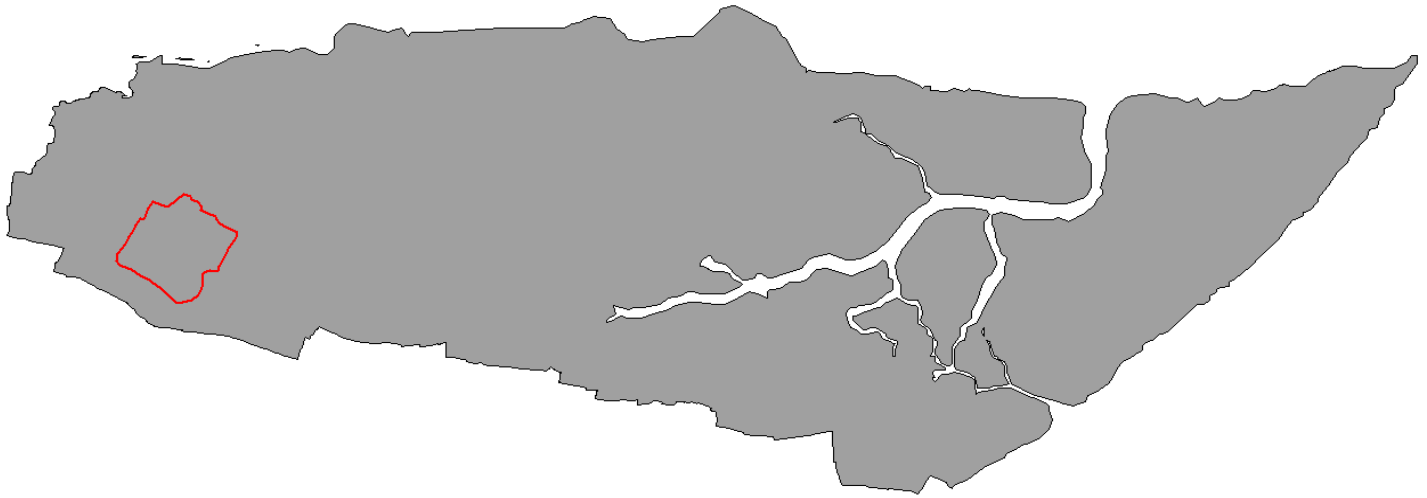
CDA DESCRIPTION

<table>
<tr><td colspan="3">Critical Drainage Area ID: ROC 1</td><td colspan="2">Rayleigh</td></tr>
<tr><td colspan="5">  </td></tr>
<tr><td>Description:</td><td colspan="2">• Surface water generally flows from the east of the CDA towards the west and the Rawreth Brook. A significant amount of surface water ponding occurs in the centre of the CDA and there are a number of significant flow paths as a result of the local topography. One PSWFH have been identified in the CDA.
• Some surface water ponding is predicted against the embankments of the railway line.
• A number of open watercourses flow through the CDA.
• There is one flood storage area within the CDA – Boston Avenue.</td><td>Critical Infrastructure:</td><td>• Rayleigh Primary School, Glebe Junior and Infant School, Sweyne Park School, Down Hall Primary School, Edward Francis School
• Police Station
• Pumping Station (northern boundary of the CDA)</td></tr>
<tr><td rowspan="2"></td><td colspan="2" rowspan="2"></td><td>Validation:</td><td>Sewer flooding incidents have occurred along Crown Hill and Eastwood Road.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Flood Risk Categorisation:</td><td colspan="2">Surface Water</td><td rowspan="2">PSWFH:</td><td rowspan="2">Pluvial modelling identifies surface water ponding along the embankment of the railway line in the west and along the course of the open watercourses within the CDA.</td></tr>
<tr><td rowspan="3">Property Count:</td><td>558 buildings of which 481 are residential properties</td><td>>0.1m</td></tr>
<tr><td>61 buildings of which 59 are residential properties</td><td>>0.3m</td><td rowspan="2">Figures:</td><td rowspan="2">Figure D 19 – Surface Water Flood Depth (1% AEP)
Figure D 20 – Surface Water Flood Hazard (1% AEP)</td></tr>
<tr><td>24 buildings of which 24 are residential properties</td><td>>0.5m</td></tr>
</table>

SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Stage 1 - Identify Potential Measures

Critical Drainage Area ID: ROC 1		Rayleigh			
	Measure	**Opportunity Assessment**	**Description**	**Location / Specific Details**	**Comments**
SOURCE	**Green Roof**		Generic Measure	Throughout CDA	To be identified on site-by-site basis when opportunities arise but likely to be limited opportunity for implementation of measure within the CDA.
	Soakaways		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Swales		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Permeable Paving		Generic Measure	New developments	Further investigation is needed to assess the infiltration potential due to geology.
	Rainwater Harvesting		Generic Measure	Throughout CDA, Sweyne Park School	Small scale systems (Water Butts) installed in each property. Building with large roof areas, such as schools can utilise larger systems. In addition this provides a non potable water supply.
	Detention Basins		Embankments or detention basins to retain stormwater	Sweyne Park, Sweyne Park School	Enhance existing capacity of open spaces to retain stormwater
	Ponds and Wetlands		Enhance riparian habitats though online storage along watercourse or offline storage in spaces adjacent	Sweyne Park	These require a permanent water source, so will need to be developed in conjunction with the watercourse.
	Other 'Source' Measures	N/A			
PATHWAY	**Increasing Capacity in Drainage Systems**		Increase conveyance through CDA	PSWFH areas	This will reduce the local flood risk, however may exacerbate the problem of flooding downstream.
	Separation of Foul and Surface Water Sewers			PSWFH areas	Already separate
	Improved Maintenance Regimes		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Managing Overland Flows (Online Storage)		Two stage channel	Sweyne Park	Increase the capacity of the existing watercourse. Restrict flow volumes downstream to cause water to accumulate upstream in the channel and park area.
	Managing Overland Flows (Preferential Flowpaths)		Alteration of road structure (increased pavement height and lower road depth) to define flow path of surface water	London Hill, London Road, Crown Hill, Grange Gardens	Roads that are prone to channelling surface water due to their layout can be modified to ensure water is contained within the road and therefore reduce the risk of flooding to adjacent buildings.
	Land Management Practices		Farming practices to reduce surface water generation. Aeration of compact ground on sports fields	Farmland to the South-West of CDA, parks and school grounds	Large green spaces within the CDA. Incorporate into exsisitng maintaince regimes of the sites.
	Deculverting Watercourse(s)				Watercourse is already open where possible.
	Other 'Pathway' Measures		Further investigation of ordinary watercourse	Ordinary watercourse from Heron Close towards the A129.	Increase the capacity of the existing watercourse. Restrict flow volumes downstream to cause water to accumulate upstream in the channel and park area.
RECEPTOR	**Improved Weather Warning**		Employ Extremer Weather Alert service provided by Met Office and EA	Throughout CDA	Combine with SWMP mapped outputs to inform emergency planners of areas to focus resources.
	Planning Policies to Influence Development		Generic Measure	Throughout CDA	For all new development.
	Temporary or Demountable Flood Defences		Demountable flood barriers	PSWFH area	To be implemented where surface water flooding risk is greatest
	Social Change, Education and Awareness		Generic Measure	Throughout CDA	Will be dependent on engagement opportunities with community. In areas with a large migration of population it will be difficult to undertake / pass on information from one property owner to other
	Improved Resilience and Resistance Measures		Increase drainage along preferential flow paths and areas of ponding.	Throughout CDA	Reduce risk to those at greatest risk of surface water flooding
	Other 'Receptor' Measures	N/A			

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SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Rochford District Council

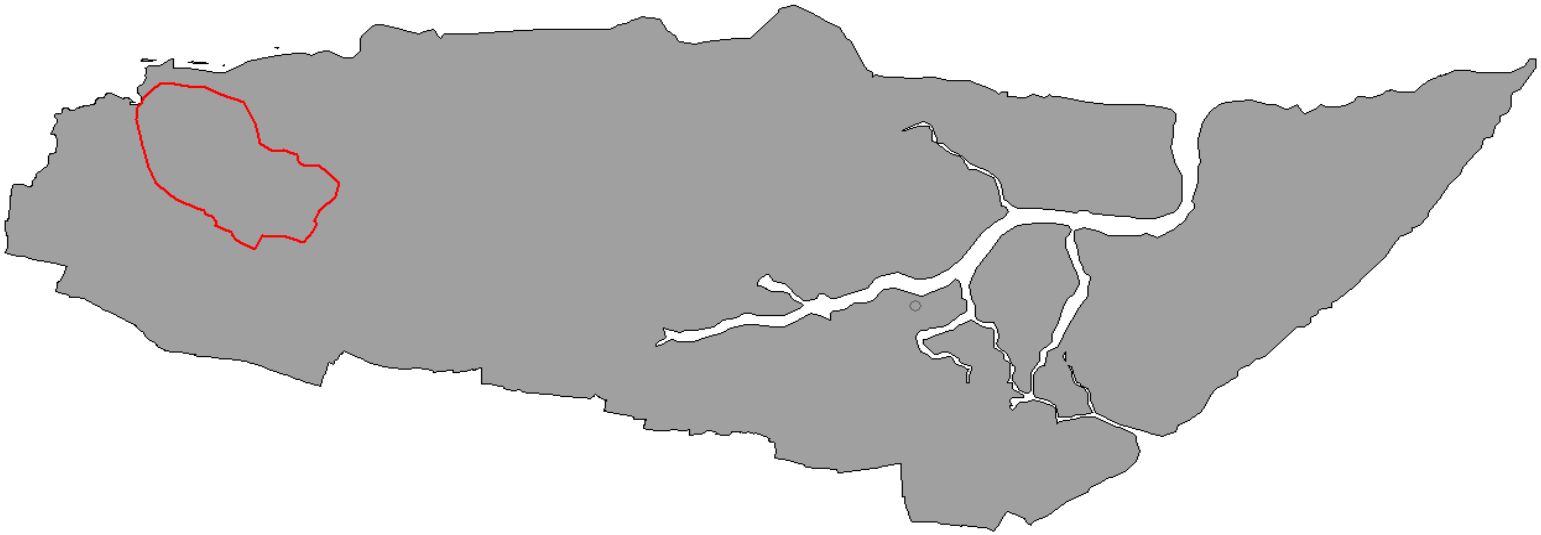
Stage 2 and 3 - Options Identification and Short Listing

Critical Drainage Area ID: ROC 1 — **Rayleigh**

Option No.	Option (Scheme Category)	Standard Measures: SOURCE — Green Roof	Soakaways	Swales	Permeable Paving	Rainwater Harvesting	Detention Basins	Ponds and Wetlands	Other 'Source' Measures	Standard Measures: PATHWAY — Increasing Capacity in Drainage Systems	Separation of Foul and Surface Water Sewers	Improved Maintenance Regimes	Managing Overland Flows (Online Storage)	Managing Overland Flows (Preferential Flowpaths)	Land Management Practices	Deculverting Watercourse(s)	Other 'Pathway' Measures	Standard Measures: RECEPTOR — Improved Weather Warning	Planning Policies to Influence Development	Temporary or Demountable Flood Defences	Social Change, Education and Awareness	Improved Resilience and Resistance Measures	Other 'Receptor' Measures	Appropriate Measures Available?	Shortlisting Options: Technical	Economic	Social	Environmental	Objectives	Overall	Take Forward Option to Detailed Assessment?	Comments
1	**Do Nothing**																							✓	2	-1	-2	0	-2	-3	✓	In line with PAG the 'do nothing' option (no intervention and no maintenance) and 'do minimum' (continuation of current practise) should be taken forward to the detailed options assessment.
2	**Do Minimum**																							✓	2	0	-1	0	-1	0	✓	
3	**Improved Maintenance**																							✓	2	1	1	0	1	5	✓	This option is relatively easy to implement through the revision of the existing maintenance schedule. However this will only have localised benefits.
4	**Planning Policy**																							✓	2	2	0	1	1	6	✓	To implement this option into new developments would be relatively simple through planning policy.
5	**Source Control, Attenuation and SUDS**								N/A															✓	0	1	1	1	2	5	✓	Implementation of water butts across buildings at the head of the CDA. This will provide a non-potable water supply in addition to stormwater retention.
6	**Flood Storage / Permeability**								N/A															✓	1	0	1	1	2	5	✓	Further investigation would be needed to assess the potential of detention basins or ponds. The geology of the area will limit the use of infiltration systems.
7	**Separate Surface Water and Foul Water Sewer Systems**																							×								
8	**De-culvert / Increase Conveyance**																							✓	2	1	0	1	1	5	✓	Watercourses are open where possible. Dense developed areas limit further deculverting. Channels can be modified to have two stages, to provide additional capacity during high flow conditions.
9	**Preferential / Designated Overland Flow Routes**																							✓	1	1	0	0	2	4	×	Surface water tends to follow road channels already, so there is no need for preferential flow paths.
10	**Community Resilience**																						N/A	✓	2	0	2	0	1	5	✓	A combination of education and awareness will be beneficial. However resilience measures would prove too costly for this CDA.
11	**Infrastructure Resilience**																						N/A	✓	1	1	2	0	1	5	✓	This may be an option for Sweyne Park School, as this has the greatest risk of surface water flooding associated to it.
12	**Other - Improvement to Drainage Infrastructure**																							✓	1	-1	0	0	1	1	×	This is technically possible but the cost-benefit ratio is likely to be negative.
13	**Other or Combination of Above**																							✓	1	0	2	2	2	7	✓	Combination of measures across the catchment will have a large effect across the CDA.

SOUTH ESSEX
SURFACE WATER MANAGEMENT PLAN

CDA DESCRIPTION

<table>
<tr><td colspan="3">Critical Drainage Area ID: ROC 2</td><td colspan="2">Watery Lane</td></tr>
<tr><td colspan="5">  </td></tr>
<tr><td>Description:</td><td colspan="2">• Surface water flows predominantly towards the northwest and towards Breeches Brook. The CDA is largely rural; however it provides a critical road network via Watery Lane to the A130. There is one PSWFH within the CDA.
• The northern proportion of the CDA and PSWFH coincides with the fluvial flood zone 2 and 3 of the tidal River Crouch.</td><td>Critical Infrastructure:</td><td>• Sewage Treatment Works
• Pumping Stations</td></tr>
<tr><td>Flood Risk Categorisation:</td><td colspan="2">Surface Water</td><td>Validation:</td><td>• There are three historical records of surface water flooding along Watery Lane.
• There is one sewer flooding record along Ferry Road.</td></tr>
<tr><td rowspan="3">Property Count:</td><td>138 buidlings of which 63 are residential properties</td><td>>0.1m</td><td rowspan="2">PSWFH:</td><td rowspan="2">• Pluvial modelling indicates that surface water is generated from the land around Trenders Hall, to the north of the Sweyne Park area.
• From the pluvial modelling, it can be seen that the greatest flood depths are shown to coincide with the Breeches Brook.
• The Environment Agencies Flood Zone 3 intersects part of this area</td></tr>
<tr><td>26 buidlings of which 4 are residential properties</td><td>>0.3m</td></tr>
<tr><td>7 buidlings of which 0 are residential properties</td><td>>0.5m</td><td>Figures:</td><td>Figure D 21 – Surface Water Flood Depth (1% AEP)
Figure D 22 – Surface Water Flood Hazard (1% AEP)</td></tr>
</table>

SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Stage 1 - Identify Potential Measures

Critical Drainage Area ID: ROC 2		Watery Lane			
	Measure	**Opportunity Assessment**	**Description**	**Location / Specific Details**	**Comments**
SOURCE	**Green Roof**		Generic Measure	New developments	Could be implemented in new developments. However these are costly and have limited surface water management potential.
	Soakaways		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Swales		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Permeable Paving		Generic Measure	New developments	Further investigation is needed to assess the infiltration potential due to geology.
	Rainwater Harvesting		Generic Measure	New developments	Small scale systems (Water Butts) installed in each property. New developments can incorporate large scale rainwater harvesting. In addition, this provides a non potable water supply.
	Detention Basins		Embankments or detention basins to retain stormwater	Throughout the CDA, Hanover golf club	Enhance existing capacity of open spaces to retain stormwater
	Ponds and Wetlands		Flood storage within pond and wetland systems.	Alongside river channels	This would require a permanent water source, so would need to be developed in conjunction with the watercourse.
	Other 'Source' Measures	N/A			
PATHWAY	**Increasing Capacity in Drainage Systems**		Increase conveyance through CDA	Area around Watery Lane	This will reduce the local flood risk, however may exacerbate the problem of flooding downstream.
	Separation of Foul and Surface Water Sewers				Already separate
	Improved Maintenance Regimes		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Managing Overland Flows (Online Storage)		Online storage area. Swales alongside open areas	Alongside Watery Lane	
	Managing Overland Flows (Preferential Flowpaths)				Limited opportunity to create preferential flow paths. Watery Lane is a key transport link
	Land Management Practices		Increase vegetation coverage over open space. Aeration of compact ground . Farming practices	Throughout CDA	Majority of CDA is agricultural land. Development of best management practices with land managers could potentially be beneficial.
	Deculverting Watercourse(s)				Watercourse is already open where possible.
	Other 'Pathway' Measures	N/A			
RECEPTOR	**Improved Weather Warning**		Employ Extremer Weather Alert service provided by Met Office and EA	Throughout CDA	Combine with SWMP mapped outputs to inform emergency planners of areas to focus resources.
	Planning Policies to Influence Development		Generic Measure	Throughout CDA	For all new development.
	Temporary or Demountable Flood Defences		Demountable flood barriers	PSWFH area	To be implemented where surface water flooding risk is greatest
	Social Change, Education and Awareness		Generic Measure	Throughout CDA	Will be dependent on engagement opportunities with community. In areas with a large migration of population it will be difficult to undertake / pass on information from one property owner to other
	Improved Resilience and Resistance Measures		Increase drainage along preferential flow paths and areas of ponding	Throughout CDA	reduce risk to those at greatest risk of surface water flooding
	Other 'Receptor' Measures	N/A			

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SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Rochford District Council

Stage 2 and 3 - Options Identification and Short Listing

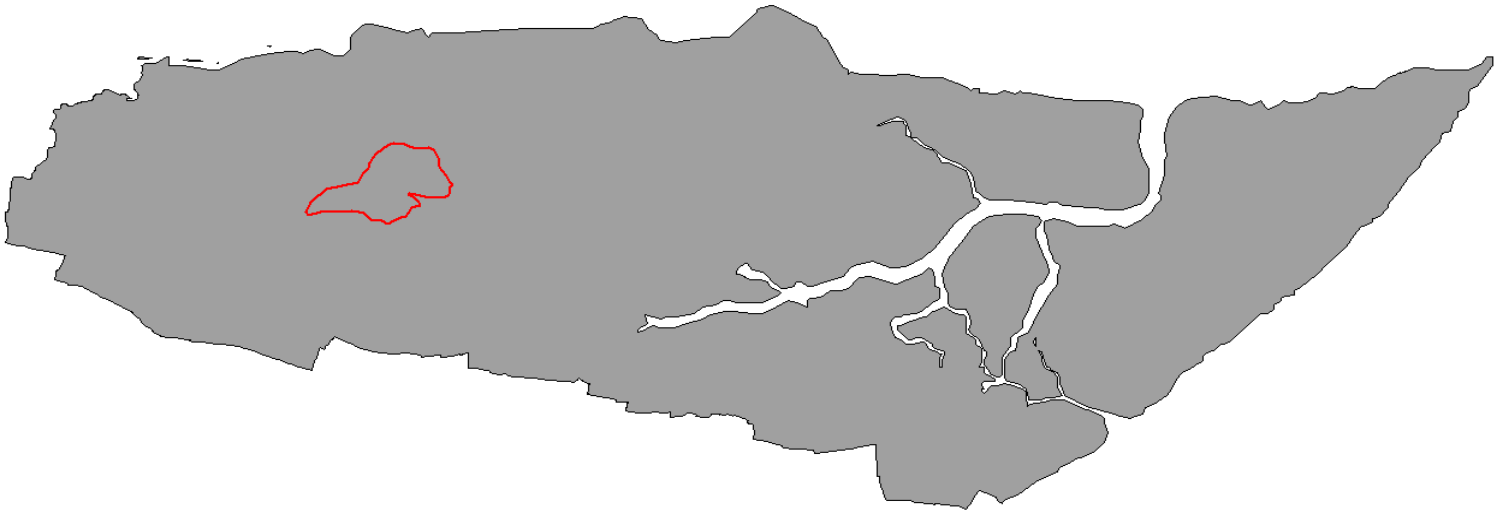
Critical Drainage Area ID: ROC 2 — **Watery Lane**

Option No.	Option (Scheme Category)	Standard Measures: SOURCE — Green Roof	Soakaways	Swales	Permeable Paving	Rainwater Harvesting	Detention Basins	Ponds and Wetlands	Other 'Source' Measures	Standard Measures: PATHWAY — Increasing Capacity in Drainage Systems	Separation of Foul and Surface Water Sewers	Improved Maintenance Regimes	Managing Overland Flows (Online Storage)	Managing Overland Flows (Preferential Flowpaths)	Land Management Practices	Deculverting Watercourse(s)	Other 'Pathway' Measures	Standard Measures: RECEPTOR — Improved Weather Warning	Planning Policies to Influence Development	Temporary or Demountable Flood Defences	Social Change, Education and Awareness	Improved Resilience and Resistance Measures	Other 'Receptor' Measures	Appropriate Measures Available?	Shortlisting Options — Technical	Economic	Social	Environmental	Objectives	Overall	Take Forward Option to Detailed Assessment?	Comments
1	**Do Nothing**																							✓	2	-1	-2	0	-2	-3	✓	In line with PAG the 'do nothing' option (no intervention and no maintenance) and 'do minimum' (continuation of current practise) should be taken forward to the detailed options assessment.
2	**Do Minimum**																							✓	2	0	-1	0	-1	0	✓	
3	**Improved Maintenance**																N/A							✓	2	1	1	0	1	5	✓	This option is relatively easy to implement through the revision of the existing maintenance schedule. However this will only have localised benefits
4	**Planning Policy**																							✓	2	2	0	1	1	6	✓	To implement this option into new developments would be relatively simple through planning policy.
5	**Source Control, Attenuation and SUDS**								N/A															✓	1	1	1	2	0	5	✓	These can be incorporated into new development planned within the CDA. The influence of planning policy will ensure that they are implemented into new design.
6	**Flood Storage / Permeability**								N/A								N/A							✓	1	1	0	1	0	3	✖	The benefits will not outweigh the costs as relatively few buildings will be influenced by a flood storage system.
7	**Separate Surface Water and Foul Water Sewer Systems**																							✖								
8	**De-culvert / Increase Conveyance**																N/A							✖								
9	**Preferential / Designated Overland Flow Routes**																N/A							✖								
10	**Community Resilience**																						N/A	✓	2	1	1	0	1	5	✓	A combination of resistance measures, education and flood warning would be beneficial in reducing flood damages
11	**Infrastructure Resilience**																						N/A	✓	2	1	1	0	1	5	✓	Resilience pumping stations: the benefits of this will exceed the costs
12	**Other - Improvement to Drainage Infrastructure**																N/A							✓	1	-1	0	0	1	1	✖	This is technically possible but the cost-benefit ratio is likely to be negative.
13	**Other or Combination of Above**																							✖								

SOUTH ESSEX
SURFACE WATER MANAGEMENT PLAN

CDA DESCRIPTION

Critical Drainage Area ID: ROC 4	**Hockley**



Description:	Surface water flows generally from the west to the east of the CDA. There are two main areas where surface water flooding is greatest. These tend to follow the culverted channels of tributaries joining the Hockley Brook to the east of the CDA.		**Critical Infrastructure:**	• Greensward Academy, Plumberow Primary School, Hockley Primary School • Police Station
			Validation:	• There are records of historical flooding at Plumbery Avenue, The railway overpass of Spa Road and Sunnyfield Gardens. • There are records of sewer flooding at Main Road and Southend Road Main Road.
Flood Risk Categorisation:	Surface Water, Ordinary Watercourse and Sewer		**PSWFH:**	• The pluvial modelling highlights the areas with the greatest flood depths to be the culverted section of a tributary of the Hockley Brook where it forms part of the Anglian Water drainage system. This covers the areas of Southview Road, Spa Road and Broadlands Road. • In addition the modelled results show flooding in the railway cutting.
Property Count:	227 buildings of which 204 are residential properties	>0.1m		
	19 buildings of which 19 are residential properties	>0.3m	**Figures:**	Figure D 25 – Surface Water Flood Depth (1% AEP) Figure D 26 – Surface Water Flood Hazard (1% AEP)
	3 buildings of which 3 are residential properties	>0.5m		

SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Stage 1 - Identify Potential Measures

Critical Drainage Area ID: ROC 4		Hockley			
	Measure	**Opportunity Assessment**	**Description**	**Location / Specific Details**	**Comments**
SOURCE	**Green Roof**		Generic Measure	New developments	Could be implemented in new developments. However these are costly and have limited surface water management potential.
	Soakaways		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Swales		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Permeable Paving		Generic Measure	New developments	Further investigation is needed to assess the infiltration potential due to geology.
	Rainwater Harvesting		Generic Measure	Throughout CDA	Small scale systems (Water Butts) installed in each property. New developments can incorporate large scale rainwater harvesting. In addition, this provides a non potable water supply.
	Detention Basins		Bunds or detention basins to retain stormwater	Marylands Wood, Bett's Wood	Enhance existing capacity of open spaces to retain stormwater
	Ponds and Wetlands		Enhance riparian habitats though online storage along watercourse or offline storage in spaces adjacent	Marylands Wood, Bett's Wood	These require a permanent water source, so will need to be developed in conjunction with the watercourse.
	Other 'Source' Measures	N/A			
PATHWAY	**Increasing Capacity in Drainage Systems**		Increasing sewer capacity	Across the CDA	High number of historical DG5 records suggest undercapcity of the sewer system. Investigate causes of sewer flooding.
	Separation of Foul and Surface Water Sewers				Already separate
	Improved Maintenance Regimes		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Managing Overland Flows (Online Storage)		Two stage channel	Marylands Wood	Increase storage of excess water upstream of the urban area
	Managing Overland Flows (Preferential Flowpaths)		Adjust road structure to channel surface water low	Spar Rd, Leamington Rd, Southebourn Grove	Flow is preferential in these areas already. Adjusted road structures will help ensure flow remains in the road channel.
	Land Management Practices		Increase vegetation coverage over open space. Aeration of compact ground on sports fields	Throughout CDA	Majority of CDA being heavily urbanised
	Deculverting Watercourse(s)				Watercourse is already open where possible.
	Other 'Pathway' Measures	N/A			
RECEPTOR	**Improved Weather Warning**		Employ Extremer Weather Alert service provided by Met Office and EA	Throughout CDA	Combine with SWMP mapped outputs to inform emergency planners of areas to focus resources.
	Planning Policies to Influence Development		Generic Measure	Throughout CDA, Foundry Industrial Estate redevelopment	For all new development.
	Temporary or Demountable Flood Defences		Demountable flood barriers	PSWFH area	To be implemented where surface water flooding risk is greatest
	Social Change, Education and Awareness		Generic Measure	Throughout CDA	Will be dependent on engagement opportunities with community. In areas with a large migration of population it will be difficult to undertake / pass on information from one property owner to other
	Improved Resilience and Resistance Measures		Increase drainage along preferential flow paths and areas of ponding	Throughout CDA	reduce risk to those at greatest risk of surface water flooding
	Other 'Receptor' Measures	N/A			

URS Scott Wilson

SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

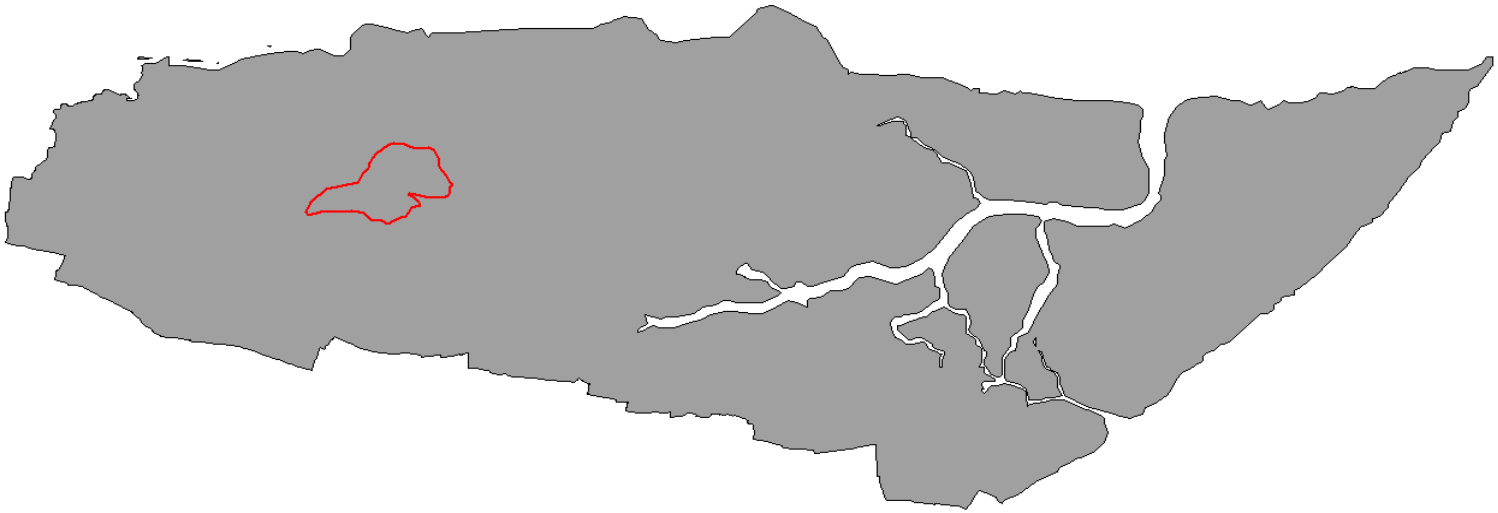
Rochford District Council

Stage 2 and 3 - Options Identification and Short Listing

Critical Drainage Area ID: ROC 4 — **Hockley**

Option No.	Option (Scheme Category)	Standard Measures: SOURCE: Green Roof	Soakaways	Swales	Permeable Paving	Rainwater Harvesting	Detention Basins	Ponds and Wetlands	Other 'Source' Measures	PATHWAY: Increasing Capacity in Drainage Systems	Separation of Foul and Surface Water Sewers	Improved Maintenance Regimes	Managing Overland Flows (Online Storage)	Managing Overland Flows (Preferential Flowpaths)	Land Management Practices	Deculverting Watercourse(s)	Other 'Pathway' Measures	RECEPTOR: Improved Weather Warning	Planning Policies to Influence Development	Temporary or Demountable Flood Defences	Social Change, Education and Awareness	Improved Resilience and Resistance Measures	Other 'Receptor' Measures	Appropriate Measures Available?	Shortlisting Options: Technical	Economic	Social	Environmental	Objectives	Overall	Take Forward Option to Detailed Assessment?	Comments
1	**Do Nothing**																							✓	2	-1	-2	0	-2	-3	✓	In line with PAG the 'do nothing' option (no intervention and no maintenance) and 'do minimum' (continuation of current practise) should be taken forward to the detailed options assessment.
2	**Do Minimum**																							✓	2	0	-1	0	-1	0	✓	
3	**Improved Maintenance**																N/A							✓	2	1	1	0	1	5	✓	This option is relatively easy to implement through the revision of the existing maintenance schedule. However this will only have localised benefits
4	**Planning Policy**																							✓	2	2	0	1	1	6	✓	To implement this option into new developments would be relatively simple through planning policy.
5	**Source Control, Attenuation and SUDS**								N/A															✓	0	1	1	1	2	5	✓	To implement this option into new developments would be relatively simply and through planning policy. Once an area has been identified as being in a critical drainage area, policies to manage the surface water on the site are already in place. Foundry Industrial Estate redevelopment will provide a significant area where these mechanism could be implemented.
6	**Flood Storage / Permeability**								N/A								N/A							✓	1	0	1	1	2	5	✓	There are a number of locations where flood storage could be developed to create multifunctional green spaces.
7	**Separate Surface Water and Foul Water Sewer Systems**																							✗								
8	**De-culvert / Increase Conveyance**																N/A							✗								
9	**Preferential / Designated Overland Flow Routes**																N/A							✓	2	1	0	0	-2	1	✗	Cost will not be outweighed by the benefits of such an option.
10	**Community Resilience**																						N/A	✓	2	0	2	0	1	5	✓	Education and awareness will be beneficial, however providing resilience measure is likely to be too costly.
11	**Infrastructure Resilience**																						N/A	✓	2	-1	0	0	0	1	✗	Infrastructure not at high risk of surface water flooding within the CDA
12	**Other - Improvement to Drainage Infrastructure**																N/A							✓	1	-1	0	0	1	1	✗	This is technically possible but the cost-benefit ratio is likely to be negative.
13	**Other or Combination of Above**																							✓	1	0	2	2	2	7	✓	Combination of measures across the catchment will have a large effect across the CDA.

CDA DESCRIPTION

Critical Drainage Area ID: ROC 6			Rayleigh East	
				
Description:	Surface water flows from the northwest and southwest of the CDA to the east. Surface water flooding is concentrated along two corridors associated with either culverted watercourses now forming part of Anglian Water's drainage network or open watercourse and also where these join. The Noble's Green ditch flows from the North of the CDA to the west. There is one PSWFH within the CDA.		**Critical Infrastructure:**	• The Fitzwimarc School, Grove Wood Primary School • Pumping Station • Fire Station
Flood Risk Categorisation:	Surface Water, Ordinary Watercourse and Sewer		**Validation:**	There are three sewer flooding records within the PSWFH area. These are located along Napier Road, The Chase and Bramfield Road East.
Property Count:	224 buildings of which 208 are residential properties	>0.1m	**PSWFH:**	There are two corridors where the pluvial modelling shows a concentration of flooding. The first runs from Kings Road and the second from Napier Road. These meet in the area of The Chase and Chase End and flow east along Milton Close, following the path of the Nobles Green Ditch. The PSWFH extends to the western extent of the urbanised area.
	30 buildings of which 30 are residential properties	>0.3m	**Figures:**	Figure D 29 – Surface Water Flood Depth (1% AEP) Figure D 30 – Surface Water Flood Hazard (1% AEP)
	1 residential property	>0.5m		

SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Stage 1 - Identify Potential Measures

Critical Drainage Area ID: ROC 6		Rayleigh East			
	Measure	**Opportunity Assessment**	**Description**	**Location / Specific Details**	**Comments**
SOURCE	**Green Roof**		Generic Measure	Throughout CDA	Not an option to retrofit to existing buildings. No major development planned where option could potentially be implemented
	Soakaways		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Swales		Generic Measure	Throughout the CDA, on grass verges alongside roads etc .	To be identified on site-by-site basis.
	Permeable Paving		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Rainwater Harvesting		Generic Measure	Throughout CDA	Small scale systems (Water Butts) installed in each property. Buildings with large roof areas (e.g. Schools) can incorporate large scale rainwater harvesting. In addition, this provides a non potable water supply.
	Detention Basins		Create and enhance water storage spaces in existing green and open spaces	King George's Playing Fields, Napier Road Green Space, Grove Nature Reserve	Modification of opens spaces to temporarily retain stormwater
	Ponds and Wetlands		Ponds and wetlands with additional capacity to accommodate runoff	Larger green spaces: recreational (Fairview Playground, and school grounds (FitzWimarc School, Grove Wood School)	Would require a permanent water supply, but could also provide additional social and environmental benefits.
	Other 'Source' Measures	N/A			
PATHWAY	**Increasing Capacity in Drainage Systems**		Increase conveyance of stormwater from the site.	PSWFH areas	This will reduce the local flood risk, however may exacerbate the problem of flooding downstream.
	Separation of Foul and Surface Water Sewers				Already separate
	Improved Maintenance Regimes		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Managing Overland Flows (Online Storage)		Create attenuation areas in conjunction with main flow paths.	Along main watercourse	Develop online storage through increased channel capacity in farmland north of Milton Close and Bramfield Road East.
	Managing Overland Flows (Preferential Flowpaths)		Alteration of road structures to direct the flow of water	Sections of Albert Road, Bull Lane and The Chase.	May require little alteration as surface waters tend to follow these roads under current conditions.
	Land Management Practices		Aeration of compact ground on sports fields. Increased vegetation coverage.	Throughout the CDA	Increasing infiltration within the topsoils of the sports ground at the head of the catchment will reduce the volume of surface water generated
	Deculverting Watercourse(s)				Watercourses are already open where possible
	Other 'Pathway' Measures	N/A	Two stage channel	River Roach (along Milton Close and Bramfield Road East)	Redefine channel so river and create 2 stage channel to prevent flooding of properties
RECEPTOR	**Improved Weather Warning**		Employ Extremer Weather Alert service provided by Met Office and EA	Throughout CDA	Combine with SWMP mapped outputs to inform emergency planners of areas to focus resources.
	Planning Policies to Influence Development		Generic Measure	Throughout CDA	For all new development.
	Temporary or Demountable Flood Defences			PSWFH	
	Social Change, Education and Awareness		Generic Measure	Throughout CDA	Will be dependent on engagement opportunities with community. In areas with a large migration of population it will be difficult to undertake / pass on information from one property owner to other
	Improved Resilience and Resistance Measures			Critical infrastructure within CDA	
	Other 'Receptor' Measures	N/A			

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SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Rochford District Council

Stage 2 and 3 - Options Identification and Short Listing

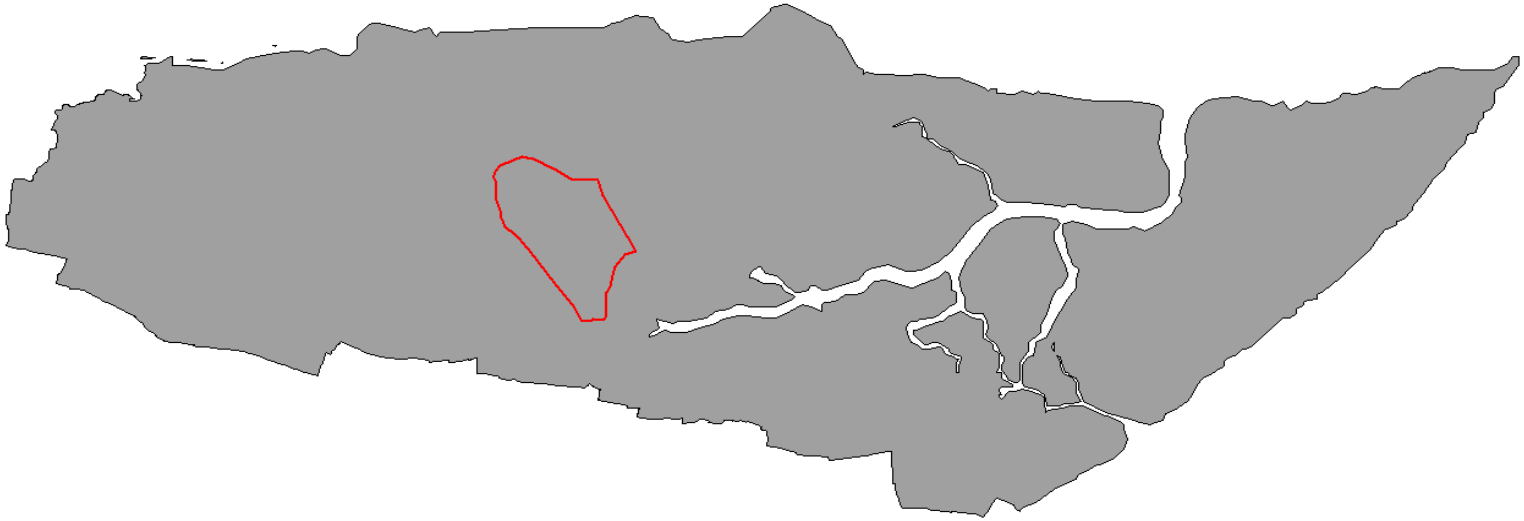
Critical Drainage Area ID: ROC 6 — **Rayleigh East**

Option No.	Option (Scheme Category)	Standard Measures: SOURCE: Green Roof	Soakaways	Swales	Permeable Paving	Rainwater Harvesting	Detention Basins	Ponds and Wetlands	Other 'Source' Measures	PATHWAY: Increasing Capacity in Drainage Systems	Separation of Foul and Surface Water Sewers	Improved Maintenance Regimes	Managing Overland Flows (Online Storage)	Managing Overland Flows (Preferential Flowpaths)	Land Management Practices	Deculverting Watercourse(s)	Other 'Pathway' Measures	RECEPTOR: Improved Weather Warning	Planning Policies to Influence Development	Temporary or Demountable Flood Defences	Social Change, Education and Awareness	Improved Resilience and Resistance Measures	Other 'Receptor' Measures	Appropriate Measures Available?	Shortlisting Options: Technical	Economic	Social	Environmental	Objectives	Overall	Take Forward Option to Detailed Assessment?	Comments
1	**Do Nothing**																							✓	2	-1	-2	0	-2	-3	✓	In line with PAG the 'do nothing' option (no intervention and no maintenance) and 'do minimum' (continuation of current practise) should be taken forward to the detailed options assessment.
2	**Do Minimum**																							✓	2	0	-1	0	-1	0	✓	
3	**Improved Maintenance**																							✓	2	1	1	0	1	5	✓	This option is relatively easy to implement through the revision of the existing maintenance schedule. However this will only have localised benefits
4	**Planning Policy**																							✓	2	2	0	1	1	6	✓	To implement this option into new developments would be relatively simple through planning policy.
5	**Source Control, Attenuation and SUDS**								N/A															✓	1	2	1	1	1	6	✓	Small scale rainwater harvesting, such as Water Butts can be installed in all properties. Wide scale implementation of these should have a cumulative effect in reducing runoff, which may be sufficient to reduce local flood risk within the PSWFH areas of the CDA Land management in the north and west of the CDA (swales, bunds etc).
6	**Flood Storage / Permeability**								N/A															✓	1	0	1	1	2	5	✓	There are number of green spaces, of varying size and functionality that can be modified as multifunctional spaces to retain stormwater during flood events. Infiltration from these is limited due to the geology, therefore drainage from the site will need to be controlled
7	**Separate Surface Water and Foul Water Sewer Systems**																							×								
8	**De-culvert / Increase Conveyance**																							×								
9	**Preferential / Designated Overland Flow Routes**																							✓	2	0	1	0	2	5	✓	Alter the road structure that currently influences the flow of surface water from the north of the CDA. This will help to ensure flood waters are contained.
10	**Community Resilience**																						N/A	✓	2	-1	1	0	1	3	×	Education and awareness will be beneficial, especially to residents in the PSWFH. Resilience measures are unlikely to be cost effective.
11	**Infrastructure Resilience**																						N/A	✓	2	1	1	0	0	4	×	There is no critical infrastructure located within the PSWFH
12	**Other - Improvement to Drainage Infrastructure**																							✓	1	-1	0	0	2	2	×	This is technically possible but the cost-benefit ratio is likely to be negative.
13	**Other or Combination of Above**									N/A														✓	1	1	2	2	1	7	✓	Combination of measures across the catchment will have a large effect across the CDA.

SOUTH ESSEX
SURFACE WATER MANAGEMENT PLAN

CDA DESCRIPTION

Critical Drainage Area ID: ROC 7	**Ashingdon/Rochford**



Description:	• Surface waters tend to flow from the north to the south of this CDA. There are two PSWFH within the CDA. The first is to the north and is influenced by the railway line embankment. The second is to the south and is in the area of the River Roach. The Eastwood Brook joins the River Roach at this point. • The southern PSWFH coincides with the tidal River Roach and fluvial flood zone 2 and 3.		**Critical Infrastructure:**	• The King Edmund School, Holt Farm Infant, Holt Farm Junior, Waterman Primary, St Teresa's Catholic Primary, Rochford Primary and Nursery School. • Fire Station
Flood Risk Categorisation:	Surface Water		**Validation:**	• Historic floods have been recorded along Brays Lane, Craven Close, Devon Gardens, Meesons Mead, Back Lane, South Street and Southend Road. • There are no records of sewer flooding within the CDA.
Property Count:	349 buildings of which 271 are residential properties	>0.1m	**PSWFH:**	• There are two PSWFH within the CDA. The first is located around Devon Gardens, Oaklands and Banyard Way, where surface water accumulates behind the railway embankment. • The second PSWFH covers a larger area to the south of the CDA. This includes The Drive, Pollards Close and Bradley Way. The Eastwood Brook joins the River Roach at this point.
	108 buildings of which 69 are residential properties	>0.3m	**Figures:**	Figure D 31 – Surface Water Flood Depth (1% AEP) Figure D 32 – Surface Water Flood Hazard (1% AEP)
	55 buildings of which 30 are residential properties	>0.5m		

SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Stage 1 - Identify Potential Measures

Critical Drainage Area ID: ROC 7		Ashingdon/Rochford			
	Measure	**Opportunity Assessment**	**Description**	**Location / Specific Details**	**Comments**
SOURCE	**Green Roof**		Generic Measure	New Development	Could be implemented in new developments. However these are costly and have limited surface water management potential.
	Soakaways		Generic Measure	New Development	Due to geology in the majority of the CDA there is a low potential for infiltration SUDS. However, in the south of the CDA (Rochford) further site investigation should be undertaken to investigation the infiltration rate.
	Swales		Generic Measure	New Development	To be identified on site-by-site basis.
	Permeable Paving		Generic Measure	New Development	Due to geology in the majority of the CDA there is a low potential for infiltration SUDS. However, in the south of the CDA (Rochford) further site investigation should be undertaken to investigation the infiltration rate.
	Rainwater Harvesting		Generic Measure	Throughout CDA	Small scale systems (Water Butts) installed in each property. Buildings with large roof areas (e.g. Schools) can incorporate large scale rainwater harvesting. In addition, this provides a non potable water supply.
	Detention Basins		Create and enhance water storage spaces in existing green and open spaces	Larger green spaces: recreational (Fairview Playground, and school grounds (FitzWimarc School, Grove Wood School)	Modification of opens spaces to temporarily retain stormwater
	Ponds and Wetlands		Ponds and wetlands with additional capacity to accommodate runoff	Larger green spaces: recreational (Fairview Playground, and school grounds (FitzWimarc School, Grove Wood School)	Would require a permanent water supply, but could also provide additional social and environmental benefits.
	Other 'Source' Measures	N/A			
PATHWAY	**Increasing Capacity in Drainage Systems**		Increase conveyance of stormwater from the site.	The Drive, Dalys Rd, North Street, South Street, West Street, Bradley Way	This will reduce the local flood risk, however may exacerbate the problem of flooding downstream.
	Separation of Foul and Surface Water Sewers				Already separate
	Improved Maintenance Regimes		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Managing Overland Flows (Online Storage)		Increase channel capacity to provide storage during times of high flow.	Recreation ground south of Bradley Way	Limited space within the CDA to implement. Potential to utilise the space of the recreation ground south of Bradley Way,
	Managing Overland Flows (Preferential Flowpaths)		Alter road structure to retain flows	The Drive, Pollards Close	To ensure flow stays within the road channel and doesn't flood surrounding buildings
	Land Management Practices		Increase vegetation coverage over open space	Throughout the CDA	Increase surface roughness to reduce generation of overland flow
	Deculverting Watercourse(s)				Watercourses are already open where possible
	Other 'Pathway' Measures		Increase conveyance through Railway embankment	Railway embankment at Banyard Way	Investigation into feasibility.
RECEPTOR	**Improved Weather Warning**		Employ Extremer Weather Alert service provided by Met Office and EA	Throughout CDA	Combine with SWMP mapped outputs to inform emergency planners of areas to focus resources.
	Planning Policies to Influence Development		Generic Measure	Throughout CDA	For all new development.
	Temporary or Demountable Flood Defences			PSWFH	
	Social Change, Education and Awareness		Generic Measure	Throughout CDA	Will be dependent on engagement opportunities with community. In areas with a large migration of population it will be difficult to undertake / pass on information from one property owner to other
	Improved Resilience and Resistance Measures			Critical infrastructure within CDA	Resilience measures would be required over number of buildings and is likely to be costly.
	Other 'Receptor' Measures	N/A			

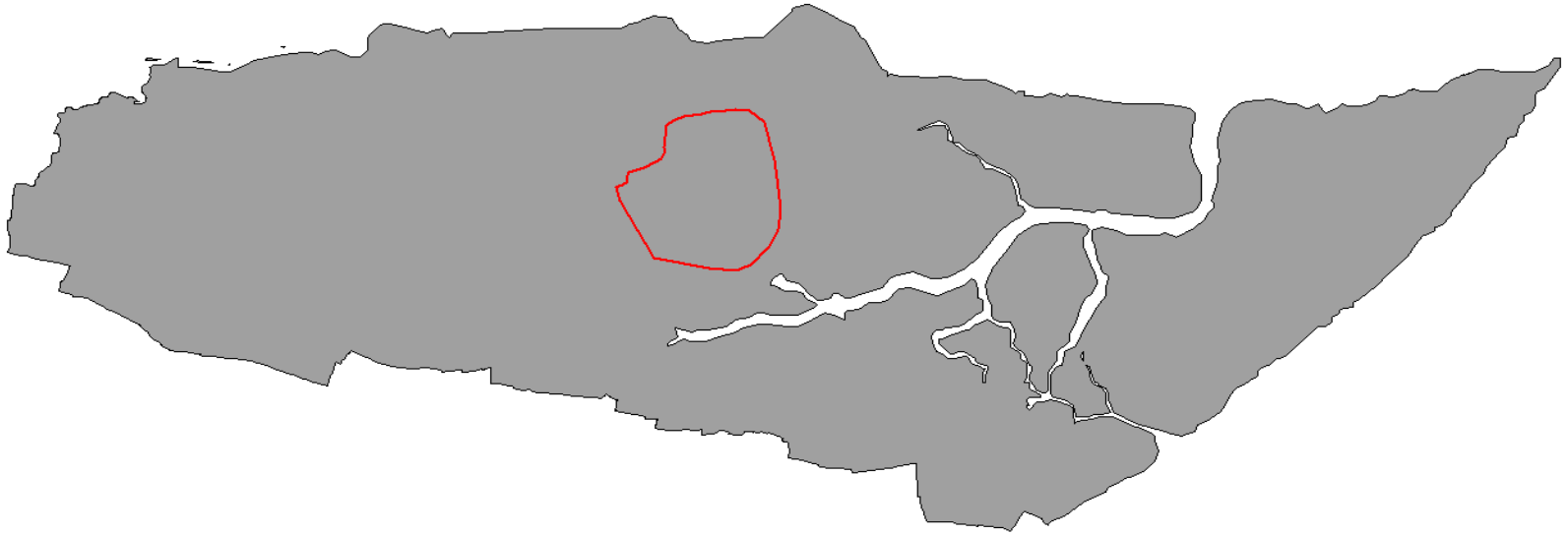
SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Stage 2 and 3 - Options Identification and Short Listing

Critical Drainage Area ID: ROC 7 — **Ashingdon/Rochford**

Option No.	Option (Scheme Category)	Standard Measures: SOURCE — Green Roof	Soakaways	Swales	Permeable Paving	Rainwater Harvesting	Detention Basins	Ponds and Wetlands	Other 'Source' Measures	Standard Measures: PATHWAY — Increasing Capacity in Drainage Systems	Separation of Foul and Surface Water Sewers	Improved Maintenance Regimes	Managing Overland Flows (Online Storage)	Managing Overland Flows (Preferential Flowpaths)	Land Management Practices	Deculverting Watercourse(s)	Other 'Pathway' Measures	Standard Measures: RECEPTOR — Improved Weather Warning	Planning Policies to Influence Development	Temporary or Demountable Flood Defences	Social Change, Education and Awareness	Improved Resilience and Resistance Measures	Other 'Receptor' Measures	Appropriate Measures Available?	Shortlisting Options: Technical	Economic	Social	Environmental	Objectives	Overall	Take Forward Option to Detailed Assessment?	Comments
1	**Do Nothing**																							✓	2	-1	-2	0	-2	-3	✓	In line with PAG the 'do nothing' option (no intervention and no maintenance) and 'do minimum' (continuation of current practise) should be taken forward to the detailed options assessment.
2	**Do Minimum**																							✓	2	0	-1	0	-1	0	✓	
3	**Improved Maintenance**																							✓	2	1	1	0	1	5	✓	This option is relatively easy to implement through the revision of the existing maintenance schedule. However this will only have localised benefits
4	**Planning Policy**																							✓	2	2	0	1	1	6	✓	To implement this option into new developments would be relatively simple through planning policy.
5	**Source Control, Attenuation and SUDS**								N/A															✓	1	2	1	1	2	7	✓	Small scale rainwater harvesting, such as Water Butts can be installed in all properties. Wide scale implementation of these should have a cumulative effect in reducing runoff, which may be sufficient to reduce local flood risk within the PSWFH areas of the CDA Land management in the north and west of the CDA (swales, bunds etc).
6	**Flood Storage / Permeability**								N/A															✓	1	0	1	1	2	5	✓	There are number of green spaces, of varying size and functionality that can be modified as multifunctional spaces to retain stormwater during flood events. Infiltration from these is limited due to the geology, therefore drainage from the site will need to be controlled
7	**Separate Surface Water and Foul Water Sewer Systems**																							✗								
8	**De-culvert / Increase Conveyance**																							✗								
9	**Preferential / Designated Overland Flow Routes**																							✓						0	✗	
10	**Community Resilience**																							✓	2	0	2	0	1	5	✓	The benefits will not outweigh the costs of resilience measures.
11	**Infrastructure Resilience**																							✓	2	-1	2	0	2	5	✓	The cost of such an option may be high, however, application to critical infrastructure within the PSWFH may be essential to ensure continued functionality during a flooding event.
12	**Other - Improvement to Drainage Infrastructure**																							✓	0	-1	2	0	2	3	✗	The benefits will not outweight the costs of such an option.
13	**Other or Combination of Above**																							✓	1	1	2	2	1	7	✓	Combination of measures across the catchment will have a large effect across the CDA.

CDA DESCRIPTION

CDA ID: ROC 8			Great Stambridge	
				
Description:	• Surface water flows from the north to the south of the CDA. The Great Stambridge Brook flows through Great Stambridge in the south of the CDA. Pluvial modelling shows a wide extent of surface water flooding across the CDA; this however covers mainly rural areas. There are several distinct preferential flow paths across the CDA such as the track between White House Farm and Kensal House. • The PSWFH coincides with the Great Stambridge Brook fluvial and tidal flood zone 2 and 3.		**Critical Infrastructure:**	Canewdon Endowed Church of England Primary School
Flood Risk Categorisation:	Surface Water		**Validation:**	There is one historical flooding record at Ash Tree Court.
Property Count:	40 buildings of which 18 are residential properties	>0.1m	**PSWFH:**	The pluvial modelling indicates that surface water flows from the north to the south of the CDA. Flooding is widespread across the CDA, however the PSWFH focuses on the flooding estimated in the Great Stambridge area.
	13 buildings of which 3 are residential properties	>0.3m	**Figures:**	Figure D 33 – Surface Water Flood Depth (1% AEP) Figure D 34 – Surface Water Flood Hazard (1% AEP)
	3 buildings of which 1 are residential properties	>0.5m		

SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Stage 1 - Identify Potential Measures

CDA ID: ROC 8		Great Stambridge			
	Measure	**Opportunity Assessment**	**Description**	**Location / Specific Details**	**Comments**
SOURCE	**Green Roof**		Generic Measure	Throughout CDA, especially new development in South Canewdon	These could be implemented in new developments. This will be enhanced through planning policy.
	Soakaways		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Swales		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Permeable Paving		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Rainwater Harvesting		Generic Measure	Throughout CDA, especially new development in South Canewdon	These could be implemented in new developments. This will be enhanced through planning policy.
	Detention Basins		Embankments or detention basins to retain stormwater	Land the north of Apton Hall Road	Upstream storage will reduce the flood depths at residential areas to the south
	Ponds and Wetlands			Land the north of Apton Hall Road	This will require a permanent water supply, therefore will have limited potential.
	Other 'Source' Measures	N/A			
PATHWAY	**Increasing Capacity in Drainage Systems**		Increasing sewer size	Stambridge Road	This will reduce the local flood risk, however increasing conveyance may exacerbate downstream flooding
	Separation of Foul and Surface Water Sewers				Already separate
	Improved Maintenance Regimes		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Managing Overland Flows (Online Storage)		Create attenuation areas in conjunction with river	PSWFH	
	Managing Overland Flows (Preferential Flowpaths)				
	Land Management Practices		Increase vegetation coverage over open space	Throughout the CDA	Increase surface roughness to reduce generation of overland flow
	Deculverting Watercourse(s)				Watercourse is already open where possible.
	Other 'Pathway' Measures		Modification of river structure	PSWFH	Increase Capacity of river - 2 stage channel, remove sharp bend in river to increase conveyance.
RECEPTOR	**Improved Weather Warning**		Employ Extremer Weather Alert service provided by Met Office and EA	Throughout CDA	Combine with SWMP mapped outputs to inform emergency planners of areas to focus resources.
	Planning Policies to Influence Development		Generic Measure	Throughout CDA	For all new development.
	Temporary or Demountable Flood Defences		Demountable flood barriers	PSWFH area	Temporary measure to use when there is a high risk of flooding this requires an improved weather warning to ensure defences are in place before the main flood
	Social Change, Education and Awareness		Generic Measure	Throughout CDA	Will be dependent on engagement opportunities with community.
	Improved Resilience and Resistance Measures			PSWFH area	Temporary or permanent flood resilience measures could be applied to houses identified to be at the greatest risk of surface water flooding.
	Other 'Receptor' Measures	N/A			

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SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

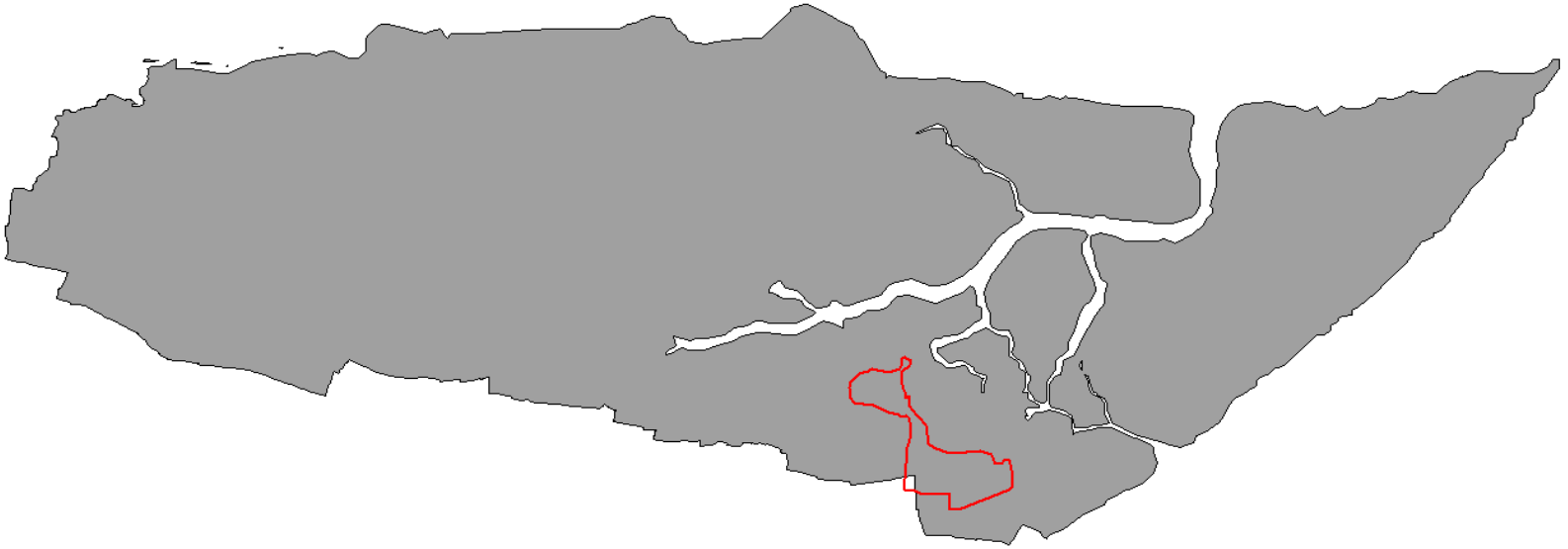
Rochford District Council

Stage 2 and 3 - Options Identification and Short Listing

CDA ID: ROC 8 — **Great Stambridge**

Option No.	Option (Scheme Category)	Standard Measures: SOURCE: Green Roof	Soakaways	Swales	Permeable Paving	Rainwater Harvesting	Detention Basins	Ponds and Wetlands	Other 'Source' Measures	PATHWAY: Increasing Capacity in Drainage Systems	Separation of Foul and Surface Water Sewers	Improved Maintenance Regimes	Managing Overland Flows (Online Storage)	Managing Overland Flows (Preferential Flowpaths)	Land Management Practices	Deculverting Watercourse(s)	Other 'Pathway' Measures	RECEPTOR: Improved Weather Warning	Planning Policies to Influence Development	Temporary or Demountable Flood Defences	Social Change, Education and Awareness	Improved Resilience and Resistance Measures	Other 'Receptor' Measures	Appropriate Measures Available?	Shortlisting Options: Technical	Economic	Social	Environmental	Objectives	Overall	Take Forward Option to Detailed Assessment?	Comments
1	**Do Nothing**																							✓	2	-1	-2	0	-2	-3	✓	In line with PAG the 'do nothing' option (no intervention and no maintenance) and 'do minimum' (continuation of current practise) should be taken forward to the detailed options assessment.
2	**Do Minimum**																							✓	2	0	-1	0	-1	0	✓	
3	**Improved Maintenance**																							✓	2	1	1	0	1	5	✓	This option is relatively easy to implement through the revision of the existing maintenance schedule. However this will only have localised benefits
4	**Planning Policy**																							✓	2	2	0	1	1	6	✓	To implement this option into new developments would be relatively simple through planning policy.
5	**Source Control, Attenuation and SUDS**								N/A															✓	1	2	1	1	2	7	✓	Small scale rainwater harvesting, such as Water Butts can be installed in all properties. Wide scale implementation of these should have a cumulative effect in reducing runoff, which may be sufficient to reduce local flood risk within the PSWFH areas
6	**Flood Storage / Permeability**								N/A															✓	1	0	1	1	2	5	✓	There are number of green spaces, of varying size and functionality that can be modified as multifunctional spaces to retain stormwater during flood events. Infiltration from these is limited due to the geology, therefore drainage from the site will need to be considered.
7	**Separate Surface Water and Foul Water Sewer Systems**																							×								
8	**De-culvert / Increase Conveyance**																							✓	1	0	1	1	2	5	✓	Increase conveyance through the modification of the channel structure. Initial feasibility study required.
9	**Preferential / Designated Overland Flow Routes**																							✓	0	1	0	0	0	1	×	There is limited opportunity for the creation of preferential flow paths
10	**Community Resilience**																						N/A	✓	2	1	1	0	1	5	✓	A combination of resistance measures, education and flood warning would be beneficial in reducing flood damages. Elderly population may require additional support
11	**Infrastructure Resilience**																						N/A	✓	2	1	1	0	0	4	×	There is no critical infrastructure in the PSWFH, therefore the nenefits will not outweigh the costs.
12	**Other - Improvement to Drainage Infrastructure**																							✓	2	0	0	0	2	4	×	This is technically possible but the cost-benefit ratio is likely to be negative.
13	**Other or Combination of Above**																							×								

CDA DESCRIPTION

Critical Drainage Area ID: ROC 9		Little/Great Wakering	
			
Description:	• The Little-Great Wakering CDA is located near to the Tidal River Roach and is in proximity of several main rivers. • In the absence of pluvial model covering the location, the Environment Agency's Flood Map for Surface Water has been used to define surface water flooding areas in the CDA. This map shows ponding of surface water in Great Wakering associated with low lying topography and flooding in proximity to watercourses in Little Wakering and Barling.	**Critical Infrastructure:**	Barling Magna Community Primary School, Great Wakering Primary School
		Validation:	• There is historical flooding at New Road. • There are historical sewer flooding records at Church Road, Kimberley Road and Little Wakering Road.
Flood Risk Categorisation:	Surface Water and Sewer	**PSWFH:**	• The Environment Agency's Flood Map for Surface Water indicates areas of surface water flooding occurring along Barling Road, Church Road and Little Wakering Road near Barling. There is also deep flooding modelled along Twyford Avenue, to the north of the residential area of Great Wakering.
Figures:	Figure D 35 – Environment Agency Flood Map for Surface Water		

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SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Rochford District Council

Stage 1 - Identify Potential Measures

Critical Drainage Area ID: ROC 9		**Little/Great Wakering**			
	Measure	**Opportunity Assessment**	**Description**	**Location / Specific Details**	**Comments**
SOURCE	**Green Roof**		Generic Measure	Throughout CDA	These are technically and economically unfeasible to retrofit to buildings. They also have limited surface water management potential.
	Soakaways		Generic Measure	Throughout CDA	Further investigation is needed to assess the infiltration potential due to geology.
	Swales		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Permeable Paving		Generic Measure	New developments	Further investigation is needed to assess the infiltration potential due to geology.
	Rainwater Harvesting		Generic Measure	Throughout CDA	Small scale systems (Water Butts) installed in each property. Building with large roof areas, such as schools can utilise larger systems. In addition this provides a non potable water supply.
	Detention Basins		Embankments or detention basins to retain stormwater	Throughout CDA	Enhance existing capacity of open spaces to retain stormwater. To be assessed on a site-by-site basis
	Ponds and Wetlands		Enhance riparian habitats though online storage along watercourse or offline storage in spaces adjacent		These require a permanent water source, so will need to be developed in conjunction with the watercourse.
	Other 'Source' Measures	N/A			
PATHWAY	**Increasing Capacity in Drainage Systems**		Increase conveyance through CDA	Little Wakering Road	This will reduce the local flood risk, and may provide temporary online storage during tide locked conditions.
	Separation of Foul and Surface Water Sewers		Enhance existing surface water drainage network to cover areas where drainage is inadequate	Little Wakering Road	Sections are only served by foul drains. The surface water drainage network can be expanded to accommodate larger volumes of stormwater.
	Improved Maintenance Regimes		Generic Measure	Throughout CDA	To be identified on site-by-site basis.
	Managing Overland Flows (Online Storage)		Online storage area. Swales alongside open areas	Throughout CDA	
	Managing Overland Flows (Preferential Flowpaths)		Alteration of road structure (increased pavement height and lower road depth) to define flow path of surface water	Throughout CDA	There is no tendency in the current situation for flows to follow the roads, therefore major reconstruction will be needed for this to work.
	Land Management Practices		Farming practices to reduce surface water generation.	Throughout CDA	Large areas of farmland surround the urban area. Practices such as ploughing land parallel to flow directions could reduce volumes of surface water contributing to flooding.
	Deculverting Watercourse(s)				Watercourse is already open where possible.
	Other 'Pathway' Measures	N/A			
RECEPTOR	**Improved Weather Warning**		Employ Extremer Weather Alert service provided by Met Office and EA	Throughout CDA	Combine with SWMP mapped outputs to inform emergency planners of areas to focus resources.
	Planning Policies to Influence Development		Generic Measure	Throughout CDA	For all new development.
	Temporary or Demountable Flood Defences		Demountable flood barriers	Throughout CDA	To be implemented where surface water flooding risk is greatest
	Social Change, Education and Awareness		Generic Measure	Throughout CDA	Will be dependent on engagement opportunities with community. In areas with a large migration of population it will be difficult to undertake / pass on information from one property owner to other
	Improved Resilience and Resistance Measures		Increase drainage along preferential flow paths and areas of ponding	Throughout CDA	Reduce risk to those at greatest risk of surface water flooding
	Other 'Receptor' Measures	N/A			

SOUTH ESSEX
SURFACE WATER OPTION SCORING MATRIX

Stage 2 and 3 - Options Identification and Short Listing

Critical Drainage Area ID: ROC 9 — **Little/Great Wakering**

Option No.	Option (Scheme Category)	Standard Measures: SOURCE — Green Roof	Soakaways	Swales	Permeable Paving	Rainwater Harvesting	Detention Basins	Ponds and Wetlands	Other 'Source' Measures	Standard Measures: PATHWAY — Increasing Capacity in Drainage Systems	Separation of Foul and Surface Water Sewers	Improved Maintenance Regimes	Managing Overland Flows (Online Storage)	Managing Overland Flows (Preferential Flowp	Land Management Practices	Deculverting Watercourse(s)	Other 'Pathway' Measures	Standard Measures: RECEPTOR — Improved Weather Warning	Planning Policies to Influence Development	Temporary or Demountable Flood Defences	Social Change, Education and Awareness	Improved Resilience and Resistance Measure	Other 'Receptor' Measures	Appropriate Measures Available?	Shortlisting Options: Technical	Economic	Social	Environmental	Objectives	Overall	Take Forward Option to Detailed Assessme	Comments
1	**Do Nothing**																							✓	2	-1	-2	0	-2	-3	✓	In line with PAG the 'do nothing' option (no intervention and no maintenance) and 'do minimum' (continuation of current practise) should be taken forward to the detailed options assessment.
2	**Do Minimum**																							✓	2	0	-1	0	-1	0	✓	
3	**Improved Maintenance**																N/A							✓	2	1	1	0	1	5	✓	This option is relatively easy to implement through the revision of the existing maintenance schedule. However this will only have localised benefits
4	**Planning Policy**																							✓	2	2	0	1	1	6	✓	To implement this option into new developments would be relatively simple through planning policy.
5	**Source Control, Attenuation and SUDS**								N/A															✓	0	1	1	1	2	5	✓	These will be difficult to implement over large areas, due to cost and ownership issues.
6	**Flood Storage / Permeability**								N/A								N/A							✓	1	0	1	1	2	5	✓	Further investigation would be needed to assess the potential of detention basins or ponds. Further investigation of the geology of the area will need to be undertaken to assess the infiltration potential of the area.
7	**Separate Surface Water and Foul Water Sewer Systems**																							×								
8	**De-culvert / Increase Conveyance**																N/A							×								
9	**Preferential / Designated Overland Flow Routes**																N/A							✓	-2	-1	1	0	2	0	✖	Extensive reconstruction of road structures will be needed to channel flow. The benefits are unlikely to exceed the costs.
10	**Community Resilience**																						N/A	✓	2	1	1	0	1	5	✓	A combination of resistance measures, education and flood warning would be beneficial in reducing flood damages
11	**Infrastructure Resilience**																						N/A	✓	1	1	1	0	1	4	✖	There is no critical infrastructure within the CDA. There are however two schools.
12	**Other - Improvement to Drainage Infrastructure**																N/A							✓	1	-1	0	0	1	1	✖	This is technically possible but the cost-benefit ratio is likely to be negative.
13	**Other or Combination of Above**																							×								