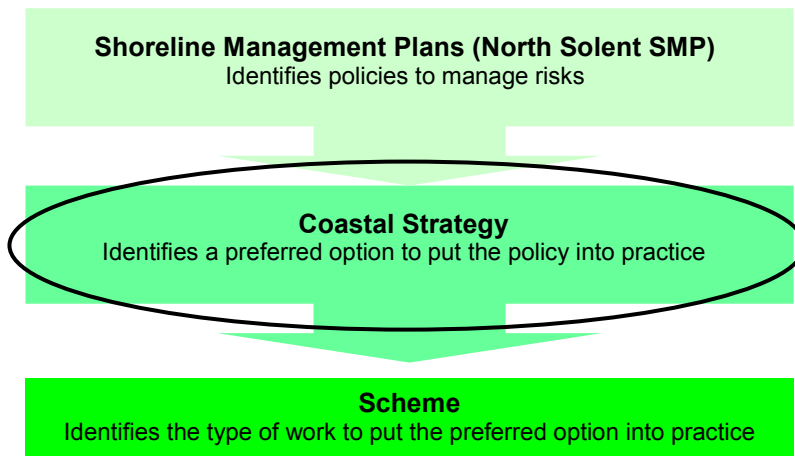
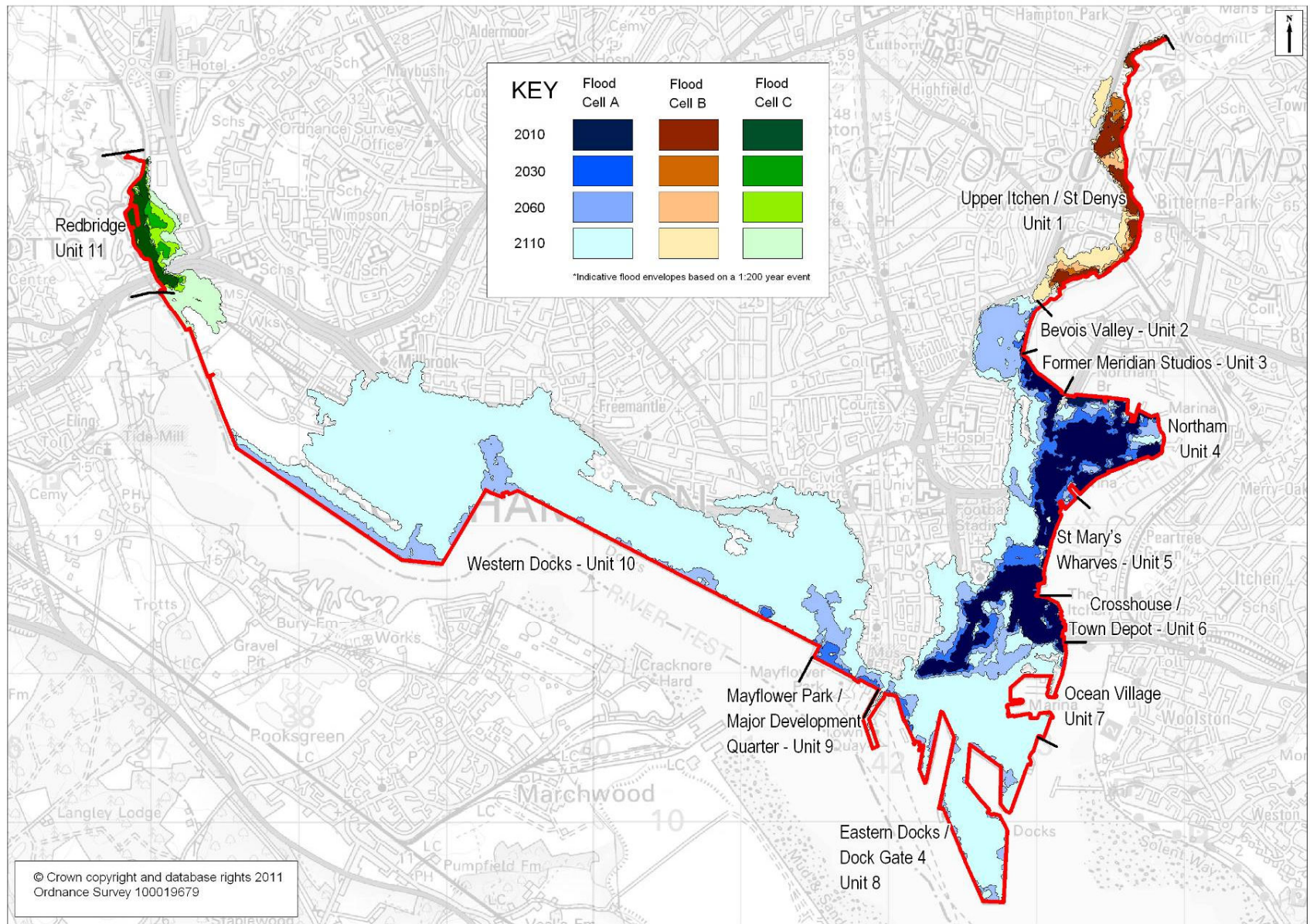


**APPENDIX 1**

***Southampton Coastal Strategy Decision Report - Figures & Tables***

**Figure 1. Flood & Erosion Risk Management Framework**





**Figure 2. The growth of the three discrete Flood Cells (A, B, and C) created by a 1:200 year (0.5% Annual Exceedance Probability (AEP)) event at 2010, 2030, 2060 and 2110**

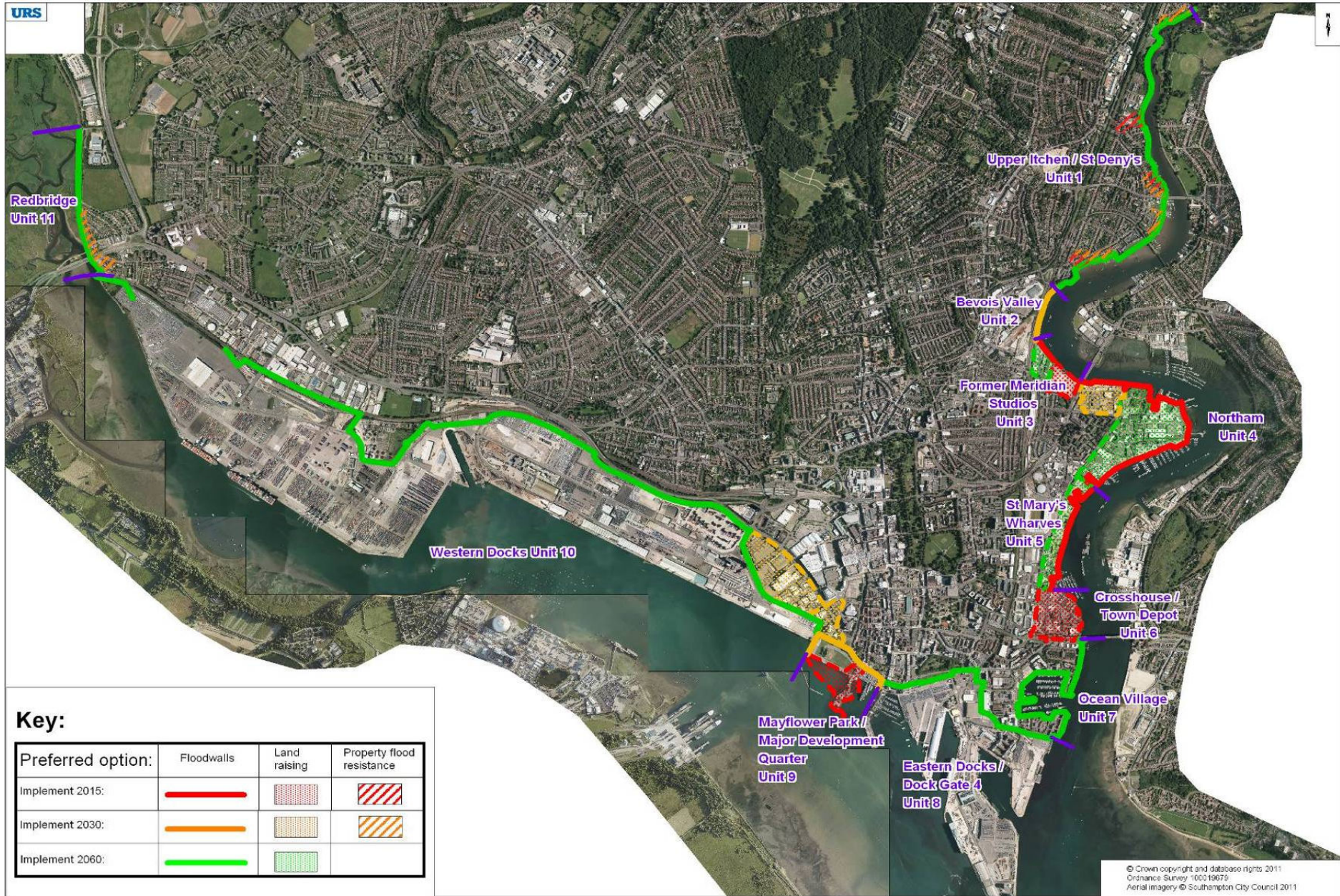


Figure 3. Map of the preferred Strategy options for the 11 “Option Development Units”

**Table 1. Summary of baseline flood risk, flood cells and assets at risk of tidal flooding now and at 2110.**

Parameter	Year	Upper Itchen / St Denys	Bevois Valley	Former Meridian Studios site	Northam	St Mary's Wharves	Crosshouse/ Town Depot	Ocean Village	Eastern Docks / Dock Gate 4	Mayflower Park / Major Development Quarter	Western Docks	Redbridge
		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11
Event return period when flooding begins to affect receptors	2010	1:20 year (5% AEP)	>1:200 year (<0.5% AEP)	1:50 year (2% AEP)	1:50 year (2% AEP)	1:50 year (2% AEP)	1:50 year (2% AEP)	>1:200 year (<0.5% AEP)	>1:200 year (<0.5% AEP)	>1:200 year (<0.5% AEP)	>1:200 year (<0.5% AEP)	1:100 year (1% AEP)
	2110	<1:1 year (100 % AEP)	1:5 year (20% AEP)	<1:1 year (100 % AEP)	<1:1 year (100 % AEP)	<1:1 year (100 % AEP)	<1:1 year (100 % AEP)	1:50 year (2% AEP)	1:10 year (10% AEP)	1:10 year (10% AEP)	1:10 year (10% AEP)	<1:1 year (100 % AEP)
Typical flood depth range from a 1:200 year (0.5% AEP) event in metres	2010	0.25 - 0.75	0	0.25 - 0.5	0.25 - 0.75	0.25 - 0.5	0.25 - 0.75	0	0	0	0	0
	2030	0.5 - 0.75	0	0.5 - 0.75	0.75 - 1	0.5 - 0.75	0.75 - 1	0	0.5 - 0.75 via 'back door'	0	0	0.25
	2060	0.75 - 1.25	0.5 - 0.75	0.75 - 1	1 - 1.25	0.5 - 1	0.75 - 1.25	0	1 - 1.75 via 'back door'	0.25 - 0.5	0	0.25 - 0.75
	2110	1.75 - 2	1.5 - 2	1.5 - 1.75	1.75 - 2.25	1.5 - 2	1.75 - 2	0.5 - 1	1.5 - 2	1 - 1.5	1 - 1.75	1 - 1.75
Flood cell extent (See Error! Reference source not found.Figure 1)	2010	B		A	A	A	A					
	2030	B		A	A	A	A		A			C
	2060	B	A	A	A	A	A		A	A		C
	2110	B	A	A	A	A	A	A	A	A	A	C
Assets at risk from a 1:200 year (0.5% AEP) event	2010	Portwood WTW. Railway and roads. 175 residential properties. 7 commercial properties.	None	654 Residential properties of which 240 Deprived. 499 commercial properties, road, aggregate wharves.				None	None	None	None	Railway and roads. 49 residential properties. 3 commercial properties.
	2110	Portwood WTW. Railway and roads. 585 residential properties. 52 commercial properties.	1924 Residential properties of which 568 Deprived. 1279 commercial properties. Aggregate Wharves. St Mary's Football Stadium, Southampton Central Station, Arterial Roads and mainline railways, West Quay, Ocean Village, ABP Port, Cruise Terminals, Millbrook WTW.									Railway and roads. 224 residential properties. 7 commercial properties.

**Table 2. Local level long list options, short list options and elements of preferred local options for each Unit.**

Flood Cell	Area (Unit)	Option	Short-listed	Comment	Element of preferred local option?
B	Upper Itchen / St Denys (1)	Raise Priory Road	No	Rejected - significant lengths of private residential ownership of much of this frontage, and the relatively low economic benefits generated behind the frontline of properties.	
		Wholesale re-development / land raising -	No	Rejected - many residential properties along the frontage would need to be demolished and redeveloped which would not be socially acceptable.	
		Steel sheet pile front line defences.	Yes	Many residential properties and commercial assets along the frontage are at high risk of flooding over The Strategy period so a detailed appraisal of a frontline defence option was undertaken.	No – technically very difficult, expensive and access / aesthetic issues.
		Floodwall defences.	Yes	Many residential properties and commercial assets along the frontage are at high risk of flooding over The Strategy period so a detailed appraisal of a floodwall defence option was undertaken.	Yes – from 2060 for strategic options 2 & 3 when flood resistance not viable as risk increases.
		Community and property level flood resistance / resilience / adaptation including warnings / incident response / advice.	Yes	The flood envelope is relatively narrow and it is mainly waterfront properties at risk of flooding. Due to long stretches of private frontages where waterfront access and riverside views are an important factor for many residents this option (where the risks are managed and adapted to) was appraised in detail.	Yes – from 2015 to 2060 to reduce flood consequences to vulnerable properties for strategic options 2 & 3.
A	Bevois Valley (2)	Community and property level flood resistance / resilience / adaptation.	No	Rejected – as this unit is part of a continuous flood cell and the depths associated with future flood events are significant by 2060 so this option was rejected for detailed appraisal.	
		Land raising through redevelopment	No	Rejected due to the presence of the railway line at the frontline, and the operational / technical issues of land raising along a railway line.	
		Steel sheet pile front line defences.	Yes	A number of receptors and assets are at high risk of flooding and area also part of a larger continuous flood cell	Yes - for strategic options 2 & 3.
A	Former Meridian Studios Site (3)	Earth Embankment defences	No	Rejected - impractical due to current land use requirements and the significant land take required	
		Floodwall front line defences	Yes	Number of receptors and assets are at high risk of flooding over The Strategy period and area part of a larger continuous flood cell with flow paths through to adjacent areas.	Yes - from 2015 to 2060 for strategic option 2 & 3.
		Land raising through redevelopment	Yes	Strong potential for land raising as part of the site is currently cleared and awaiting re-development.	Yes - from 2015 to 2060 for strategic option 2 and 3.
A	Northam Bridge to Belvedere Wharf (4)	Community and property level flood resistance / resilience / adaptation	No	Rejected - flood depths become large and the flood extent significant so resistance, resilience and adaptation would not be sufficient to mitigate the risks. The economic benefits of defending this frontage are also large and area is also part of a larger continuous flood cell.	
		Earth Embankment defences.	No	Rejected - significant land take required and area is highly developed, with industrial and residential land uses. Also detrimental to operational requirements of the quays.	
		Steel sheet pile front line defences.	Yes	A number of receptors and assets are at high risk of flooding over The Strategy period and area also part of a larger continuous flood cell.	No – ruled out through high cost, technical difficulties, and operational impingement grounds
		Floodwall front line defences	Yes	A number of receptors and assets are at high risk of flooding over The Strategy period and area also part of a larger continuous flood cell.	Yes - from 2015 to 2060 for strategic option 2 & 3.
		Land raising	Yes	Potential operational difficulties of implementing a front line defence option, and potential for re-development.	Yes – from 2060 for strategic options 2 & 3.

Flood Cell	Area (Unit)	Option	Short-listed	Comment	Element of preferred local option?
A	St Mary's Wharves (5)	Community and property level flood resistance / resilience / adaptation	No	Rejected - flood depths become large and the flood extent significant and resistance, resilience and adaptation cannot adequately mitigate the risks. The unit is also part of a larger continuous flood cell.	
		Earth Embankment defences	No	Rejected - highly developed, industrial and residential land uses. Also would hinder the operational requirements of the quays and requires significant land take.	
		Road raising at the rear of the Wharves	No	Rejected - due to the levels required to provide protection, the limited space due to dense industrial land use and the access requirements for plant to the wharves.	
		Steel sheet pile front line defences.	Yes	This option was appraised in detail as there are a number of receptors and assets at high risk of flooding, over The Strategy period and unit is also part of a larger continuous flood cell.	No – ruled out through high cost, technical difficulties, and operational impingement grounds
		Floodwall front line defences.	Yes	A high number of receptors and assets at high risk of flooding, over The Strategy period. This option is also a lower cost option than the sheet pile option and unit also part of a larger continuous flood cell.	Yes - from 2015 to 2060 for strategic option 2 & 3.
		Land raising.	Yes	Potential operational difficulties of implementing a front line defence option, and the potential for re-development in this unit.	Yes – from 2060 for strategic options 2 & 3.
A	Cross-house/ Town Depot (6)	Steel sheet pile front line defences.	Yes	A number of receptors and assets at high risk of flooding over The Strategy period and unit is also part of a larger continuous flood cell.	No - less cost effective and more technically difficult than a wall
		Floodwall front line defences.	Yes	A number of receptors and assets at high risk of flooding over The Strategy period. This is also a lower cost option than the sheet pile option and unit is also part of a larger continuous flood cell.	Only if land raising not undertaken from 2015
		Land raising through redevelopment.	Yes	This site is earmarked for redevelopment. This is also the most technically robust defence type to protect against flooding.	Yes - from 2015 for strategic options 2, & 3.
A	Ocean Village (7)	Road raising.	No	Rejected - this option does not provide protection to the key receptors in Ocean village.	
		Steel sheet pile front line defences.	No	There is a flood risk mainly 'via the back door' from other areas (i.e. the Port and Town Depot) so this option as a stand alone solution.	
		Defend front line with tide gate / lock across entrance to marina and defences along perimeter of ABP land and demountable defences / ramps on access points.	Yes	A number of receptors and assets are at high risk of flooding, over The Strategy period. Also this is part of a larger continuous flood cell with flow paths through to the City Centre.	No - prohibitively expensive
		Raise quay walls with floodwall defences along perimeter of ABP land and demountable defences / ramps on access points.	Yes	As above but more cost effective than the option with a tide gate on the Marina entrance.	Yes - from 2060 for strategic options 2 & 3.
A	Eastern Docks / Dock Gate 4 (8)	Front line floodwall defences	No	Rejected - due to operational requirements of the Port.	
		Raise Canute / Platform Road.	No	Rejected - this option is technically very challenging, given access requirements and tight urban fabric.	
		Demountable defences along roads	No	Rejected - operationally intensive to use long stretches of demountable defences and requires ongoing maintenance and operation. There is also a high risk of failure with this option.	
		ABP boundary flood wall with demountables / ramps across access points.	Yes	The Port boundary provides a potential defence corridor and this option would provide protection to a large number of receptors behind the Port. This option would also not impinge on Port operations.	Yes - from 2060 for strategic options 2 & 3.
A	Mayflower	Road raising.	No	Rejected - technically challenging and expensive given access requirements.	

Flood Cell	Area (Unit)	Option	Short-listed	Comment	Element of preferred local option?
	Park / Major Development Quarter (9)	Front line steel sheet pile defences	Yes	The site is earmarked for redevelopment so there is the opportunity to implement new front line defences.	No – less cost effective than other options.
		Land raising through redevelopment	Yes	This is a relatively cost effective solution which could be integrated into the park and any redevelopment.	Yes – from 2015 for strategic options 2 & 3.
		Earth Embankment defences.	Yes	This option is technically feasible and there is room to implement an embankment.	No – significant land take required.
		Floodwall at rear of park and along the port boundary with demountable defences / ramps on access points.	Yes	This could be constructed to provide robust flood protection to the Major Development Quarter.	Only if land raising doesn't occur. From 2030 for strategic options 2 & 3.
		Construct elevated service road as flood defence.	No	Rejected – due to the operational requirements of the Port and ABP is not currently exploring this option.	
A	Western Docks (10)	Front line floodwall	No	Rejected - This is a high cost option and logistically very difficult. Access requirements are also a key issue.	
		Raise road at rear of the Port	No	Rejected - this is a high cost and logistically very difficult. Key infrastructure (Millbrook WTW) will also not be protected.	
		Upgrade railway line at rear to act as a defence	No	Rejected - this is a high cost option and very disruptive for a working Port. ABP is also currently not exploring this option.	
		Raise entire Port area	No	Rejected - ABP is currently not exploring this option so this was ruled out for detailed appraisal	
		Raise the service road through the Port.	No	Rejected - ABP is currently not exploring this option so this was ruled out for detailed appraisal	
		Floodwall along ABP boundary with ramps / demountables on access points.	Yes	This option would provide flood protection to the receptors at risk behind the Port with minimal disruption to port operations and maintaining access to the Port.	Yes – all other options ruled out by ABP due to operational requirements.
C	Redbridge (11)	Steel sheet pile front line defences along the river channel.	No	Rejected – potential significant detrimental environmental impacts of this option on the designated site of the lower Test Valley.	
		Earth embankment defences alongside railway	Yes	The railway provides a useful feature to utilise as a defence corridor. This option would generate maximum benefits as the greatest number of receptors would be protected and is more environmentally sympathetic.	No - environmentally detrimental, technically challenging in places and land take issues
		Steel sheet pile defences along the railway line.	Yes	High number of residential properties and commercial assets are at high risk of flooding over The Strategy period and the railway provides a useful defence corridor.	No – environmentally detrimental and costly
		Floodwall along the railway line.	Yes	High number of residential properties and commercial assets are at high risk of flooding over The Strategy period and the railway provides a useful defence corridor.	Yes – from 2060 for strategic options 2 & 3 when risk becomes more significant
		Community and property level flood resistance / resilience / adaptation including warnings / incident response / advice.	Yes	Due to the SMP policy of No Active Intervention, with a significant flood risk over The Strategy period this option where the risks are managed and adapted to, was appraised in detail.	Yes – from 2030 for strategic options 2 & 3 to reduce flood consequences to vulnerable properties

**Table 3. Economic summary of Preferred Strategy**

	<b>Cell A</b>	<b>Cell B</b>	<b>Cell C</b>	<b>Total</b>
<b>Standard of Protection</b>	1:200	1:200	1:200	
<b>PV Costs (£k)</b>				
<b>Capital</b>	13,757	1,826	476	16,059
<b>Non-capital</b>	1,387	511	199	2,098
<b>Total PV Costs (£k)</b>	15,144	2,337	675	18,157
<b>PV Benefits (£k)</b>	209,006	23,746	6,131	238,882
<b>Average Benefit/Cost Ratio</b>	13.8	10.2	9.1	13.2
<b>Cash Costs (£k)</b>				
<b>Capital</b>	29,980	3,820	1,230	35,030
<b>Non-capital</b>	2,384	1,372	729	4,485
<b>Total Cash Costs (£k)</b>	32,364	5,192	1,959	39,515





**Table 5. Estimated funding Strategy and potential breakdown of contributions to implement the preferred options (present cash costs for capital schemes)**

	Area	Upper Itchen / St Denys	Bevois Valley	Meridian Studios	Northam	St Mary's Wharves	Crosshouse / Town Depot	Ocean Village	Eastern Docks / Dock Gate 4	Mayflower Park / Major Development Quarter	Western Docks	Redbridge	Total
	Option Development Unit	1	2	3	4	5	6	7	8	9	10	11	
2015	Scheme	Flood resistance scheme		Floodwall + Raised land	Floodwall	Floodwall	Land Raising						
	Total Cost	£300,000		£1,240,000	£1,730,000	£870,000	£2,300,000						
	FDGiA	£300,000		£420,000	£1,730,000	£870,000							£3,320,000
	Developer / CIL / Other			£820,000			£2,300,000						£3,120,000
2030	Scheme	Flood resistance scheme	Steel sheet pile defence		Land raising	Land raising				Floodwall		Flood resistance scheme	
	Cost	£520,000	£2,380,000		£5,200,000	£940,000				£890,000		£150,000	
	FDGiA	£420,000								£890,000		£100,000	£1,410,000
	Developer / CIL / Other	£100,000	£2,380,000		£5,200,000	£940,000						£50,000	£8,670,000
2060	Scheme	Floodwall		Land raising	Land raising	Land raising		Floodwall	Floodwall along ABP boundary		Floodwall with access provisions	Floodwall along railway	
	Total Cost	£3,000,000		£820,000	£5,200,000	£940,000		£1,280,000	£1,510,000		£4,680,000	£1,080,000	
	FDGiA	£2,000,000						£800,000	£1,000,000		£3,000,000	£500,000	£7,300,000
	Developer / CIL / Other	£1,000,000		£820,000	£5,200,000	£940,000		£480,000	£510,000		£1,680,000	£580,000	£11,210,000