

Welsh Government

Consultation on the Implementation of Sustainable Drainage Systems (SuDS) on New Developments

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19 MAY 2017

PART 1 – Consultation Stage Explanatory Memorandum to Commencement of the Flood and Water Management Act 2010, Schedule 3 for Sustainable Drainage

This consultation stage Explanatory Memorandum has been prepared for the Welsh Government, Water Policy Branch.

PART 1 – Consultation Stage Explanatory Memorandum to Commencement of the Flood and Water Management Act 2010, Schedule 3 for Sustainable Drainage

1. Description

- 1.1 Schedule 3 of the Flood and Water Management Act¹ (the Act) relates to provisions for sustainable drainage (SuDS). These include the establishment of a SuDS Approving Body (SAB) to be set up within the local authority alongside their lead local flood authority duty (LLFAs), SAB approval will be required before construction of drainage systems can commence on new and redeveloped sites. Provided appropriate national standards are met², the SAB will be required to adopt and maintain the approved SuDS that serve more than one property.
- 1.2 SuDS can provide a range of benefits, including *reducing damage from flooding, improving water quality, protecting and improving the environment, protecting health and safety, and ensuring the stability and durability of drainage systems*. These are consistent with both the well-being goals and the sustainable development principles contained within the Well-being of Future Generations (Wales) Act 2015³.
- 1.3 At present, the use of SuDS on new developments is non-mandatory. As a result, the use of SuDS is limited and systems are not always compliant with standards. This is due, in large part, to uncertainty around adoption and ongoing maintenance.

2. Legislative background

- 2.1 Under paragraph 19 of Schedule 7 to the Government of Wales Act 2006 the National Assembly for Wales has competence to legislate in relation to Water supply, water resources management, water quality, flood risk management and competence to represent water and sewerage consumers. SuDS, which deal with surface water drainage for the purposes of flood risk management, falls within the scope of this competence.
- 2.2 This consultation deals with surface water drainage in Wales only. This differs from all other aspects of sewerage and drainage which are provided by sewerage undertakers under the Water Industry Act 1991 (WIA), Under the WIA, Welsh Ministers are responsible for the regulation of water and sewerage undertakers who operate wholly or mainly in Wales and the Secretary of State has responsibility for water and sewerage companies operating wholly or mainly in England. As a result, for drainage services provided by the water and sewerage undertakers those parts of Wales served by Severn Trent Water are regulated by the Secretary of State and those parts of England served by Dŵr Cymru Welsh Water are the responsibility of Welsh Ministers.

¹ UK Government (2010) Flood and Water Management Act

² Welsh Government (2016) Recommended non-statutory standards for sustainable drainage (SuDS) in Wales

³ Welsh Government (2015) Well-being of Future Generations (Wales) Act

- 2.3 Schedule 3 of the Act uses the term “Minister” to denote both Welsh Ministers and the Secretary of State. The term “Minister” is used in this document to denote the Welsh Ministers.

3. Purpose & intended effect of the legislation

- 3.1 This section includes the policy objective(s) of the legislation, including an assessment of why government intervention is considered necessary. More detailed information on these points is provided in Part 2, where the detail of the costs and benefits of the options are considered.

What is the Problem under consideration?

- 3.2 Around 163,000 properties in Wales are at risk of surface water flooding (120,000 residential & 43,000 non-residential)⁴. Flooding from surface water runoff costs Wales an estimated £60-£130 million per year, 29% of which falls to business.
- 3.3 The risk of flooding is increasing, largely due to climate change and urbanisation. Surface runoff can be a major source of pollution; both directly and from overwhelmed sewers discharging into rivers. Pressure to take action on water quality, for example by increasing the capacity of the sewerage system, also stems from the current need to comply with EU legislation, in particular the Water Framework Directive.
- 3.4 According to Natural Resources Wales (ibid, p.4) *“there is distinct lack of ‘public clarity’ over responsibilities (‘who does what’), particularly in relation to the management of coastal and surface water flooding”*. Of particular concern is the lack of clear responsibilities for maintaining and operating surface water drainage systems that are not defined as traditional piped or sewered drains that connect to the public sewer system or otherwise.
- 3.5 SuDS (Sustainable Drainage Systems) reduce the rate and volume of surface runoff from developments to more closely match ‘greenfield’ sites. This generally means lower or slower discharges compared with conventional drains. They are a more sustainable and resilient form of drainage and typical components include ponds, permeable paving and swales⁵.
- 3.6 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 provision.
- 3.7 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.

⁴ Natural Resources Wales (2016) Flood and Coastal Erosion Risk Management in Wales, 2014 – 2016

⁵ CIRIA (2015) The SuDS Manual (C753)

- 3.8 The Pitt review⁶, which followed the 2007 floods, made specific recommendations with regards to surface runoff:
- Clarify the responsibility for the adoption and maintenance of sustainable drainage systems; and
 - Remove the automatic right to connect to surface public water sewers (Section 106 and Section 115 of the Water Industry Act 1991).

Why does the Government need to intervene?

- 3.9 The justification for, and use of, SuDS is well established in the planning system, which includes Part H of the Building Regulations (which consolidates standards previously included in the Code for Sustainable Homes), as well as voluntary standards such as the Home Quality Mark. However, the current uptake of SuDS is low, limiting the potential contribution of SuDS to mitigating flood risk from surface run-off and the risk of sewer overload, or to protecting water quality.
- 3.10 In the past, most developments have been built with separate drains for foul water and surface runoff, although some 70% of the UK's sewer network is combined, so many surface water drains connect into existing combined sewers. A relatively low proportion (around 20-40% based on anecdotal evidence) can be described as SuDS that comply with national standards⁷. The market has been slow in voluntarily integrating SuDS into development plans. The market has been constrained by:
- Information failure – currently, there is a lack of consistent mandatory standards. Despite the existence of good practice, bad practice is also evident and contributes to a perception that SuDS are expensive and entail non-essential costs;
 - Externalities – there is a disconnect between those who manage and/or pay for surface water drainage and those who benefit from sustainable management. The benefits are often public and generally accrue further downstream, i.e. some way away from the point at which the rain falls and is dealt with;
 - 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, where they are built. However, the arrangements for this are highly variable and ad-hoc.
- 3.11 In addition to the constraints mentioned above, there are also weak market drivers for the management of surface water runoff:
- The legacy of draining surface water runoff into our sewers means that foul water and surface runoff are often seen as a single problem. However, over recent years there has been little change in the amount of water each person uses at home⁸ i.e. little improvement in water efficiency per person. In contrast,

⁶ Cabinet Office (2008) The Pitt Review: Learning the Lessons from the 2007 Floods

⁷ Welsh Government (2016) Recommended non-statutory standards for sustainable drainage (SuDS) in Wales

⁸ Environment Agency (2008) Water resources in England and Wales – current state and future pressures

Ofwat estimate a 27% increase in sewer flooding from climate change going forward. Thus the influence of surface runoff (influenced by the pattern of climate change, as well as urban creep) on our sewers will increase relative to the amounts of foul water to be handled.

- Current arrangements for flood insurance cover are highly cross-subsidised by those not at risk and this disincentivises the uptake of management measures, including SuDS.

Policy Objective

3.12 Commencement of Schedule 3 is intended to:

- Move provision of SuDS from a non-statutory to a statutory requirement;
- Ensure compliance with and consistency of standards for long term surface water management;
- Provide certainty for developers that SuDS will be adopted without the need for lengthy negotiation or significant expense;
- Reduce the risk of localised, surface water flooding;
- Mitigate pollution that may arise from surface water runoff; and
- Reduce extra load on public sewers and the need for additional capacity.

3.13 Other, indirect benefits include:

- Help achieve the goals of the Well-being of Future Generations (Wales) Act 2015, namely (1) Prosperous Wales, (2) Resilient Wales, (3) Healthier Wales, (4) More equal Wales, (5) Wales of cohesive communities, and (6) Globally responsible Wales;
- Achieve compliance with the Planning (Wales) Act 2015, which imposes duties requiring “*sustainable development*” consistent with SuDS features on new developments;
- Contribute to the requirements of the Environment (Wales) Act 2016;
- Help meet the goals of the EU Water Framework Directive;
- Reduce air pollution through the increased use of green infrastructure, contributing to achieving the Air quality standards (Wales) Regulations 2010;
- Contribute to the goals of the Water Strategy for Wales, which sets out strategic direction for water policy over the next 20 years and beyond;
- Contribute to the Wales Programme for Government 2016-2021, which aims to deliver a Wales which is prosperous and secure, healthy and active, ambitious and learning, united and connected. It identifies green infrastructure as an opportunity to address poverty, housing and infrastructure drivers, whilst meeting broader longer term objectives;

- Help meet Welsh Housing Quality Standards, which state that new homes constructed for Registered Social Landlords (housing associations) for both social housing and sale on the open market must be “*located in attractive and safe environments*”, use “*soft and hard landscaping with planting in protected areas*” and provide “*adequate, practical and maintainable communal areas*”;
- Help Wales to achieve carbon reduction objectives⁹ and adapt to climate change; and
- Increase wetland habitats and urban green space to meet the aim of the National Biodiversity Strategy and the commitments to the Habitats and Birds Directives.

Why SuDS?

- 3.14 Flood damage from surface runoff is predicted to increase by between 60-220%. The range accounts for uncertainty in climate predictions over the next 50 years as a result of different precipitation patterns from climate change and continued urbanisation.
- 3.15 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%.
- 3.16 The majority of towns and cities in Wales were constructed with combined sewers where surface runoff mixes with foul water and is then transported to a treatment plant that extracts clean water. In around half of the network, current sewerage systems are at or beyond capacity.
- 3.17 In these situations, during periods of intense rain, the combined sewers quickly become full. When this happens, untreated sewage and foul water discharges to streams and rivers through engineered overflows (intended to prevent similar flooding in properties). During floods, this will combine with flood waters and in a small number of cases it can also flood homes directly.
- 3.18 The extent of legal discharges is limited by Natural Resources Wales permits and is constrained by the following directives:
- Bathing Water Directive;
 - Shellfish Directive;
 - Water Framework Directive; and
 - Urban Waste Waters Treatment Directive.
- 3.19 The sewage network in England and Wales is valued at £174 billion and this will have to grow by 35% over the next 30 years in order to provide capacity for climate change, urban creep and new connections. Growth in capacity could be reduced to 29% if new connections were not made (through introducing SuDS). This could save up to £10.4 billion in investment from water and sewerage companies.

⁹ Consistent with the advice set out Committee on Climate Change (2017) Advice on the Design of Welsh Carbon Targets

3.20 SuDS provide an opportunity to avoid many of the new connections and to develop an alternative infrastructure to public sewers – offering significant savings in investment.

4. Consultation

4.1 In developing the evidence to support the RIA¹⁰, consultation has taken place with a wide range of organisations and sectors, including:

- Local authorities
- Developers and home builders
- Water and sewerage companies
- Natural Resources Wales
- Non-government organisations and the third sector
- Consumer bodies
- Academia
- Sector professionals

5. Further details of the consultation undertaken are included in the RIA below (Part 2).

¹⁰ See for example EPC (2017) Sustainable Drainage Systems on new developments, Analysis of evidence including costs and benefits of SuDS construction and adoption. Final Report for the Welsh Government, January 2017.

PART 2 – REGULATORY IMPACT ASSESSMENT

6. What Policy Options have been considered?

6.1 The Welsh Government has considered three main policy options (Table 1).

Table 1: Summary of policy options considered

Policy option	Name	Description
1	Do nothing	The baseline option, involving continuation of current non-regulatory policy.
2	Commence Schedule 3	Mandatory use of SuDS compliant with national standards on all minor and major development (more than 1 dwelling or sites larger than 0.5 hectares).
3	Planning approach	Expectation that SuDS will be provided on all minor and major development wherever this is appropriate and unless demonstrated to be inappropriate. Use of planning conditions or planning obligations to ensure that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

6.2 In addition to the three options outlined above, a number of other options were discussed but excluded from full consideration in the RIA. However, some of these may not be inconsistent with the policy options set out above, and these are discussed in the broader consultation paper. These options, and the reason for their exclusion, are shown in Table 2.

Table 2: Options discussed but excluded from full consideration in RIA

Option	Description	Reason for exclusion
Water company adoption	Water and sewerage company (WaSC) required to adopt, and responsible for maintaining, certain SuDS (e.g. below ground, proprietary) compliant with standards.	Options for voluntary adoption of SuDS and maintenance by water company are considered in the broader consultation paper. Non-voluntary adoption would need a change in primary legislation (S104 of the Water Industry Act 1991), and legislation to remove automatic right to connect. Creates incentive to install systems where adoption more certain (likely to be below ground, as in Scotland).
Amended Schedule 3	SAB established for SuDS approval, but SuDS adopted	Options for amending Schedule 3, e.g. through regulations and orders,

	by different groups, such as local authority, WaSC or housing association, depending on functionality, benefits, etc.	are discussed in broader consultation paper. High risk of differing approaches in different areas and duplication of standards. Also proliferation of bodies with SuDS responsibilities likely to create confusion.
Sewers for adoption	Update Sewers for Adoption (guidance for design and construction of sewers that will be adopted by Sewerage Undertakers in accordance with Section 104 of the Water Industry Act 1991) to include SuDS.	No mandatory requirement, so unlikely to significantly change current situation.

What is the preferred option?

6.3 Option 2 is the preferred option. The NPV (net present value) for Option 2 is estimated to be £155.5m (range £78.9m to £945.2m). It is positive suggesting that the net benefits to society outweigh the net costs to society. The NPV for Option 1 is zero, and the NPV for Option 3 is estimated to be £52.2m, i.e. around one-third of the benefits of the preferred option.

7. Cost Benefit Analysis of Options

7.1 We have used guidance provided by HM Treasury¹¹ to carry out a Cost Benefit Analysis (CBA) for the three policy options.

7.2 The appraisal period is assumed to run from 2018 to 2026. The final year (2026) was chosen as this correlates with the end-point of many of the local development plans in Wales, i.e. there is greater certainty regarding the scale and extent of housing and other development over this period. Of course, a longer appraisal period could be justifiable and may be appropriate, although the scale and extent of new development and exogenous changes would be more uncertain. Nevertheless, adopting a longer period would give greater importance to those impacts recurring over time. This is examined through sensitivity analysis.

7.3 The impacts of the options have been classed as either:

- One-off – impacts are assumed at the start of the appraisal period (2018); or
- Recurring – impacts are assumed to occur each year (from 2018 to 2026 inclusive).

¹¹ HM Treasury (2011) Green Book

- 7.4 In accordance with HM Treasury guidance, a discount ratio of 3.5% has been applied to future costs and benefits, in order to calculate the value of present value (PV) impacts. Changing this rate is examined through sensitivity analysis.
- 7.5 The focus in the RIA is on additional/marginal costs and benefits associated with options 2 and 3. Therefore, any costs/benefits under Option 1 (the 'Do Nothing' option) are not additional to current situation and are assumed to be zero.
- 7.6 The costs and benefits accruing to a number of key groups and organisations have been considered. These are
- Welsh Government
 - Local authorities/SABs
 - Developers
 - Water and sewerage companies
 - Property owners/occupiers
 - Natural Resources Wales
 - General population
- 7.7 The specific impacts considered in the RIA draws on engagement with stakeholders, a range of previous work, including Defra (2010)¹², the SuDS Manual¹³ and the CIRIA Benefits of SuDS Tool (BeST), and expert knowledge. The full list of impacts considered is shown in Table 3.

Table 3: Impacts considered (full list)

Potential impacts	Description
Construction	Construction of compliant SuDS
Fees (developers)	Application/approval/certification/inspection/adoption fee
Land take	Additional land take from SuDS
Start-up (developers)	Capacity building, upskilling and training
Connection charges (developers)	Avoided surface water connection applications/charges
Adoption, O&M (developers)	Reduced operation and monitoring (O&M), and certainty of adoption, leading to efficiencies in planning process and development, as well as reduced or simplified interaction with a complex array of interests, including the WaSC, Planning Authority, Highways Authority and NRW.
Start-up (local	Establish SAB, including administration, accounting, legal fees,

¹² Commencement of the Flood and Water Management Act 2010, Schedule 3 for Sustainable Drainage: Impact Assessment

¹³ CIRIA (2015) The SuDS Manual (C753)

authorities/SABs)	registration charges, advertising, promotional activity, engagement, employee training, etc
O&M (local authorities/SABs)	Operation and maintenance of SuDS
Adoption (local authorities/SABs)	Additional duty/responsibility to maintain, potentially offset by reduced risk from orphaned or abandoned schemes
Revenue (local authorities/SABs)	Revenue from application/approval fees
Monitoring & enforcement (local authorities/SABs)	Monitoring and enforcement of SuDS, including appeals and ensuring proper functioning (e.g. porous pavements and soakaways)
Asset base (WaSC)	Opportunity cost of foregone increase in asset base, on which companies can earn a return
Connection charges (WaSC)	Reduced revenue from surface water connection applications/charges
Infrastructure	Reduced/deferred future investment need in sewerage infrastructure, reduced O&M costs for conventional sewers (e.g. pumping, treatment) and improved ability to take an integrated approach to urban water systems.
Monitoring & enforcement (WaSC)	Reduced need for monitoring and enforcement of sewer connections
Surface water charges	Reduction in charges paid by property owners/occupiers for surface water drainage
Flood risk	Avoided damage and associated impacts (e.g. on psychological health) from reduced flood risk
Amenity	Enhanced attractiveness and liveability of developments
O&M (property owners/occupiers)	Added responsibilities for surface water in curtilage
Building temperature	Impact of SuDS on cooling (summer) or insulation (winter)
Crime	Reduced crimes against property or people
Traffic calming	Risk of road accidents or street-based recreation opportunities
Infraction	Avoided risk of infraction of water quality related EU directives
Growth	Economic growth
Enabling development	Contribution to affordable housing targets
Appeals	Costs of establishing and running Planning Inspectorate (PINS) to

	deal with appeals
Wider benefits	Related to goals in the Well-being of Future Generations Act 2015, including prosperous, resilient, healthier Wales, etc
Rainwater harvesting	Reduced flows, pollution or mains consumption
Tourism	Attractiveness of tourist sites
Regulation	Improved ability of NRW to tackle diffuse pollution, surface water flood risk and deliver ecosystem benefits
Flood risk	Increased risk of flooding in public areas (e.g. roads) due to exceedance
Biodiversity	New or enhanced habitats and opportunities for wildlife
Carbon	Reduction or sequestration of greenhouse gas emissions resulting from reduced pumping/treatment or new/additional planting
Education	Increased opportunities for learning and development
Climate change	Enhanced ability to mitigate or adapt to the expected impacts of climate change
Water quantity	Additional surface or groundwater available for abstraction, or to help alleviate drought/water scarcity
Health	Improved health and well-being due to increased/enhanced access and use of green space or, depending on type of SuDS used, improved air quality and temperature regulation (e.g. using green roofs)
Recreation	Improved or enhanced recreational opportunities (e.g. walking, fishing, watersports)
Water quality	Reduced sewer/surface water overflows and natural infiltration of surface water before it enters watercourses, leading to improved or enhanced water quality of surface, ground, transitional or coastal waters, consistent with objectives of Water Framework Directive

- 7.8 A proportionate approach has been taken, with the impacts above 'screened' for significance. Where costs and benefits are likely to be small, or impacts considered likely to affect only a few organisations/firms, or many organisations/firms to a very small degree, these have not been valued. Significant environmental and social impacts have been valued using BeST.
- 7.9 In many cases, there is no overall net change anticipated, although some degree of redistribution (a 'transfer' of costs and benefits from one group to another) is expected. In these cases, the effects have been assessed in the RIA.

7.10 Each valued impact in the RIA comprises two components:

- A quantified estimate of the annual impact; and
- A monetary unit value.

These are multiplied together to calculate a monetised annual value for each significant impact. Where possible, low and high estimates for each component are considered (as well as the central or best estimate). As a result, the RIA includes a range for each monetised annual value. Further sensitivity analysis, considering changes to the key parameters of the discount rate and the assessment period, has also been undertaken.

7.11 In the analysis and presentation that follows, positively valued impacts indicate a benefit, whilst impacts with a negative value indicate a cost.

Assumptions

7.12 The key assumptions applied in undertaking the RIA are set out in Table 4.

Table 4: Key assumptions in RIA

General assumptions	
1	Administrative changes expected to be cost neutral
2	All valued impacts are presented as benefits. Therefore, costs appear as negative values.
3	Significant wider benefits assessed using BeST. These include amenity, education and carbon.
4	Commercial and industrial developments include those over 0.1ha (100m ²).
5	Benefits are assumed to start accruing from 2018, the first year of the appraisal period.
6	The timescale for the assessment is 2026, to maintain consistency with the end date for the majority of local development plans in Wales.
7	Historic values have been updated to 2016 prices using Bank of England online inflation calculator.
8	Weighted average salary of SAB officer ranges from £30,369 (av salary of civil engineer) to £61,467 (Defra, 2010) (£72,326 in 2016 prices), mean (central) £51,348. Salaries likely to vary across Wales.
9	SAB running costs - 1 Full Time Employee (FTE) per 100 major or 150 major and minor drainage applications/ year.
10	No. SAB applications (large scale major) 9.75 (low) 21.3 (high); (non-large scale major) 42.25 (low) 92.3 (high); (minor) 510.25 (low) 1114.7 (high) (Defra, 2010)

11	Current situation (baseline) includes compliant SuDS on 20% to 40% of new development. Anecdotal evidence suggests that this may be optimistic (so the benefits of the two policy options may be larger than those estimated here).
12	Planning option will lead to compliant SuDS on 30% (low), 40% (central) or 50% (high) of new development
13	Estimates for projections for housing development are set out in Annex 1, and for commercial and industrial development in Annex 2. These projections are generally higher than actual construction over recent years and, as such, may be challenging to achieve.

Option 1: Do nothing

- 7.13 This is the baseline option and involves a continuation of current non-regulatory policy.
- 7.14 Although there will be costs and benefits associated with this option (for example due to urban growth or climate change), they are assumed to impact on all options equally. Therefore, they are not considered to be additional and are not analysed in the RIA.

Option 2: Commence Schedule 3

- 7.15 This is the preferred option and involves the mandatory use of SuDS compliant with national standards on all minor and major development (more than 1 dwelling or sites larger than 0.1 hectares).
- 7.16 A summary of the impacts considered likely under Option 2 is shown in Table 5 below. This also includes the group impacted, a description of the impact, whether the impact is likely to be a cost or a benefit to the impacted group, whether the impact is one-off or recurrent, whether it has been valued and comments setting out the reasons for this.

Table 5: Impacts of Option 2

Group	Impact	Description	Cost or Benefit?	One-off or recurrent?	Value in RIA?	Comments
Developers	Construction	Construction of compliant SuDS	Benefit	Recurrent	Yes	Evidence from EPC report suggests capital costs are lower for compliant SuDS than for conventional systems. Some of this benefit may accrue to water and sewerage companies, so could also be some redistributive impact.
	Fees	Application/approval/certification/inspection/adoption fee	Cost	Recurrent	Yes	Administrative changes expected to be cost neutral, so costs will be offset by SAB revenue and no overall net change. However, will be redistributive impact so effects need to be assessed.
	Land take	Additional land take from SuDS	Cost	Recurrent	No	CIWEM (2017) concludes that " <i>We consider that arguments for not delivering SuDS on the basis of site constraints may be overstated... with good planning there may be no additional requirement for land or that the additional land needed for SuDS can be small and affordable</i> ". If SuDS are planned into developments from the outset, and there is clarity of requirements for SuDS in the planning process, there appears to be no impact on the number of units, and this appears to be a perceived cost which is therefore not valued.
	Start-up	Capacity building, upskilling and training	Cost	One-off	Yes	Include in RIA
	Connection charges	Avoided surface water connection applications/charges	Benefit	Recurrent	Yes	May be offset by any potential reduction in water and sewerage company revenue.
	Adoption, O&M	Reduced O&M, and certainty of adoption, leading to efficiencies in planning process and development, as well as reduced/simplified interaction with a complex array of interests, including the WaSC, Planning Authority, Highways Authority and NRW	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
	Local authorities/SABs	Start-up	Establish SAB, including administration, accounting, legal fees, registration charges, advertising, promotional activity, engagement, employee training, etc	Cost	One-off	Yes

Annex 1

	O&M	Operation and maintenance of SuDS	Benefit	Recurrent	Yes	Evidence from EPC report suggests O&M costs are lower for compliant SuDS than conventional systems. Some of this benefit may accrue to water and sewerage companies, so could be some distributional impact.
	Adoption	Additional duty/responsibility to maintain, potentially offset by reduced risk from orphaned or abandoned schemes	Cost or benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
	Revenue	Revenue from application/approval fees	Benefit	Recurrent	Yes	Administrative changes expected to be cost neutral, so benefits will be offset by developer costs and no overall net change. However, will be redistributional impact so effects need to be assessed.
	Monitoring & enforcement	Monitoring and enforcement of SuDS, including appeals and ensuring proper functioning (e.g. porous pavements and soakaways)	Cost	Recurrent	Yes	May be offset by any potential increase in water and sewerage company revenue.
Water and sewerage companies	Asset base	Opportunity cost of foregone increase in asset base, on which companies can earn a return	Cost	Recurrent	No	Any savings to companies would be returned to customers through regulatory process, resulting in no net gain.
	Connection charges	Reduced revenue from surface water connection applications/charges	Cost	Recurrent	No	Under this option, most developments would still connect to the foul/combined public sewer, so it is likely that water and sewerage companies would still need to consent and charge for connections and inspection (although companies could see reduction in adoption fees). Any potential impacts therefore not valued.
	Infrastructure	Reduced/deferred future investment need in sewerage infrastructure, reduced O&M costs for conventional sewers (e.g. pumping, treatment) and improved ability to take an integrated approach to urban water systems.	Benefit	Recurrent	No	Already largely captured in construction benefit to developers and O&M benefit to local authorities/SABs
	Monitoring & enforcement	Reduced need for monitoring and enforcement of sewer connections	Benefit	Recurrent	No	Under this option, most developments would still connect to the foul/combined public sewer, so it is likely that water and sewerage companies would still have the same asset base and still need to undertake the same level of inspection, monitoring and enforcement. Any potential impacts therefore not valued.

Annex 1

Property owners/occupiers	Surface water charges	Reduction in charges paid for surface water drainage	Benefit	Recurrent	No	Any reduction in charges paid to water and sewerage company likely to be offset by development management charge, so no overall impact.
	Flood risk	Avoided damage and associated impacts (e.g. on psychological health) from reduced flood risk	Benefit	Recurrent	No	Any benefit should be equal for both SuDS and piped systems (unless standards are higher for properties than for sewers, which is unlikely). Therefore, no net benefit anticipated.
	Amenity	Enhanced attractiveness and liveability of developments	Benefit	Recurrent	Yes	Valued in BeST using estimates of willingness of pay of residents for 'street improvements through greening'. These may capture elements of other benefits to the wider population (particularly biodiversity, health, recreation and water quality), so these are not valued separately due to risk of double counting.
	O&M	Added responsibilities for surface water in curtilage	Cost	Recurrent	No	Unlike pipes, SuDS cannot be ignored and, although this may be perceived as an additional cost/nuisance (at least initially), it could equally be a benefit as there is less likelihood/consequence of problems from SuDS. So overall, no net impact assumed.
	Building temp	Impact of SuDS on cooling (summer) or insulation (winter)	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
	Crime	Reduced crimes against property or people	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
	Traffic calming	Risk of road accidents or street-based recreation opportunities	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
	Welsh Government	Infraction	Avoided risk of infraction of water quality related EU directives	Benefit	Recurrent	No
Growth		Economic growth	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
Enabling development		Contribution to affordable housing targets	Benefit	Recurrent	No	Any reduced housing construction costs already counted (under 'developers') and could be offset by possible reduced housing densities (also counted under 'developers')
Appeals		Costs of establishing and running Planning Inspectorate (PINS) to deal with appeals	Cost	Recurrent	No	PINS work funded by cost recovery on case-by-case basis. No 'set-up' costs or impacts on Welsh Government.

Annex 1

	Wider benefits	Related to WCFG Act goals, including prosperous, resilient, healthier Wales, etc	Benefit	Recurrent	No	Overlaps with impacts on 'general population', so high risk of double counting if included here.
	Rainwater harvesting	Reduced flows, pollution or mains consumption	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
	Tourism	Attractiveness of tourist sites	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
NRW	Regulation	Improved ability to tackle diffuse pollution, surface water flood risk and deliver ecosystem benefits	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
General population	Flood risk	Increased risk of flooding in public areas (e.g. roads) due to exceedance	Cost	Recurrent	No	Likely to be offset by any reduced risk of hydraulic overload flooding resulting from lower volumes in sewerage system
	Biodiversity	New or enhanced habitats and opportunities for wildlife	Benefit	Recurrent	No	Not valued due to potential for double counting with amenity benefit to property owners/occupiers.
	Carbon	Reduction or sequestration of greenhouse gas emissions resulting from reduced pumping/treatment or new/additional planting	Benefit	Recurrent	Yes	Include in RIA
	Education	Increased opportunities for learning and development	Benefit	Recurrent	Yes	Include in RIA
	Climate change	Enhanced ability to mitigate or adapt to the expected impacts of climate change	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
	Water quantity	Additional surface or groundwater available for abstraction, or to help alleviate drought/water scarcity	Benefit	Recurrent	No	Not enough evidence to identify or quantify impact robustly.
	Health	Improved health and well-being due to increased/enhanced access and use of green space or, depending on type of SuDS used, improved air quality and temperature regulation (e.g. using green roofs)	Benefit	Recurrent	No	Not valued due to potential for double counting with amenity benefit to property owners/occupiers.
	Recreation	Improved or enhanced recreational opportunities (e.g. walking, fishing, watersports)	Benefit	Recurrent	No	Not valued due to potential for double counting with amenity benefit to property owners/occupiers.
	Water quality	Reduced sewer overflows and natural infiltration of surface water before it enters watercourses, leading to improved or enhanced water quality of surface, ground, transitional or coastal waters, consistent with objectives of Water Framework Directive	Benefit	Recurrent	No	Not valued due to potential for double counting with amenity benefit to property owners/occupiers.

7.17 Table 6 summarises the PV impacts for Option 2. Each valued impact is considered, in turn, below Table 6. The NPV for Option 2 is estimated to be £155.5 million (range £78.9m to £945.2m). It is positive suggesting that the net benefits to society outweigh the net costs to society.

Table 6: Summary table of PV impacts for Option 2

Group	Impact	Total PV impact (£ million)		
		Low	Central	High
Developers	Construction	80.3	160.5	955.9
	Fees	- 2.6	- 4.8	- 7.4
	Start-up	- 0.1	- 0.3	- 0.5
	Connection charges	1.5	5.1	10.7
Local authorities/SABs	Start-up	- 0.0	- 0.0	- 0.0
	O&M	- 0.1	0.2	0.3
	Revenue	2.6	4.8	7.4
	Monitoring & enforcement	- 5.0	- 15.3	- 29.9
Property owners/occupiers	Amenity	2.1	4.7	7.5
General population	Carbon	0.1	0.3	0.6
	Education	0.1	0.2	0.6
	TOTAL	78.9	155.5	945.2

7.18 Developers: Construction of SuDS

The annual impact on developers associated with the construction of SuDS is as follows.

Residential

Low:	£9,594,089
Central:	£19,596,997
High:	£117,082,700

Commercial and industrial

Low:	£605,694
Central:	£785,026
High:	£4,315,041

These estimates are based on the information provided in Table 7.

Table 7: Impact on developers: Construction of SuDS

		Value	Units	Source	Assumptions
Quantified estimate of impact (residential)	Low	5,220	New homes per year	Public Policy Institute for Wales (2015) ¹⁴	Assume compliant SuDS currently on 20-40% of new developments, so option applies to additional 60% (low), 70% (central) and 80% (high) of new development.
	Central	10,010		Housing White Paper (2012) ¹⁵	
	High	12,946		Information from local development plans provided by WG (March, 2017)	
Monetary value (residential)	Low	1,838	Capex saving per unit £	EPC (2017) ¹⁶	Outliers removed
	Central	1,958			Median value
	High	9,044			Mean value
Quantified estimate of impact (commercial & industrial)	Low	330	New developments per year	New industrial and commercial orders for construction 2018-2026 (min) ¹⁷	Assume compliant SuDS currently on 20-40% of new developments, so option applies to additional 60% (low), 70% (central) and 80% (high) of new development.
	Central	401		As above (mean)	
	High	477		As above (max)	
Monetary value (commercial & industrial)	Low	1,838	Capex saving per unit £	EPC (2017)	Outliers removed
	Central	1,958			Median value
	High	9,044			Mean value

7.19 Developers: SAB fees

The annual impact on developers associated with SAB fees is as follows.

Low: - £335,646

Central: - £609,593

High: - £939,441

These estimates are based on the information provided in Table 8.

¹⁴ Public Policy Institute for Wales (2015) Future Need and Demand for Housing in Wales

¹⁵ Based on Holmans, A. and Monk, S. (2010) Housing need and demand in Wales 2006–2026. Social Research Number 03/2010. Cardiff: Welsh Government

¹⁶ Sustainable Drainage Systems on new developments, Analysis of evidence including costs and benefits of SuDS construction and adoption. Final Report for the Welsh Government, January 2017

¹⁷ ONS, NEWOGOR New Orders for Construction: by Government Office Region (Wales), accessed April 2017

Table 8: Impact on developers: SAB fees

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	562	Applications per year	Defra (2010) ¹⁸	Sum of: large scale major (9.75); non-large scale major (42.25); minor (510.25)
	Central	895			Average of low and high
	High	1,228			Sum of: large scale major (21.3); non-large scale major (92.3); minor (1,114)
Monetary value	Low	- 597	Fee per application	Defra (2010)	Original value (£507) updated to 2016 prices
	Central	- 681			Average of low and high
	High	- 765			Original value (£650) updated to 2016 prices

7.20 Developers: start-up

The one-off impact on developers associated with start-up costs is as follows.

Low:	- £76,766
Central:	- £259,593
High:	- £548,472

These estimates are based on the information provided in Table 9.

Table 9: Impact on developers: start-up

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	4,550	Total days	WG analysis of IDBR (see Annex 2)	Number of developers (910) assumed to be those involved in 'Development of building projects'. We assume each developer invests 5 (low), 10 (central) or 15 (high) person-days of transitional, one-off time (for training, skills, etc)
	Central	9,100			
	High	13,650			
Monetary value	Low	- 16.9	Cost per day	Defra (2010)	Annual salary/related costs of staff: Min £30,369 (av salary of civil engineer), max £61,467 (£72,326 in 2016 prices), mean (central) £51,348. Assume 1,800 days per FTE p.a. (8 hours/day x 5 days/week x 45 weeks/year)
	Central	- 28.5			
	High	- 40.2			

7.21 Developers: connection charges avoided

The annual impact on developers associated with connection charges is as follows.

¹⁸ Commencement of the Flood and Water Management Act 2010, Schedule 3 for Sustainable Drainage: Impact Assessment. 'SuDS - Defra SuDS CBA alias' spreadsheet, 'Assumptions'.

Low:	£191,671
Central:	£649,782
High:	£1,364,236

These estimates are based on the information provided in Table 10.

Table 10: Impact on developers: Connection charges

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	562	Applications per year	Defra (2010)	Sum of: large scale major (9.75); non-large scale major (42.25); minor (510.25)
	Central	895			Average of low and high
	High	1,228			Sum of: large scale major (21.3); non-large scale major (92.3); minor (1,114)
Monetary value	Low	341	Charge per development	Defra (2010), using data from DCWW ¹⁹ and SVT ²⁰	Assume each development with compliant SuDS would save one application charge, one sewer connection charge and inspection charge. For DCWW and SVT, these are, respectively: £155 (DCWW) and £114.90 (SVT); £183 (DCWW) and £455.67 (SVT); £43 (DCWW) and £500 (SVT). We take the average of each to generate a central value (£135 + £319 + £272 = £726), and low and high estimates for each to generate low (£341) and high (£1,111).
	Central	726			
	High	1,111			

7.22 Local authorities/SABs: start-up

The one-off impact on local authorities/SABs associated with start-up costs is as follows.

Low:	- £1,772
Central:	- £5,991
High:	- £12,657

These estimates are based on the information provided in Table 11.

¹⁹ Developer services schedule of charges 2016-17

²⁰ Developer charges 2015/16

Table 11: Impact on local authorities/SABs: start-up

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	105	Total days	-	Each of 21 local authorities/SABs in Wales invests 5 (low), 10 (central) or 15 (high) person-days of transitional, one-off time (for training, skills, etc)
	Central	210			
	High	315			
Monetary value	Low	- 16.9	Cost per day	Defra (2010)	Annual salary/related costs of staff: Min £30,369 (av salary of civil engineer), max £61,467 (£72,326 in 2016 prices), mean (central) £51,348. Assume 1,800 days per FTE p.a. (8 hours/day x 5 days/week x 45 weeks/year)
	Central	- 28.5			
	High	- 40.2			

7.23 Local authorities/SABs: Operation and maintenance of SuDS

The annual impact on local authorities/SABs associated with the operation and maintenance of SuDS is as follows.

Residential

Low:	- £12,871
Central:	£29,123
High:	£37,665

Commercial and industrial

Low:	- £813
Central:	£1,167
High:	£1,388

These estimates are based on the information provided in Table 12.

Table 12: Impact on local authorities/SABs: Operation and maintenance of SuDS

		Value	Units	Source	Assumptions
Quantified estimate of impact (residential)	Low	5,220	New homes per year	Public Policy Institute for Wales (2015)	Assume compliant SuDS currently on 20-40% of new developments, so option applies to additional 60% (low), 70% (central) and 80% (high) of new development.
	Central	10,010		Housing White Paper (2012)	
	High	12,946		Information from local development plans provided by WG (March, 2017)	
Monetary value (residential)	Low	- 2.5	Opex saving per unit £	EPC (2017)	Median value
	Central	2.9			Outliers removed
	High	2.9			Mean value
Quantified estimate of impact (commercial & industrial)	Low	330	New developments per year	New industrial and commercial orders for construction 2018-2026 (min)	Assume compliant SuDS currently on 20-40% of new developments, so option applies to additional 60% (low), 70% (central) and 80% (high) of new development.
	Central	401		As above (mean)	
	High	477		As above (max)	
Monetary value (commercial & industrial)	Low	- 2.5	Opex saving per unit £	EPC (2017)	Median value
	Central	2.9			Outliers removed
	High	2.9			Mean value

7.24 Local authorities/SABs: Revenue from application/approval fees

The annual impact on local authorities/SABs associated with revenue from application/approval fees is as follows.

Low: £335,646

Central: £609,593

High: £939,441

These estimates are based on the information provided in Table 13.

Table 13: Impact on local authorities/SABs: Revenue from application/approval fees

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	562	Applications per year	Defra (2010)	Sum of: large scale major (9.75); non-large scale major (42.25); minor (510.25)
	Central	895			Average of low and high
	High	1,228			Sum of: large scale major (21.3); non-large scale major (92.3); minor (1,114)
Monetary value	Low	597	Per application	Defra (2010)	Original value (£507) updated to 2016 prices
	Central	681			Average of low and high
	High	765			Original value (£650) updated to 2016 prices

7.25 Local authorities/SABs: Monitoring and enforcement

The annual impact on local authorities/SABs associated with monitoring and enforcement is as follows.

Low:	- £637,749
Central:	- £1,940,954
High:	- £3,797,115

These estimates are based on the information provided in Table 14.

Table 14: Impact on local authorities/SABs: Monitoring and enforcement

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	21	Total FTEs (full-time equivalents)	Info provided by LAs (4 Apr 2017)	Each of 21 local authorities/SABs in Wales requires 1.8 FTEs (min 1, max 2.5)
	Central	38			
	High	53			
Monetary value	Low	- 30,369	Per FTE	Defra (2010)	Annual salary/related costs of staff: Min £30,369 (av salary of civil engineer), max £61,467 (£72,326 in 2016 prices), mean (central) £51,348.
	Central	- 51,348			
	High	- 72,326			

7.26 Property owners/occupiers: Amenity

The annual impact on property owners/occupiers associated with amenity is as follows.

Low:	£269,352
Central:	£594,594
High:	£955,410

These estimates are based on the information provided in Table 15.

Table 15: Impact on property owners/occupiers: Amenity

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	13,050	Residents	Public Policy Institute for Wales (2015)	Assume compliant SuDS currently on 20-40% of new developments, so option applies to additional 60% (low), 70% (central) and 80% (high) of new development. Assume 2.5 residents per property
	Central	25,025		Housing White Paper (2012)	
	High	32,365		Information from local development plans provided by WG (March, 2017)	
Monetary value	Low	20.64	Per resident per year	BeST	Use values in BeST associated with 'street improvements through greening'
	Central	23.76			
	High	29.52			

7.27 General population: Carbon

The PV impact on the general population associated with carbon is as follows.

Low: £95,933 (1,918 tonnes carbon sequestered)

Central: £335,655 (6,711 tonnes carbon sequestered)

High: £642,465 (12,845 tonnes carbon sequestered)

These estimates are based on the information provided in Table 16.

Table 16: Impact on general population: Carbon

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	6,868	Additional trees	As per previous impacts for residential and commercial & industrial development	Assume additional 1 (low), 2 (central) and 3 (high) medium-sized trees per new home, and 5 (low), 10 (central) and 15 (high) trees per new commercial and industrial development.
	Central	24,030			
	High	45,995			
Monetary value	Low	34	£ per tonne CO2e	Based on values in BeST for non-traded price of carbon (2020) (values vary slightly from 2018 to 2026)	PV calculated automatically in BeST
	Central	67			
	High	101			

7.28 General population: Education

The annual impact on the general population associated with education is as follows.

Low:	£9,564
Central:	£30,240
High:	£73,140

These estimates are based on the information provided in Table 17.

Table 17: Impact on general population: Education

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	600	Student visits per year	-	Assume 2 (low), 5 (central) and 10 (high) schools built with compliant SuDS per year, each leading to additional 300 student visits (10 visits for 30 children each) to see and study SuDS
	Central	1,500			
	High	3,000			
Monetary value	Low	15.94	Value of visit	BeST	Use values in BeST associated with 'value of visit'
	Central	20.16			
	High	24.38			

Option 3: Planning approach

7.29 This option provides an expectation that SuDS will be provided on all minor and major development (more than 1 dwelling or sites larger than 0.1 hectares) wherever this is appropriate and unless demonstrated to be inappropriate. It entails the use of planning conditions or planning obligations to ensure that there are clear arrangements in place for ongoing maintenance over the lifetime of the development where SuDS are used. Where SuDS are not used, current arrangements (e.g. related to O&M) are expected to continue (i.e. no change from the baseline).

7.30 The impacts considered likely under Option 3 are largely the same as those considered likely under Option 2 and included in Table 5. The differences under Option 3 compared with Option 2 are that, under Option 3, we assume:

- There are no start-up costs for SABs or developers;
- There are no SAB-related fees for developers or concurrent revenue for SABs;
- Construction and O&M costs are applicable to 30% (low), 40% (central) and 50% (high) of the developments that would achieve compliant SuDS under Option 2 (i.e. 50-70% of new developments do not include compliant SuDS);

- Additional/reduced connection charges are applicable to 30% (low), 40% (central) and 50% (high) of the developments that would achieve compliant SuDS under Option 2;
- Amenity, carbon and education impacts are applicable to 30% (low), 40% (central) and 50% (high) of the developments that would achieve compliant SuDS under Option 2; and
- There are additional, recurring costs to local authorities/SABs of consultation, planning conditions and funding agreements in relation to surface water drainage on all planning applications.

7.31 Table 18 summarises the PV impacts for Option 3. Each valued impact is considered, in turn, below Table 18. The NPV for Option 3 is estimated to be £52.2m (range £19.9m to £455.6m). It is positive suggesting that the net benefits to society outweigh the net costs to society.

Table 18: Summary table of PV impacts for Option 3

Group	Impact	Total PV impact (£ million)		
		Low	Central	High
Developers	Construction	24.1	64.2	477.9
	Connection charges	0.5	2.0	5.4
Local authorities/SABs	Consultation	- 0.3	- 1.0	- 2.3
	O&M	- 0.0	- 0.1	- 0.2
	Monitoring & enforcement	- 5.0	- 15.3	- 29.9
Property owners/occupiers	Amenity	0.6	1.9	3.8
General population	Carbon	0.0	0.1	0.3
	Education	0.0	0.1	0.3
	TOTAL	19.9	52.2	455.6

7.32 **Developers: Construction of SuDS**

The annual impact on developers associated with the construction of SuDS is as follows.

Residential

Low: £2,878,227
 Central: £7,838,799
 High: £58,541,350

Commercial and industrial

Low: £181,708

Central: £314,011
High: £2,157,520

These estimates are based on the information provided in Table 19.

Table 19: Impact on developers: Construction of SuDS

		Value	Units	Source	Assumptions
Quantified estimate of impact (residential)	Low	1,566	New homes per year	Public Policy Institute for Wales (2015)	Under this option, assume 30% (low), 40% (central) and 50% (high) take-up of compliant SuDS compared to Option 1.
	Central	4,004		Housing White Paper (2012)	
	High	6,473		Information from local development plans provided by WG (March, 2017)	
Monetary value (residential)	Low	1,838	Capex saving per unit £	EPC (2017)	Outliers removed
	Central	1,958			Median value
	High	9,044			Mean value
Quantified estimate of impact (commercial & industrial)	Low	99	New developments per year	New industrial and commercial orders for construction 2018-2026 (min)	Under this option, assume 30% (low), 40% (central) and 50% (high) take-up of compliant SuDS compared to Option 1.
	Central	160		As above (mean)	
	High	239		As above (max)	
Monetary value (commercial & industrial)	Low	1,838	Capex saving per unit £	EPC (2017)	Outliers removed
	Central	1,958			Median value
	High	9,044			Mean value

7.33 Developers: connection charges avoided

The annual impact on developers associated with connection charges is as follows.

Low: £57,501
Central: £259,913
High: £682,118

These estimates are based on the information provided in Table 20.

Table 20: Impact on developers: Connection charges

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	169	Applications per year	Defra (2010)	Sum of: large scale major (9.75); non-large scale major (42.25); minor (510.25). Assume 30% take-up of compliant SuDS.
	Central	358			Average of low and high. Assume 40% take-up of compliant SuDS.
	High	614			Sum of: large scale major (21.3); non-large scale major (92.3); minor (1,114). Assume 50% take-up of compliant SuDS.
Monetary value	Low	341	Charge per development	Defra (2010), using data from DCWW ²¹ and SVT ²²	Assume each development with compliant SuDS would save one application charge, one sewer connection charge and inspection charge. For DCWW and SVT, these are, respectively: £155 (DCWW) and £114.90 (SVT); £183 (DCWW) and £455.67 (SVT); £43 (DCWW) and £500 (SVT). We take the average of each to generate a central value (£135 + £319 + £272 = £726), and low and high estimates for each to generate low (£341) and high (£1,111).
	Central	726			
	High	1,111			

7.34 Local authorities/SABs: consultation

The annual impact on local authorities/SABs associated with consultation is as follows.

Low:	- £81,331
Central:	- £172,671
High:	- £296,127

These estimates are based on the information provided in Table 21.

²¹ Developer services schedule of charges 2016-17

²² Developer charges 2015/16

Table 21: Impact on local authorities/SABs: Consultation

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	1.1	Number of FTEs required	Defra (2010)	Sum of: large scale major (9.75); non-large scale major (42.25); minor (510.25). Assume 30% take-up of compliant SuDS. 1 FTE per 150 major and minor drainage applications/year
	Central	2.4			Average of low and high. Assume 40% take-up of compliant SuDS. 1 FTE per 150 major and minor drainage applications/year
	High	4.1			Sum of: large scale major (21.3); non-large scale major (92.3); minor (1,114). Assume 50% take-up of compliant SuDS. 1 FTE per 150 major and minor drainage applications/year
Monetary value	Low	- 30,369	Per FTE	Defra (2010)	Annual salary/related costs of staff: Min £30,369 (av salary of civil engineer), max £61,467 (£72,326 in 2016 prices), mean (central) £51,348.
	Central	- 51,348			
	High	- 72,326			

7.35 Local authorities/SABs: Operation and maintenance of SuDS

The annual impact on local authorities/SABs associated with the operation and maintenance of SuDS is as follows.

Residential

Low: - £3,861

Central: £11,649

High: £18,832

Commercial and industrial

Low: - £244

Central: £467

High: £694

These estimates are based on the information provided in Table 22.

Table 22: Impact on local authorities/SABs: Operation and maintenance of SuDS

		Value	Units	Source	Assumptions
Quantified estimate of impact (residential)	Low	1,566	New homes per year	Public Policy Institute for Wales (2015)	Under this option, assume 30% (low), 40% (central) and 50% (high) take-up of compliant SuDS compared to Option 1.
	Central	4,004		Housing White Paper (2012)	
	High	6,473		Information from local development plans provided by WG (March, 2017)	
Monetary value (residential)	Low	- 2.5	Opex saving per unit £	EPC (2017)	Median value
	Central	2.9			Outliers removed
	High	2.9			Mean value
Quantified estimate of impact (commercial & industrial)	Low	99	New developments per year	New industrial and commercial orders for construction 2018-2026 (min)	Under this option, assume 30% (low), 40% (central) and 50% (high) take-up of compliant SuDS compared to Option 1.
	Central	160		As above (mean)	
	High	239		As above (max)	
Monetary value (commercial & industrial)	Low	- 2.5	Opex saving per unit £	EPC (2017)	Median value
	Central	2.9			Outliers removed
	High	2.9			Mean value

7.36 Local authorities/SABs: Monitoring and enforcement

The annual impact on local authorities/SABs associated with monitoring and enforcement is as follows.

Low:	- £637,749
Central:	- £1,940,954
High:	- £3,797,115

These estimates are based on the information provided in Table 23.

Table 23: Impact on local authorities/SABs: Monitoring and enforcement

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	21	Total FTEs (full-time equivalents)	Info provided by LAs (4 Apr 2017)	Each of 21 local authorities/SABs in Wales requires 1.8 FTEs (min 1, max 2.5)
	Central	38			
	High	53			
Monetary value	Low	- 30,369	Per FTE	Defra (2010)	Annual salary/related costs of staff: Min £30,369 (av salary of civil engineer), max £61,467 (£72,326 in 2016 prices), mean (central) £51,348.
	Central	- 51,348			
	High	- 72,326			

7.37 Property owners/occupiers: Amenity

The annual impact on property owners/occupiers associated with amenity is as follows.

Low:	£80,806
Central:	£237,838
High:	£477,705

These estimates are based on the information provided in Table 24.

Table 24: Impact on property owners/occupiers: Amenity

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	3,915	Residents	Public Policy Institute for Wales (2015)	Assume 2.5 residents per property. Under this option, assume 30% (low), 40% (central) and 50% (high) take-up of compliant SuDS compared to Option 1.
	Central	10,010		Housing White Paper (2012)	
	High	16,182		Information from local development plans provided by WG (March, 2017)	
Monetary value	Low	20.64	Per resident per year	BeST	Use values in BeST associated with 'street improvements through greening'
	Central	23.76			
	High	29.52			

7.38 General population: Carbon

The PV impact on the general population associated with carbon is as follows.

Low:	£28,774 (575 tonnes carbon sequestered)
Central:	£134,262 (2,684 tonnes carbon sequestered)
High:	£321,226 (6,422 tonnes carbon sequestered)

These estimates are based on the information provided in Table 25.

Table 25: Impact on general population: Carbon

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	2,060	Additional trees	As per previous impacts for residential and commercial & industrial development	Assume additional 1 (low), 2 (central) and 3 (high) medium-sized trees per new home, and 5 (low), 10 (central) and 15 (high) trees per new commercial and industrial development. Under this option, assume 30% (low), 40% (central) and 50% (high) take-up of compliant SuDS compared to Option 1.
	Central	9,612			
	High	22,997			
Monetary value	Low	34	£ per tonne CO2e	Based on values in BeST for non-traded price of carbon (2020) (values varies slightly from 2018 to 2026)	PV calculated automatically in BeST
	Central	67			
	High	101			

7.39 General population: Education

The annual impact on the general population associated with education is as follows.

Low:	£2,869
Central:	£12,096
High:	£36,570

These estimates are based on the information provided in Table 26.

Table 26: Impact on general population: Education

		Value	Units	Source	Assumptions
Quantified estimate of impact	Low	180	Student visits per year	-	Assume additional visits based on 30% (low), 40% (central) and 50% (high) take-up of compliant SuDS compared to Option 1.
	Central	600			
	High	1,500			
Monetary value	Low	15.94	Value of visit	BeST	Use values in BeST associated with 'value of visit'
	Central	20.16			
	High	24.38			

Non-monetised impacts

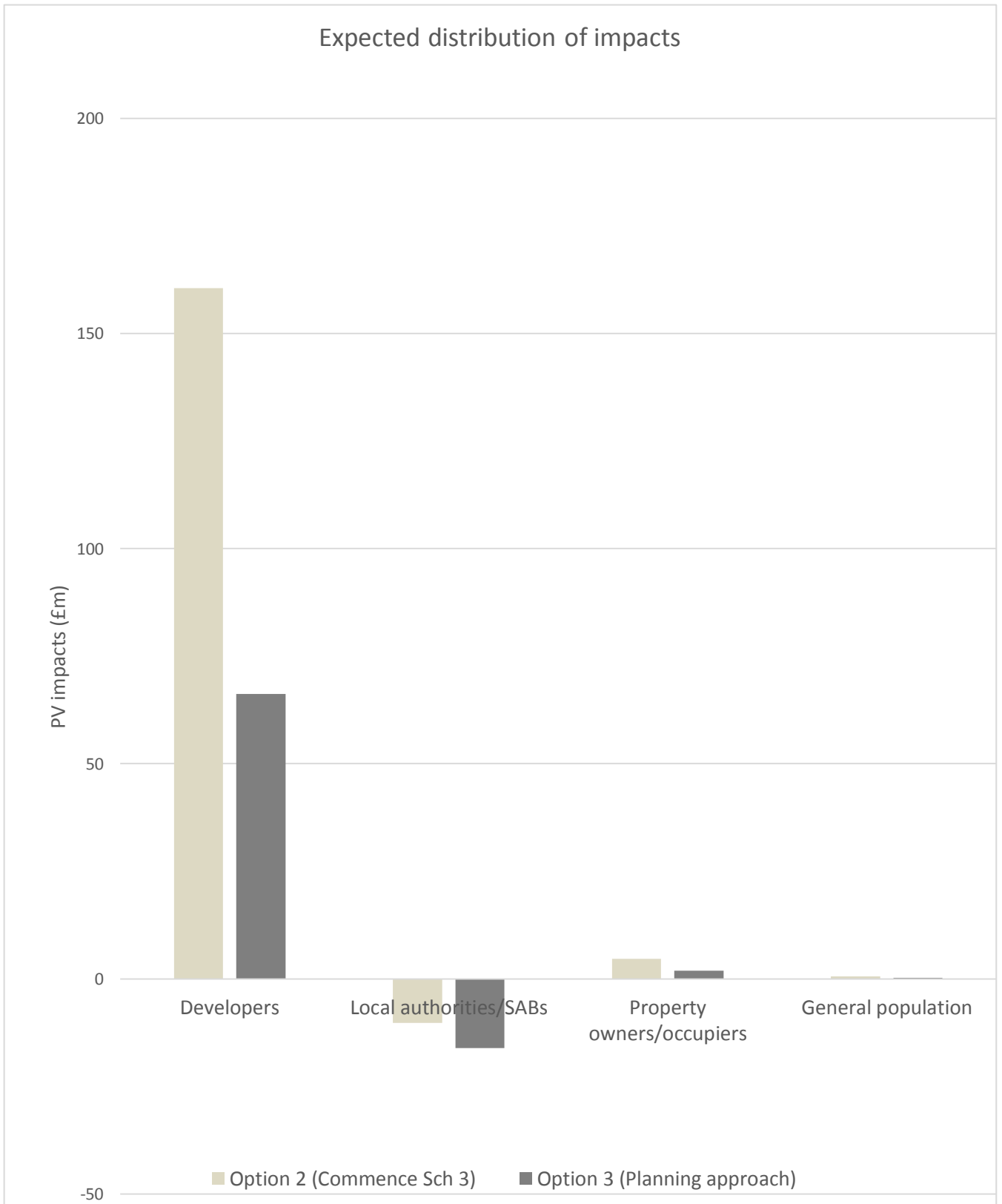
7.40 A number of potential impacts have not been valued, largely due to difficulties in quantifying/monetising the possible change with any certainty, and the risk of double counting with other (valued) impacts. These include:

- Potential impacts on water and sewerage companies, e.g. reduced revenue from surface water connection applications/charges, or the reduced need for monitoring and enforcement of sewer connections. This is because, even under the policy changes considered, most developments would still connect to the foul/combined public sewer. It is therefore likely that companies would still need to consent and charge for connections and inspection, and would still have the same asset base and need to undertake the same level of inspection, monitoring and enforcement.
- Certainty of adoption for developers, leading to efficiencies in planning process and development, as well as reduced/simplified interaction with a complex array of interests, including the WaSC, Planning Authority, Highways Authority and NRW;
- Reduced risk to local authorities from orphaned or abandoned schemes;
- Avoided risk of infraction of water quality related EU directives;
- Economic growth;
- Biodiversity - new or enhanced habitats and opportunities for wildlife;
- Enhanced ability to mitigate or adapt to the expected impacts of climate change;
- Additional surface or groundwater available for abstraction, or to help alleviate drought/water scarcity;
- Improved health and well-being due to increased/enhanced access and use of green space or, depending on type of SuDS used, improved air quality and temperature regulation (e.g. using green roofs). Where assessed, the benefits to health from SuDS and green infrastructure can be substantial, to the extent that they may dominate financial benefits;

- Improved or enhanced recreational opportunities (e.g. walking, fishing, watersports); and
- Reduced sewer overflows and natural infiltration of surface water before it enters watercourses, leading to improved or enhanced water quality of surface, ground, transitional or coastal waters, consistent with objectives of Water Framework Directive.

Summary of costs and benefits

- 7.41 Option 2 is the preferred option. The NPV (net present value) for Option 2 is estimated to be £155.5m (range £78.9m to £945.2m). It is positive suggesting that the net benefits to society outweigh the net costs to society. The NPV for Option 1 is zero, and the NPV for Option 3 is estimated to be £52.2m, i.e. around one-third of the benefits of the preferred option and lacking the security of outcomes of Option 2.
- 7.42 Sensitivity analysis has been applied to these results by adjusting two of the key parameters used in the appraisal, the timeframe for the appraisal period and the discount rate.
- 7.43 Extending the appraisal by 10 years (from 2018 to 2035) results in an increase in NPV for Option 2 to £270.2m (central estimate), an increase of 74%. The NPV for Option 3 increases to £90.6m, a similar percentage increase. This provides an even stronger justification for the preferred option.
- 7.44 Reducing the discount rate from 3.5% to 2% increases the NPV for Option 2 to £164.5m and for Option 3 to £55.2m. Increasing the discount rate to 5% decreases the NPV for Option 2 to £147.4m and for Option 3 to £49.5m, i.e. the impact is marginal and the relative situation does not change. Option 2 is still strongly preferred.
- 7.45 The expected distribution of impacts across the key groups considered is shown in Figure 1. This suggests that developers are expected to benefit significantly (especially under Option 2), primarily due to reduced construction costs. Local authorities may incur a small net cost (slightly larger under Option 3), largely due to the impact of additional monitoring and enforcement. The overall monetised impacts to property owners/occupiers and the general population are expected to be relatively modest, albeit positive and significant. The benefits to these groups are expected to be larger under Option 2. In short, all impacted groups are expected to be better off under Option 2 than they would be under Option 3.



8. Competition Assessment

8.1 Expected impacts on competition are set out in Table 27 below.

Table 27: Competition filter test

Question	Answer yes or no
Q1: In the market(s) affected by the new regulation, does any firm have more than 10% market share?	No
Q2: In the market(s) affected by the new regulation, does any firm have more than 20% market share?	No
Q3: In the market(s) affected by the new regulation, do the largest three firms together have at least 50% market share?	No
Q4: Would the costs of the regulation affect some firms substantially more than others?	No
Q5: Is the regulation likely to affect the market structure, changing the number or size of businesses/organisation?	No
Q6: Would the regulation lead to higher set-up costs for new or potential suppliers that existing suppliers do not have to meet?	No
Q7: Would the regulation lead to higher ongoing costs for new or potential suppliers that existing suppliers do not have to meet?	No
Q8: Is the sector characterised by rapid technological change?	No
Q9: Would the regulation restrict the ability of suppliers to choose the price, quality, range or location of their products?	Yes

8.2 The regulation is likely to create a shift away from the use of underground proprietary SuDS products, and more traditional engineering-based drainage solutions, towards novel, greener above-ground solutions and products. However, the analysis presented here suggests that this move is likely to result in lower costs for developers, their supply chains and others. In addition, no restrictions on the type or price of existing or new products associated with the regulation are foreseen or expected.

8.3 In summary, the regulation is unlikely to have a significant detrimental effect on competition.

9. Specific Impact Assessments

Small Firms Impact Test

9.1 The start-up costs for developers and local authorities/SABs is based on an estimate of 5 (low), 10 (central) or 15 (high) person-days of transitional, one-off time (for training, skills, etc). This is likely to have a larger impact on smaller firms or local authorities with fewer employees than a larger organisation.

9.2 However, the analysis presented here suggests that any additional costs will be more than offset by reduced construction costs and other impacts.

Greenhouse Gas Assessment

9.3 The preferred option is likely to provide benefits in terms of both climate change adaptation and mitigation. The analysis presented here suggests that between 1.9 and 12.8 thousand tonnes of carbon could be sequestered under the preferred option over the eight year period analysed, although this benefit would continue beyond this period.

Wider Environmental issues Impact Test

9.4 As highlighted in the analysis and the non-monetised section above, the increased use of good quality compliant SuDS under the preferred option is likely to have a number of positive environmental impacts, including supporting localised biodiversity, reducing air pollution and improving the quality of water.

9.5 Evidence of the potential multiple and wide ranging benefits of SuDS is further illustrated in the EPC report. Overall the findings indicate use of SuDS on new developments in Wales is variable in quality and performance. There is currently a preponderance of 'hard' SuDS (largely comprising underground measures and attenuation ponds), with fewer 'landscaped' (vegetated) SuDS that can potentially deliver multiple benefits, including enhanced biodiversity.

9.6 Potential benefits of good quality SuDS are similarly emphasised in SuDS guidance "Maximising the potential for people and wildlife" (RSPB, WWT, 2012)²³. Which concludes, SuDS where designed to integrate surface water management and water quality improvements with people and wildlife benefits has the potential to:

- manage volume and flow rates of run-off to reduce the downstream flow and destructive power of surface water, and reduce the risk of flooding,
- improve water quality by reducing pollution locally and downstream in streams, rivers and estuaries,
- encourage natural groundwater recharge to help maintain river and stream flows in periods of dry weather, and support wetlands in the wider landscape,
- protect and enhance water quality and provide significant opportunities for wetland habitat creation,
- support the well-being of people and communities and increase the amenity value of developed land, and
- increase evapotranspiration and climate regulation in urban areas.

9.7 Numerous studies highlight key concerns about the significant effects of entrapment in conventional drainage of wildlife. A recent survey²⁴ in a single local

²³ https://www.rspb.org.uk/Images/SuDS_report_final_tcm9-338064.pdf

²⁴ PKC SuDS Biodiversity Review and Report, A Study of Mitigation, Tayside Biodiversity Partnership, August 2015

authority area found these “*number in the hundreds over the course of a single year*”, posing a key risk to amphibians and small mammals, some of which are protected species. In conclusion the study recommended that the implementation of good quality SuDS designed for wildlife, as well as for flood risk, is undertaken. That the requirement for SuDS on new developments has the potential to provide a valuable new resource to halt the recent global amphibian declines associated with habitat loss.

Health and Well-being Impact Test

9.8 As highlighted in the non-monetised section above, the increased use of SuDS under the preferred option is likely to have a number of positive impacts on health and well-being. Due to the risk of double counting (particularly with amenity benefits to property owners/occupiers), these impacts have not been monetised, though they could be very substantial.

Human Rights Impact Test

9.9 It is envisaged that the proposal will have no impact on human rights.

Justice Impact Test

9.10 It is envisaged that the proposal will have no impact on the justice system.

Rural Proofing Impact Test

9.11 It is envisaged that the proposal will have no impact on rural communities.

Sustainable Development Impact Test

9.12 The proposal supports and is fully consistent with the principles of sustainable development and will contribute to a more sustainable Wales.

9.13 Future generations are expected to benefit significantly from the proposal.

9.14 It fully reflects the following principles which underpin the sustainable development principle in the Well-being of Future Generations (Wales) Act 2015:

- **Long-term thinking:** ensuring a greater emphasis on long-term outcomes, the proposed policy to make mandatory the requirement for sustainable drainage on new developments fully reflects the need to protect and enhance the environment for present and future generations. A principle of the national standards is to ensure that the design of the SuDS take account of the likely impacts of climate change. Adapting to a changing climate is an important safeguard of lives and property over the long-term.
- **Integration:** the evidence suggests good quality, SuDS compliant with the national standards may have multiple benefits, integrating:

- Social issues, SuDS may result in increased amenity through enhanced attractiveness and liveability of developments, improved or enhanced recreational opportunities, increased educational opportunities for learning and development.
 - Environmental issues, evidence suggests SuDS may contribute to reduced or sequestered green house gas emissions and positive impacts on water quality, new or enhanced opportunities for habitat and wildlife.
 - Economic issues, through balancing positive impacts of SuDS in the community, for developers and householders, against the marginal increase in costs for Local Authorities for undertaking enforcement and monitoring.
- **Working across organisational boundaries:** the proposed policy approach has been developed with the involvement of government, private and voluntary organisations and individuals who are representative of stakeholders in the sector.
 - **Focusing on prevention:** the policy proposal focuses on implementing good quality sustainable drainage. It is envisaged this will have positive impacts, ranging from climate change mitigation to improved health and well-being and protecting habits and wildlife.
 - **Engagement and involvement:** the proposed implementation of Schedule 3 of the Act will be informed by an advisory group representing a wide range of stakeholders in the sector.

Welsh Language

9.15 It is not envisaged that the proposal will have any impact on the Welsh language..

Statutory Equality Duties Impact Test

9.16 It is envisaged that the proposal will have no impact on statutory equality duties.

Annex 1: Housing development

Residential							
	Local authority	Date of adoption of LDP	LDP Period	Housing allocations	Delivery since start of plan to April 2016	Estimated new homes to end LDP period	Estimated new homes per year
South Wales							
1	Caerphilly	Nov-10	2006-2021	8,625	4,239	4,386	877
2	Rhondda Cynon Taf	Mar-11	2006-2021	14,385	4,645	9,740	1,948
3	Merthyr Tydfil	May-11	2006-2021	3964	1580	2,384	477
4	Blaenau Gwent	Nov-12	2006-2021	3,500	1,084	2,416	483
5	Bridgend	Sep-13	2006-2021	9,690	4,589	5,101	1,020
6	Torfaen	Dec-13	2006-2021	3,897	1888	2,009	402
7	Monmouthshire	Feb-14	2011-2021	4,500	1,265	3,235	647
8	Newport	Jan-15	2011-2026	10,350	2,697	7,653	765
9	Cardiff	Jan-16	2006-2026	41,415	13,585	27,830	2,783
10	Vale of Glamorgan	Expected 2017	2011-2026	9,460	1,358	8,102	810
West Wales							
11	Swansea	Expected 2018	2010-2025			0	-
12	Carmarthenshire	Dec-14	2006-2021	13,352	5,606	7746	1,549
13	Ceredigion	Apr-13	2007-2022	6,000	1,745	4255	709
14	Neath Port Talbot	Jan-16	2011-2026	7,800	1.501	7798	780
15	Powys	Expected 2017/18	2011-2016			0	-
16	Pembrokeshire	Feb-13	2011-2021	5,724	2,052	3672	734
North Wales							
17	Flintshire	Expected 2019	2015-2030			0	-
18	Denbigshire	Jun-13	2006-2021	7,000	2,227	4773	955
19	Wrexham	Expected 2018	2013-2028			0	-
20	Conway	Oct-13	2007-2022	6,520	2,274	4246	708
21	Gwynedd/Anglesey	Expected 2017				0	-
National Parks							
	Brecon Beacons	Dec-13	2007-2022	2,045	526	1,519	253

Annex 1

Pembrokeshire CNP	Sep-10	2006-2021	1,600	485	1,115	223
Snowdonia	Jul-11	2007-2022	800	448	352	59
TOTALS			160,627	52,295	108,332	16,182

The Principal Projection of Additional Homes Required by period

		2011-2031	per year
Total New Dwellings Required	%	174000	8,700
Market sector	63	109000	5,500
Social sector	37	65000	3,300
Source			

Public Policy Institute for Wales (2015) Future Need and Demand for Housing in Wales

The Principal Projection of Additional Homes Required by period

	per year
Total New Dwellings Required	14,300
Market sector	9,200
Social sector	5,100

Housing White Paper (2012) - most recent published [strategy](#)

Based on Holmans, A. and Monk, S. (2010) Housing need and demand in Wales 2006–2026. Social Research Number 03/2010. Cardiff: Welsh Government

Annex 2: Commercial and industrial development

		Industrial	Commercial
Actual	2010	74	528
	2011	73	359
	2012	82	462
	2013	73	562
	2014	116	360
	2015	180	337
	2016	105	555
Projections	2017	111	455
	2018	117	454
	2019	126	432
	2020	128	447
	2021	117	469
	2022	120	451
	2023	122	451
	2024	122	450
	2025	122	453
	2026	121	455
	Source	ONS, NEWOGOR New Orders for Construction: by Government Office Region (Wales), accessed April 2017	
	Notes	New orders in the construction industry estimates are a short-term indicator of construction contracts for new construction work awarded to main contractors by clients in both the public and private sectors within the UK. The estimates are produced and published both seasonally and non-seasonally adjusted at current prices (including inflationary price effects) and at constant prices (with inflationary effects removed). Since quarter 2 (Apr to Jun) 2013 these data have been supplied by Barbour ABI.	
		Projections based on average over previous 5 years	

Figures for RIA

Commercial	Industrial	
Estimated new developments per year		
117	432	Low
122	451	Central
128	469	High

Annex 3: Developers in Wales

Description	SIC Wales	Employee Sizeband	Enterprises	Total
Development of building projects	41100	0	585	910
	41100	1-4	245	
	41100	5-9	45	
	41100	10-19	25	
	41100	20 - 49	10	
	41100	50 - 99	0	
	41100	100 - 199	0	
	41101	200 - 249	0	
	41102	250 - 499	0	
	41103	500 - 999	0	
	41104	1,000 +	0	
Construction of commercial buildings	41201	0	205	590
	41201	1-4	290	
	41201	5-9	65	
	41201	10-19	15	
	41201	20 - 49	10	
	41201	50 - 99	5	
	41201	100 - 199	0	
	41201	200 - 249	0	
	41201	250 - 499	0	
	41201	500 - 999	0	
	41201	1,000 +	0	
Construction of domestic buildings	41202	0	550	1570
	41202	1-4	710	
	41202	5-9	160	
	41202	10-19	70	
	41202	20 - 49	40	
	41202	50 - 99	20	
	41202	100 - 199	10	
	41202	200 - 249	0	
	41202	250 - 499	0	
	41202	500 - 999	0	
	41202	1,000 +	10	

Source: WG analysis of IDBR (Inter-Departmental Business Register), ONS

Notes: Figures include a small number of enterprises where the headquarters is outside Wales but have economic activity inside Wales. Figures are rounded to the nearest five (so zeros may not be true zeros), are for 2016 and sourced from the IDBR (ONS). The SIC code used is based on the Welsh part of the business.