culverts prone to blockages duri FCC currently uses weather forecast information to identify when a flood is lik opportunity to link this option to the FFWS identified for the following Analysis Un and Ward, Nanny and Delvin, Mayne and Sluice and Coastal). Hydraulic modelling indicates that properties in the following locations are at ri- blockages (based on a comparison of flood maps for the 1% AEP fluvial event culvert blockage flood maps for the 1% AEP event): Swords, Dardistown, Balgn Bridge, Warbelstown, Ashbourne, Ratoath, Ballyboghil, Skerries and Bu The BCR for this option is 0.9 and is based on an assumed 10% reduction in ecc on a review of flood maps for the with and without culver blockage scenarios, likely to alter overland flood routes or impact on areas of significant natural flood	ancement culvert bli maintena go fs cree ecast. A li additiona enance re ation, silt, vance of ing a floor rely. Then its (Broad sk due to against ti fifin, Port ettystown onomic ris tod plain s	<ul> <li>(Fingal ockage nne at ens on a lockage</li> <li>(ulverts rubbish) a flood d event.</li> <li>e is an dimeadow</li> <li>culvert</li> <li>e is an dimeadow</li> <li>culvert</li> <li>culvert</li> <li>culvert</li> <li>sk. Based n is not torage.</li> </ul>	The public awareness and education campaign is necessary to educate the public of the risk of flooding to their properties and the protection methods available to them to reduce potential damage from flood events (i.e. individual property flood proofing IPFP measures). Information would be disseminated through the distribution of information leaflets, FEM FRAMS website and provision of public information leaflets, FEM FRAMS website and provision of public information days. IPFP involves the use of 'off the shelf' flood defence products to provide individual flood protection to residential and commercial properties. Such products include flood gates, flood barriers, air vent blocks and the installation of non return valves to service pipes. The level of protection afforded by individual property protection is dependant on a number of factors including the uptake, advance warning of flood risk and depth of flooding. It is assumed that this measure is only applicable when the depth of flooding at a property is less than 0.6m. The BCR for this option is 0.85 and is based on an assumed 20% reduction in economic risk. The benefits of this option would be significantly greater if the option under govided with a FFWS. Details of the FFWS are detailed in the following Analysis Units (Broadmeadow and Ward, Nanny and Delvin, Mayne and Sluice and Coasta)). The BCR for this option when combined with a FFWS is 3. This option will not alter existing overland flood routes or impact on areas of significant natural flood plain storage.	
					Comments	Score	Weighted Score	Comments Score Weighte	Comments
	E) Protect, and where possible enhance, landscape character and visual amenity within the study area	5	5	The Meath area of the AU comprises the following seven landscape character ares <b>Sentral</b> Lowlands, Bellewstown Hills, Coastal Plains, Nanny Valley, South East Lowlands, and The Ward Lowlands (all of regional importance), andTara-Skryne Hills (international importance). The Fingal area of the AU comprises the following five landscape character types: Coasta Estuary, High Lying Agricultural, Low Lying Agricultural, and Rolling Hills with Tree Bets The Meath area of the AU combines indecapes classified as being of high sensitivity along the coast and estuary condros, and also the north of the county; central and southerm areas of the county are classified as being low to medium sensitivity. Fingal County Council also designates 'Important Views'; these are concentrated in the northern half of the county, both on the coast and inland.	No changes in landscape character and visual amenity are anticipated as maintenance works will be limited to existing drainage infrastructure and channel and no new structural changes will be made. Meeting minimum target.	0	0	No change in landscape character and visual amenity as there will be there will be no physical wo within or modification to the river channels, estuaries or coastline. The only physical measures will be the installation of flood protection measures for individual properties located beyond the 0 0 waterbodies which will have no impact on landscape character or visual amenity. Meeting minimum target.	
	F) Avoid damage to or loss of features of cultural horitage importance, their setting and heritage value within the study area	5	3	57 sites on SMR/RPS/RMP at risk (1% AEP fluvial event and 0.5% AEP tidal event). Parts of 4 ACAs at risk- a total of 26.7ha at risk (1% AEP fluvial event and 0.5% AEP tida event). Ballyboghill and Lusk- 2 sites at risk (a bridge on the Ballyboghill River and an unclassified Ring Dich at Gibbonsmoot). 24Na of Newbridge Demense ACA at risk (16% o tidal area). Broadmategie to the RMP (classcode CRAV). The remaining 5 sites are within the BRI/RPS/RMP (Baster). A bit of ACA at risk 10% ACB, Comen Bridge and 2 unknown. One BRI/RPS/RMP, Baster M, Bridge K, Cowter B, Bridge and 2 unknown. One BRI/RPS/RMP, Baster M, Bridge K, Cowter B, Bridge and 2 unknown. One BRI/RPS/RMP, Baster M, Baster M, Bridge K, Rovetteve M Bridge, Rogansteme Mridge, Knockedean Bridge and a bridge at Batheary Demesnet. Lissenhall Great) and 1 Craanog north of Durshaughin). Disk of 1 ACA at risk 1 Rowelstown (c 10% of total). Mayne and Stuice- 6 sites at risk. 4 sites on RMP (Habitation Site, a possible castle site, a dwelling and classcode MOND). 2 sites on SMR: a ingfort - cashet at Farthirm and a building at Baigriffin Park. Namy and Devini - 11 sites at risk. 3 sites on RPS: a 2 Arch Bridge at Arcame, a Waysidk Cross at Gausiators and 1 Bridge - Old Mill Bridge. 1 unclassified site on RMP (Habitation Site). coverted m The remaining 5 sites are on the SMRRPS/RMP datasets: 2 Tide Mills (in Ballymadrough).	Maintenance works within the river channels, estuaries and to regularly unblock culverts would result no positive or negative change in risk to, or impacts on setting of known SMR/RPS/RMP features(through either direct impacts or impacts on setting) or ACAs. Meeting minimum target.	n O	0	There will be no positive or negative change in risk tar impacts on, SMR/RPS/RMP features through either direct impacts or impacts on setting) and ACAs as there will be there will be no physical works within or molfication to the river channels, estuarias or coastille. The only physical measures will be the installation of flood protection measures for individual properties located beyond the waterbodies which will have no impact on cultural heritage. Meeting minimum targe.	
	Environmental Total Score/ Weighted Score							o	
Total Sc	ore/ Total Weighted Score					5	345	3 125	

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Appendix F. BCR Summary

## 2. BCR of options

_			Catchm	nent scale		Nanny and Delvin AU		Br	padmeadow and Ward A	U		Mayne and Sluice AU	1					
		Option details	Catchment scale Option 1 - Development (Meath Co Co) and enhancemen (Fingal Co. Co.) of a proactive maintenance regime targeting potentia culvert blockage locations	Catchment scale Option 2 - Targeted public awareness and education campaign and individual property protection and flood proofing	Nanny and Delvin AU scale Option 1 - Develop a fluvial FFWS for the Nanny River	Duleek Area APSR Option 1 - Raising existing defence embankment to a higher standard of protection.	Duteek Area APSR - Option 1a - Raising existing defence embankment to a higher standard of protection.	Broadmeadow and Ward AU Option 1-Develop a fluvial FFWS for the Broadmeadow River .	Ratoath area APSR Options 1 - Improve channel conveyance by replacing a bridge on the Broadmeadow River at the R125 Ratoath Road and a culvert on a tributary of the river.	Roweistown East area APSR Construction of flood defence embankments	Mayne and Stuice AU Option 1 - Develop a fluvial FFWS for the Mayne River only.	St Margaret's, Dublin Airport, Belcamp and Balgriffin areas APSR Option 1 - Improving channel conveyance by replacing existing culverts together with construction of flood defence embankments (Balgriffin).	St Margaret's, Dublin Airport, Belcamp and Balgriffin areas APSR Option 1a - Improving channel conveyance by removing an existing unused bridge together with construction of flood defence embankments (Balgriffin).	Coastal AU Option 1 - Develop a combined fluvial and tidal FFWS. FFWS would be required for the triah Sea alouite and for the following rivers: Mill Stream, Rush West Stream, Ward River, Gaytorock Stream and Sluice River (consideration has been given to the proposed FFWS in other analysis units e.g. Nanny- Delwin AU).	Coastal AU Option 2-Regular inspection and maintenance of coastal defences along the coast including walls embankments and flap valves.	Portmarnock and Malahide areas APSR option 1 Rehabilitating and raising existing coastal defences at Strand Road (including rehabilitation of flapped outfal) and construction of flood defence embankment.	Portmarnock and Malahido areas APSR option 2 Rehabilitating flapped outfall and construction of flood defence embankmentis and walls to protect at risk properties at Strand Road.	Portmarnock and Malahide areas APSR option 3 Construction of flood defence embankments and walls to protect at risk properties in Malahide town centre.
		Design standard	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial	0.1% AEP fluvial	1% AEP fluvial	1% AEP fluvial	1% AEP fluvial	1% AEP fluvial	1% AEP fluvial	1% AEP fluvial	1% AEP fluvial	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal
3aseli 1e	Do nothing (assuming any current maintenance and management regime continues)																	
un u																		
Do minir	2 Proactive maintenance		1,686,164	ł											1,493,620			
Non-structural measures	3a         Develop a fluvial flood forecasting system           3b         Develop a fluvial and idal flood forecasting system           4         Targeted public awareness and education campaign           5         Individual property flood-proofing           6         Sediment management           7         Land management			4,015,341	450,803			450,803			450,803			1,761,918				
	8 Sustainable Urban Drainage Systems (SUDS)					1 123 541	282.271									623.804	43.000	
asures	9 Kenabuitation, improvement of existing detences 10 Improvement in channel conveyance 11 Provision of permanent flood walls/embankments/rock armour/revetments 12 Provision of demountable flood defences 13 Use of overland floodways (e.g. allowing flooding of roads in a controlled manner)					1,123,541	282,271		462,534	50,236		326,617	301,030			19,907	43,000	1,736,573
Structural mo	14 Flow diversion (full diversion / bypass channel, flood relief channel, etc.) 15 Flood storage reservoirs 16 Beach Recharge/sand dunes 17 Groynes																	
	18 Breakwater 19 Managed realignment 20 Tida barrier/Tidal barrage 21 Relocation of existing assets																	
basic costs (Euro			1,686,164	4,127,080	450,803	1,123,541	282,271	450,803	462,534	50,236	450,803	326,617	301,030	1,761,918	1,493,620	643,711	221,469	1,736,573
	1 Basic Construction Cost C 2. Contingency 20%	of C				1,123,541 224,708	282,271 56,454		462,534 92,507	50,236	5 •	326,617 65,323	301,030 60,206		1,330,687 266,137	643,711 128,742	221,469 44,294	1,736,573 347,315
	3         Design Team Fees & Expenses           3.1a Engineering Consultanti         Cost of works <4126, 973.81																	
l Costs	3.1b         For Reinforced Concrete Portion of Workš         3% of C <sub>inc</sub> Cost of RC Portion under 653,468.02         3% of C <sub>inc</sub> RC Portion from 653,468.02 to E 2,539,476.20         66,348.69 + 2.5% of C           RC Portion from 623,680.02 to E 2,539,476.20         61,348.69 + 2.5% of C           RC Portion from 625,498.20 to E 65,078,952.30         619,048.07 + 2% of C           RC Portion over 65,078,952.30         64,440.83 + 1.5% of C	Gric Gric I Gric																
ditiona	3. IC Auternative Method (instead of 3. 1a & 3. 1b) 6% of C 3 Environmental Consultants 5% of C					67,412 56 177	16,936		27,752	3,014		19,597	18,062		79,841	38,623	13,288	104,194
Ad	3 Economic Consultants 0.5% of C					5,618	1,411		2,313	251		1,633	1,505		6,653	3,219	1,107	8,683
	3 Specialist Consultants 2.5% of C					280,885	70,568		115,633	12,559		81,654	75,257		332,672	160,928	55,367	434,143
	4 Site Supervision Based on time cost es Clerk of works / Anum Resident Engineer / A	stimati ım =€120,000 Annum =€130,000				120,000 130,000	20,000 21,667		30,000 32,500	20,000 21,667		40,000 43,333	40,000 43,333		30,000 32,500	60,000 65,000	40,000 43,333	60,000 65,000
	5 Allowance for Archaeology 15% of C					168,531	42,341		69,380	7,535		48,993	45,154		199,603	96,557	33,220	260,486
	6 Allowance for Environmental Mitigating Measures 6% of C					67,412	16,936		27,752	3,014		19,597	18,062		79,841	38,623	13,288	104,194
	7         Allowance for Compensation and Land Acquisition         10% to 12.5% of C           8         Allowance for Art         10%           Construction cost upto €2.550.000         1% of C           Construction Cost €2.550.000 to €3.00,000         1% of C           Construction Cost €2.500.000 to €12.700,000         1% of C, Max€38,000           Construction Cost €1.000 to €12.700,000         Max €64,000.00	0.00				112,354	28,227 2,823		46,253 4,625	5,024		32,662	30,103		133,069 13,307	64,371	22,147	173,657
	9 NPV Maintenance C x 1.5% x 22.48					378,858	95,182		155,966	16,940		110,135	101,507		503,649	217,059	74,679	585,572
	Present value cost €)		1,686,164	4,127,080	450,803	2,746,732	668,928	450,803	1,090,342	153,301	450,803	809,141	752,281	1,761,918	3,074,494	1,555,454	575,481	3,984,012

#### Source = Department of Finance Circular Ref.- 11/87 Source = Section 4.2 (page 21) of "Public Art: Per Cent for Art Scheme, General National Guidelines 2004

Total PV costs for option	Furo	1 686 164	4 127 080	450 803	2 746 732	668 928	450 803	1 090 342	153 301	450 803	809 141	752 281	1 761 918	3 237 426	1 555 454	575 481	3 984 012
Total PV damages to 1% AEP fluvial/0.5% AEP tidal		14,825,219	17,458,978	2,785,357 See Opti	ion 1a	166,637	1,814,768	978,175	341,628	926,524	955,548	955,548	18,345,856	6,344,81	1,553,725	1,553,725	2,730,081
Total benefits resulting from option	Euro	1,482,522	3,491,796	557,071 See Opti	ion 1a	166,637	362,954	978,175	341,628	185,305	955,548	955,548	3,669,171	1,268,962	1,553,725	1,553,725	2,730,081
Benefit cost ratio		0.88	0.85	1.24 See Opti	ion 1a	0.25	0.81	0.90	2.23	0.41	1.18	1.27	2.08	0.39	1.00	2.70	0.69
Carry forward to MCA assessment (BCR> 0.85)		TRUE	TRUE	TRUE See Opti	ion 1a	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE
Benefit cost ratio considering: Incorporating benefits from options from other spatial assessme units, and Including the benefits of protecting for different AEP events othe the 1%/0.5% AEP fluvial and tidal event	nt r tha		2.96	4.94	1.07		3.22	0.94		1.64			7.29				
Carry forward to MCA assessment (BCR> 0.85)			TRUE	TRUE	TRUE		TRUE	TRUE		TRUE			TRUE				

<u> </u>			Coastal AU													
		Option details	Portmarnock and Malahide areas APSR option 4 Construction of flood defence walls and embankments along with rehabilitating and raising of existing coastal defences in Malahide town centre.	Portmarnock and Malahide areas APSR option 5 Construction of demountable floo defences along the coast road with permeant flood walls and improvement to defences in Malahide town centre.	Portmarnock and Malahide areas APSR option 5a Construction of demountable floc defences at the railway underpas with permeant flood walls and improvement to defences in Malahide town centre.	Swords area APSR option 1 Widening and deepening of the Gaybrook Stream to reduce fluvial flood risk to properties at Aspen near Kinsaley.	Swords area APSR option 2 Construction of flood defence walls to protect properties at ris from tidal flooding in Swords town centre.	Rush Area APSR Option 1 Construction of flood defence embankments and walls and replacing culvert along Channe Road to protect at risk propertie along the coast and from West Rush stream	Rush Area APSR Option 1a Replacing culvert along Chann Road to protect properties at risk from fluvial flooding along the West Rush stream.	Skerries APSR option 1 Rehabilitating and raising t existing coastal defences at Harbour Road to reduce tidal flood risk.	Skerries APSR option 2 Replacing culverts under roads and railway with larger capacit culverts and widening channe through park to reduce fluvial flood risk to properties at Mille Lane and Sherlock Park.	Skerries APSR option 3 Constructing a flow diversion ychannel to run in a culvert unde I the railway and roads at Miller Iane and Sherlock Park to properties at Miller Lane and Sherlock Park.	Skerries APSR option 4 Lowering road levels and raisin kerb levels along Miller Lane and Sherlock Park to allow controlled flooding along this road and reduce fluvial flood ris to properties.	Skerries APSR option 5 Construction of storage reservoir to the west of railway embankment to provide flood storage upstream of Skerries Area APSR to reduce fluvial flood risk to properties along Miller Lane and Sherlock Park	Skerries APSR option 6 Construction of storage reservoi to the west of railway embankment to provide flood storage upstream of Skerries Area APSR along with replacing culverts under roads and railwa with larger capacity culverts to reduce fluvial flood risk to properties along Miller Lane and	Laytown, Bettystown and Coastal area APSR option 1 Construction of flood defence embankments and walls to protect properties at risk along the coast and from the Nanny River
		Doeign standard													Sherlock Park.	
=		Design standard	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	I 1% AEP fluvial/0.5% AEP tidal	I 1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tidal	1% AEP fluvial/0.5% AEP tida
Base	Do nothing (assuming any current maintenance and management regime	continues)														
nimum	1 Reduce existing activities															
ĞĒ	2 Proactive maintenance 3a Develop a fluvial flood forecasting system															
Iral	3b Develop a fluvial and tidal flood forecasting system 4 Targeted public awareness and education campaign															
structu ures	5 Individual property flood-proofing															
Non-§ meas	6 Sediment management 7 Land management															
	8 Sustainable Urban Drainage Systems (SUDS)		110 101	11 616	11.646					E11.107						
	10 Improvement in channel conveyance		110,101	1,010	11,010	15,000		244,073	244,07	3	635,795	5 1,027,518	8			
S0,	11 Provision of permanent flood walls/embankments/rock armour/revetments 12 Provision of demountable flood defences	3	1,644,950	1,213,856	82,804	5	698,686	656,043	۱ <u>ــــــــــــــــــــــــــــــــــــ</u>							616,872
neasur	13 Use of overland floodways (e.g. allowing flooding of roads in a controlled a	manner)														
tural r	15 Flood storage reservoirs													279,300	0	
Struc	16 Beach Recharge/sand dunes 17 Groynes															
	18 Breakwater															
	20 Tidal barrier/Tidal barrage															
c s c	21 Relocation of existing assets															
bas			1,761,111	1,308,276	132,51	5 15,000	698,686	900,116	244,07	3 511,107	635,795	5 1,027,518	В	279,300		616,872
	1 Basic Construction Cost	сс	1,761,111	1 848,903	115,12	1 15,000	698,686	900,116	244,07	3 511,107	635,795	5 1,027,518	8	279,300		616,872
	2 Contingency 3 Design Team Fees & Expenses	20% of C	352,222	2 169,781	23,024	4 3,000	139,737	180,023	48,81	5 102,221	127,159	205,504	1	55,860		123,374
	C = being in team to be L2pointed Cost of works ≪125, 973.81 C from to €25, 973.81 to €380,921.42 C from to €380,921.42 to €334,980.02 C from to €34,880.02 to €3.48,980.02 C from to €12,497.38.10 to €3.14,345.20 C from to €12,497.38.10 to €3,348,980.40 C from to €3,714.345.20 to €3,348,980.40 C from to €3,348,930.40 to €25,394,762.00	10% of C 62,539.48 + 8% of C 66,348.89 + 7% of C 613,448.09 + 7% of C 619,046.07 + 5.5% of C 619,046.07 + 5.5% of C 666,661.25 + 4.5% of C 668,404.70 + 4.5% of C 6161,891.16 + 4% of C														
Costs	3.1b For Reinforced Concrete Partien of Workš Cost of RC Portion under€634,869.02 RC Portion from€34,869.02 to €2,539,476.20 RC Portion from€2,539,476.20 to to €5,078,952.30 RC Portion over€5,078,952.30	3% of C <sub>RC</sub> €6,348.69 + 2.5% of C <sub>RC</sub> €19,046.07 + 2% of C <sub>RC</sub> €44,440.83 + 1.5% of C <sub>RC</sub>														
litional	3.1c Alternative Method (instead of 3.1a & 3.1b)	6% of C	105,667	50,934	6,907	900	41,921	54,007	14,64	4 30,666	38,148	61,651	1	16,758	3	37,012
Add	3 Economic Consultants	0.5% of C	8 806	42,440	576	750	34,934	45,000	12,20		3 179	51,370	3	1 397	7	30,844
	3 Specialist Consultants	2.5% of C	440,278	8 212,226	28,780	3,750	174,672	225,029	61,01	8 127,777	158,949	256,879	9	69,825	5	154,218
	4 Site Supervision	Based on time cost estimati Clerk of works / Annum =€120,000 Resident Engineer / Annum =€130,000	120,000 130,000	0 120,000 0 130,000	60,000 65,000	0 10,000 0 10,833	30,000 32,500	60,000 65,000	20,00 21,66	0 40,000 7 43,333	40,000 43,333	0 40,000 3 43,333	D 3	40,000 43,333	D 3	20,000 21,667
	5 Allowance for Archaeology	15% of C	264,167	7 127,335	5 17,268	2,250	104,803	135,017	36,61	1 76,666	95,369	154,128	в	41,895	5	92,531
	6 Allowance for Environmental Mitigating Measures	6% of C	105,667	7 50,934	6,907	7 900	41,921	54,007	14,64	4 30,666	38,148	61,651	1	16,758	3	37,012
	7 Allowance for Compensation and Land Acquisition	10% to 12.5% of C	176,111	1 84,890	11,512	2 1,500	69,869	90,012	24,40	7 51,111	63,580	102,752	2	27,930	D	61,687
	8 Allowance for Arf Construction cost upto 62,550,000 Construction Cost 62,550,000 to 63,00,000 Construction Cost 63,000 to 612,700,000 Construction Cost in excess of 612,700,000	1% of C 1% of C, Max€38,000.00 Max€51,000.00 Max€64,000.00	17,611	1 8,489	9 1,15 <sup>-</sup>	150	6,987	9,001	2,44	1 5,111	6,358	3 10,275	5	2,793	3	6,169
	9 NPV Maintenance	C x 1.5% x 22.48	593,847	7 441,151	44,684	\$ 5,058	235,597	303,519	82,30	1 172,345	214,390	346,479	9	94,180	D	208,009
	Present value cost (€)		4,163,541	2,291,333	386,687	54,166	1,615,121	2,125,238	584,046	6 1,219,116	1,496,198	3 2,366,683	3	703,994		1,412,480

#### 1 Source = Department of Finance Circular Ref:- 11/87 2 Source = Section 4.2 (page 21) of "Public Art : Per Cent for Art Scheme, General National Guidelines 2004

Total PV costs for option	Euro	4,163,541	4,512,624	2,165,999	54,166	1,615,12	2,125,238	584,046	1,219,116	1,496,198	2,366,683	703,994	1,412,480
Total PV damages to 1% AEP fluvial/0.5% AEP tidal		2,730,081	2,730,081	2,730,081	193,440	580,097	1,304,292	432,280	356,311	1,876,254	1,876,255	1,876,257	1,704,694
Total benefits resulting from option	Euro	2,730,081	2,730,081	2,730,081	193,440	580,09	1,304,292	432,280	356,311	1,876,254	1,876,255	1,876,257	1,704,694
Benefit cost ratio		0.66	0.60	1.26	3.57	0.36	0.61	0.74	0.29	1.25	0.79	2.67	1.21
Carry forward to MCA assessment (BCR> 0.85)		FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	. TRUE
Benefit cost ratio considering: Incorporating benefits from options from other spatial assessment units, and Including the benefits of protecting for different AEP events other th the 1%/0.5% AEP fluvial and tidal event	a		0.99	6.76				0.88			0.82		
Carry forward to MCA assessment (BCR> 0.85)			TRUE	TRUE				TRUE			FALSE		



# Appendix G. IRR Assessment Results

Individual Risk Receptor	Accordent	Ouncashin	Dependention of the education	Flood Risk Management options	Option details
(IRR)	Assessment Unit	Ownership	Description of flood risk	(from Stage 2)	Description
AII	Catchment	Various	Various	Development (Meath County Council (MCC)) and enhancement (Fingal County Council (FCC)) of a proactive maintenance regime targeting potential culvert blockage locations	This option involves the development (Meath Co (MCC)) and enhancement (Fingal County Counce proactive maintenance regime targeting potentia locations along the watercourses in the study are carries out maintenance at approximately 20 loca flooding in Fingal. This involves the cleaning of s three week basis, with the frequency increased v forecast. A limited maintenance regime is carried option would involve including additional culverts proactive maintenance regime and setting out a µ maintenance regime for culverts in MCC. Proacti would involve removal of debris (vegetation, silt, entrance and exit of culverts on a regular basis (i advance of a flood event. Option would also invo culverts prone to blockages during a flood event. uses weather forecast information to identify whe Hydraulic modelling indicates the following location to culvert blockages (based on a comparison of f 1% AEP fluvial event against the 70% culvert blo for the 1% AEP event): Swords, Dardistown, Bala Portmarnock Bridge, Warbelstown. IRRs in Asi Ballyboghil, Skerries and Bettystown. IRRs in Asi Ballyboghil would benefit from this measure. This option would cost approximately €0.45 million the option focussed on maintenance of culverts i IRRs. Based on a review of flood maps for the w culvert blockages scenarios, this option is not like overland flood routes or impact on areas of signif plain storage.
				Construction of flood defence embankments	This option would involve the construction of floo protect the IRR. An embankment 0.5m in average in length would be required to protect the IRR for event. This embankment would surround the IRF approximately €0.01 million. The embankment we protection up to and including the 1% AEP event The extent of the proposed defences is minimal a impact on surrounding water levels. Based on a maps, this option is not likely to alter overland flo impact on areas of significant natural flood plain

ounty Council cil (FCC)) of a al culvert blockage rea. FCC currently cations at risk of screens on a two to when heavy rain is ed out by MCC. This is as part of FCC's a proactive tive maintenance , rubbish) at the (i.e. monthly) and in olve monitoring of t. FCC currently hen a flood is likely.
tions are at risk due i flood maps for the lockage flood maps algriffin, Ratoath, shbourne and
ion over 50 years if in the vicinity of the with and without kely to alter nificant natural flood
od embankments to age height and 30m or the 1% AEP IR and cost would provide nt.
and is not likely to review of flood ood routes or storage.

					Option details
Individual Risk Receptor (IRR)	Assessment Unit	Ownership	Description of flood risk	Flood Risk Management options (from Stage 2)	Description
Utility asset in Stamullin	Stamullin area APSR	Unknown	Flooding occurs where the existing culvert and channel capacity results in out of bank flows and inundation of surrounding land during a flood event. Flooding from an under capacity culvert at Stadalt Cross results in inundation of land on the left flood plain of the channel. The utility asset is located approximately 80m downstream of Stadalt Cross on the left flood plain of the channel.	Construction of flood diversion channel	This option would involve the construction of a fluchannel to increase capacity in the river system water away from the IRR. The topography of the location of the IRR means that this option is tech 150m long diversion channel running to the north channel would cost approximately €0.87 million i construction of one culvert at the access road to housing estate. This would provide protection for event. Based on a review of flood maps, this option is no overland flood routes or impact on areas of signing plain storage.
				Individual property flood proofing (IPFP)	This option would involve the installation of off th commercially available products such as door gu valves, etc. to protect the IRR. Based on aerial nature of this IRR, (i.e. small localised structure) to the use of IPFP. The cost of providing this op and would provide protection for the 1% AEP eve IPFP was permanently in place. Based on a review of flood maps, this option is n overland flood routes or impact on areas of signi plain storage.
			Flooding occurs where the existing channel and	Construction of flood defence embankments	This option would involve the construction of floc protect the IRR. An embankment 210m in length height of 1.3m would be required to protect the I event. This option would cost approximately €0. provide protection up to and including the 1% Al Based on a review of flood maps, this option is I overland flood routes. The embankment is will bl flood route along the right bank of the channel. T impact on areas of significant natural flood plain

ow diversion and divert flood land at the nically feasible. A n of the existing ncluding the Mountain View r the 1% AEP
not likely to ficant natural flood
e shelf lards, non-return ohotographs, the would lends itself tion is €11,000 ent assuming that
ot likely to alter ficant natural flood
d embankments to n, with an average RR for the 1% AEP 26 million and EP event.
ikely to alter ock an overland his option will not storage.

Description
This option would involve the construction of a floc channel to increase the capacity in the river syste water away from the IRR. The topography of the location of the IRR means that this option is tech 240m long diversion channel running to the north channel would cost approximately €1.1 million ar ncrease capacity in the system and divert flood of the WWTWs during a flood event. The costs also construction of one culvert at the access road to This option would provide protection for the 1% <i>A</i> Based on a review of flood maps, this option is n overland flood routes or impact on areas of signi plain storage.
This option would involve the construction of floo protect the IRR. An embankment approximately height and 230m in length would be required to p This option would cost approximately €0.55 millic provide protection up to and including the 1% AE Based on a review of flood maps, this option is n overland flood routes. The flood plain storage to M1 motorway will be increased with this option.
This option would involve the construction of a floc channel to increase capacity in the Ballyboghil F volume of water which naturally diverts to the Tu diverting water through the existing Ballyboghil R the M1, the issues with the capacity problems at culverts under the M1 would be reduced and her M1 would also be reduced.
The topography of the land between the Ballybog River means that this option is technically feasibl diversion channel running to the south of the exis River, linking back to the Ballyboghil upstream of cost approximately €0.9 million and would provid and including the 1% AEP event. Based on a review of flood maps, this option is li existing overland flood routes between the Ballyb Turvey River to the south. The option is not likely areas of significant natural flood plain storage.
This chat local char char construction This cons

ow diversion em and divert flood land at the nically feasible. A n of the existing nd would help water away from o include for the the WWTWs. AEP event. ot likely to alter ficant natural flood
d embankments to 2m in average protect the IRR. on and would P event. ot likely to alter the west of the
ow diversion River and limit the Irvey River. By tiver culverts under t the Turvey nce the risk to the
ghil and Turvey le. A 1.5km long sting Ballyboghil f the M1 would le protection up to
kely to alter boghil River and / to impact on

Individual Risk Receptor (IRR)	Assessment Unit	Ownership	Description of flood risk	Flood Risk Management options (from Stage 2)	Option details
					Description
Waste water pumping station in Ashbourne	Ashbourne area APSR	Local Authority	Flooding occurs where the existing channel capacity results in out of bank flows and inundation of surrounding land during a flood event. The WW pumping station is located on the left bank of the Broadmeadow River at Ashbourne	Construction of flood defence embankments	This option would involve the construction of floc protect the IRR. An embankment with an average and 100m in length would be required to protect option would cost approximately €0.06 million and protection up to and including the 1% AEP event Based on a review of flood maps, this option is r overland flood routes or impact on areas of signi- plain storage.
WWTWs at Owens Bridge	Owens Bridge area APSR	Local Authority	Flooding occurs where the existing channel capacity results in out of bank flows and inundation of surrounding land during a flood event. The WWTW is located on the right bank of the Ward River at Owens Bridge. The flood maps indicate that this WWTW is at risk for the 0.1% AEP event only.	Construction of flood defence embankments	This option would involve the construction of floc protect the IRR. An embankment 0.6m in avera 100m in length would be required to protect the would cost approximately €0.03 million and woul protection up to and including the 1% AEP event Based on a review of flood maps, this option is r overland flood routes or impact on areas of signi plain storage.
N32 at Clonshaugh	St Margaret's, Dublin Airport, Belcamp and Balgriffin areas APSR	Local Authority	Flooding occurs due to surcharging of the culvert under the N32 at Clonshaugh. Surcharging at the inlet to the culvert results in flooding along the N32 during a flood event.	Construction of flood defence embankments	This option would involve the construction of a fluto protect the IRR. An embankment with an ave 1.5m and 80m in length would be required to protoption would cost approximately €0.12 million and protection up to and including the 1% AEP even Based on a review of flood maps, this option is noverland flood routes or impact on areas of signiplain storage.

d embankments to ge height of 0.9m the IRR. This d would provide
ot likely to alter ficant natural flood
d embankments to ge height and RR. This option d provide
ot likely to alter ficant natural flood
ood embankment rage height of tect the IRR. This d provides t.
ot likely to alter ficant natural flood
-----------------------------------
Individual Risk Receptor (IRR)
WWTWs at Julianstown

ood embankments to age height of 2.2m t the IRR. This nd provide nt.

likely to alter block an overland er channel. This ural flood plain



#### Appendix H. Information for non APSRs

			Option details	Beaumont Bridge - Construction of flood defence embankments to provide protection to clusters of residential properties.	Newtown Construction of flood defence embankments	Streamstown Option 1 - Improving channel conveyance by replacing existing culvers together with construction of flood defence embankments.	The Burrows Option 1 Construction of flood defence embankments to provide protection to cluster of residential properties.
			Design standard	1% AEP fluvial	1% AEP fluvial	1% AEP fluvial	1% AEP fluvial/0.5% AEP tidal
aseli e		<b>5</b>					
<u> </u>		Do nothing (assuming any current maintenance and management regime co	ntinues)				
o inimu	1	Reduce existing activities					
ΩE	2 3a	Proactive maintenance Develop a fluvial flood forecasting system					
-	Зb	Develop a fluvial and tidal flood forecasting system					
ictura s	4	Targeted public awareness and education campaign					
n-stru asure	5 6	Sediment management					
Nor me:	7	Land management					
	8	Sustainable Urban Drainage Systems (SUDS)					
	10	Improvement in channel conveyance				917,534	
	11	Provision of permanent flood walls/embankments/rock armour/revetments		130,444	77,977		106,134
sure	12	Provision of demountable flood defences	nner)				
l mea	14	Flow diversion (full diversion / bypass channel, flood relief channel, etc.)					
ctura	15	Flood storage reservoirs					
Stru	16 17	Beach Recharge/sand dunes Grovnes					
	18	Breakwater					
	19	Managed realignment					
	20	Relocation of existing assets					
asic osts (uro)							
<u>تة م</u>				130,444	77,977	917,534	106,134
	1	Basic Construction Cost	с	130,444	77,977	917,534	106,134
	2	Contingency	20% of C	26,089	15,595	183,507	21,227
	3 3.1a	Design Team Fees & Expanses Engineering Consultants <sup>1</sup> Cost of works <6126, 973.81 C from to €136, 973.81 to €300.921.42 C from to €330.921.42 to €534.869.02 C from to €348.969.02 to 1, 269.738.1 0 C from to €1, 269.738.1 to 10 € 3, 174.345.20 C from to €1, 274.345.20 to €34.48, 690.40 C from to €6, 348690.40 to €12, 697.381.00 C from to €6, 348690.40 to €12, 697.381.00 C from to €6, 349679.40 to €12, 697.381.00 C from to €6, 349679.40 to 10 € 25, 394.762.00 Over €25, 394.762	10% of C 62,539.48 + 8% of C 66,348.69 + 7% of C 619.046.07 + 5.5% of C 619.046.07 + 5.5% of C 649.078 - 25 + 4.5% of C 668.661.25 + 4.5% of C 689.404.70 + 4.5% of C 6161.891.16 + 4% of C				
Costs	3.1b	For Reinforced Concrete Portion of Works <sup>1</sup> Cost of RC Portion under 6534,869.02 Ce2,539,476.20 RC Portion from 654,869.02 Ce2,539,476.20 RC Portion from 62,539,476.20 to to 65,078,952.30 RC Portion over 65,078,952.30	3% of C <sub>RC</sub> €6,348.69 + 2.5% of C <sub>RC</sub> €19,046.07 + 2% of C <sub>RC</sub> €44,440.83 + 1.5% of C <sub>RC</sub>				
onal	3.1c	Alternative Method (instead of 3.1a & 3.1b)	6% of C	7,827	4,679	55,052	6,368
Additi	3	Environmental Consultants	5% of C	6,522	3,899	45,877	5,307
	3	Economic Consultants	0.5% of C	652	390	4,588	531
	3	Specialist Consultants	2.5% of C	32,611	19,494	229,384	26,534
	4	Site Supervision	Based on time cost estimate Clerk of works / Annum = €120,000 Resident Engineer / Annum = €130,000	20,000 21,667	20,000 21,667	30,000 32,500	20,000 21,667
	5	Allowance for Archaeology	15% of C	19,567	11,697	137,630	15,920
	6	Allowance for Environmental Mitigating Measures	6% of C	7,827	4,679	55,052	6,368
	7	Allowance for Compensation and Land Acquisition	10% to 12.5% of C	13,044	7,798	91,753	10,613
	8	Allowance for Ar <sup>2</sup> Construction cost upto €2,550,000 Construction Cost €2,550,000 to €6,300,000 Construction Cost €6,300,00 to €12,700,000 Construction Cost in excess of €12,700,000	1% of C 1% of C, Max €38,000.00 Max €51,000.00 Max €64,000.00	1,304	780	9,175	1,061
	9	NPV Maintenance	C x 1.5% x 22.48	43,986	26,294	309,392	35,788
	•	Present value cost (E)		331 538	214 948	2 101 444	277 518

 Source – Department of Finance Circular Ref. - 11/87
 Source – Section 4.2 (page 21) of "Public Art: Per Cent for Art Scheme, General National Guidelines 2004

Total PV costs for option	Euro	331,538	214,948	2,101,444	277,518
Total PV damages to 1% AEP fluvial/0.5% AEP tidal		280,921	298,660	917,813	1,811,168
Total benefits resulting from option	Euro	280,921	298,660	917,813	1,811,168
Benefit cost ratio		0.85	1.39	0.44	6.53
Carry forward to MCA assessment (BCR> 0.85)		TRUE	TRUE	FALSE	TRUE
Benefit cost ratio considering: Incorporating benefits from options from other spatial assessment units, and Including the benefits of protecting for different AEP events other than the 1%/0.5% AEP fluvial and tidal event					
Carry forward to MCA assessment (BCR> 0.85)					











Locatio	Location Plan :						
R132 (F127) (F128) (F12							
اممم	hd						
Leger							
	Area defended by option						
Risk to C							
U	Utilities						
-	Emergency response/governance						
	Airport						
	Ballura lias						
	Railway line						
	Motorway						
	Regional						
Risk to H	luman Health						
H	High vulnerablity sites						
Risk to th	ne Environment						
2	Potential pollution sources						
	Protected areas						
	cSAC, SAC, SPA, NHA and pNHA sites						
Risk to C	ultural Heritage						
6-8	Cultural heritage sites						
	(1 in 10 chance in any given year)						
	0.5 % AEP Flood Extent (1 in 200 chance in any given year)						
	0.1 % AEP Flood Extent (1 in 1000 chance in any given year)						
	Modelled River Centreline						
USER NOTE : USERS OF THI THEIR DERIV CONDITIONS ( THIS MAP DOE	ESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF ATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF S NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE						
	Halcrow Barry Tramway House 32 Dartry Road Dublin 6 Tel: +353-1-4975716						
Clients:							
*							
Fingal Cov Comhairle Ca	the Council of the Co						
Project : FEM FRA	AMS						
Map : The Bu	rrows						
Figure By :	Kevin Daly Date : 07 Oct 2010						
Checked B	y: Clare Dewar Date : 07 Oct 2010						
Approved E	By : Anne-Marie Conibear Date : 07 Oct 2010						
TheBui	rows/CURS/T/001						
Drawing So	cale : 1:2,000 Plot Scale : 1:1 @ A3						



### Appendix I. FEM Objectives, sub-objectives and targets

Core criteria Obje		Obje	ective	Sub-objective	Indicator	Minimum requirement	Aspirational target
1	Technical       a       Ensure flood risk management options are operationally robust		Ensure flood risk management options are operationally robust		Level of operational risk of option i.e. mechanical or human intervention required (e.g. lengths/numbers of demountables, pumps etc	Manageable level of mechanical or human intervention.	No mechanical or human intervention.
		b	Minimise health and safety risk of flood risk management options	Reduce and where possible eliminate health and safety risks associated with the construction and operation of flood risk management options	Health and safety risk to construction workers and operators of flood risk management (FRM) options	Manageable level of health and safety risk.	No health and safety risk.
		с	Ensure flood risk managed effectively and sustainable into the future	Ensure flood risk management options are adaptable to future flood risk	Level of adaptability of FRM option to future flood	Option to be adaptable to the MRFS.	Option to be adaptable to the HEFS at negligible cost.
2	Economic	a	Minimise economic risk	Minimise economic risk	Average Annual Damage (AAD) (€)	No increase in economic risk	Economic risk reduced to zero
		b	Minimise risk to transport infrastructure	Minimise risk to transport infrastructure	Number of transport routes (road, rail, navigation) at risk from flooding (0.1% AEP Event)	No increase in number of transport routes at risk	Number of transport routes at risk reduced to 0
		С	Minimise risk to utility infrastructure	Minimise risk to utility infrastructure	Number of utility infrastructure assets (power stations, WWTWs, WTWs, telecom exchanges etc) at risk from flooding (0.1% AEP Event)	No increase in number of utility infrastructure assets at risk	Number of utility infrastructure assets at risk reduced to 0
		d	Manage risk to agricultural land		Area of agricultural land at risk of flooding [based on Corine land use classes] not benefiting from flood risk management measures	No increase in agricultural land at risk of flooding not benefiting from flood risk management measures	Risk to agricultural land at risk of flooding not benefiting from flood risk management measures reduced to 0
3	Social	a	Minimise risk to human health and life	Minimise risk to human health and life	Number of residential properties at risk from flooding (0.1% AEP Event)	No increase in number of properties	Number of properties reduced to 0
				Minimise risk to high vulnerability properties	Number of high vulnerability properties at risk from flooding (0.1% AEP event)	No increase in number of vulnerable properties	Number of properties reduced to 0
		b	Minimise risk to community	Minimise risk to social infrastructure	Number of high-value social infrastructural assets at risk from flooding (0.1% AEP Event)	No increase in number of assets	Number of assets reduced to 0





Core	e criteria	Obje	ctive	Sub-objective	Indicator	Minimum requirement	Aspirational target
				Minimise risk to employment	Number non-residential properties at risk from flooding (0.1% AEP Event)	No increase in non-residential properties at risk	Number of non-residential properties at risk reduced to 0
		с	Minimise risk to, or enhance, social amenity	Minimise risk to flood-sensitive social amenity sites	Number of flood-sensitive amenity sites at risk from flooding (0.1% AEP Event)	No increase in number of sites	Number of sites reduced to 0
4	Environmental a Support the objectives of the WFD		Support the objectives of the WFD	Prevent deterioration, and where possible improve, ecological status / potential of water-bodies	Ecological status of water-bodies	Provide no constraint associated with flood management measures to the achievement of good ecological status/potential	Significant contribution of flood risk management measures to the achievement of good ecological status/potential
				Prevent deterioration, and where possible improve, chemical status / potential of water-bodies	Chemical status of water-bodies	Provide no constraint associated with flood management measures to the achievement of good chemical status/potential	Significant contribution of flood risk management measures to the achievement of good chemical status/potential
		b	Minimise risk of environmental pollution	Minimise risk to potential sources of pollution	Number of potential pollution sources at risk from flooding (including those licensed under Directives 96/61/EC and 92/271/EC)	No increase in risk to potential pollution sources as a result of flood risk management measures	Reduction in risk potential pollution sources as a result of flood risk management measures
		c Avoid damage to, and where possible enhance, the flora and fauna of the study area		Avoid damage to, and where possible enhance, internationally and nationally designated sites of nature conservation importance	Reported conservation status of designated sites relating to flood risk management	No deterioration in the conservation status of designated sites as a result of flood risk management measures	Improvement in the conservation status of designated sites as a result of flood risk management measures
				Avoid damage to or loss of, and where possible enhance, habitats supporting legally protected species and other known species and habitats of conservation concern	Presence of and/or extent and quality of suitable habitat supporting legally protected species and other known species of conservation concern ('target species')	No loss of extent or deterioration in quality of suitable habitat supporting target species	Increase in extent or improvement in quality of suitable habitat supporting target species as a result of flood risk management measures
				Avoid damage to or loss of existing riverine, wetland and coastal habitats and where possible create new habitat, to maintain a naturally functioning system	Area and quality of riverine, wetland and coastal habitat maintained or created/ restored as a result of flood risk management measures	No net loss of or permanent damage to existing riverine, wetland and coastal habitats as a result of flood risk management measures	Increase in extent of riverine, wetland and coastal habitats as a result of flood risk management measures
		d	Avoid damage to, and where possible enhance, fisheries within the catchment	Maintain existing, and where possible create new, habitat supporting fisheries and maintain upstream access	Area and quality of suitable habitat supporting salmonid and other fisheries and number of upstream barriers to fish passage	No net loss of suitable habitat for fisheries and provide no new upstream barriers to fish passage	Increase extent of suitable habitat for fisheries and improve existing upstream access for fish passage
				Ensure no adverse effects on designated Shellfish Waters	Classification status of shellfish waters	No deterioration in existing classification	Improve existing classification

#### Fingal-East Meath Flood Risk Assessment and Management Study Proposed flood risk management objectives, sub-objectives, indicators and targets

-HalcrowBarry

#### Flood risk management objectives, sub-objectives, indicators and targets

Cor	Core criteria Objective		ective	Sub-objective	Indicator	Minimum requirement	Aspirational target	
	e P e a ci		Protect, and where possible enhance, landscape character and visual amenity within the catchment	Protect, and where possible enhance, landscape character, including designated highly sensitive landscapes, within the catchment	Compliance with landscape character objectives, including those of designated highly sensitive landscapes, relevant to flood risk management measures	No adverse changes in landscape character as a result of flood risk management measures	Improvements to landscape character as a result of flood risk management measures	
				Protect, and where possible enhance, important views within the catchment	Quality of visual amenity at important views relevant to flood risk management measures	No adverse changes in visual amenity as a result of flood risk management measures	Improvements to visual amenity as a result of flood risk management measures	
		f	Avoid damage to or loss of features of cultural heritage importance, their setting and heritage value within the study area	Avoid damage to or loss of known buildings, structures and areas of cultural heritage importance, including their setting and heritage value, within the study area	Numbers and types of internationally, nationally and locally designated areas, buildings, structures and features at risk from flooding	No damage to or loss of buildings, structures and features listed on the National Monuments Register, RMP, SMR, RPS and within ACAs, including their setting and heritage value, as a result of flood risk management measures; and/or No increase in flood risk for features sensitive to the impacts of flooding	Enhance the physical context and structure of water-based heritage features; and/or Reduction in flood risk for features sensitive to the impacts of flooding	





Appendix J. Cost database

#### Costs database - all values in Euro (December 2009)

	Proactive maintenance	Unit	Cost Bate (Euro)	Source				
	Channel maintenance large river (i e River Lee, Cork)	por motro	75	OPW				
Ē	Channel maintenance angleriver (i.e. Word Diver, Fingel and Maeth)	per metre	15	OPW				
Ē	Channel maintenance smail river (i.e. ward River, Fingal and Meath)	permetre	15	OFW				
<u> </u>	Regular inspection and maintenance of 20 cuiverts	per year	50,000	Fingai				
E	Flood event duty	per team of 2 per day	1,000	Halcrow				
å	Annual mainteneace of flood embankments	per meter	15	OPW				
	Defence Asset Survey	per day	1,000	Halcrow				
	Fluvial flood forecasting	Unit	Cost Rate (Euro)	Source	Comment			
	Gauging station	Per station	50,000	JBBarry	Based on information from JBBarry			
	Level-to-level correlations	Per model	50,700	Halcrow	Halcow costs (from previous project wor	'k in Wales 2006)		
	PDM rainfall-runoff models only	Per model	118,300	Halcrow	Halcow costs (from previous project wor	k in Wales 2006)		
	Upstream PDM rainfall-runoff model (with routing model)	Per model	115,227	Halcrow	Halcow costs (from previous project wor	k in Wales 2006)		
	Downstream PDM rainfall-runoff model (with routing model)	Per model	104,472	Halcrow	Halcow costs (from previous project wor	k in Wales 2006)		
Ś	Upstream PDM rainfall-runoff model (with hybrid model)	Per model	133.663	Halcrow	Halcow costs (from previous project wor	k in Wales 2006)		
nre	Downstream PDM rainfall-runoff model (with hybrid model)	Per model	124,445	Halcrow	Halcow costs (from previous project wor	k in Wales 2006)		
asi	Installation/upgrading rain guages	per gauge	1 536	Halcrow/JBB				
Me.	Tidal flood forecasting	Unit	Cost Pata (Euro)	Source	Commont			
					Comment			
'n		Per model	120,000	MarCon Computations				
rci l	Annual Operational costs	Annual op costs	30,000	MarCon Computations				
st								
Ë								
<sup>ō</sup> z	Targeted public awareness and education campaign	Unit	Cost Rate (Euro)	Source	Comment			
	Catchment/AU scale	per AU (based on 3 towns in an AU	8,500	Halcrow	Costs based on Lee CFRAMS. Costs fo	r preparing and advertising	g for Public Information Days	
	APSR	per town	4,500	Halcrow	Costs based on Lee CFRAMS. Costs for	r preparing and advertising	g for Public Information Days	
	Individual property flood proofing	Unit	Cost Bate (Fure)	Source	Comment			
	Orat for motor time individ					lan and fitt' f		
	Cost for protecting individual property	Per residential/ small commercial		Haicrow	Cost includes 2 flood gates, air vent bloc	cks and titting of non returi	n valves	L
		Large commercial		TAICTOW	Costs based on raising IPP residential c	USIS TO INCLUDE FOR ADDITION	al costs for protecting large comn	iercial units
	Subs	Unit	Cost Rate (Euro)	Source	Comment			
		m3	45	JBBarry	Attenuations ponds: assuming circa €45	-50/m3 for excavation, co	nnections, backfill, disposal exces	s material, reins
						<u> </u>		<u> </u>
	Flood Walls	Unit	Unit Cost Rate (€) based on height band				Source	Comment
			< 1.2m	1.2 - 2.1m	2.1 - 5.3m	> 5.3m		
	Betaining	m	2 358	2638	3444		EA Unit Cost Database - 2007	
	Retaining and out off		1 380	2000	4567		EA Unit Cost Database 2007	To be consider
	Determine and piled		1,300	3990	4004	10700	EA Unit Cost Database - 2007	To be consider
	Retaining and piled		1.100	4609	4024	13739	EA Unit Cost Database - 2007	TO be consider
	wall raising foundations	m	1,162	1957			EA Unit Cost Database - 2007	
	Wave	m	2,170	1850			EA Unit Cost Database - 2007	
	Embankments	Unit	Unit Cost Rate (€) based on volume					
	Earth embankments		500-5,000	5,000 - 15,000	>15,000			
		m3	98	69	36		EA Unit Cost Database - 2007	
	Sheet Piling	Unit	Unit Cost Rate (€) based on length and lo	cation of piling				
	Sheet Piling	Unit m	Unit Cost Rate (€) based on length and lo	cation of piling	Rural		FA Unit Cost Database - 2007	To be consider
	Sheet Piling	<mark>Unit</mark> m	Unit Cost Rate (€) based on length and lo Urban - <100m length	cation of piling Urban - >100m length	Rural		EA Unit Cost Database - 2007	To be consider
	Sheet Piling	Unit m	Unit Cost Rate (€) based on length and lo Urban - <100m length	cation of piling Urban - >100m length	Rural		EA Unit Cost Database - 2007	To be consider
	Sheet Piling	Unit m	Unit Cost Rate (€) based on length and lo Urban - <100m length	cation of piling Urban - >100m length	Rural		EA Unit Cost Database - 2007	To be consider
	Sheet Piling Demountable	Unit M Unit	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€)	cation of piling Urban - >100m length Source	Rural Comment		EA Unit Cost Database - 2007	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004	Unit m Unit	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€)	cation of piling Urban - >100m length Source	Rural Comment		EA Unit Cost Database - 2007	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004	Unit m Unit	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€)	cation of piling Urban - >100m length Source	Rural Comment		EA Unit Cost Database - 2007	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004	Unit m Unit	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€)	Cation of piling Urban - >100m length Source	Rural Comment (based on a 25 year life)When consider	ng demountable defences	EA Unit Cost Database - 2007	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004 Pallet Barrier demountable flood defence cost	Unit m Unit per m	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€) 771	Cation of piling Urban - >100m length Source Halcrow (2004)	Rural Comment (based on a 25 year life)When consideri retaining structure with cutt off. The retain	ng demountable defences	EA Unit Cost Database - 2007 , you need to consider the return no more than 0.5 - 1.0m above gro	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004 Pallet Barrier demountable flood defence cost	Unit m Unit per m	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€) 771	cation of piling Urban - >100m length Source Halcrow (2004)	Rural Comment (based on a 25 year life)When consideri retaining structure with cutt off. The retai implications which should be considered	ng demountable defences ining structure should be r I when using demountable	EA Unit Cost Database - 2007 , you need to consider the return no more than 0.5 - 1.0m above gro s particularly as it requires people	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004 Pallet Barrier demountable flood defence cost	Unit Unit Unit per m per m	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€) 771	Cation of piling Urban - >100m length Source Halcrow (2004)	Rural Comment (based on a 25 year life)When consideri retaining structure with cutt off. The retai implications which should be considered	ng demountable defences ining structure should be r I when using demountable	EA Unit Cost Database - 2007 , you need to consider the return no more than 0.5 - 1.0m above gro s particularly as it requires people	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004 Pallet Barrier demountable flood defence cost Operational costs	Unit m Unit per m per m erection including plant, labour and materials	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€) 771	Cation of piling Urban - >100m length Source Halcrow (2004) Halcrow (2004)	Rural Comment (based on a 25 year life)When consideri retaining structure with cutt off. The retai implications which should be considered	ng demountable defences ning structure should be r I when using demountable	EA Unit Cost Database - 2007 , you need to consider the return o more than 0.5 - 1.0m above gro s particularly as it requires people	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004 Pallet Barrier demountable flood defence cost Operational costs Storage costs	Unit m Unit per m per m erection including plant, labour and materials per anum	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€) 771 69	Cation of piling Urban - >100m length Source Halcrow (2004) Halcrow (2004) Halcrow (2004)	Rural Comment (based on a 25 year life)When consideri retaining structure with cutt off. The retai implications which should be considered	ng demountable defences ining structure should be r I when using demountable	EA Unit Cost Database - 2007 , you need to consider the return no more than 0.5 - 1.0m above gro is particularly as it requires people	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004 Pallet Barrier demountable flood defence cost Operational costs Storage costs	Unit m Unit per m per m erection including plant, labour and materials per annum	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€) 771 69 16,057	Cation of piling Urban - >100m length Source Halcrow (2004) Halcrow (2004) Halcrow (2004)	Rural Comment (based on a 25 year life)When consideri retaining structure with cutt off. The retai implications which should be considered	ng demountable defences ining structure should be r when using demountable	EA Unit Cost Database - 2007 , you need to consider the return no more than 0.5 - 1.0m above gro s particularly as it requires people	To be consider
	Sheet Piling Demountable Based on EA costs for Ironbride floods 2004 Pallet Barrier demountable flood defence cost Operational costs Storage costs Elect Storage Recorder	Unit m Unit Unit per m per m erection including plant, labour and materials per annum	Unit Cost Rate (€) based on length and lo Urban - <100m length Cost Rate (€) 771 69 16,057	Cation of piling Urban - >100m length Source Halcrow (2004) Halcrow (2004) Halcrow (2004) Cath Data (6)	Rural Comment (based on a 25 year life)When consideri retaining structure with cutt off. The retai implications which should be considered	ng demountable defences ining structure should be r I when using demountable	EA Unit Cost Database - 2007 , you need to consider the return no more than 0.5 - 1.0m above gro s particularly as it requires people	To be consider
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Installation of sluice gate	Unit	Cost Rate (€)	Source	Comment		
	per sluice gate	21,500	Spons	Based on 3m x 3m sluice gate		
New Bridge	Unit	Cost Rate (€)	Source	Comment		
	m	564,984	Spons	Based on 30m span bridge replacement		
	m	1,129,968	Spons	Based on 60m span bridge replacement		
Use of road as overland floodway	Unit	Cost Rate (€)	Source	Comment		
	m3	39	NRA Roadworks Unit Rate Datab	Excavation of material		
	m2	11	NRA Roadworks Unit Rate Datab	Road base		
	m2	8	NRA Roadworks Unit Rate Datab	Wearing course		
		50,00	Halcrow	Moving of services (cost may vary)		
Coastal	Unit	Unit Cost Rate (€) per meter of defence	Source			
Beach recharge and breakwater	m	7,532	EA Unit Cost Database - 2007			50000 m2
Beach recharge and Groynes	m	4,949	EA Unit Cost Database - 2007			19
Rock Armour	m	4,779	EA Unit Cost Database - 2007			
Revetment and wall	m	4,580	EA Unit Cost Database - 2007			
Breakwater	m	4,571	EA Unit Cost Database - 2007			
Beach recharge	m	3,666	EA Unit Cost Database - 2007			
Revetment	m	2,615	EA Unit Cost Database - 2007			
Sea Wall	m	2,293	EA Unit Cost Database - 2007			
	m3	4,057	Halcrow	Upper limit		
Tidal barrier/barrage	m3	1,379	Halcorw	Lower Limit		
Sand Duno	m	53	EA Unit Cost Database - 2007			



#### Appendix K. List of Stakeholders



#### List of Stakeholders

Category	Sub-grouping	Organisation
Decision makers	TDs and Senators	<ul> <li>Dublin North constituency</li> <li>Dublin West constituency</li> <li>Dublin North East constituency</li> <li>Meath East constituency</li> <li>Louth constituency</li> </ul>
	Councillors	<ul> <li>Fingal Electoral Areas <ul> <li>Balbriggan</li> <li>Malahide</li> <li>Swords</li> <li>Howth</li> </ul> </li> <li>Meath Electoral Areas <ul> <li>Dunshaughlin</li> <li>Slane</li> <li>Navan Area</li> </ul> </li> <li>Balbriggan Town Council</li> <li>Louth Electoral Areas <ul> <li>Drogheda East</li> </ul> </li> </ul>
Primary stakeholders	Local stakeholders	<ul> <li>Drogheda West</li> <li>Fingal County Council (FCC)*</li> <li>Meath County Council (MCC)*</li> <li>Office of Public Works*</li> <li>DAFF*</li> <li>Dublin Airport Authority</li> <li>Dublin Airport Authority Stakeholders Forum</li> <li>Iarnród Éireann</li> <li>National Roads Authority</li> <li>Meath County Development Board</li> <li>Chambers of Commerce – Fingal</li> <li>Chambers of Commerce – Meath</li> <li>Irish Farmers Association</li> </ul>
	Environmental organisations	<ul> <li>National Parks &amp; Wildlife Service</li> <li>Eastern Regional Fisheries Board</li> <li>Eastern River Basin District Project</li> </ul>
	SEA Environmental Authorities	<ul> <li>Environmental Protection Agency</li> <li>Department of Environment, Heritage and Local Government (DEHLG)</li> <li>Department of Communications, Energy and Natural Resources (DCENR)</li> </ul>
Secondary stakeholders	Government Departments/Councils	<ul> <li>Department of Community, Rural and Gaeltacht Affairs</li> <li>Department of Transport</li> <li>Dublin City Council</li> </ul>
	Community organisations	<ul> <li>FCC Community Forum (through the relevant Strategic Policy Committees)</li> <li>Fingal Development Board</li> <li>Meath Forum</li> </ul>
	National organisations	<ul><li>Fáilte Ireland</li><li>Electricity Supply Board</li><li>Marine Institute</li></ul>



Category	Sub-grouping	Organisation
	Local business organisations	<ul> <li>Forest Service</li> <li>Coillte Teoranta</li> <li>Geological Survey of Ireland</li> <li>Teagasc</li> <li>An Garda Siochána</li> <li>Construction Industry Federation (CIF)</li> <li>Meath County Enterprise Board</li> <li>Fingal County Enterprise Board</li> <li>Fingal Tourism</li> <li>Meath Tourism</li> <li>Dublin Airport Stakeholders Forum</li> </ul>
	Environmental organisations	<ul> <li>Irish Wildlife Trust</li> <li>Central Fisheries Board</li> <li>Heritage Council</li> <li>An Taisce</li> <li>Birdwatch Ireland</li> <li>Marine Institute</li> <li>Landscape Alliance Ireland</li> </ul>

\* Member of project team / Steering Group



# Appendix L. List of culverts for proactive maintenance by the Local Authorities



## List of culverts for proactive maintenance by the Local Authorities

The following is a list of culverts/bridges that were identified during the topographic survey and/or hydraulic modelling as being subject to blockage and, if blocked, could affect nearby property. This list was also reviewed at the workshops and structures were added/deleted based on the knowledge of local area engineers. The culverts/bridges in bold text were used in the risk of blockage of structures and the results were reported on in the hydraulics report.

This is a preliminary list and a review of this list to confirm the risk of blockage should be carried out on a regular basis. In addition, the Local Authority should include any additional culverts/bridges that they encounter that are subject to blocking. It should be noted that the OPW currently maintain the culverts/bridges in Duleek as part of the OPW flood relief scheme.

River Name	No	Blockage Locations
Broadmeadow (BRO)	5	<ul> <li>Warblestown Bridge 4Ba5770</li> <li>Ashbourne Bridge @ Bridge Street 4Ba15420</li> <li>Robertstown Br 4Ba12867</li> <li>Moulden Bridge 4Ba19220</li> <li>Tributary in Ashbourne 4Bau2326</li> </ul>
Ward (WAR)	2	<ul> <li>Balheary Road Bridge 4Wa102 &amp; 4Wa 953</li> <li>Swords Town Centre u/s or d/s 4Wa1296</li> </ul>
Lissenhall (LIS)	0	None – high ground
Turvey (TUR)	3	<ul> <li>R127 &amp; R126 Turvey Avenue (just d/s M1) 6Ta4353</li> <li>M1 crossing 6Ta4822</li> <li>d/s 6Ta3920</li> </ul>
Rush Road Stream (RUR)	1	Tomastown Long culvert 14Pa1830
Nanny (NAN)	4	<ul> <li>Kentstown Bridge R153</li> <li>Duleek - Kingsgate Br (Parmadden trib)</li> <li>Duleek - Main St Br (Parmadden trib)</li> <li>R152 at Duleek</li> </ul>
Mosney (MOS)	3	<ul> <li>Mosney St Bridge 19Maa548</li> <li>Near Woodland Ave 19Ma742</li> <li>19Ma1191</li> </ul>
Delvin (DEL)	3	Three potential locations in Stamullen
Brookside Stream (BSS)	1	Laytown Road Bridge
Corduff (COR)	2	<ul> <li>N1 Corduff Bridge 8Ca1129</li> <li>R127 Dublin Road Bridge 2Ca611</li> </ul>
Ballyboghill (BAL)	2	<ul> <li>R122 Wyanstown Road Culvert 7Ba10,000</li> <li>Ballyboghill Bridge R108</li> </ul>

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River Name	No	Blockage Locations
Balbriggan Urban (BNS)	0	Mainly culverted
Mill stream (MIL)	1	Holmpatrick road bridge 15Ma222
St. Catherine's Stream (CAT)	1	CAT – R128 roadbridge
Rush West (RSW)	1	<ul> <li>RWS – Channel Road culvert (11Wa267)</li> </ul>
Rush Town Stream (RUT)	2	<ul> <li>Skerries Road Br (R128)</li> <li>Farran's Lane - Screen at 12Ra1448U</li> </ul>
Balleally Stream (BAY)	2	Two locations in Lusk 9Ba3905 & 9Ba3030
Bracken River (BRA)	4	<ul> <li>Rowans Little Area 16Mae33</li> <li>Decoy Bridge 16Ma5361</li> <li>Bridge Street, Balbriggan town ctr 16Ma244U</li> <li>R132 16Mab2430</li> </ul>
Bride Stream (BRI)	1	Small access bridge 10La3409 (north Lusk)
Jones Stream (JON)	0	None – mainly rural area
Gaybrook (GAY)	2	<ul><li>Holywell estate 3Ga3779</li><li>Double box culvert 3GAc899</li></ul>
Mayne (MAY)	3	<ul> <li>N32 culvert 1Ma6020</li> <li>Mayne River at Swords Road (R132) 1Ma7268</li> <li>Cuckoo stream at Wellfield Bridge (R123) 1Mac258</li> </ul>
Sluice (SLU)	6	<ul> <li>Kilsealey Lane Bridge 2Sa3626</li> <li>Portmarnock trotting track 2Sa2300</li> <li>Portmarnock trotting track 2Sa2187</li> <li>Railway culvert at Hazlebrook 2Saa259</li> <li>Back Road short culvert 2Saa2012 &amp;</li> <li>Back road long culvert 2Saa2373</li> </ul>
Nr Locations identified	49	





## Appendix M. Executive Summary of the Hydrology Report



#### **Executive Summary**

Fingal County Council (FCC), in conjunction with Meath County Council (MCC) and the Office of Public Works (OPW), are undertaking a flood risk assessment and management study in Fingal and East Meath – the Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS). Halcrow Barry (HB) was commissioned to carry out the work on behalf of FCC/MCC/OPW. The main report from this study – a Flood Risk Management Plan – will identify a programme of prioritised studies, actions and works to manage flood risk in the Fingal and East Meath (FEM) study area.

This Hydrology Report, together with the Preliminary Hydrology Report published in February 2009, details the hydrological assessment that has been undertaken for this study with the objective of determining hydrological inputs for the 23 rivers and streams in the study area that are to be modelled, for specific design events and future scenarios. The hydrology is based on a review and analysis of historic flood information and use of meteorological and hydrometric records. The Flood Studies Report (FSR), Flood Estimation Handbook (FEH) and the Irish Flood Studies Update (FSU) methodologies have been used to enable the determination of design hydrological inputs which also consider potential future catchment changes likely to influence flood risk.

The analysis presented in this report is concerned with the estimation of extreme flows, which will form the basis for subsequent flood level and mapping stages of FEM FRAMS. To distribute these flows along the river reach, the HPWs (High Priority Watercourses) and MPWs (Medium Priority Watercourses) sections of the 23 rivers and streams that are to be modelled, have been further sub-divided into a total of 270 sub-catchments. Catchment characteristics of these sub-catchments have been extracted using GIS automation tools aided by manual checking. Design inflows at these sub-catchments are calculated using the catchment characteristics, FSU-based rainfall inputs and applying the FSSR 16 and IOH 124 unit hydrograph methods. The total routed inflows from all the upstream sub-catchments at the gauging stations will be reconciled with the statistical method estimated design floods at the gauging stations using iterative simulations in the river hydraulic models.

Hydraulic model calibration and verification events have been identified by reviewing the information on historic floods in the study area including photographs of flood events or their aftermaths. It should also be noted that most of the hydrometric stations in the study area were inoperational between 1995 and 2001 and thus the recent flooding events do not have corresponding hydrometric information. This meant that calibration of only three river hydraulic models out of the total 23 river and stream models was possible. To assist in the future model calibration and flood forecasting in the rivers, Halcrow Barry has developed a priority list of hydrometric gauging stations that should be installed or re-activated in the catchment.

The FEM FRAM study will identify both the existing risk and potential future risk of flooding in the study area. There are a number of drivers that can influence future flood risk in the study area, the main drivers have been identified as being climate change and increasing urbanisation. These drivers have been extensively investigated and two future flood risk management scenarios have been proposed, a Mid Range Future Scenario and a High End Future Scenario. The outputs from this hydrological assessment will inform the subsequent stages of this study and, in particular, the hydraulic modelling and flood mapping stages. Knowledge of the hydrological processes and historic flooding gained from this work will support the decision making process for the flood risk management options.

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