Title:	Impact Assessment (IA)
Commencement of the Flood and Water Management Act 2010, Schedule 3 for Sustainable Drainage	**IA No:** Defra 1367
	Date: 06/12/2011
	Stage: Consultation
Lead department or agency: Defra	**Source of intervention:** Domestic
	Type of measure: Secondary legislation
Other departments or agencies: BIS, CLG	**Contact for enquiries:** Oliver Grant 020 7238 5864 Nick Haigh 020 7238 4505

Summary: Intervention and Options

What is the problem under consideration? Why is government intervention necessary?

Flooding from surface runoff costs England an estimated £1.3bn to £2.2bn per year, 29% of which falls to business. The risk of flooding is on the rise owing to climate change and urbanisation. Surface runoff can be a major source of pollution; both directly and from drowned sewers discharging into our rivers; and major investment is needed to tackle it. Today the majority of surface runoff drains into our sewers, even from new developments and demands major investment - an estimated £600m per year. Extra pressure to take action stems from compliance with EU legislation, in particular the Water Framework Directive. The market is failing to provide a sustainable approach to draining surface runoff from the majority of new development.

What are the policy objectives and the intended effects?

Government intends for this policy to correct the market failure and for the surface runoff from new development to be drained sustainably. Sustainable drainage mimics the natural processes and helps protect against both flood risk and pollution. This assessment considers options to commence provisions in Schedule 3 of the Flood and Water Management Act 2010. The policy provides certainty about adoption of the new drainage structures - a significant factor in the market failure; that the requirements are proportionate to the size and risk of new developments; and that drainage is practical and affordable. The policy allows local authorities to build capacity; provides an opportunity for local benefits of amenity, biodiversity; and ensures the systems they adopt are fit for purpose, easy to maintain and robust.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

The alternative to regulation is the baseline for this assessment. The non-regulatory approach is all but exhausted with policy, standards and guidance promoting sustainable drainage for surface runoff. The policy options commence the provisions in the Act for: 1) large-scaled major development only; 2) all major development; 3) all major and minor development; 4) all major, minor and permitted development; and 5) major developments in areas of high flood risk only. Option 3 is preferred in economic terms; this commences the provisions for all major and minor development. However, current capacity to establish a SuDS Approving Body (SAB) in some local authorities is a challenge in the short-term and a phased approach may be desirable. Perhaps with Option 2 implemented in the short-term, followed by Option 3 after three years. This combination is presented as Option 6 in the summary sheets. An alternative, lower cost variant is Option 3A, where development under a Neighbourhood Development Order is exempt.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 09/2017 **What is the basis for this review?** PIR. **If applicable, set sunset clause date:** 09/2019	
Are there arrangements in place that will allow a systematic collection of monitoring information for future policy review?	Yes

SELECT SIGNATORY Sign-off for consultation stage Impact Assessments:

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible SELECT SIGNATORY: ..... Date: .....

Summary: Analysis and Evidence

Policy Option 1

Description:

Commence for large-scale major development (200 or more dwellings; 1000m2 or more floor space)

Price Base Year 2011	PV Base Year 2011	Time Period Years 50	Net Benefit (Present Value (PV)) (£m)		
			Low: 615	**High:** 2371	**Best Estimate: 1493**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0.01	1	39	**675**
High	0.06		85	**1474**
Best Estimate	0.04		62	**1074**

Description and scale of key monetised costs by 'main affected groups'

Future maintenance costs to SuDS Approving Bodies (SABs) of new SuDS (£993m PV best estimate), plus a net cost to developers of £81m PV. The latter figure comprises £113m in SAB application fees and £0.03m in transitional costs, less a saving of £32m in Water & Sewerage Companies (WaSCs) application fees in respect of new drainage. NB construction costs of new SuDS are assumed to be, on average, the same as for conventional drainage (though this position will vary from site to site).

Other key non-monetised costs by 'main affected groups'

Potential one-off start-up costs for Local Authorities as SAB.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			76	**1290**
High			226	**3844**
Best Estimate			151	**2567**

Description and scale of key monetised benefits by 'main affected groups'

Savings in traditional drainage maintenance costs to WaSCs of £1,655m PV best estimate. Saving in flood damage of £264m PV to businesses and £647m PV to households and others, compared with overall 50-year baseline flood damages of £4,244m - £26,687m PV (after accounting for current policy and practice).

Other key non-monetised benefits by 'main affected groups'

Saving in capital investment in traditional sewerage networks. Improvements in water quality because of reduced sewer overflows and natural infiltration of surface water before it enters watercourses. Reduced risk of infraction relating to EU water quality legislation. Improvements in local amenity where certain kinds of SuDS are used. Potential health improvements from increased green space, and groundwater recharge which could alleviate drought in water-stressed areas.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

Baseline assumes 56,000 (low) to 76,000 (high) properties currently at flood risk @ £23-29k annual damage. Aggregate damage grows by 60-110% by year 50. Large-scale major developments account for 20% of the development not controlled by current policy/practice; SuDS reduce damage on these by 30%. 15 large-scale major developments per SAB pa @ 10 ha each, requiring 0.3-0.8 engineer-equivalent FTE at a cost rate of £61,467/FTE. Transitional time cost per developer 10 person days. Traditional drainage infrastructure saving £60 per developed unit, based on existing WaSC rebates for non-connection. 29% of damage reduction accrues to business as a cost reduction (based on EA research into costs of 2007 floods). Variability mostly due to baseline damage variation.

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 4.8	**Benefits:** 83.2	**Net:** 0	Yes	IN

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Options		
From what date will the policy be implemented?			01/10/2012		
Which organisation(s) will enforce the policy?			SABs		
What is the annual change in enforcement cost (£m)?			£4.9m SAB admin		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			No		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -Small	**Non-traded:** 0	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:** 0	**Benefits:** 0	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro** n/k	**< 20** n/k	**Small** n/k	**Medium** n/k	**Large** n/k
Are any of these organisations exempt?	No	No	No	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on…?	**Impact**	**Page ref within IA**
Statutory equality duties[1] Statutory Equality Duties Impact Test guidance	No	
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	
Small firms Small Firms Impact Test guidance	No	
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	39
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	39
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	39
Human rights Human Rights Impact Test guidance	No	
Justice system Justice Impact Test guidance	No	
Rural proofing Rural Proofing Impact Test guidance	No	
Sustainable development Sustainable Development Impact Test guidance	Yes	39

[1] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Summary: Analysis and Evidence

Policy Option 2

Description:

Commence for all major development (more than 10 dwellings)

Price Base Year 2011	PV Base Year 2011	Time Period Years 50	Net Benefit (Present Value (PV)) (£m)		
			Low: 935	**High:** 3622	**Best Estimate: 2279**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0.03	1	60	**1049**
High	0.11		132	**2292**
Best Estimate	0.07		96	**1671**

Description and scale of key monetised costs by 'main affected groups'

Future maintenance costs to SuDS Approval Bodies (SABs) of new SuDS (£1,528m PV best estimate), plus a net cost to developers of £143m PV. The latter figure comprises £314m in SAB application fees and £0.07m in transtional costs, less a saving of £171m in Water & Sewerage Companies (WaSCs) application fees in respect of new drainage. NB construction costs of new SuDS are assumed to be, on average, the same as for conventional drainage (though this position will vary from site to site).

Other key non-monetised costs by 'main affected groups'

Potential one-off start-up costs for Local Authorities as SuDs Approval Bodies.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			117	**1984**
High			348	**5914**
Best Estimate			232	**3949**

Description and scale of key monetised benefits by 'main affected groups'

Savings in traditional drainage maintenance costs to WaSCs of £2,546m PV best estimate. Saving in flood damage of £407m PV to businesses and £996m PV to households and others, compared with overall 50-year baseline flood damages of £4,244m - £26,687m PV (after accounting for current policy and practice).

Other key non-monetised benefits by 'main affected groups'

Saving in capital investment in traditional sewerage networks. Improvements in water quality because of reduced sewer overflows and natural infiltration of surface water before it enters watercourses. Reduced risk of infraction relating to EU water quality legislation. Improvements in local amenity where certain kinds of SuDS are used. Potential health improvements from increased green space, and groundwater recharge which could alleviate drought in water-stressed areas.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

Assumptions: As Option 1 except:
- SAB time cost estimates based on 15 large-scale and 65 other major developments per SAB pa @ 10 and 1 hectares each, respectively, requiring 1.5 engineer-equivalent FTE at a cost rate of £61,467/FTE.
- Overall, major developments account for 30% of the development not controlled by current policy/practice, based on CLG data for numbers of planning applications and hectarage assumptions.

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 13.4	**Benefits:** 133.2	**Net:** 0	Yes	IN

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Options		
From what date will the policy be implemented?			01/10/2012		
Which organisation(s) will enforce the policy?			SABs		
What is the annual change in enforcement cost (£m)?			£13.7m SAB admin		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			No		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -Small	**Non-traded:** 0	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:** 0	**Benefits:** 0	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro** n/k	**< 20** n/k	**Small** n/k	**Medium** n/k	**Large** n/k
Are any of these organisations exempt?	No	No	No	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on…?	**Impact**	**Page ref within IA**
Statutory equality duties[1] Statutory Equality Duties Impact Test guidance	No	
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	
Small firms Small Firms Impact Test guidance	No	
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	39
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	39
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	39
Human rights Human Rights Impact Test guidance	No	
Justice system Justice Impact Test guidance	No	
Rural proofing Rural Proofing Impact Test guidance	No	
Sustainable development Sustainable Development Impact Test guidance	Yes	39

[1] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Summary: Analysis and Evidence

Policy Option 3

Description:

Commence for major and minor development (more than 1 dwelling)

Price Base Year 2011	PV Base Year 2011	Time Period Years 50	Net Benefit (Present Value (PV)) (£m)		
			Low: 1886	**High:** 8370	**Best Estimate: 5128**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0.86	1	97	**1670**
High	0.86		186	**3057**
Best Estimate	0.86		142	**2364**

Description and scale of key monetised costs by 'main affected groups'

Future maintenance costs to SuDS Approval Bodies (SABs) of new SuDS (£2,546m PV best estimate), plus a net cost to developers of £-183m PV (net saving). The latter figure comprises £1,664m in SAB application fees and £0.80m in transtional costs, less a saving of £1847m in Water & Sewerage Companies (WaSCs) application fees in respect of new drainage. NB construction costs of new SuDS are assumed to be, on average, the same as for conventional drainage (though this position will vary from site to site).

Other key non-monetised costs by 'main affected groups'

Potential one-off start-up costs for local authorities as SABs.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			209	**3556**
High			672	**11426**
Best Estimate			440	**7491**

Description and scale of key monetised benefits by 'main affected groups'

Savings in traditional drainage maintenance costs to WaSCs of £4,244m PV best estimate. Saving in flood damage of £942m PV to businesses and £2,306m PV to households and others, compared with overall 50-year baseline flood damages of £4,244m - £26,687m PV (after accounting for current policy and practice).

Other key non-monetised benefits by 'main affected groups'

Saving in capital investment in traditional sewerage networks. Improvements in water quality because of reduced sewer overflows and natural infiltration of surface water before it enters watercourses. Reduced risk of infraction relating to EU water quality legislation. Improvements in local amenity where certain kinds of SuDS are used. Potential health improvements from increased green space, and groundwater recharge which could alleviate drought in water-stressed areas.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5%

Assumptions: as Option 2 except:
- SABs now receive applications from all minor and developments: assumed 810 per SAB pa, requiring 8.0 engineer-equivalent FTE at a cost rate of £61,467/FTE.
- Overall, developments impacted account for 60% of the development not controlled by current policy/practice. SuDS reduce local flood damage by 35% on the proportion of uncontrolled development impacted. This is higher than Options 1/2, because of the relative impact of urban infill development in the "minor" category (such development would have connected to the most constrained urban drainage systems in the baseline).

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 71.0	**Benefits:** 299.9	**Net:** 0	Yes	IN

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Options		
From what date will the policy be implemented?			01/10/2012		
Which organisation(s) will enforce the policy?			SABs		
What is the annual change in enforcement cost (£m)?			£72.6m SAB admin		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			No		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -Small	**Non-traded:** 0	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:** 0	**Benefits:** 0	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro** n/k	**< 20** n/k	**Small** n/k	**Medium** n/k	**Large** n/k
Are any of these organisations exempt?	No	No	No	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on…?	**Impact**	**Page ref within IA**
Statutory equality duties[1] Statutory Equality Duties Impact Test guidance	No	
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	
Small firms Small Firms Impact Test guidance	No	
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	39
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	39
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	39
Human rights Human Rights Impact Test guidance	No	
Justice system Justice Impact Test guidance	No	
Rural proofing Rural Proofing Impact Test guidance	No	
Sustainable development Sustainable Development Impact Test guidance	Yes	39

[1] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Summary: Analysis and Evidence

Policy Option 3A

Description:

Commence for major and minor development but with exemption where Neighbourhood Development Orders apply

Price Base Year 2011	PV Base Year 2011	Time Period Years 50	Net Benefit (Present Value (PV)) (£m)		
			Low: 1163	High: 5233	Best Estimate: 3198

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0.86		53	**956**
High	0.86	1	103	**1761**
Best Estimate	0.86		78	**1359**

Description and scale of key monetised costs by 'main affected groups'

Costs are as Option 3 except their scale is reduced to the assumed extent of uptake of Neighbourhood Development Orders (NDOs), development under which would be exempt from SuDS Approving Bodies (SABs) drainage approvals. As per the Impact Assessment, 5% uptake of NDOs per annum is assumed for 11 years (the appraisal period of that IA). Estimates suggest that instead of a consistent 60% of "uncontrolled" development being impacted by SuDS, only 38% is impacted by Year 11, as the number of NDOs increase.

Other key non-monetised costs by 'main affected groups'

As Option 3 - potential one-off start-up costs for SABs.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			120	**2119**
High			399	**6994**
Best Estimate			260	**4557**

Description and scale of key monetised benefits by 'main affected groups'

Again, benefits are as Option 3 except their scale is reduced in line with growing uptake of NDOs. As for costs, NDO uptake is 5% per annum for 11 years – consistent with the CLG IA for NDOs. After year 11, it is assumed that the effect of any further growth in NDO uptake, on SuDS uptake, is exactly offset by the fact, by then, NDOs may start to include their own requirements for SuDS in Orders. As such, the percentage of "uncontrolled" development impacted by SuDS policy remains constant at an estimated 38% after year 11.

Other key non-monetised benefits by 'main affected groups'

As Option 3, but reduced in scale as for monetised benefits.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5%

Assumptions as Option 3 except as stated above, plus:

- It is assumed that NDOs are evenly distributed across SABs.
- Large-scale major development is out of scope for NDOs.
- SAB resource requirement is reduced in proportion to reduced number of applications.

The key assumption is the rate of uptake in NDOs, designed to be consistent with CLG's IA *Localism Bill: Neighbourhood Plans and Community Right to Build* (CLG, 2011).

Direct impact on business (Equivalent 50yr) £m):			In scope of OIOO?	Measure qualifies as
Costs: 37.5	**Benefits:** 167.3	**Net:** 0	Yes	IN

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Options		
From what date will the policy be implemented?			01/10/2012		
Which organisation(s) will enforce the policy?			SABs		
What is the annual change in enforcement cost (£m)?			£36.7m SAB admin		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			No		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -Small	**Non-traded:** 0	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:** 0	**Benefits:** 0	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro** n/k	**< 20** n/k	**Small** n/k	**Medium** n/k	**Large** n/k
Are any of these organisations exempt?	No	No	No	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on…?	**Impact**	**Page ref within IA**
Statutory equality duties[1] Statutory Equality Duties Impact Test guidance	No	
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	
Small firms Small Firms Impact Test guidance	No	
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	39
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	39
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	39
Human rights Human Rights Impact Test guidance	No	
Justice system Justice Impact Test guidance	No	
Rural proofing Rural Proofing Impact Test guidance	No	
Sustainable development Sustainable Development Impact Test guidance	Yes	39

[1] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Summary: Analysis and Evidence

Policy Option 4

Description:

Commence for all development with drainage implications

Price Base Year 2011	PV Base Year 2011	Time Period Years 50	Net Benefit (Present Value (PV)) (£m)		
			Low: 247	**High:** 5765	**Best Estimate: 3006**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	1.43	1	185	**3692**
High	1.43		405	**8063**
Best Estimate	1.43		295	**5877**

Description and scale of key monetised costs by 'main affected groups'

Future maintenance costs to SuDS Approving Bodies (SABs) of new SuDS (£2,546m PV best estimate), plus a net cost to developers of £3,331m PV. The latter figure comprises £5,177m in SAB application fees and £1.33m in transtional costs, less a saving of £1847m in Water & Sewerage Companies (WaSCs) application fees in respect of new drainage. NB construction costs of new SuDS are assumed to be, on average, the same as for conventional drainage (though this position will vary from site to site).

Other key non-monetised costs by 'main affected groups'

Potential one-off start-up costs for local authorities as SABs.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			231	**3938**
High			813	**13828**
Best Estimate			522	**8883**

Description and scale of key monetised benefits by 'main affected groups'

Savings in traditional drainage maintenance costs to WaSCs of £4,244m PV best estimate. Saving in flood damage of £1,345m PV to businesses and £3,294m PV to households and others, compared with overall 50-year baseline flood damages of £4,244m - £26,687m PV (after accounting for current policy and practice).

Other key non-monetised benefits by 'main affected groups'

Saving in capital investment in traditional sewerage networks. Improvements in water quality because of reduced sewer overflows and natural infiltration of surface water before it enters watercourses. Reduced risk of infraction relating to EU water quality legislation. Improvements in local amenity where certain kinds of SuDS are used. Potential health improvements from increased green space, and groundwater recharge which could alleviate drought in water-stressed areas.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

Assumptions: as Option 3 except:
- SABs now receive applications from all developments (including "other" and "permitted") with drainage implications: assumed nearly 3,000 per SAB pa (including over 2,000 other and permitted), requiring 25 engineer-equivalent FTE at a cost rate of £61,467/FTE.
- Overall, developments impacted account for 100% of the development not controlled by current policy/practice. SuDS reduce local flood damage by 30% on the proportion of uncontrolled development impacted.

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 220.8	**Benefits:** 317.0	**Net:** 0	Yes	IN

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Options		
From what date will the policy be implemented?			01/10/2012		
Which organisation(s) will enforce the policy?			SABs		
What is the annual change in enforcement cost (£m)?			£225.9m SAB admn		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			No		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -Small	**Non-traded:** 0	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:** 0	**Benefits:** 0	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro** n/k	**< 20** n/k	**Small** n/k	**Medium** n/k	**Large** n/k
Are any of these organisations exempt?	No	No	No	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on…?	**Impact**	**Page ref within IA**
Statutory equality duties[2] Statutory Equality Duties Impact Test guidance	No	
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	
Small firms Small Firms Impact Test guidance	No	
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	39
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	39
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	39
Human rights Human Rights Impact Test guidance	No	
Justice system Justice Impact Test guidance	No	
Rural proofing Rural Proofing Impact Test guidance	No	
Sustainable development Sustainable Development Impact Test guidance	Yes	39

[2] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Summary: Analysis and Evidence

Policy Option 5

Description:

Commence for major developments in areas of the country with identified flood risk (e.g. 77 SWMP pilots)

Price Base Year 2011	PV Base Year 2011	Time Period Years 50	Net Benefit (Present Value (PV)) (£m)		
			Low: 591	**High:** 2531	**Best Estimate: 1561**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0.03	1	32	**550**
High	0.11		69	**1201**
Best Estimate	0.07		50	**875**

Description and scale of key monetised costs by 'main affected groups'

Future maintenance costs to SuDS Approval Bodies (SABs) of new SuDS (£800m PV best estimate), plus a net cost to developers of £75m PV. The latter figure comprises £164m in SAB application fees and £0.07m in transtional costs, less a saving of £89m in Water & Sewerage Companies (WaSCs) application fees in respect of new drainage. NB construction costs of new SuDS are assumed to be, on average, the same as for conventional drainage (though this position will vary from site to site).

Other key non-monetised costs by 'main affected groups'

Potential one-off start-up costs for Local Authorities as SABs.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			67	**1140**
High			219	**3732**
Best Estimate			143	**2436**

Description and scale of key monetised benefits by 'main affected groups'

Savings in traditional drainage maintenance costs to WaSCs of £1,334m PV best estimate. Saving in flood damage of £320m PV to businesses and £783m PV to households and others, compared with overall 50-year baseline flood damages of £4,244m - £26,687m PV (after accounting for current policy and practice).

Other key non-monetised benefits by 'main affected groups'

Saving in capital investment in traditional sewerage networks. Improvements in water quality because of reduced sewer overflows and natural infiltration of surface water before it enters watercourses. Reduced risk of infraction relating to EU water quality legislation. Improvements in local amenity where certain kinds of SuDS are used. Potential health improvements from increased green space, and groundwater recharge which could alleviate drought in water-stressed areas.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

As Option 2 - commence for all major development, except costs and benefits scaled for 77 SABs rather than 147. Overall, developments impacted account for 16% of the total development not controlled by current policy/practice. SuDS reduce local flood damage by 45% on the proportion of uncontrolled development impacted. This is higher than other options as it is assumed that Surface Water Management Plans (SWMPs) provide an effective basis for targetting. In practice, however, this may not be realised as SWMP areas do not necessarily coincide with wider drainage catchments. This means that SuDS focussed purely in SWMP areas may not be as effective as indicated.

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 7.0	**Benefits:** 74.3	**Net:** 0	Yes	IN

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Options		
From what date will the policy be implemented?			01/10/2012		
Which organisation(s) will enforce the policy?			SABs		
What is the annual change in enforcement cost (£m)?			£7.2m SAB admin		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			No		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -Small	**Non-traded:** 0	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:** 0	**Benefits:** 0	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro** n/k	**< 20** n/k	**Small** n/k	**Medium** n/k	**Large** n/k
Are any of these organisations exempt?	No	No	No	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

Please note this checklist is not intended to list each and every statutory consideration that departments should take into account when deciding which policy option to follow. It is the responsibility of departments to make sure that their duties are complied with.

Does your policy option/proposal have an impact on…?	**Impact**	**Page ref within IA**
Statutory equality duties[1] Statutory Equality Duties Impact Test guidance	No	
Economic impacts		
Competition Competition Assessment Impact Test guidance	No	
Small firms Small Firms Impact Test guidance	No	
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	39
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	39
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	39
Human rights Human Rights Impact Test guidance	No	
Justice system Justice Impact Test guidance	No	
Rural proofing Rural Proofing Impact Test guidance	No	
Sustainable development Sustainable Development Impact Test guidance	Yes	39

[1] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Summary: Analysis and Evidence

Policy Option 6

Description:

Phased approach allowing for build up of SAB capacity: Option 2 followed by Option 3 after 3 years.

Price Base Year 2011	PV Base Year 2011	Time Period Years 50	Net Benefit (Present Value (PV)) (£m)		
			Low: 1,873	**High:** 8,245	**Best Estimate: 5,059**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0.86	1	90	**1,664**
High	0.86		187	**3,114**
Best Estimate	0.86		139	**2,389**

Description and scale of key monetised costs by 'main affected groups'

Future maintenance costs to SuDS Approving Bodies (SABs) of new SuDS (£2,534m PV best estimate), plus a net cost to developers of -£145m PV (net saving). The latter figure comprises £1,505m in SAB application fees and £0.9m in transtional costs, less a saving of £1,649m in Water & Sewerage Companies (WaSCs) application fees in respect of new drainage. NB construction costs of new SuDS are assumed to be, on average, the same as for conventional drainage (though this position will vary from site to site).

Other key non-monetised costs by 'main affected groups'

Potential one-off start-up costs for Local Authorities as SABs.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			206	**3,537**
High			661	**11,358**
Best Estimate			434	**7,448**

Description and scale of key monetised benefits by 'main affected groups'

Savings in traditional drainage maintenance costs to WaSCs of £4,223m PV best estimate. Saving in flood damage of £935m PV to businesses and £2,290m PV to households and others, compared with overall 50-year baseline flood damages of £4,244m - £26,687m PV (after accounting for current policy and practice).

Other key non-monetised benefits by 'main affected groups'

Saving in capital investment in traditional sewerage networks. Improvements in water quality because of reduced sewer overflows and natural infiltration of surface water before it enters watercourses. Reduced risk of infraction relating to EU water quality legislation. Improvements in local amenity where certain kinds of SuDS are used. Potential health improvements from increased green space, and groundwater recharge which could alleviate drought in water-stressed areas.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

This option is an amalgamation of Option 2 for years 1-3, and Option 3 thereafter.

Direct impact on business (Equivalent Annual) £m):			In scope of OIOO?	Measure qualifies as
Costs: 64.2	**Benefits:** 290.2	**Net:** 0	Yes	IN

Enforcement, Implementation and Wider Impacts

What is the geographic coverage of the policy/option?			Options		
From what date will the policy be implemented?			01/10/2012		
Which organisation(s) will enforce the policy?			SABs		
What is the annual change in enforcement cost (£m)?			£72.6m SAB admin		
Does enforcement comply with Hampton principles?			Yes		
Does implementation go beyond minimum EU requirements?			No		
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** -Small	**Non-traded:** 0	
Does the proposal have an impact on competition?			No		
What proportion (%) of Total PV costs/benefits is directly attributable to primary legislation, if applicable?			**Costs:** 0	**Benefits:** 0	
Distribution of annual cost (%) by organisation size (excl. Transition) (Constant Price)	**Micro** n/k	**< 20** n/k	**Small** n/k	**Medium** n/k	**Large** n/k
Are any of these organisations exempt?	No	No	No	No	No

Specific Impact Tests: Checklist

Set out in the table below where information on any SITs undertaken as part of the analysis of the policy options can be found in the evidence base. For guidance on how to complete each test, double-click on the link for the guidance provided by the relevant department.

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Competition Competition Assessment Impact Test guidance	No	
Small firms Small Firms Impact Test guidance	No	
Environmental impacts		
Greenhouse gas assessment Greenhouse Gas Assessment Impact Test guidance	Yes	39
Wider environmental issues Wider Environmental Issues Impact Test guidance	Yes	39
Social impacts		
Health and well-being Health and Well-being Impact Test guidance	Yes	39
Human rights Human Rights Impact Test guidance	No	
Justice system Justice Impact Test guidance	No	
Rural proofing Rural Proofing Impact Test guidance	No	
Sustainable development Sustainable Development Impact Test guidance	Yes	39

[1] Public bodies including Whitehall departments are required to consider the impact of their policies and measures on race, disability and gender. It is intended to extend this consideration requirement under the Equality Act 2010 to cover age, sexual orientation, religion or belief and gender reassignment from April 2011 (to Great Britain only). The Toolkit provides advice on statutory equality duties for public authorities with a remit in Northern Ireland.

Evidence Base (for summary sheets) – Notes

Use this space to set out the relevant references, evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Please fill in **References** section.

References

Include the links to relevant legislation and publications, such as public impact assessments of earlier stages (e.g. Consultation, Final, Enactment) and those of the matching IN or OUTs measures.

No.	Legislation or publication
1	Additional Evidence for SuDS
2	National Standards **(Annex A)**
3	Draft Sustainable Drainage (Approval and Adoption) (England) Order 2012 **(Annex B)**
4	Draft Sustainable Drainage (Enforcement) (England) Order 2012 **(Annex C)**
5	Draft Sustainable Drainage (Procedure) (England) Regulation 2012 **(Annex D)**
6	Draft Sustainable Drainage (Appeals) (England) Regulation 2012 **(Annex E)**

Evidence Base

Ensure that the information in this section provides clear evidence of the information provided in the summary pages of this form (recommended maximum of 30 pages). Complete the **Annual profile of monetised costs and benefits** (transition and recurring) below over the life of the preferred policy (use the spreadsheet attached if the period is longer than 10 years).

The spreadsheet also contains an emission changes table that you will need to fill in if your measure has an impact on greenhouse gas emissions.

Annual profile of monetised costs and benefits* - (£m) constant prices

	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9
Transition costs										
Annual recurring cost										
Total annual costs	See	Excel	Sheet	For	Lead	Option	3			
Transition benefits										
Annual recurring benefits										
Total annual benefits										

* For non-monetised benefits please see summary pages and main evidence base section

Microsoft Office
Excel Worksheet

Sustainable Drainage Systems

SuDS reduce the rate and volume of surface runoff from developments to more closely match 'greenfield' sites. This generally means lower or slower discharges compared to conventional drains. Typical components include: ponds, permeable paving and swales.

SuDS are a more resilient form of drainage – protecting against surface runoff flooding and reductions in ground water, reducing pollution (including from overflows of combined sewers), helping manage temperature fluctuations and often providing opportunities to enhance local biodiversity and amenity at no additional cost.

Many of the techniques are low-tech and all are tried and tested. The photos below are for illustrative purposes only and show a (a) swale, (b) permeable roadside drain, (c) retention basin, (d) soakaway and (e) permeable paving.

(a)  (b)  (c)  (d)  (e) 

The Flood and Water Management Act 2010

Schedule 3 of the Act makes provision for Ministers to publish National Standards for sustainable drainage. These are intended to work with the national planning framework, in particular local standards to help deliver biodiversity, amenity and sustainable construction.

Schedule 3 of the Act includes a provision that requires developers to seek drainage approval from a SuDS Approving Body (SAB) before starting any construction work that has drainage implications. The SAB must determine if the application meets the National Standards with regard to statutory guidance. All approved SuDS which serve more than one property must be adopted and maintained by the SAB under the provisions.

Exemptions to the regime may be allowed by regulation and the Act specifically allows for phased commencement to manage impacts on local authorities and businesses.

EVIDENCE BASE

Problem under consideration and rationale for intervention

1. The principle of SuDS is well established in the planning system, which includes Part H of the Building Regulations, Planning Policy Statement 25 and the Code for Sustainable Homes. However, the uptake of SuDS is insufficient to mitigate increasing flood risk from surface runoff, the risk of sewer overload, or to protect water quality.

2. From the 1960s most development has been built with separate drains for foul water and surface runoff. However, only small proportion is loosely described as SuDS by Local Planning Authorities[1]. The bottom line is that the market is responding too slowly and is ultimately constrained by:

- A lack of consistent standards to identify affordable drainage that is fit-for-purpose (information failure). There is good practice 'out there' but bad practice is also evident and the latter contributes to perception that SuDS are expensive 'nice to haves'.
- A lack of coherent arrangements for the adoption and ongoing maintenance of drainage. Currently, developers or local authorities have to make arrangements to finance the ongoing maintenance of SuDS. However, arrangements are ad-hoc and highly variable. Examples of current practice are: the passing on of costs to property management companies and thence to residents (not always possible); or providing an upfront sum to local authorities who take on assets long-term (this only occurs sporadically or where local authorities happen to be SuDS 'enthusiasts'). Where ongoing financing is not possible, developers faced with the whole-life cost of SuDS are disincentivised in contrast to conventional drainage systems, where the maintenance is automatically taken on by water companies and financed through water bills. The lack of satisfactory adoption and maintenance arrangements is illustrated by the phenomenon of unmaintained 'orphan' SuDS, which have not been adopted and often only come to light during an investigation of local flooding. In many cases the lack of maintenance has increased the risk of flooding.
- A disconnect between those who drain surface runoff sustainably and those who benefit further downstream (an externality). Local authorities are improving their understanding of local flood risk – through Preliminary Flood Risk Assessments and Surface Water Management Plans. This will improve evidence to support where SuDS will do most good. However, developments that may help reduce local flood risk may not be easily identifiable as beneficiaries and therefore there is a limit to the market incentive.

3. A lack of SuDS undoubtedly contributed to the 2007 floods and resulted in recommendations from the Pitt Review:

- Clarify the responsibility for the adoption and maintenance of SuDS (see Para.2).
- Remove the automatic right to connect surface runoff to public sewers (Section 106 and Section 115 of the Water Industry Act 1991) (see Para.4).

4. Further to these constraints there are additional problems:

- The legacy of draining surface runoff into our sewers means that foul water and surface runoff are often seen as a single problem. However, over the past decade there has been little change in the average amount of water each person uses at home[2]. In contrast, Ofwat estimate a 27% increase in sewer flooding from climate change. Thus the influence of surface runoff (influenced by changing rainfall patterns due to climate change, as well as urban creep) on our sewers will likely continue to grow.
- Current arrangements for flood insurance are cross-subsidised by those not at risk and this disincentivises the uptake of SuDS etc. The universal availability of flood insurance (and affordable premiums) is currently protected by the Statement of Principles between Defra and the Association of British Insurers. The statement includes a commitment by government to provide sufficient management of flood risk, including that from surface water.

Policy Objective

5. Implementation of SuDS provisions in the Act are intended to:

- Provide certainty for developers that SuDS will be adopted without the need for lengthy negotiation or significant expense.
- Reduce the risk of local flooding associated with more development.
- Mitigate pollution that may arise from surface runoff from the development.
- Reduce extra load on public sewers and the need for additional capacity.

[1] Defra survey (2010) of 26 local authorities in England

[2] Water resources in England and Wales - current state and future pressures (EA, 2008)

6. Commencing the provisions may improve the general resilience of our water bodies, helping us adapt to climate change; and increase wetland habitats and urban green space to meet the aims of the National Biodiversity Strategy and our commitment to the Habitats and Birds Directives.

7. In commencing the provisions this policy aims to realise as many benefits as possible whilst not requiring applications to drain surface runoff from every development; and ensure that there is sufficient skills and capacity in developers and SABs.

THE BASELINE

Current Policy

8. It is estimated that drainage loosely described as sustainable is currently being built in 40% of new developments as a result of existing planning policies and a clear Government steer about the future direction of policy. Local Planning Authorities can and do require SuDS to their own specification and do adopt SuDS by agreement.

9. The Water Framework Directive requires that all discharges of surface runoff are managed to mitigate risk to the receiving environment. The risk of substantial infraction fines from the EU increases the urgency to manage the water quality of surface runoff, particularly from urban developments.

10. At present, SuDS are recommended by Planning Policy Statement 25, which states that surface runoff from a developed site should be managed in a sustainable way to mimic flows arising from the site prior to development.

11. An interim code of practice for SuDS was published by Defra in 2004 but has not been updated and does not set standards to reduce flood risk or water pollution.

Reform of the Planning System

12. Government has recently ended its consultation proposing substantial changes to the planning system – the National Planning Policy Framework (NPPF). A presumption for development and community planning is at the heart of the NPPF, which is intended to stimulate the supply of housing. In particular, a Neighbourhood Development Order (NDO) is an instrument for communities to identify sites for development. The NDO sets out local conditions for development that together with the objectives of the NPPF replace the requirement for planning permission.

13. There is potential for conflict between planning reform and the requirement for all construction with drainage implications to be approved by a SAB. We will explore this during consultation, to understand the effect of SAB approval on the presumption for development and the implication of a possible exemption for development via NDOs.

14. An option (3A) for the exemption of new development via an NDO from SAB approval is a late addition and both the economic case for SuDS and the potential impact of SuDS approval on the economic case for NDOs needs to be considered.

Expected increase in Flood Risk

15. Flood damage from surface runoff is predicted to increase between 60-220% (this range accounts for uncertainty in climate predictions) over the next 50 years as a result of different rainfall patterns from climate change and continued urbanisation [see Annex 2]. SuDS can reduce this increase by storing runoff, slowing the rate at which runoff enters water bodies and helping runoff infiltrate into the ground. It is estimated that SuDS can reduce flood damage by as much as 30%.

Increase in Combined Sewer Overflows

16. The majority of our towns and cities were constructed with “combined” sewers (CSOs) where surface runoff mixes with foul water and is then transported to a treatment plant that extracts clean water. In about 50% of the network, current sewerage systems are at or beyond capacity.

17. In these situations, during periods of intense rain, the combined sewers quickly become full. When this happens, untreated sewage and foul water discharges directly to streams and rivers

through engineered overflows (intended to prevent similar flooding in properties). During floods, it will mingle with flood waters and in a small number of cases sewers can also flood homes directly.

18. The extent of legal discharges is limited by Environment Agency (EA) permit and constrained by the Bathing Waters Directive, Shellfish Directive, Water Framework Directive and Urban Waste Waters Treatment Directive.

19. The current best estimate is that sewerage infrastructure valued at £174bn, will have to grow by 35% over the next 30 years to provide capacity for urban creep, new connections and climate change. We estimate that capacity will only have to grow by 29% if new connections are not made; saving up to £10.4bn.

20. As little as 30% (varies) of water in our sewers is from connected property and roads; the rest typically flows off indirectly-connected impermeable surfaces, the area of which is growing through permitted or illegal development known as 'urban creep'. Furthermore, sewerage undertakers traditionally apply a 600% safety factor to the capacity of sewage treatment works to manage extra surface runoff. The proportion of surface runoff to foul water will depend on the season, local climate and catchment and more work is required to understand this.

21. SuDS present us with the opportunity to avoid many of the new connections and to develop an alternative infrastructure to public sewers – offering significant savings in investment.

Adaptation to Climate Change

22. Continued urbanisation and climate change will lead to bigger temperature fluctuations and hotter weather in urban areas. During summer, cities can be up to 11^{o}C hotter than the surrounding rural area, which requires more air conditioning and/or added discomfort. The extent of the problem depends on the nature of the development. By managing water on the surface, SuDS are extremely good at combating the 'urban heat island' effect by a natural process of evaporation, which draws in heat from the surrounding area. It should be noted that the benefits have not been monetised in this assessment. This benefit may be more relevant to options that include minor urban development (Options 3 and 4).

Biodiversity

23. Conventional drainage and in particular gully pots are a considerable hazard to amphibians, including protected species such as Great Crested Newts. The animals are attracted to the water but drown because they are unable to get back out. SuDS do not share these problems and indeed with modifications can provide a good habitat for amphibians. For example, SuDS are part of the mitigation required by Natural England where Great Crested Newts are present.

24. More widely, SuDS can provide an important habitat of vegetation and standing water that benefits plant life, animals and birds. It should be noted that this benefit has not been monetised in this assessment.

Water Quality and Quantity

25. Surface runoff from roads and parking areas, in particular, is polluted with metals, hydrocarbons and sediment. Either these are flushed into the sewer and treated by a sewage treatment works or flushed straight into a water body. As a result there are pronounced swings in temperature, quantity, and pollutant load.

26. SuDS are effective at reducing the sediment load in surface runoff, breaking down chemical pollutants, and reducing the metal load. SuDS reduce ammonia concentrations (which are toxic to fish) and increase the oxygen content available to aquatic life. They reduce swings of temperature and pollutant concentrations in the water and increase the flow to water bodies during dry periods, thus protecting against drought. SuDS can also increase the replenishment of groundwater. It should be noted that the benefits have not been monetised in this assessment.

Amenity

27. The proposed National Standards do not make any particular requirements for the visual quality of SuDS. However the inclusion of vegetated SuDS can improve the visual appeal of an area and there is evidence to suggest that being in the vicinity of a park can result in uplift of house prices. It should be noted that the benefits have not been monetised in this assessment.

Costs of SuDS

28. Overall, evidence suggests that SuDS are cheaper to build, saving up to 30% construction costs (see Annex 2). The evidence also suggests that for worst case scenarios, "difficult sites", SuDS add an extra cost of approximately 5%. Clearly construction costs can vary according to the development site but these are capped in the National Standards by a test for affordability. This addresses the concern of some developers that SuDS give rise to significant costs associated with land-take. It is assumed that SuDS will be no more expensive than conventional drainage for this assessment.

29. Maintenance of SuDS is estimated to cost £6 per dwelling per annum more than conventional drainage. This assumption was made for the impact assessment of local flood risk management, which included SuDS[3]. Although more recent case studies have suggested that SuDS are cheaper to maintain in many developments (see Annex 2), to be conservative in testing the economic case for SuDS, we have maintained the earlier assumption that SuDS are slightly more expensive to maintain.

Costs to Developers

30. The National Standards for SuDS are, at worst, broadly cost neutral to build and maintain; and in favourable circumstances may provide a significant saving.

31. Many developers are already familiar with SuDS and use them in some situations. However, this assessment assumes that each developer affected by the provisions would require 10 days of staff time to build skills and capacity for the new requirements ("up-skilling" cost).

32. Drainage applications to a SAB will be a new cost to developers of a few hundred pounds per application. However, the SuDS process will reduce negotiations and simplify interaction with a complex array of interests, which includes the WASC, Local Planning Authority, Highways Authority and the Environment Agency. Moreover, the policy has been developed to run alongside planning requirements.

33. SuDS will reduce the number of full applications for a new development to connect to the public sewer – surface runoff will be managed by SuDS. Developers currently pay around £2100 per property to connect surface runoff, which typically comprises five separate charges; of application; connection; inspection; infrastructure; and requisition. In the economic analysis in this IA, it is conservatively assumed that each development (rather than individual property) with SuDS would save on average one application charge, one connection charge, and one inspection charge (total saving around £600). This reflects the fact that some residual connections may still be required in some cases (even though total flows may be greatly reduced), and also that connections to the public sewer may often be made not at each individual property, but downstream of a collector drain. In areas with combined sewers, it is further assumed that separate connections for surface and foul drainage are made, so there will still be at least some savings in connection charges. All of these assumptions will be tested further with OfWAT and companies during consultation stage.

34. At present many developers pay a commuted sum to Local Authorities for the maintenance of adopted SuDS.

Costs to Water and Sewerage Companies

35. Addressing future investment in sewerage infrastructure is essential for public health and to avoid infraction under a number of European Directives, including Urban Waste Water Treatment, Water Framework and Bathing Water. There is a substantial benefit to Water and Sewage Companies (WaSCs) from the uptake of SuDS:

[3] Halcrow evidence base for the Impact Assessment of the Flood and Water Management Bill (precursor to the Act) in 2009

- Reduce future investment need in sewerage infrastructure
- Reduced operation and maintenance costs for conventional sewers (maintenance of adopted sewers will be the responsibility of the SAB)

36. It has been assumed that WaSCs save £60 per annum for each development unit built with SuDS rather than conventional drainage. This saving has been estimated using the rebate currently available to water customers (on application) if they do not connect to a sewer for the disposal of surface runoff. The rebate has been used to derive a proxy for the real resource cost saving to the wider economy arising from connections not being made to conventional sewers. The household rebate currently averages £38, though this was estimated to be £30[3] and our analysis conservatively assumes the latter amount. However, the £30 has been doubled to account for the fact that, for each unit of development, there will also be a saving relating to highway drainage. The latter is not subject to an "on demand" rebate to household customers, as highways drainage is generally an arrangement between water companies and developers or public authorities. Nevertheless, going forward, SuDS would also result in real resource cost savings in this area, as well as drainage from household plots. A broad-brush cross-check of the total £60 resource cost saving per development unit has been made by dividing industry-wide sewer maintenance costs by numbers of customers, which produces a figure in the same ball-park. Furthermore, the rebate is a small proportion of an average £238 sewerage bill and the value of managing surface runoff vs foul water will increase in the future - see Para.4

37. The following points about the £60 WaSC saving figure are emphasised:

- The estimate is a key driver of the economic benefits of SuDS set out in this impact assessment, but at this consultation stage is just that – an estimate. During consultation, Defra will be seeking more definitive evidence of potential savings with OfWAT and WaSCs, particularly for the assumed highways element;
- That said, the £60 figure as estimated relates to operation (e.g. pumping) and maintenance savings only and it does not reflect any savings in wider network infrastructure investment which are very likely to be significant with widespread uptake of SuDS – see non-monetised benefits. To this extent, it is felt that the provisional saving figure is likely to be conservative;
- For the purposes of estimating direct costs and benefits to business under the government's "One In, One Out" (OIOO) approach to regulation, it has been assumed that WaSCs would receive the direct, first-round savings represented by the £60 figure. In practice, given the regulated market for water, these savings will tend to be passed on to customers through reduced drainage rates, but this is taken as a second-round (indirect) effect. The validity of this approach will be explored with OfWAT during consultation. We also await advice from the Department for Business, Innovation and Skills on the treatment of costs and savings to companies in regulated monopoly settings, for the purposes of OIOO calculations.

Costs to Wider Business

38. Throughout this impact assessment, 29% of the monetised benefits of reducing flooding under the commencement options is estimated to fall to businesses (of all kinds). This proportion is informed by the Environment Agency's research into the impacts of the widespread surface water flooding in England in 2007. For "One In, One Out" purposes, we view a reduction in flood damage resulting from the SuDS regulations as a reduction in direct business costs. The costs of flooding are very real to business, typically resulting in lost stock, damage to building fabric and equipment. However it should be noted that in any given time period, such costs arise with an estimable probability, rather than certainty. The economic assessment therefore estimates the expected annual value of damage costs (i.e. taking into account their probability) in the calculation of flood damage savings.

39. As the impact of flooding rises, the cost of underwriting insurance for houses and businesses in areas that often flood becomes prohibitive. The Association of British Insurers agreed with Government following the 2007 floods that the Pitt recommendations (including the recommendation to clarify responsibility for SuDS) would be implemented.

Costs to Local Authorities

40. Local authorities will be required to establish a SAB. It is assumed (and the fees designed) that staff costs will be recouped through application fees to developers. There may be minor non-staff start-up costs associated with recruitment overheads, IT etc but these have not been monetised in this assessment; these are felt to be small and difficult to generalise. This assumption will be tested in consultation. In practice, the latter costs can be met through funding already supplied through Area Based Grant for new burdens arising from local flood risk management provisions of the Flood and Water Management Act.

41. The cost of maintaining new SuDS will also fall to local authorities as the SAB. This is a significant cost and has been monetised in this assessment. The range of 50-year Present Value costs is estimated at broadly £1bn for Options 1&5 to £2.5bn for Options 3&4 – the equivalent annual figures range from £34m-£109m. Again, funding for these costs will be provided through Area Based Grant in the short-term. Options for long-term funding are being developed in parallel to this consultation.

42. Local authorities will benefit from reduced flood damage in their areas and this benefit is estimated as a "non-business" in this assessment. The other key beneficiaries of reduced "non-business" flood damage are households.

THE OPTIONS

43. This impact assessment compares the costs and benefits of commencing provisions for different scales of development, in order to identify low risk, high benefit options:

1	Commence for large scale major development of 200+ dwellings*
2	Commence for all major development of 10+ dwellings*
3	Commence for major and minor development of 1+ dwelling*
3A	Commence option 3 but development by Neighbourhood Development Orders exempted
4	Commence for all development with drainage implications*
5	Commence for major developments in areas with identified flood risk*
6	Phased (gradual) commencement of developments*
*or areas of 1000m^2 or more	

44. The options would provide certainty for developers and SABs but would require sufficient capacity to be able to make timely decisions, as well as skills in businesses to design and construct SuDS. In particular, Options 5 and 6 have been developed to address the skills and capacity issues that concern some local authorities. These options target the commencement of provisions in areas where managing flood risk from surface runoff is a high priority (Option 5) or by phasing the provisions over time for different types of development (Option 6). It is proposed to use Surface Water Management Plans (SWMPs) to identify areas where managing flood risk from surface runoff is a high priority.

45. For new developments that are already planned there would need to be transition arrangements. For all options transition is intended to be 12 months and exempt:

- Developments that already granted planning permission before commencement; or
- Developments with one or more reserve matters where an application for approval of the reserve matter(s) is made; or
- A valid planning application had been submitted before commencement.

Monetary benefit-cost assessment: overview of approach

46. The costs and benefits of SuDS are relatively long-term, with the impact of both climate change and urbanisation predicted to get much worse over time. It would be possible to continue to using piped solutions in some areas for some time, but much more costly to retrofit SuDS to existing layouts.

47. This Impact Assessment therefore considers the benefits and costs of commencing the provisions and maintaining the policy for the next 50 years, albeit with a 10 year assessment conducted as a check that the approach remains economically justified over a shorter period.

Society's preference is to have benefits now and pay later, so both costs and benefits are discounted at an annual rate of 3.5% for the first 30 years and then 3% thereafter, in line with the HMT *Green Book* guidance on economic appraisal in central government.

48. The key indicator of economic worth of the options is Net Present Value = Discounted Benefits – Discounted Costs. The benefits and costs of SuDS commencement are summarised below, with those items monetised in this assessment shown in ***bold***.

Benefits	***Reduction in flood damage to property.***
	Reduction in additional traditional sewerage costs (operation & maintenance)
	Reduction in additional sewerage capacity investment
	Other climate change mitigation and adaptation benefits (especially Options 3,4,6)
	Biodiversity and amenity benefits (certain SuDS types)
	Water quality benefits, including avoiding EU infraction
	Groundwater recharge benefits in water-stressed areas
Costs	***Net construction costs (developers)***
	Net maintenance costs (SABs)
	Transitional "up-skilling" costs (developers)
	Net application/connection costs (SABs/developers)
	SAB start-up costs (LAs)

General Assumptions

49. The "Low" scenario in the table of assumptions below is intended to reflect the reasonable lower bounds of likely variation in the key parameters, based on current evidence, whilst the "High" scenario represents reasonable upper bounds. Analysis under "Low" applies all the lower bound parameters simultaneously, and that under "High" applies all the upper bounds simultaneously. Some of the variations in parameters are interrelated – for example, "Growth in damage due to urbanisation" and "Estimated new development units per annum".

Baseline scenario	**Low**	**Central**	**High**
a. Properties at significant SW flood risk today	56K	66K	76K
b. Annual average damage per at-risk property	£23,290	£26,000	£29,430
c. Growth in damage due to climate change (estimated by Foresight Flooding report)	30%	70%	110%
d. Growth in damage due to urbanisation (estimated in work carried out by Halcrow (2009)	30%	70%	110%
e. Increased pressure on the sewerage system under business as usual.	35%*		
f. Increased pressure on the sewerage system with no new connections	29%*		
g. Proportion of new development (all types) already covered ("controlled") by SuDS schemes.	38%		
h. Proportion of major and minor development already controlled by SuDS schemes	63%		
j. Total residual uncontrolled surface water flood damage (50-year PV, derived from (a)-(d) and (g) above)	£4.2bn	£15.5bn	£26.7bn
Estimated new development units per annum ("major" plus "minor"; excludes "other" and permitted development)	273K	420K	596K
Proportion of total new development area accounted for by other and permitted development	25%		

Additional construction costs		0**	
Net additional maintenance costs of SuDS	£6/unit		
SAB running costs (passed on to developers as application costs)	1 Full Time Employee (FTE) per 100 major or 150 major and minor drainage applications/ year.		
Neighbourhood Development Orders	5% uptake per annum over 11 years, impact thereafter offset by NDOs requiring SuDS.		

Notes

*For information. The benefit-cost analysis does not include estimates of network investment savings at this stage – only those relating to operation and maintenance.

**Case study evidence (see Annex 2) suggests costs could vary from -30% to +2% but 0 assumed throughout.

Key assumptions and estimates by Option* (see below for basis and sources)

*Excluding Option 6; this is an amalgamation of Options 1-3. Basis for these assumptions (further information provided below and in Annex 2)

Option	**1**	**2**	**3**	**3A**	**4**	**5**
	Large Scale Major	**All Major**	**All Major & Minor**	**NDOs exempt, remaining major & minor**	**All Drainage implications**	**Major in identified flood risk**
% of all uncontrolled development impacted	20%	30%	60%	38%*	100%	16%
Assumed effectiveness of SuDS in reducing flood risk	30%	30%	35%	35%	30%	45%
Expected applications per SAB pa	15	80	865	390*	2,900	80
SAB officers FTEs per SAB	0.5	1.2	9.1	4.1*	24.2	1.2
Developers affected	5	10	300	300	500	10

***After year 11. (Declines progressively from 60% in first year – see notes in next section).

Basis and sources for assumptions summarised above (see also Annex 2)

50. ***Properties at significant SW flood risk today*:** evidence from two surface water flooding studies – the Kingston and Richmond SWMP and the Ravensbourne Delivery Plan (a comprehensive assessment of flood risks from all sources in this catchment in SE London) was used by Halcrow to calculate the likely number of flooded properties for a range of event probabilities to determine an annualised value.

51. ***Annual average damage per at-risk property*:** Lewes Integrated Urban Drainage pilot project (£23,290), Foresight Future Flooding (£22,630), Ravensbourne Delivery Plan (£23,000 to £25,000) and Richmond and Kingston first edition SWMP (£30,000).

52. ***Growth in damage due to climate change and urbanisation*:** Hogsmill, River Aire and West Garforth Integrated Urban Development pilot studies, as well as those used in the Foresight Report.

53. ***Increased pressure on the sewerage system*:** Pressure on the sewerage system was anticipated to increase by 35% on a business as usual case by MWH and 29% if there were no new connections to the system (i.e. through SuDS).

54. ***Proportion of new development already covered by SuDS schemes*:** A small telephone survey of planning authorities was conducted in January 2011 to assess what proportion of new developments had SUDS. This broadly confirmed the picture set out in the Halcrow analysis for the earlier IA.

55. ***Estimated new development units per annum*:** Based on the Housing and Planning Statistics for 2010.

56. ***Additional construction costs*:** Existing case-studies on greenfield sites were supplemented by bespoke financial comparisons between SuDS and traditionally piped solutions.

57. ***Net maintenance costs*:** costs are derived from the WASC rebates for surface water drainage and costs from occasional case-studies, but there is considerably less evidence than for the construction costs.

58. ***Uncontrolled development impacted*** (i.e. brought into sustainable drainage "control" or practice)**:** estimates are based on proportions of development hectares for different classes (based on advice from CLG) of development and broad proportions of new development already covered ("controlled") by SuDS (based on a telephone survey of Local Planning Authorities – see above). The derivation of the "uncontrolled development impacted" estimates by Option is set out below:

Derivation of proportions of otherwise "uncontrolled" development impacted by SuDS policy

Development type	% of total development hectarage (A)	% of new development not controlled currently (B)	% of total development hectarage not controlled (C) = (A)x(B)/100	% of uncontrolled hectarage (D) = (C)/63*100	Controlled by Option... 1	2	3	4
Large-scale major	29	42	12	20	Y	Y	Y	Y
Other major	16	42	7	11		Y	Y	Y
Minor	30	62	19	30			Y	Y
Other+permitted	25	100	25	40				Y
Total	**100**		**63**	**100**				
Total uncontrolled hectarage impacted (brought into control):					**20%**	**30%**	**60%**	**100%**

Notes:

For **Option 3A**, the "uncontrolled development impacted" (UDI) proportion in year 0 is the same as that for Option 3 (60%). This is then reduced over years 1-11 as the number of Neighbourhood Development Orders increases, implying greater numbers of exemptions for individual applications. Time profile of uncontrolled development impacted: 60% in year 0, made up of 20% large-scale major and 40% other major & minor development, as Option 3. After year 1, large-scale major development is not within scope of NDOs, so remains at 20%; the remaining 40% declines by 5% per annum up to year 11. By that year, the starting 40% fraction has declined to 18%, and remains constant thereafter. Overall impact proportion after year 11 is therefore 20% + 18% = **38%.**

For **Option 5**, the UDI proportion of Option 2 is scaled by the share of all Lead Local Flood Authorities having pilot Surface Water Management Plans (77 out of 147 = 52%). This leads to a (constant) UDI proportion of **16%**.

59. ***Assumed effectiveness of SuDS in reducing flood risk*:** We estimate that 30% of the additional surface water flooding risk could be mitigated by using SuDS for most options. One exception is Option 3, where the targeting of minor development is expected to yield higher savings as a good proportion of this will be infill development otherwise connecting to heavily-constrained urban drainage systems. The other exception is Option 5, where the targeting by flood risk yields a higher saving[4]. All estimates are judgements based on figures derived by Foresight and the Environment Agency. 50% of the additional risk is expected to be due to continuing urbanisation. However, the SuDS impact is unlikely to be a total mitigation of additional risk, and it is assumed

[4] Note however the significant caveat at paragraph 85 about Option 5: effectiveness may be limited by the fact SWMP areas are not necessarily drainage catchment areas.

that only 60% of the increase due to urbanisation could be prevented by the use of SuDS (hence 30% overall).

60. ***Requirement for SAB staff*****:** Derived from Local Authority analysis of jobs involved in carrying out an application, and comparisons with planning.

61. ***Businesses require up-skilling*****:** no data is available on the profile of the construction industry. It seems a reasonable judgement to assume that larger companies (of which there are fewer) manage the larger projects.

COST BENEFIT ANALYSIS

Option 1 – Commence for large-scale major development

Summary of economic indicators (central "best" estimates) **SUDS Option 1**

£m, 50 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	1,655	Developers: net SuDS capital costs	0	
All business: flood damage saving	264	Developers: upskilling costs	0.03	
		Developers: applications to SABs	113	
		Developers: WaSC application savings	-32	
Total direct benefits to business	**1,919**	**Total direct costs to business**	**81**	**1,838**
Non-business flood damage savings	647	SABs: SuDS maintenance costs	993	
TOTAL BENEFITS	**2,567**	**TOTAL COSTS**	**1,074**	**1,493**

Key figures (major + minor development)**:**

Developers impacted	5 -20
Average total properties with SuDS pa	335262
Average new properties with SuDS pa	63575

62. This option phases SAB approval for large scale major developments and redevelopments. These developments have extensive pre-planning discussions, widespread technical capability in the development teams and space to ensure good suitable drainage designs, which will reduce costs to developers. Application costs are spread over a larger number of units and it is likely to be the larger firms that will be required to come to terms with the new approach. LAs would have only a small volume of new work.

63. However this solution does not address the many problems identified effectively. Large scale major developments account for only 0.5% of planning applications, leaving most future risk from development unmitigated, and not providing any certainty about SuDS ownership for the many developments which do decide to undertake SuDS. Development on this scale is uneven, leaving many LAs with little clarity about the size or type of SuDS Approving Body they will need over the next few years. Moreover, the intensified development of brownfield sites in dense urban areas has most potential to cause degradation and this option would not address them. Large scale major developments are slow, so starting with this option and then expanding to other major developments would not allow time for learning.

Benefits – central case

64. Overall, the estimated benefits of SuDS in new development are a) a reduction in surface water flood damage, and b) a saving in operation and maintenance costs associated with traditional drainage. In practice, there will also be (potentially large) benefits in terms of reduced investment in new sewer capacity, improved water quality (e.g. through natural infiltration), biodiversity and health (where SuDS create new green space), but these aspects have not been monetised.

65. Total flood damage savings for Option 1 are estimated at £911m (Present Value, PV, over 50 years, central case). This figure is calculated as baseline flood damage not controlled by existing policies (total £15,466m PV over 50 years – see baseline assumptions, line j), multiplied each year by 20% (the proportion of otherwise-"uncontrolled" development which would be impacted by the new SuDS provisions under this option – see p.23), and then multiplied by 30% (the average

assumed mitigation rate for SuDS, based on Foresight and EA evidence – see Annex 2). The resulting time series of annual flood damage savings is then discounted and summed to get £911m PV. Of this total, 29% is assumed to accrue to businesses, and 71% to other beneficiaries (notably households). These proportions are informed by Environment Agency research into the distribution of costs in the summer 2007 flood event (which was mostly characterised as surface water flooding). As such, benefits to business are estimated as **£264m** PV, and non-business benefits as **£647m** PV.

66. Savings in maintenance and investment costs associated with traditional drainage are estimated as £60 per development unit[5] built with SuDS, of which there are estimated to be an extra 64,000 annually under Option 1, compared with the baseline. In the first year, this benefit is therefore around £3.8m. However, this benefit accumulates year on year, as more units are built, so that by the fiftieth year, the annual benefit is £190m (undiscounted). Discounting the annual benefits and totalling them gives an overall PV benefit figure of **£1,655m**.

67. Overall total benefits of Option 1 sum to **£2,567m** PV, of which **£1,919m** are first-round benefits to businesses.

Costs – central case

68. Costs of SuDS in new development comprise developer costs (a one-off transitional "up-skilling" cost, capital costs, application costs to SuDS Approval Bodies, net of a saving in application costs to WaSCs), plus the costs to SABs for ongoing maintenance of SuDS. There may also be potential one-off start-up cost to SABs, but these have not been estimated.

69. Developer capital costs are assumed to be **zero**, as evidence suggests that SuDS are either cost-neutral or cheaper to build than conventional drainage (the conservative position of cost-neutrality has been taken for the analysis). Up-skilling costs are valued at 10 person days per affected developer, of which there are an assumed 12 under Option 1 (average of "low" and "high" cases). At a rate of £61,500 per FTE, this equates to around £36,000, which is then discounted slightly as costs are assumed to be borne a year from policy commencement. This gives the figure of **£0.03m** PV in the table.

70. Developer application costs to SABs are estimated as the resource time expended by SABs in processing drainage applications, which are assumed to be fully passed on to developers. For Option 1, a Full Time Equivalent requirement per SAB (of which there are 147) has been estimated based on an assumed expected volume of 15 large-scale applications per SAB. Evidence on the relationship between applications and FTEs has been taken from experience in Cambridge (see Annex 2). This leads to an estimate of 0.44 FTE per SAB. This has been inflated by 25% (to 0.55 FTE) to account for an assumed 80% of initial applications not being successful, based on experience in the mainstream planning system, as reported by CLG. An FTE is valued at £61,500 per annum (salary plus employer costs). Multiplying 0.55 FTE by £61,500 and by 147 SABs leads to an undiscounted figure of £5m per annum. Discounting and summing over 50 years leads to an overall PV estimate of **£113m**.

71. Meanwhile, developers are expected to make a saving from reduced applications to WaSCs in respect of new surface water sewers for connection and adoption. It has been assumed that, for each large-scale development for which an (ultimately successful) application is made to a SAB, there is a corresponding saving on an application fee to the relevant WaSC (£105.50 has been taken as a typical value from WaSC websites). In addition, it has been assumed that each application saves on inspection and connection charges in respect of one new sewerage connection. From a survey of WaSC websites, these are taken as £161 and £346 respectively. Conservatively, these costs exclude any wider "infrastructure" and "requisition" charges which tend to levied on new developments but which we understand tend to be negotiated on a case-by-case basis, and so are difficult to generalise. Overall for Option 1, a saving of £613 per SAB application is assumed, which is multiplied by the assumed number of SAB applications (15 each in 147 SABs). This gives an annual figure of £1.4m, which is discounted and summed over 50 years to give **£32m** PV.

[5] See "Costs to Water and Sewerage Companies" section earlier in this document.

72. SuDS maintenance costs falling on SABs are estimated as £36 per unit per annum. Under Option 1, nearly 64,000 units are built with SuDS each year (over the baseline), resulting in a total maintenance cost of £2.3m in the first year. However, as for the savings in traditional drainage costs made by WaSCs, this cost accumulates year-on-year (as each year's costs are ongoing). By year 50, the undiscounted figure is £114m. Discounting and summing the annual figures leads to an overall 50-year estimate of **£993m** PV.

73. Overall total costs of Option 2 sum to **£1,074m** PV, of which **£81m** are first-round net costs to business (developers), with the remainder being borne by SABs.

74. Subtracting total costs from total benefits gives an overall 50-year Net Present Value of **£1,493m**. Meanwhile, the Net Present Value for business is estimated at **£1,838m**, which can be expressed as a negative Cost to Business under the One In, One Out (OIOO) arrangements.

Option 2 – Commence for all "major" development

Summary of economic indicators (central "best" estimates) **SUDS Option 2**

£m, 50 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	2,546	Developers: net SuDS capital costs	0	
All business: flood damage saving	407	Developers: upskilling costs	0.07	
		Developers: applications to SABs	314	
		Developers: WaSC application savings	-171	
Total direct benefits to business	**2,953**	**Total direct costs to business**	**143**	**2,810**
Non-business flood damage savings	996	SABs: SuDS maintenance costs	1,528	
TOTAL BENEFITS	**3,949**	**TOTAL COSTS**	**1,671**	**2,279**

Key figures (major + minor development)**:**

Developers impacted	10	-40
Average total properties with SuDS pa		369495
Average new properties with SuDS pa		97808

75. This option phases SAB approval for all major development and redevelopment. These applications share the benefits features of large scale major development to a lesser extent: pre-application discussions are still encouraged and there is space to identify a suitable drainage design. However, there is considerably more major development so more of the SuDS benefits would be realised. It is also more evenly spread, enabling good predictions about the size of SAB needed and consistency of work stream.

76. There were 12,300 major planning decisions in England so the approach would require a fairly fast learning curve for Local Authorities: all LAs and far more developers would be impacted. This option would not address redevelopment of small brownfield sites in crowded urban areas which have considerable potential for environmental degradation.

77. It is estimated that this option would impact 30% of the 63% of development which is left "uncontrolled" by current policy and practice under the baseline. Compared with Option 1, an assumed 65 major developments per SAB are brought in to scope. As for Option 1, the effectiveness of SuDS in reducing flood damage on those developments to which it is applied is assumed to be 30%.

78. Compared with Option 1, benefits increase in line with the extra development targeted. Costs also increase. Each SAB is now estimated to require an extra 1 FTE, and more developers face transitional costs. The biggest increase over Option 1 is in maintenance costs of SuDS (these increase cumulatively), though these are more than offset by reductions in traditional sewer network costs (in the benefits column). Overall, the Net Present Value of the Option 2 is stronger; in effect, there are increasing returns to scale from widening the scope of the SuDS measures to include all major development (not just large scale major development).

Option 3 – Commence for all major and minor development

Summary of economic indicators (central "best" estimates) **SUDS Option 3**

£m, 50 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	4,244	Developers: net SuDS capital costs	0	
All business: flood damage saving	942	Developers: upskilling costs	0.80	
		Developers: applications to SABs	1,664	
		Developers: WaSC application savings	-1,847	
Total direct benefits to business	**5,185**	**Total direct costs to business**	**-183**	**5,368**
Non-business flood damage savings	2,306	SABs: SuDS maintenance costs	2,546	
TOTAL BENEFITS	**7,491**	**TOTAL COSTS**	**2,364**	**5,128**

Key figures (major + minor development)**:**

Developers impacted	300	-300
Average total properties with SuDS pa		434700
Average new properties with SuDS pa		163013

79. This option phases SAB approval for major and minor development and redevelopment. It will require most developers and local authorities to build capacity, knowledge and skills to deal with new methods of draining surface runoff. This option does not address the impact of "urban creep" from developments which do not require planning permission (permitted development), but otherwise provides good coverage of developments with drainage implications. It captures both the easy cases and those which, whilst more difficult, are also associated with larger environmental degradation. This option would substantially commence the provisions, realising the benefits and stimulating the SuDS market.

80. Minor developments make up over 90% of planning applications, so this option would both impose higher application costs per unit and also require a very steep learning curve for local authorities, who would be expected to handle a significant volume of new work from the outset, and developers. Beginning with this option would not enable LAs and developers to learn gradually.

81. It is estimated that this option would impact 60% of the 63% of development which is left "uncontrolled" by current policy and practice under the baseline. Compared with Option 2, the effectiveness of SuDS in reducing flood damage on those developments to which it is applied is assumed to increase slightly to 35% (from 30%), reflecting the fact that many minor developments will constitute urban "infill", and applying SuDS would tend to have stronger benefits (because of constrained urban sewer networks) than for an average large development. However, the overall results are not very sensitive to this figure, as the key driver of net benefit is the sewer maintenance saving net of SAB application costs.

82. Compared with Option 2, benefits increase in line with the extra development targeted. Costs also increase; this impact is more significant than between Option 1 and Option 2, because of the large volume of "minor" development, relative to "major". Each SAB is now estimated to require an extra 6.5 FTE compared with 1.5 in Option 2. The number of developers facing transitional costs increases markedly, from an assumed 25 to 300, because it is assumed that only a small number of developers deal with major developments, but very much more with minor developments. It should be noted however that these estimates of developer numbers are highly speculative in the absence of firm information – though in the calculations, the number of developers only feeds through to the small "up-skilling" transitional cost. Overall, however the Net Present Value of Option 3 is still somewhat higher compared with Option 2; the increase in benefit from including minor development (£3,542m) more than outweighs the increase in cost (£693m).

Option 3A – Commence for all major and minor development (exemption for Neighbourhood Development Orders)

Summary of economic indicators (central "best" estimates) **SUDS Option 3A**

£m, 50 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	2,456	Developers: net SuDS capital costs	0	
All business: flood damage saving	609	Developers: upskilling costs	0.80	
		Developers: applications to SABs	918	
		Developers: WaSC application savings	-1,033	
Total direct benefits to business	**3,065**	**Total direct costs to business**	**-115**	**3,180**
Non-business flood damage savings	1,492	SABs: SuDS maintenance costs	1,473	
TOTAL BENEFITS	**4,557**	**TOTAL COSTS**	**1,359**	**3,198**

83. Option 3A is a variant of Option 3 whereby exemption of drainage approval applies where a Neighbourhood Development Order is in force (consistent with emerging principles under the new National Planning Policy Framework)[6]. Initially this implies some loss of uptake of SuDS, as it is assumed that NDOs will not require sustainable drainage (at least in the short to medium term). Over the first 11 years (consistent with assumptions made in CLG's recent Impact Assessment relating to NDOs, see reference in Option 3A summary sheet), uptake of NDOs grows by a simple linear 5% per annum (reaching 55% penetration by the end of the period). As such, new development with SuDS progressively declines. Overall, by year 11, only 38% of "uncontrolled" new development is being successfully targeted by the SuDS provisions in Schedule 3 of the FWMA 2010 (for more information see earlier assumptions section) – compared with 60% under "core" Option 3. This proportion of impacted development then remains constant, as it is assumed that by that time, NDOs start to feature SUDS voluntarily, and the effect of this exactly offsets any further increase in uptake of NDOs. Clearly this is an arbitrary assumption and evidence on the likely uptake of NDOs and scope for voluntary SuDS will be explored further in consultation.

84. Overall, the total costs of Option 3A are reduced by around £1bn over 50 years (43%), and the benefits by £3bn (39%) – though in the context of other options in this IA it retains a relatively strong Net Present Value of around £3.2bn. Whilst Option 3A is less preferred than Option 3 in NPV terms, in a world where Option 3 may not be deliverable (due to changes in Planning Policy), it may remain preferred to other options if their costs and benefits scale similarly (though this will need to be revisited post-consultation).

Option 4 – Commence for all development (major, minor, other and permitted)

Summary of economic indicators (central "best" estimates) **SUDS Option 4**

£m, 50 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	4,244	Developers: net SuDS capital costs	0	
All business: flood damage saving	1,345	Developers: upskilling costs	1.33	
		Developers: applications to SABs	5,177	
		Developers: WaSC application savings	-1,847	
Total direct benefits to business	**5,589**	**Total direct costs to business**	**3,331**	**2,258**
Non-business flood damage savings	3,294	SABs: SuDS maintenance costs	2,546	
TOTAL BENEFITS	**8,883**	**TOTAL COSTS**	**5,877**	**3,006**

Key figures (major + minor development)**:**

Developers impacted	500	-500
Average total properties with SuDS pa		434700
Average new properties with SuDS pa		163013

85. This option phases SAB approval for all development and redevelopment with drainage implications – whether it requires planning permission or not. It would therefore take in such "other" and "permitted" developments as householders building extensions, sheds, summerhouse, patios, small agricultural buildings, caravan sites, forestry buildings and roads. This option shares many of

[6] Note that the Neighbourhood Development Order variant could in principle be applied to all Options (except Option 1 as large-scale major development is outside the proposed scope of NDOs), but it is only formally assessed here for Option 3 as this is the economically-preferred Option. If the NDO variant was applied to the other Options using similar assumptions, this would be expected to lead to a similar proportionate reduction of Net Present Value (i.e. of about 35-40%).

the features of option 3 to a greater extent: fully realising the benefits and stimulating the SuDS market, but requiring applications for very small projects, imposing a heavy work load on SAB, and a fast learning curve for developers. It differs in scale (requiring far more applications and threatening to overwhelm LAs) and SuDS for permitted development would not be linked to any existing planning process, making enforcement difficult.

86. By definition, this option impacts 100% of the 63% of development which is left "uncontrolled" by current policy and practice under the baseline. Compared with Option 3, the effectiveness of SuDS in reducing flood damage on those developments to which it is applied is assumed to decline back to the "base" level of 30% (from 35%), reflecting the "across-the-board" nature of application.

87. Compared with Option 3, benefits do increase in line with the extra development targeted, but attenuated slightly by the lower average mitigation rate. Costs, however, increase by a much larger amount than benefits (by over £3.5bn, compared with only a £1.4bn increase in benefit). There are two factors driving this: first the fact that each SAB is now estimated to require an extra 17 FTE to handle the extra drainage applications, which have a much lower ratio of development units to FTE. This disproportionate increase in SAB costs is not offset by any increased saving in WaSC costs from traditional drainage applications, because "other" and "permitted" developments are assumed not to require formal connections to sewers in the absence of SuDS. (It should be noted however that it is also assumed that SuDS arrangements for "other" and "permitted" development will generally be too minor to be usefully adopted by SABs – so there is at least no increase in SAB maintenance costs under this option). Overall, the Net Present Value of Option 4 is some £2.1bn less than Option 3; diminishing returns have set in. The targeting of all "other" and "permitted" development for SuDS is not economically efficient.

Option 5 –Commence for "major" developments in areas with identified flood risk

Summary of economic indicators (central "best" estimates) **SUDS Option 5**

£m, 50 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	1,334	Developers: net SuDS capital costs	0	
All business: flood damage saving	320	Developers: upskilling costs	0.07	
		Developers: applications to SABs	164	
		Developers: WaSC application savings	-89	
Total direct benefits to business	**1,653**	**Total direct costs to business**	**75**	**1,578**
Non-business flood damage savings	783	SABs: SuDS maintenance costs	800	
TOTAL BENEFITS	**2,436**	**TOTAL COSTS**	**875**	**1,561**

Key figures (major + minor development)**:**

Developers impacted	10	-40
Average total properties with SuDS pa		193545
Average new properties with SuDS pa		51233

88. This option phases SAB approval for major developments in areas that have a Surface Water Management Plan. Plans identify areas of flood risk from surface runoff and suggest local authorities that have the skills and capacity to implement the regulations and National Standards. Given their previous engagement, they are likely to have more interest in, and greater knowledge of SuDS. Furthermore, there are concerns that Local Authorities and developers are struggling to keep up with the pace of change. This option would enable the Standards to be applied where there are existing flooding concerns: for example that have been identified in a Surface Water Management Plan of Preliminary Flood Risk Assessment.

89. This approach has the benefit of reducing the number of SABs that would be needed and focuses action in areas where Local Authorities are already used to thinking about flood risk. However, it substantially reduces the scale of implementation and is likely to have considerable overlap with LAs that already require SuDS who are likely to be taking voluntary action anyway. A decision would be needed about whether the requirement was to be delineated at County, District level, or even more local level and this could lead to even more uncertainty about requirements. Increases in flood risk would continue unabated in the wider catchment areas.

90. The costs and benefits of this option are as for Option 2, but scaled for 77 SABs (being the current number with SWMPs) rather than 147, and assuming a higher upper bound on the effectiveness of SuDS in reducing flood damage (45% rather than 30%, reflecting an assumed improved ability to target those areas where SuDS will be needed). It is estimated that the option would impact 16% of "uncontrolled" development, though this assumes that such development is evenly distributed across SABs.

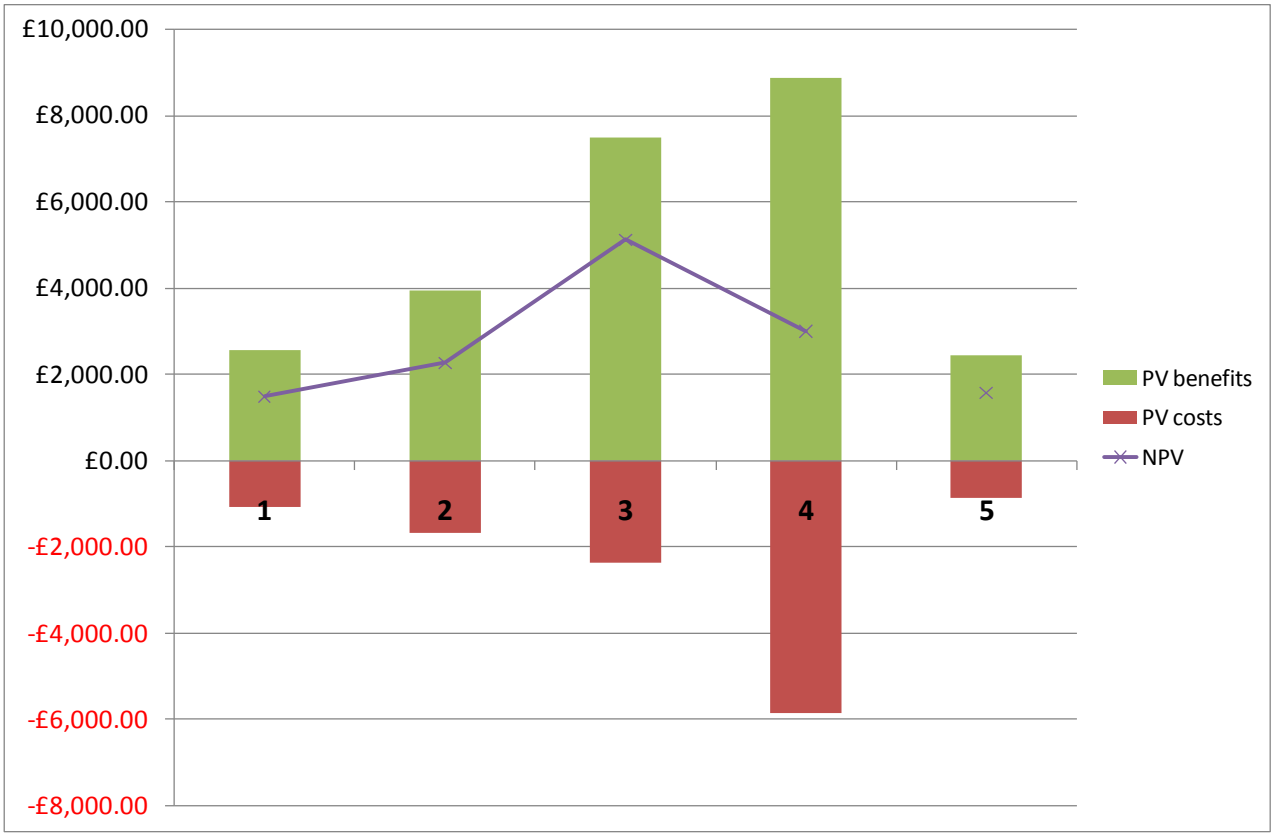
91. Although the Option has a positive NPV, its smaller scale than other options means this is less than most other Options (except Option 1). Furthermore, it should be noted that there are fundamental difficulties with assessing impacts under Option 4, because SWMP areas do not necessarily represent drainage catchments. It may be that at least some benefit is only achieved from targeting development *outside* (upstream of) the identified high-risk areas, rather than *within* them. At present, national-level surface water mapping does not allow identification of external catchment areas for Option 5, which means development characteristics for these options cannot be estimated. For this reason, benefit results for Option 5 should be viewed with particular caution.

SUMMARY COSTS & BENEFITS

92. The table and **Chart 1** below summarise the overall cost-benefit estimates for the options considered. Note that this is restricted to options consistent with the existing planning policy framework, but note that costs and benefits will scale where exemption is allowed under Neighbourhood Development Orders – see the illustration presented under Option 3A in the previous section. The table repeats, in one place, the figures entered in the front sheets of this impact assessment (and presents ratios of overall benefits to costs); the chart plots the benefit, cost and Net Present Value estimates for the options. For Options 1-4, the estimates can be regarded as points on a continuous "curve" of the net benefits of applying SuDs to greater volumes of development (starting with the largest first). This net benefit relationship is shown by the grey line.

Option		Net costs to business (£m)				Total costs (£m)				Total benefits (£m)				NPV (£m)	Benefit to cost ratio
		Transition	Years	Average annual	Total (PV)	Transition	Years	Average annual	Total (PV)	Transition	Years	Average annual	Total (PV)		
0 Baseline	Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	High	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cent	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
1 Nat Stds lge scale major	Low	£0.01	0	-63	-1,061	£0.01	0	39	675	-	-	76	1,290	615	
	High	£0.06	0	-155	-2,616	£0.06	0	85	1,474	-	-	226	3,844	2,371	
	Cent	**£0.04**	**0**	**-109**	**-1,838**	**£0.04**	**0**	**62**	**1,074**	**-**	**-**	**151**	**2,567**	**1,493**	**2.4**
2 NS all major	Low	£0.03	0	-97	-1,621	£0.03	0	60	1,049	-	-	117	1,984	935	
	High	£0.11	0	-238	-3,999	£0.11	0	132	2,292	-	-	348	5,914	3,622	
	Cent	**£0.07**	**0**	**-167**	**-2,810**	**£0.07**	**0**	**96**	**1,671**	**-**	**-**	**232**	**3,949**	**2,279**	**2.4**
3 NS major and minor	Low	£0.86	0	-169	-2,852	£0.86	0	97	1,670	-	-	209	3,556	1,886	
	High	£0.86	0	-457	-7,884	£0.86	0	186	3,057	-	-	672	11,426	8,370	
	Cent	**£0.86**	**0**	**-313**	**-5,368**	**£0.86**	**0**	**142**	**2,364**	**-**	**-**	**440**	**7,491**	**5,128**	**3.2**
4 NS all developm't	Low	£1.43	0	-87	-942	£1.43	0	185	3,692	-	-	231	3,938	247	
	High	£1.43	0	-279	-3,574	£1.43	0	405	8,063	-	-	813	13,828	5,765	
	Cent	**£1.43**	**0**	**-183**	**-2,258**	**£1.43**	**0**	**295**	**5,877**	**-**	**-**	**522**	**8,883**	**3,006**	**1.5**
5 NS major 77 pilots	Low	£0.03	0	-52	-878	£0.03	0	32	550	-	-	67	1,140	591	
	High	£0.11	0	-135	-2,279	£0.11	0	69	1,201	-	-	219	3,732	2,531	
	Cent	**£0.07**	**0**	**-94**	**-1,578**	**£0.07**	**0**	**50**	**875**	**-**	**-**	**143**	**2,436**	**1,561**	**2.8**

Chart 1: Present Value Benefits, Costs and Net Present Value of the Options (£m, over 50 years)



93. Chart 1 above highlights the increasing returns to scale of applying SuDS to increasing volumes of development as covered by Options 1-3. The key driver of this is the fact that benefits to WaSCs from reduced operation and maintenance expenditure on conventional sewers increases more quickly, with increased units of development, than the major cost item – namely, the maintenance costs to SABs of the growing SuDS stock. Option 4 introduces a large volume of other and permitted development. This imposes a large cost in terms of additional administration within SABs (over £3.5 bn in 50-year Present Value terms), which is not outweighed by the increase in benefit. The latter is restricted to a reduction in flood damage (there are no sewer maintenance savings as it is assumed that the other and permitted development brought within scope would not have had surface water sewer connections in any case). As such, by Option 4, diminishing returns from applying SuDS to greater volumes of development have set in. This suggests that the optimum option is Option 3 (commence for major and minor development). Option 5 is treated separately in the chart. In practice, it could be thought of as representing a scale of commencement somewhere between Options 1 and 2 (major development within specified areas only). It has a lower NPV than Option 3.

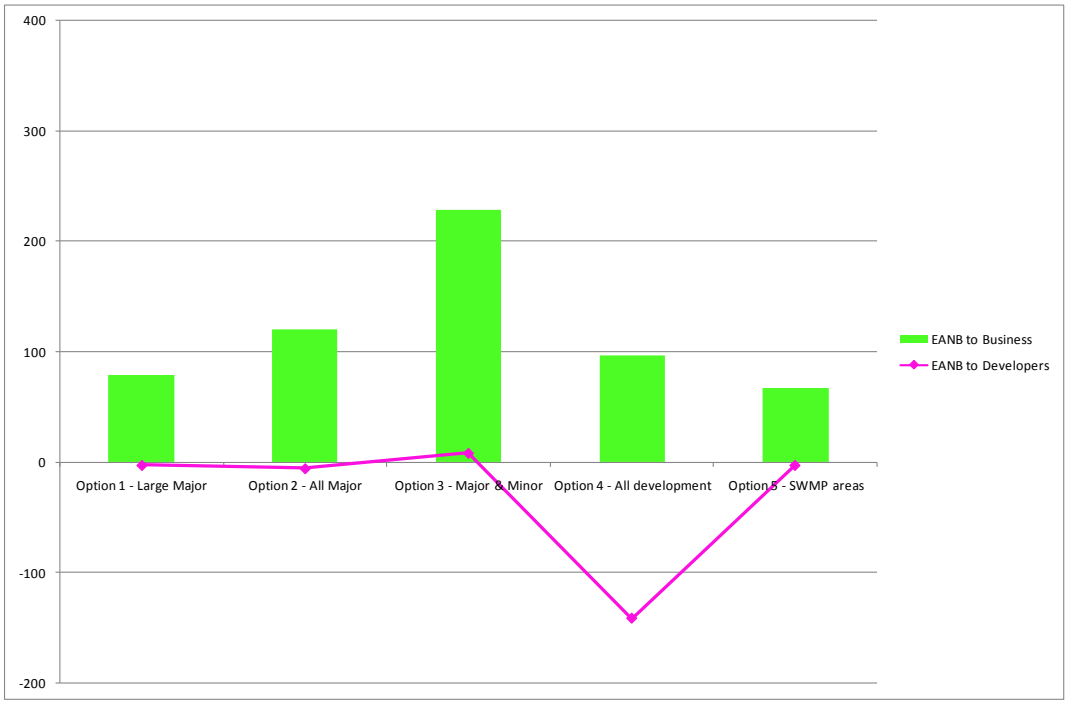
Equivalent Annual Net Benefit to business

94. ***Chart 2*** below summarises the Equivalent Annual Net Benefit (EANB) to Business, estimated according to the formula in Government's One In, One Out (OIOO) Methodology[7] and presented in the summary sheets at the beginning of this assessment. As well as the total EANB, that which accrues to developers is presented separately (red line). For most options, the impact on developers is estimated to be broadly neutral, except for Option 4 where the administrative burden of SAB applications for "other" and permitted development is not offset by savings in application costs and connection charges to WaSCs (as it is assumed such development would not normally be directly connected to traditional sewers). It is assumed the cost to micro-businesses is negligible for most options and OOIO for micro-businesses not applicable for options with a positive EANB. It should be noted that despite the existence of positive net benefits to business from most of the SuDS commencement options, the measures would nevertheless constitute an "IN" under One In,

[7] Version 1.0, 31 January 2011

One Out (as new regulation is being introduced), albeit one with zero cost for regulatory accounting purposes.

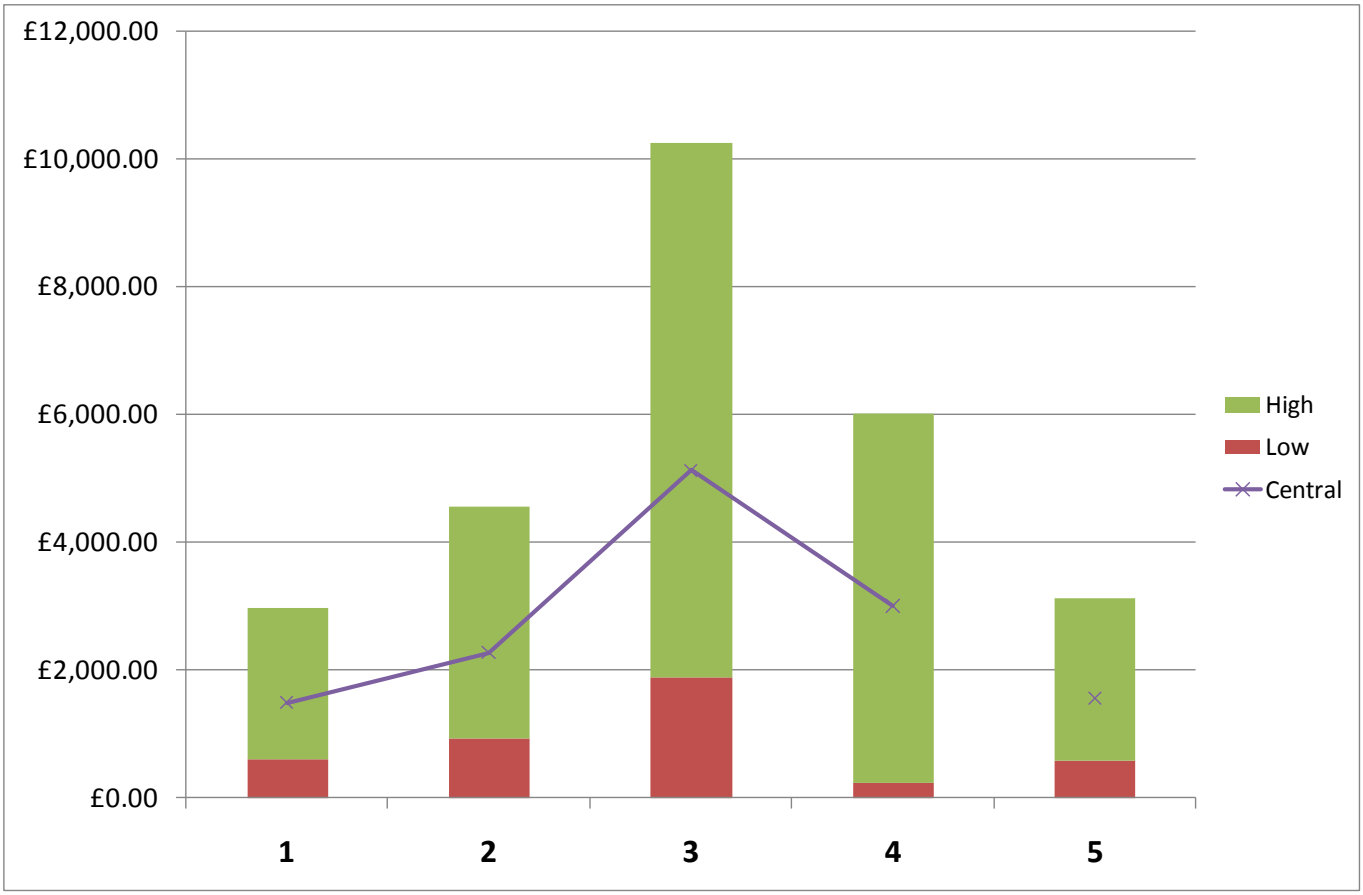
Chart 2: Summary of Equivalent Annual Net Benefit to Business (all businesses and developers), £m



Scenario analysis

95. **Chart 3** below shows how the Net Present Value for each Option varies from the central case (presented in the previous chart) under the "Low" and "High" scenarios (see baseline scenario for a summary). This gives an indication of how NPV might vary depending on different, inherently uncertain, states of the world (in terms of current surface water flood risk, future growth in damage due to climate change and urbanisation, and future annual volume of major and minor development). Note that the "Low" case simultaneously embodies all the assumptions relating to the Low scenario set out in the baseline scenario, and the "High" case similarly embodies all assumptions relating to that scenario.

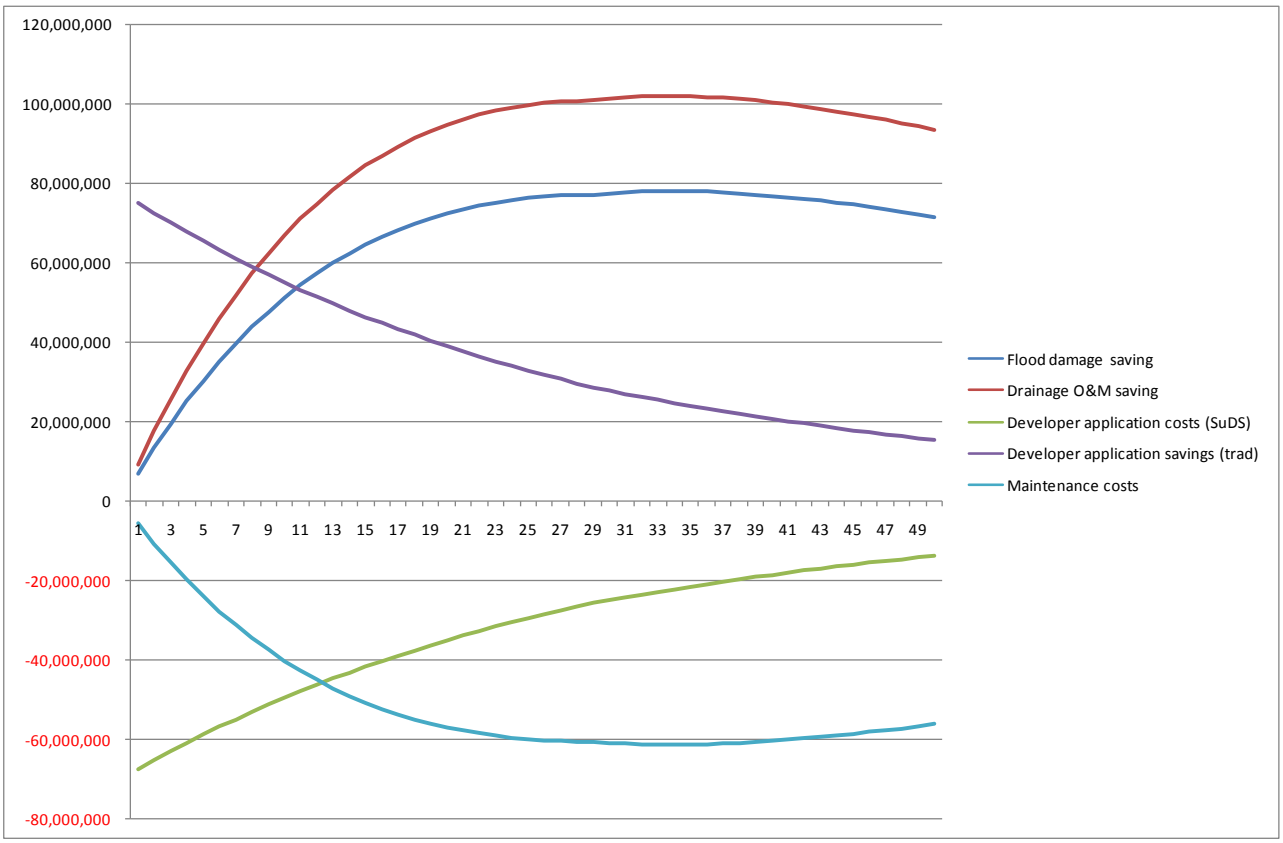
Chart 3: Range of estimated Net Present Value for SuDS implementation options (£m, 50 yrs)



96. The line graph again plots the "central" NPV across Options 1-4 (that for Option 5 is denoted by the cross), with "high" NPV shown by the green bars, and "low" NPV by the red bars. This indicates that even under the "low" scenario (low current flood risk, low damage growth, and low future major and minor development volumes), Option 3 remains "preferred", and that all Options maintain a positive NPV - though that for Option 4 is perhaps marginal. It should be noted however, that both this and the previous chart do not take into account the potentially strong un-monetised benefits of SuDS, so the simple graphical representation of monetised costs and benefits could underplay the true worth of SuDS. It is felt however that the un-monetised benefits will generally tend to scale with volumes of development; so would not alter the basic ranking of options implied by the charts.

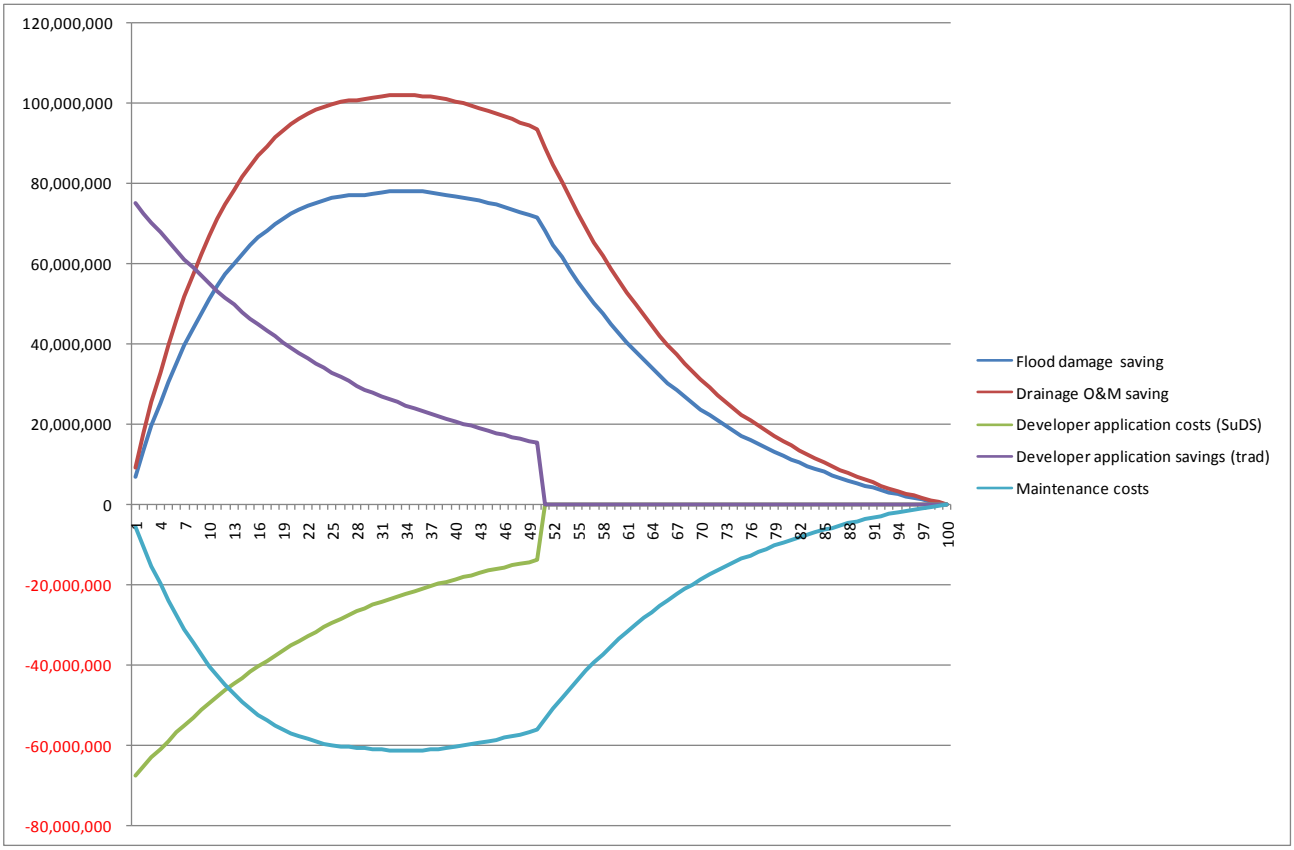
97. **Chart 4** below shows the profile of the costs and benefits of the leading Option 3 over the 50-year appraisal period. Benefits are shown as positive values, and costs as negative values. The chart shows how flood damage and drainage operation and maintenance (O&M) savings accumulate over the period along with maintenance costs – though all reach a plateau because of the effects of discounting (in undiscounted terms they continue to increase). Meanwhile, developer application costs (for SuDS) and application savings (for traditional drainage), which are constant in annual undiscounted terms, decline when expressed in discounted terms. The chart gives an indication of the magnitude of costs and benefits expected for Option 3 at particular points in time, and could be used to inform monitoring of the SuDS provisions and review (e.g. at the 5-year point).

Chart 4: Costs and benefits of Option 3 by year (Present Value, £)



98. It should be noted that the analysis in the main body of the IA assumes that the policy is in place for 50 years but only captures the costs and benefits accruing during that time. If the policy were actually ended after 50 years, there would in practice be a continuation of flood damage and drainage O&M savings for at least some period thereafter, depending on the approach to maintenance and the life of SuDS components. If maintenance of SuDS existing at the "policy off" point was continued in full, then it might be reasonable to assume the stock of existing SuDS continued to give benefit, say for up to 50 years from the time they were first built (based on other drainage assets). The profile of costs and benefits in this eventuality is set out in **Chart 5** below, where benefits and maintenance costs continue but are gradually eroded as SuDS reach the end of their useful lives (and are replaced with traditional drainage). Because the sum of continuing flood damage and drainage savings exceed the continuing maintenance costs, the measured Net Present Value of Option 3 over the resulting 100 year period is around 30% higher than in the 50-year situation represented in Chart 4 (NPV increases from £5,128m over 50 years to £6,848 over 100 years). This potential for continuing net benefits even after any termination of new SuDS builds after year 50 has not been reflected, which has the effect of making this assessment conservative.

Chart 5 Costs and benefits of Option 3 by year – "policy off" in year 50 with continued maintenance (Present Value, £)



"Policy off" after year 10

99. The impact of a shorter appraisal period for the viability of SuDS has been tested by assuming SuDS commencement is only for 10 years, after which time the policy is "switched off" and new developments revert to traditional drainage. However, maintenance of the stock of SuDS built up in the 10 years the policy was "on" is continued, until that stock reaches the end of its life (assumed here to be after 40 years[8]). The results of this analysis are presented in the table and **Chart 6** below.

Summary of economic indicators (central "best" estimates) **SUDS Option 3 (10 yrs)**

£m, 50 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	1,271	Developers: net SuDS capital costs	0	
All business: flood damage saving	282	Developers: upskilling costs	0.80	
		Developers: applications to SABs	583	
		Developers: WaSC application savings	-648	
Total direct benefits to business	**1,553**	**Total direct costs to business**	**-63**	**1,617**
Non-business flood damage savings	691	SABs: SuDS maintenance costs	763	
TOTAL BENEFITS	**2,244**	**TOTAL COSTS**	**699**	**1,545**

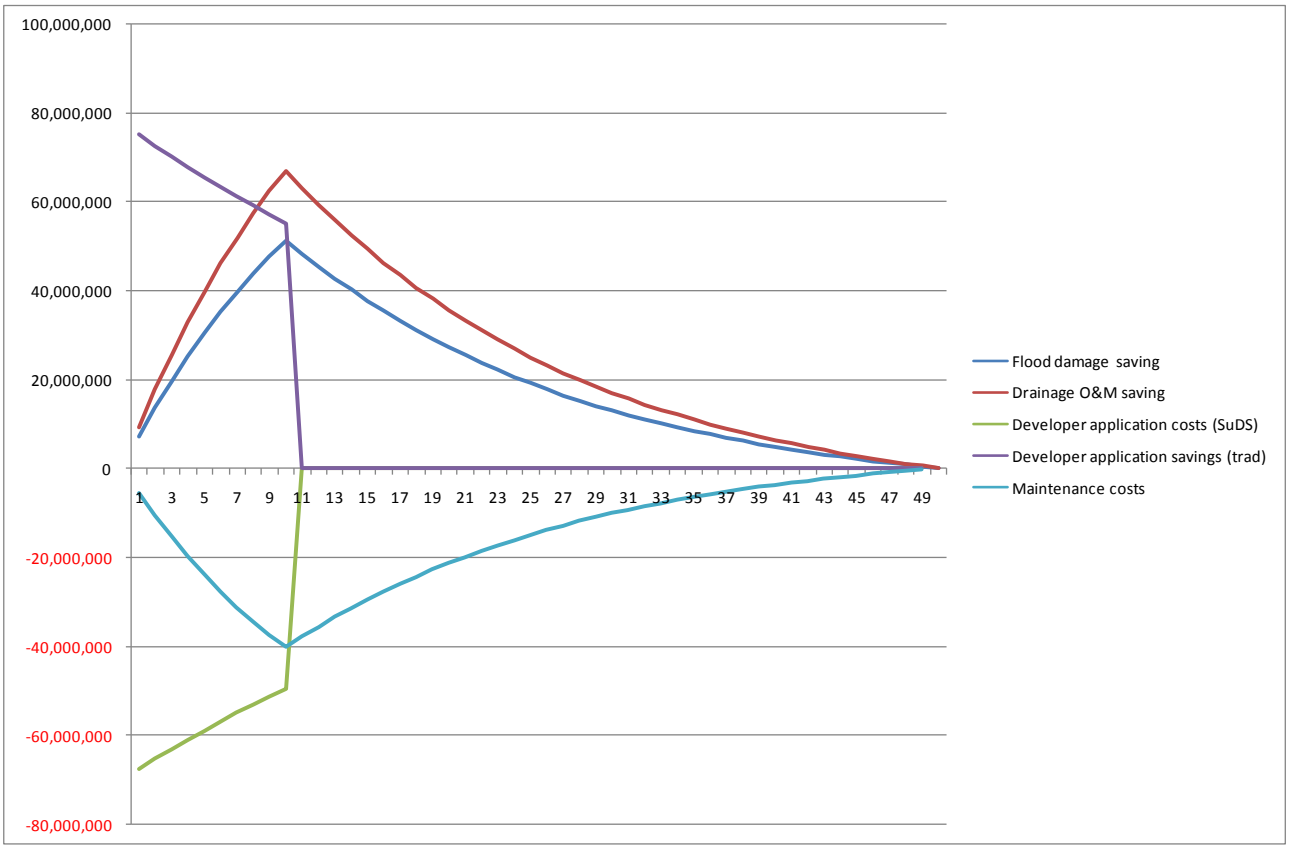
Key figures (major + minor development)**:**

Developers impacted	300	-300
Average total properties with SuDS pa		434700
Average new properties with SuDS pa		163013

100. The table above shows that a 10-year commencement of Option 3 (plus 40 years of maintenance) would still deliver net benefits, albeit with a Net Present Value (at £1,545m over 50 years) around a fifth of that for the equivalent 50-year "policy on" option followed by 50 years of maintenance (NPV = £6,848m).

[8] As an approximation to the 50 years felt to be a reasonable life but allowing use of the basic 50-year analytical framework.

Chart 6 costs and benefits of Option 3 by year – "policy off" in year 10 with continued maintenance (Present Value, £)



UNMONETISED COSTS & BENEFITS

101. This section provides extra material on the non-quantified benefits of the options and also a preliminary assessment of implementing SuDS against aspects of the following relevant Specific Impact Tests (see Summary sheets at the beginning of this IA; more formal SITs will be developed post-consultation):

- Environmental Impacts – Greenhouse gas assessment and wider environmental issues;
- Social impacts – Health and wellbeing;
- Sustainable Development.

102. Good-quality urban green space such as that generated through SuDS can have an important positive impact on climate change adaptation: reduce air pollution; absorb carbon dioxide; moderate the urban heat island effect; support biodiversity; play a role in flood alleviation and water management; and provide sites for alternative energy production. In general, these benefits will scale in proportion with general application of SuDS, although options such as 3 and 6 which include minor development (which is more likely to be urban) may contribute more in these areas, e.g. to reductions in the urban heat island effect.

103. Evidence from ongoing monitoring at the Lamb Drove in Cambridge case study (see Annex 2) suggests that the SuDS 'treatment train' has an important positive impact on water quality; this is illustrated through reductions in concentrations of a variety of pollutants and other indicators:

- There are significantly higher concentrations of hydrocarbons at the traditional control site compared to the SuDS site;
- There appears to be some reductions in metals, most significantly the reduction in zinc, as water progresses through the SuDS system;
- Suspended solids are generally below expected levels;

- There is quantitative evidence of a benefit in relation to chemical oxygen demand and biological oxygen demand.

104. SuDS will therefore tend to result in reduced treatment costs for water companies (not captured in the economic analysis set out in the above sections). It will contribute to meeting water quality standards required by the Water Framework Directive. If these targets are not met, there could be significant infraction costs. In general, it is felt that these benefits will scale in proportion with other benefits of SuDS, so considering them does not lead to a change in option ranking when compared with the monetary analysis.

105. A goal of the National Standards is to encourage surface management of surface runoff at its source, which has an important positive impact on biodiversity. A recent Defra report *Making Space for Nature*[9] emphasises the importance of a coherent and resilient ecological network for England. It made recommendations for a step change in nature conservation, to deliver a resilient natural environment for wildlife and citizens. Improved flood water management is identified as a contributory part. The biodiversity benefits of SuDS will be most significant for certain SuDS elements (e.g. swales, ponds etc) but there is not thought to be any systematic difference in benefits between options, and in general they will tend to correlate with the other benefits of each option.

106. SuDS encourage the use of multi-functional space and public open space providing an important positive impact on amenity. This is difficult to quantify but could be measured through increases in property prices close to attractive water features. The CABE Space report "*Does money grow on trees?*[10]*"* explores how well-planned and managed parks, gardens and squares can have a positive impact on the value of nearby properties and can attract inward investment and people to an area. The study examined eight UK parks and a clear positive relationship was found between the value of homes and whether they overlook, or are close to, a park. The increase in value ranged from between 0 per cent and 34 per cent, with a typical increase of about 5 per cent. The study also identified other, non-financial benefits arising from being close to a park and found that good-quality parks and green spaces are essential in facilitating strong, long lasting communities.

107. High-quality, well managed green spaces can have a positive impact on physical and mental health from exercise and access to nature. A survey[11] by MORI for CABE Space found that 91 per cent of the public believed that public parks and open spaces improve people's quality of life, and 74 per cent believed that parks and open spaces are important to people's health and mental and physical wellbeing.

108. *Making Space for Nature* also cites health benefits of good quality open space. "People who live within 500 m of accessible green space are 24 per cent more likely to meet recommended levels of physical activity, while reducing the numbers of sedentary individuals in the population by just 1 per cent could reduce morbidity and mortality rates valued at £1.44 billion for the UK."

109. Social benefits will approximately scale in proportion with other monetised benefits and so considering them does not lead to a change in option ranking.

110. SuDS have a significant positive impact on sustainable development in terms of economic, social and environmental impacts (monetised and non-). A principle of the National Standards is to ensure that the design of SuDS take account of the likely impacts of climate change. As set out in the CABE Space briefing, *Adapting public space to climate change*, well-designed, flexible public spaces play an important role in the adaptation to, and mitigation of the effects of climate change — a role that will only get more important in future years.

Local Authority (SAB) capacity to achieve Option 3

111. Although Option 3 is preferred based on the foregoing, in practice if Local Authorities do not have sufficient capacity to set up and run SABs to deal with the volumes of development implied by this option, then the net benefits may either not be achieved, or achieved more slowly than envisaged in the analysis.

[9] http://www.defra.gov.uk/environment/biodiversity/.../201009space-for-nature.pdf

[10] http://www.cabe.org.uk/files/the-value-of-public-space.pdf

[11] *Public attitudes to architecture and public space: transforming neighbourhoods*, CABE Space, 2004

112. To the extent this is true, then there is a case to phase commencement of Schedule 3 of the Flood and Water Management Act, starting with (say) Large-scale major development first for a period, then rolling out the provisions to include other major development and ultimately, minor development (as envisaged by Option 3).

113. To illustrate the implications of this in terms of Net Present Value, another Option (6) has been constructed which implies slower build up of SuDS to development. The Option assumes:

- On initial commencement, the provisions apply only to major development, for a period of three years.
- After three years, provisions are extended to all major and minor development.

114. In analytical terms, this effectively means that Option 2 applies for 3 years, followed by Option 3 for the remainder of the appraisal period. The economic results for this (calculated over a 7 year period – results thereafter should be the same as for Option 3) are as follows:

Summary of economic indicators (central "best" estimates) **SUDS Option 6**

£m, 7 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	202	Developers: net SuDS capital costs	0	
All business: flood damage saving	43	Developers: upskilling costs	0.07	
		Developers: applications to SABs	269	
		Developers: WaSC application savings	-278	
Total direct benefits to business	**245**	**Total direct costs to business**	**-9**	**254**
Non-business flood damage savings	105	SABs: SuDS maintenance costs	121	
TOTAL BENEFITS	**350**	**TOTAL COSTS**	**113**	**238**

115. To aid comparison, 7-year results for Option 3 have also been extracted. When these are subtracted from those of Option 6 above (to derive the extra benefit from Option 6), the results are as follows:

Summary of economic indicators (central "best" estimates) **Option 6 - Option 3**

£m, 7 year total Present Value

Benefits		Costs		Benefits net of costs
WaSCs: sewer network savings	-21	Developers: net SuDS capital costs	0	
All business: flood damage saving	-7	Developers: upskilling costs	-0.73	
		Developers: applications to SABs	-159	
		Developers: WaSC application savings	198	
Total direct benefits to business	**-28**	**Total direct costs to business**	**38**	**-65**
Non-business flood damage savings	-16	SABs: SuDS maintenance costs	-13	
TOTAL BENEFITS	**-44**	**TOTAL COSTS**	**25**	**-69**

116. The results above show the extent to which phasing the provisions might impose an "opportunity cost" in the early years, if capacity in local authorities turns out not to have been a significant risk. The loss of net benefit would total around £70m. Clearly, if capacity remains a significant risk then Option 3 benefits are unachievable and the opportunity cost would not arise.

CONCLUSION

117. During consultation, Defra, working with other departments, will seek to reduce uncertainty in the NPV estimates by acquiring more data and information about the economic performance of different options. At this stage, however, some general principles can be drawn from the analysis.

118. Overall, the probability of net economic benefits from implementing the best of the options for SuDS provisions of the Flood and Water Management Act is strong. This is particularly the case when considering the conservative aspects of the analysis (e.g. no construction cost savings or

sewer capacity investment savings have been included) and the strong non-monetary benefits of SuDS.

119. In essence, the overall benefits of implementing SuDS are reduced or neutral construction and operating costs for drainage, reduced flood damage, improved biodiversity and reduced pressure on conventional drainage systems. Meanwhile, the real resource costs are in terms of ongoing maintenance of SuDS, administration within SABS, and a one-off "up-skilling" cost on the part of business, offset by reduced administration within Water and Sewerage Companies. How these benefits and costs play out depends on the scope and coverage of implementation.

120. Based on the current analysis and assumptions as presented, Option 3 (commencing for all major and minor development) is strictly preferred in economic terms, but with Options 6 (phased commencement of Option 3) and Option 3A (Option 3 consistent with Neighbourhood Development Orders) ranked second and third respectively. Option 3A, in particular, has a similar ratio of benefits to costs as Option 3 but it is, in effect, implemented on a smaller scale, meaning it is a cheaper option with less impact on new development.

121. During consultation, the following, particular issues will be explored to improve the evidence base (consultees in brackets):

- Better estimates of operation, maintenance and network investment savings to Water and Sewerage Companies from enhanced uptake of SuDS, to validate or update the current £60/development unit assumption informed by current company rebates (WaSCs and OfWAT)
- More technical evidence on the likely reductions in connections to surface water sewers for an average development with SuDS within each planning class, and evidence to validate current assumptions on savings in charges to developers (WaSCs and OfWAT)
- Validity of assuming sewer network savings are first-round direct savings to water companies (as regulated monopolies) and hence classified as "benefits to business" under OIOO (OfWAT, BIS Better Regulation Executive)
- Potential non-staff start-up costs of SABs (Local Authorities, Local Government Association)
- Implications of a possible exemption for development by an Neighbourhood Development Order to be exemption from SuDS approval