adroit economics ltd

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Building Regulations Sustainability Review: Incorporating aspects of the Code for Sustainable Homes into the Building Regulations in Wales…Economic Impact Assessment

Prepared by Adroit Economics

For and on behalf of

Welsh Government

Author: *Dr Steve Sheppard*

steve.sheppard@adroit-economics.co.uk

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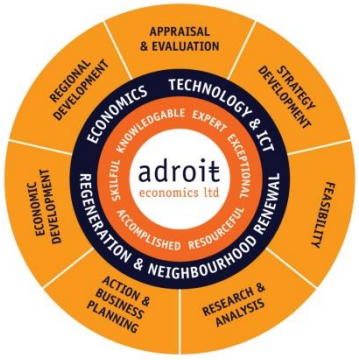


Registered Office:

Adroit House, 31 Finchley Road, Hale, Altrincham, Cheshire, WA15 9RE

Company registered in England No: 05567197

www.adroit-economics.co.uk

1. Introduction

1.1 Adroit Economics Ltd was commissioned by the Welsh Government to undertake an economic impact assessment (EIA) of the proposed changes to the Welsh building regulations, regarding inclusion of water and security standards into the regulations for new domestic buildings, and inclusion of water standards for new non-domestic buildings[1].

1.2 Previously, standards for these were covered by the Code for Sustainable Homes (CfSH) and BREEAM, incorporated in planning policy Technical Advice Note 22: Sustainable Buildings (TAN 22). TAN 22 was withdrawn in 2014 and so the Welsh Government is considering potential inclusion of aspects of the CfSH and BREEAM considered suitable for inclusion into building regulations. These proposals are based on the Mott MacDonald analysis of CfSH and BREEAM[2]

1.3 The 2014 amendments to Part L of the Building Regulations aligned or improved the energy use requirements of TAN 22, and therefore these changes are not included in this economic impact assessment (EIA).

Policy options considered

1.4 Two broad policy options are proposed by the Welsh Government and these are assessed and compared in the EIA

- Option 1 do nothing (the counterfactual)
  - = This option assumes a continued requirement for all dwellings to be built to the standards set out in TAN 22 (i.e. CfSH level 3 for dwellings and BREEAM "Very Good" for non-domestic buildings).
  - = The Welsh Government's view is that this would represent a backward step compared to embedding sustainability within mandated standards and continue to rely on third party certification incurring the additional costs. Moreover, this option would fail to provide the physical security provision to complement planning policy guidance on designing out crime and therefore continuing to rely on the individual judgements by developers.
- Option 2 the proposed changes
  - = Option 2 is based on the withdrawal of TAN 22 and the inclusion of water and security requirements into building regulations.
  - = The Welsh Government's view is that this introduces aspects of sustainability to new residential and non-domestic buildings which combined with the 2014 changes to Part L address the mandatory features of CfSH and BREEAM[3]. Withdrawal of the TAN22 sustainable buildings national planning policy reduces costs through removal

[1] Existing buildings will not be affected

[2] http://gov.wales/topics/planning/planningresearch/publishedresearch/planning-for-sustainable-buildings-review/?lang=en

[3] CfSH is based on achieving a number of credits to achieve one of 6 levels. There are some elements of CfSH that are mandatory and others which are optional ways of achieving the credits needed to achieve the required level.

of the need for third party certification. Moreover, a summary of the technical specification of the proposed changes is as follows (full detail is provided in the separately published AECOM cost reports).

Summary of technical specification of the proposed changes to the Water and Security policy under option 2

Water (Part G (Sanitation, Hot Water Safety and Water Efficiency))

- Water efficiency in new dwellings and those created by change of use was introduced in to Part G in 2010. There are no existing provisions for the regulation of water efficiency of non-domestic buildings though compliance with the previous BREEAM 'Very Good ' policy required a water use reduction of at least 12.5% over the BREEAM.
- New build homes - two approaches are proposed to achieve broadly the same level of efficiency.
  - Water use limit - building on the current standard based on the water calculator, a 110 litres per person per day limit within Wales is proposed for new build dwellings (dwellings formed by a change of use will still require current requirement of a 125 litres per person per day limit) unless a water butt (100 litres) for external irrigation is installed. In line with existing regulations, this will also allow for a fixed factor of 5 litres per person per day for external water usage.
  - A fittings based approach – this is a simplified alternative approach based on maximum performance levels for water consuming components that are commonly found within a dwelling. Four options are being put, combining different combinations of proposed components allowing flexibility (with some fittings allowing for higher water consumption, offset by other more efficient components).
- New build non domestic buildings
  - There is currently no provision for water efficiency in non-domestic buildings within regulations.
  - It is being proposed to extend proposals across all new non-domestic buildings. Given the range of water uses across the wide range of buildings included within the term non domestic it is proposed that a fittings based approach be applied to all new non-domestic buildings (including extensions) in Wales. Unlike in domestic dwellings, it is not proposed that all water use within a property be regulated, but instead only the 'domestic scale' water consuming components which will be present across all building types, including: WCs, urinals, wash hand basin taps and showers.

Security

- New homes
  - There is currently no provision for security or security lighting measures in new private domestic buildings within building regulations
  - It is being proposed that the dwelling physical requirements of the police Secured by Design scheme be incorporated into the requirements for domestic buildings

EIA approach

1.5 Adroit Economics Ltd undertook a similar EIA exercise to assist the Department of Communities, Homes and Local Government to undertake a comprehensive review of options to revise the English housing standards. This analysis draws on the overall approach, the principles, the cost benefit models and some of the data sets used/ developed during the course of that work.

1.6 The principal analysis undertaken in the EIA involves construction of a series of cost benefit spreadsheets that allow the analysis of costs to the construction industry, associated with each proposed option, over a 10 year period (the cost benefit analysis or CBA)

1.7 AECOM has provided detailed unit costs relating to the proposed options. The AECOM work is reported in separate cost reports.

1.8 Adroit Economics has constructed the cost benefit spreadsheets, incorporated the AECOM unit cost figures and drawing on different data sets and assumptions, discussed and agreed with the Welsh Government, has projected future new build rates of different domestic and non-domestic building types, over a 10 year period, in order to estimate total cost implications of the proposed options to the construction industry.

This document

1.9 This document sets out the approach, methods, metrics, assumptions and sources incorporated in, and the results of, the EIA of the above options.

1.10 This is the first stage of EIA, designed to support the consultation stage of the Welsh Government's formal Impact Assessment (IA).

1.11 Following analysis of consultation feedback by the Welsh Government, and any corresponding revision of the proposed options, revised analysis will then be undertaken, to support the final EIA.

1.12 If you have any questions or require further information please do not hesitate to contact us

- Dr Steve Sheppard, CEO, Adroit Economics
  - Steve.sheppard@adroit-economics.couk

2. Executive Summary

2.1 This report sets out the results of the Economic Impact Assessment (EIA) of the Welsh Government's proposed changes to the building regulations regarding security standards for new domestic dwellings and proposed changes to water efficiency standards for new build dwellings and new build non-domestic buildings.

2.2 The EIA calculates:

- the reduced costs to the construction industry of the proposed changes, compared with the current situation (the counterfactual)
- the benefits to dwelling occupiers, where the evidence permits

Cost savings to the construction industry

2.3 Cost savings are achieved in two ways:

- reduced cost of materials and components
- reduced administrative/managerial compliance process costs

2.4 Cost savings are calculated as follows

- change in materials and component costs of proposed options compared with the current situation
- change in time (and time costs) involved in administrative/managerial compliance process costs associated with the proposed options compared with the current situation
- but taking account of the cost of transition from the current to the proposed option (time costs)

2.5 Costs are estimated for a range of different building types. The volume of new building for each building type, over a 10 year period, is then estimated. Total costs are calculated by multiplying unit building type costs with the estimated total of new builds for each type, each year, over the 10 year period. The results are present in present value terms, using the standard NPV function, with a discount rate of 3.5%.

Cost savings to the construction industry

2.6 The results of the EIA suggest that the proposed policy changes are likely to result in cost savings to the construction industry of between £17.5m to a £23.5m (calculated over a 10 year period (NPV @ 3.5%)).

2.7 The EIA process is not a precise science, not least because it relies on a number of assumptions. Therefore, in accordance with Government guidance on policy appraisal, the EIA tests the implications of varying key assumptions in the analysis and provides a total of 9 sets of results, each for a different set of assumptions. These are termed EIA scenarios

2.8 The results for each of 9 EIA scenarios are shown in the tables below:

Table 2.1: Scenario analysis results – net cost reductions to industry (10 yr NPV £m)

Net cost reductions to industry (10 Year NPV (£m))			
	low build rate	central build rate	high build rate
low unit costs	£20.1	£21.8	£23.5
central unit cost	£19.8	£21.4	£23.2
high unit costs	£17.5	£19.0	£20.5

Table 2.2: Scenario analysis results –Equivalent Annual Net Cost reduction to industry (10 yr EANC £m)

Net cost reduction to industry (10 Year EANC (£m))			
	low build rate	central build rate	high build rate
low unit costs	£2.3	£2.5	£2.7
central unit cost	£2.3	£2.5	£2.7
high unit costs	£2.0	£2.2	£2.4

Benefits to building occupiers

2.9 The EIA estimates and monetises the benefits of the proposed changes to individual occupiers and to wider society where the evidence allows.

2.10 Regarding proposed changes to water standards, individual dwelling occupiers will benefit from reduced use of both hot and cold water, resulting in reduced water consumption costs (where metered) and reduced energy costs. The net savings to individual occupiers are likely to be minimal however. The EIA has therefore not sought to quantify or monetise these.

2.11 Water standard changes, when aggregated across the whole community will result in reduced water extraction and processing costs, and, in reduced energy use – with implications for climate change commitments. Quantification and monetisation of these wider community benefits are not within the scope of this EIA.

2.12 Regarding proposed changes to security standards, essentially the proposals retain the key elements of current security standards (Secure by Design) and continue to apply these to new residential dwellings.

2.13 Based on the available evidence in the literature of the monetised benefits of reduced burglary, applied to the house building projections used in this EIA, it is estimated that the resulting reduced cost of burglaries ranges from £16.7m - £48.5m. Even under the low impact assumption of a 20% reduction in burglaries, the user benefits outweigh the costs of the proposed policy.

3. Overall approach

3.1 This economic impact assessment (EIA) is designed to assess the net cost changes to the construction industry of constructing new residential and non-residential buildings in Wales over the next 10 years that are likely to arise as a result of the changes to the building regulations proposed by the Welsh Government.

3.2 The proposed changes relate to water and security standards only.

3.3 Several design changes (options) have been proposed for each and the purpose of this EIA is to assess the net cost changes to the construction industry of complying with each proposed standard and the overall net impact of the proposed changes.

3.4 The net cost change for each proposed option is calculated by first estimating the cost of construction under the current regulations (this is termed the counterfactual assessment), then deducting the cost of construction estimated to arise as a result of each proposed standard change.

3.5 The Welsh Government has identified the proposed changes to be assessed; consultants, Mott MacDonald has defined the technical specifications of each change; and AECOM has provided the units costs of the proposed changes

3.6 Types of cost that are considered in the EIA are:

- **Construction costs** – time and components, associated with implementing the standards for each component for each option
- **Process costs** – time and resources incurred by firms and regulators to ensure compliance with the standards
- **Transition costs** - time costs associated with staff reading and understanding the new guidance

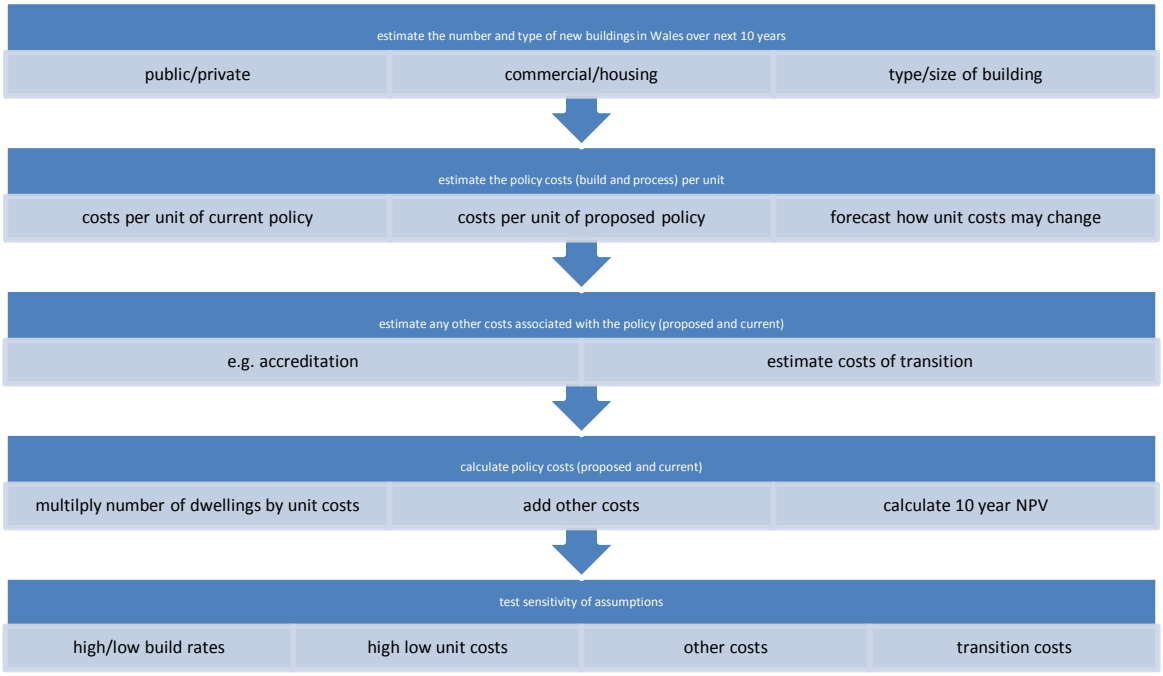
3.7 The costs are estimated per new house for different housing types, sizes and tenure and per building for different types/sizes of non-domestic building.

3.8 The costs per building type are then scaled up to estimate total costs for all new building per year in Wales. The total cost per year is then projected forward over a 10-year period, based on assumptions regarding new build rates per building type across Wales. New house building rate projections are based on Welsh Government new build projections and non-domestic build rate projections are based on a variety of calculations undertaken by Adroit Economics.

3.9 These scaled-up cost elements, for the counterfactual and for reach proposed change are assessed over a 10 year period, using a standard 10-year NPV cash flow model, with all costs converted to present values using the standard NPV function at 3.5% discount rate.

3.10 Benefits, of the proposed design changes, to users (occupiers), such as the benefits of increased security and reduced water consumption are noted in the EIA but not quantified. The EIA focusses on costs, on comparing costs to the construction industry that derive from the proposed standards changes.

3.11 The following diagram illustrates the sequence of calculations carried out in the EIA


estimate the number and type of new buildings in Wales over next 10 years
public/private
commercial/housing
type/size of building
estimate the policy costs (build and process) per unit
costs per unit of current policy
costs per unit of proposed policy
forecast how unit costs may change
estimate any other costs associated with the policy (proposed and current)
e.g. accreditation
estimate costs of transition
calculate policy costs (proposed and current)
multilply number of dwellings by unit costs
add other costs
calculate 10 year NPV
test sensitivity of assumptions
high/low build rates
high low unit costs
other costs
transition costs

4. Core assumptions underpinning the EIA

4.1 This section sets out the core assumptions which underpin the EIA. The core assumptions can be divided into two sets:

- Those relating to estimating the cost impacts of the proposed water and security standards on new house building, and
- Those relating to estimating the cost impacts of the proposed water standards on new non-domestic building.

Data sources

4.2 The following points should be noted regarding the data sources used:

- Where possible, data sources specific to Wales have been used i.e. relevant data sources published by the Welsh Government or other organisations
- In some cases, data are only available for England and Wales combined, in which case we have drawn on additional data sets, that help us distinguish between England and Wales, as a proxy, to estimate Wales-specific metrics
- Where relevant and helpful, we have referred to the primary and secondary sources used in the equivalent English EIA work, undertaken by Adroit Economics on behalf of DCLG. The English assessment was a substantial exercise and a large number of potential relevant sources of data were identified.
- Cost data related to the proposed design changes are provided by AECOM. Please refer to the AECOM report for details.

4.3 Adroit Economics' role is limited to constructing the EIA methodology, drawing on the cost data provided AECOM, in order to estimate likely cost impacts of the proposed standards.

Core housing EIA assumptions

4.4 Core assumptions relating to the housing impact estimates include assumptions regarding:

- Unit cost changes per new dwelling resulting from the proposed standards compared with the current situation (the counterfactual)
- Varying unit costs to reflect the likely mix, size and tenure of new house building, across Wales, in a typical year
- Forecasting likely future new build rates for each year, over the 10-year EIA assessment period

Unit Build Costs

4.5 AECOM has provided all unit build costs. Please refer to the separately published AECOM cost reports.

Process Costs

4.6 Process costs are costs not directly associated with the building works to comply with a standard but arising from the process of compliance. These include additional design time

incorporating requirements and commissioning of specialist reports. For planning authorities, the process costs include the time required to receive and review evidence of compliance.

4.7 Most of the standards considered within this report incur a "process" cost related to professionals' time spent dealing with the standard, for example architects time working on specifications for doors, windows and locks.

4.8 The basis of the cost applied to such professionals' time is to use a blended average between market rates (i.e. what a client could expect to pay for a professional's time) and the ONS Annual Survey of Hours and Earnings (ASHE) reflecting wages with 30% added for overheads. The two sets of rates and resultant average adopted are indicated in Table 4.1 below. Market rates are derived from Welsh Government National Procurement Service (NPS) consultants' framework.

Table 4.1: Hourly Rates by Occupation for Process Costs

Description	ONS hourly pay	NPS rate	Blended hourly rate
Architect	22.22	41.06	31.64
Inspectors of standards and regulations	16.05	32.1	24.08
Mechanical engineer	21.74	44.88	33.31
Construction manager	19.09	46.44	32.77
Electrical engineers	21.85	44.88	33.37
Building surveyor	18.56	37.12	27.84
Quantity surveyor	20.09	43.63	31.86
Skilled trades	12.04	24.08	18.06

Process Costs: Secure by Design

4.9 AECOM have estimated the costs of SBD to be £16.20 per dwelling. Please refer to the separately published AECOM cost reports for details.

Process Costs: Proposed Security Standard

4.10 The proposed security standard covers relatively few building elements (doors and windows, lighting) and would be applied to all dwellings. It is therefore anticipated that the process associated with the standard would be limited and it is estimated that 5 minutes would be spent for each dwelling type checking compliance of components. Table 4.2 below indicates the anticipated cost for a medium (50 unit) scheme with 5 dwelling types.

Table 4.2: Proposed Security Standard Process Costs per Dwelling

Professional	hours	rate	Total
Design team	.40	£31.64	£12.66
Building control	.20	£24.08	£4.81
Total (50 dwellings)			£17.47
Per Dwelling			**£0.35**

Process Costs: Code for Sustainable Housing

4.11 Process costs associated with Code for Sustainable Homes can include:

- Undertaking technical calculations, for example related to water use.
- Collating and reviewing compliance evidence, for example light fitting specifications, materials
- Traceability (responsible sourcing).
- Specialist consultant reports, for example relating to daylighting and ecology.
- The cost to achieve certification for each dwelling charged by the Building Research Establishment.

4.12 An assessment of non-energy process costs for CfSH level 3 housing has been based on the assumptions set out in the assessment undertaken in England as part of the 2015 Housing Standards Review[4]. The cost per unit of £125/unit plus BRE fee of £37/unit (3 bed house) for medium size development. This provides a total unit cost of £167.

Process Costs: Domestic Water Standards

4.13 For new housing the process for checking compliance with the proposed standard would be the same as that currently undertaken in relation to the current Building Regulations (the only difference being a reduction in water use). Given this point there would be no process costs in addition to the current Building Regulations.

Housing types

4.14 Unit costs have been provided for the following housing types, sizes and tenures

4.15 Different dwelling types and sizes will incur different costs. In order to reflect the mix of housing in Wales the EIA assumes ***5 dwelling types***. The costs of implementing the policy have been estimated for the following specific types of houses which have been applied to a more general type of dwelling as presented in the table 4.3

Table 4.3: Cross referencing housing types

Unit Cost Estimates	Dwelling Scale Up numbers
1 bed flat	1 bed apartment
2 bed flat	2 bed apartment
2 bed terraced house	2 bed house
3 bed semi-detached house	3 bed house
4 bed detached house	4+bed house

Housing tenure

4 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/418419/150327_HSR_Security_IA_Final_Web_version.pdf

4.16 The EIA needs to distinguish between private and RSL dwellings, because the policy changes impact differently. Table 4.4 shows the proportions adopted in the EIA

- The 2014/15 new dwellings data published by Welsh Government has been used to estimate the proportion of dwellings that will be built.
- The EIA assumes that the proportion does not change over the period.

Table 4.4: Assumed split between private and RSL and by size, based on Welsh Government figures

	Private Dwellings	RSL dwellings
1 bed apartment	6%	3%
2 bed apartment	6%	3%
1-2 bed house	11%	3%
3 bed house/flat	34%	4%
4+ bed house/flat	29%	1%
	86%	14%

4.17 It should be noted that the proposed changes to water and security policy are assumed to impact only on the new private dwellings. New RSL dwellings are expected to continue to be required to be built to CfSH and SBD standards

New Build Dwellings beyond CfSH Level 3

4.18 Although the expectation in TAN22 was for new dwellings to be built to CfSH Level 3, a small proportion of private dwellings were built to CfSH Level 4+. Given that this was not a requirement from policy, it is assumed that these dwellings would be built to the same standard irrespective of the policy. Therefore, it is anticipated that a small proportion of new private dwellings will continue to be built to CfSH Level 4+

4.19 In 2013, the data for Wales indicates that a total of 2.8% of dwellings received completion certificates for CfSH Level 4+. This has been used as the estimate of the proportion of dwellings that would continue to meet this standard over the appraisal period.

New house build rate estimates for Wales

4.20 Having established unit cost estimates (i.e. estimates of cost changes for each policy option for individual building types, tenure and sizes of new dwelling), the EIA estimates the number of dwellings (by type, size and tenure) likely to be built each year over the 10 year assessment period.

4.21 To do this the EIA adopts an overall new housebuilding estimate for each year, to which the above split by housing type, size and tenure is then applied.

Welsh Government – house building projections.

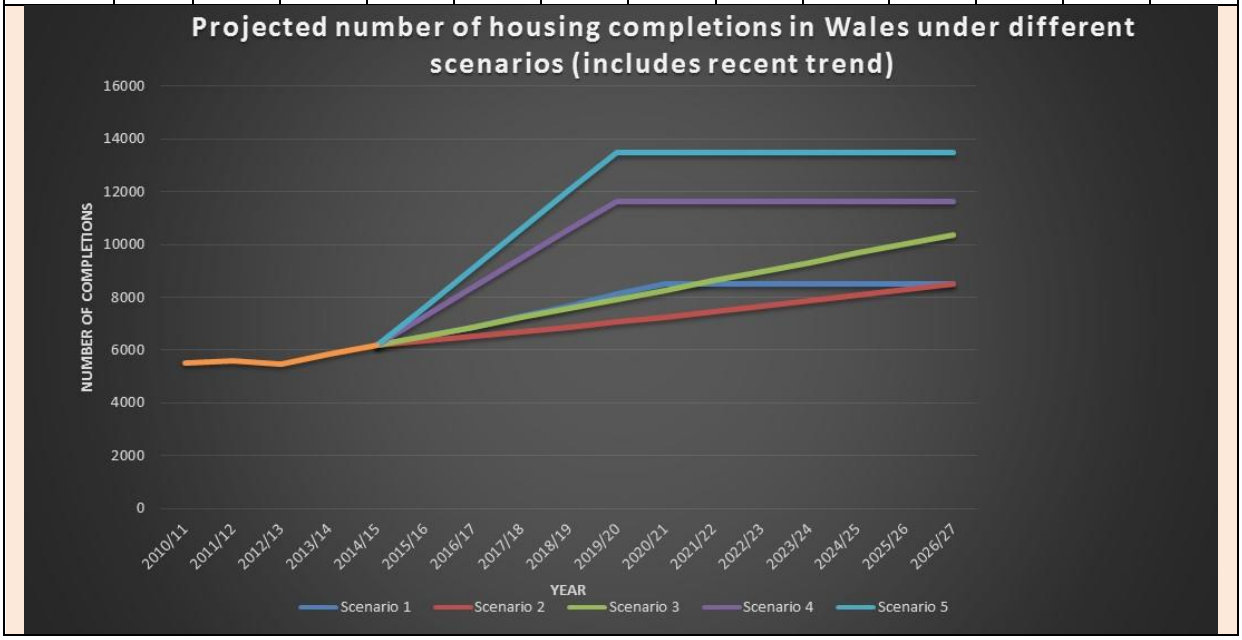
4.22 The housebuilding projections used in the EIA are derived from the Welsh Government's latest new housebuilding projection data, shown at tables 4.5 and 4.6 below. Because estimating new build rates is not an exact science, a number of different scenarios are provided.

Table 4.5: Past house building trends in Wales

	2010/11	2011/12	2012/13	2013/14
Historic	5505	5575	5451	5843

Table 4.6: Welsh Government House Building Projections

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Scenario 1	6170	6520	6880	7270	7680	8110	8500	8500	8500	8500	8500	8500	8500
Scenario 2	6170	6340	6510	6690	6870	7060	7250	7450	7650	7860	8070	8290	8500
Scenario 3	6170	6520	6870	7220	7570	7920	8270	8620	8970	9320	9670	10020	10370
Scenario 4	6170	7270	8370	9470	10570	11650	11650	11650	11650	11650	11650	11650	11650
Scenario 5	6170	7640	9110	10580	12050	13500	13500	13500	13500	13500	13500	13500	13500
Historic	6170												

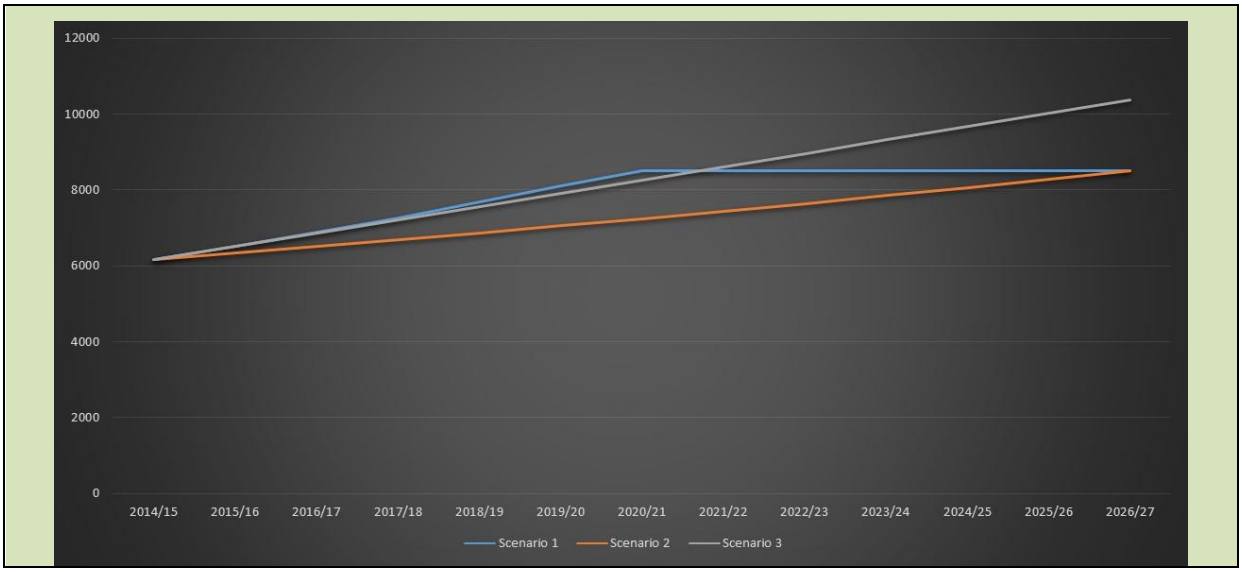


House building projections used in the impact assessment

4.23 This EIA adopts three new house building scenarios as shown in table 4.7

Table 4.7: Housebuilding projections used in the EIA

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Scenario 1	6170	6520	6880	7270	7680	8110	8500	8500	8500	8500	8500	8500	8500
Scenario 2	6170	6340	6510	6690	6870	7060	7250	7450	7650	7860	8070	8290	8500
Scenario 3	6170	6520	6870	7220	7570	7920	8270	8620	8970	9320	9670	10020	10370



4.24 The three scenarios are based on the Welsh Government's new housebuilding projections, adjusted to reflect the following considerations:

- Scenario 1 - Housing completions are assumed to increase at the most recent rate until the level reaches the pre-downturn average of approx. 8,500 per annum (approximate average from 2000-01 to 2007-08)
- Scenario 2 – A slower increase in housing completions is assumed, so the return to the average pre-downturn levels is only achieved towards the end of the appraisal period (assumes 2.7% growth per annum)
- Scenario 3 – A 350 increase in completions per annum is assumed (on the basis that the number of completions has increased by 300-400 in last two years)

4.25 Each of these scenarios forms the basis of three EIA scenarios – a low growth, a central growth and a high growth EIA scenario.

- New build scenario 1 is used as the basis for the central EIA scenario
- New build rate scenario 2 is used as the basis for the low growth EIA scenario, and
- New build rate scenario 3 is used as the basis for the high growth EIA scenario (see further on for a discussion of the scenarios modelled in the EIA)

4.26 The EIA 10-year modelling period starts from 2017 when the new policy is expected to commence (although the model includes figures for 2016 as well)

Core non-domestic EIA assumptions

4.27 Core non-domestic EIA assumptions include:

- Defining types/sizes of non-domestic building to include in the EIA
- Cost change, per non domestic building type per unit resulting from the proposed standards compared with the current situation (the counterfactual)
- Estimating future new build rates over the 10 year EIA period

Defining types of non-domestic building to include in the EIA

4.28 Unit costs have been provided for the following types of non-domestic building, modelled in the EIA

Table 4.8: Non-domestic new build types included in the EIA

▪ Offices
▪ Hotels
▪ Warehouses
▪ Retail
▪ University - HEIs
▪ Multi-Residential – care homes, halls of residence etc.

Unit costs

4.29 Again, these are provided by AECOM. Please refer to the AECOM cost reports for details.

Process Costs: BREEAM

4.30 Cost of BREEAM assessments include the costs of the assessor's time and the BRE registration and quality assurance costs. Costs vary greatly from project to project and the level of service offered, the degree of support and engagement the design team and/or the client wants, i.e. basic assessment and certification or a greater role in the BREEAM co-ordination and associated consultancy.

4.31 Experience indicates a standard design and post-construction assessment with certification of a typical project, to a professional standard of quality would cost around £10,000 per assessment including the BREs registration and certification fees. Where enhanced services are being offered this can rise to £20,000 per project. The lower cost has been used for this assessment

Table 4.9: Registration data from BRE

Year	Registration	Certification
2012	63	81
2013	71	86
2014	51	65
2015	100	88

4.32 Clearly the number of registrations and completion certification varies from year to year. For the purposes of this assessment a conservative reduction on the counterfactual of the annual number of developments not having to receive BREEAM certification has been used of 70. It is assumed that this would be constant over the review period

Table 4.10: Annual BREEAM Process costs

	Certifications	**£cost/project**	**total**
Annual	70	10,000	700,000

Process Costs: Proposed Non-Domestic Water Standards

4.33 For non-domestic buildings a fitting approach is proposed. Once designers have become familiar with the new requirements, sourcing suitable products and reflecting the reduced water demand in system calculations there would be no ongoing process costs. In addition much of the industry will be familiar with the BREEAM approach and mandatory water efficiency standards. Therefore there would be no process costs in addition to the current Building Regulations.

Estimating future new non-domestic build rates over the 10 year EIA period

4.34 The Welsh Government does not provide formal new build projections for non-domestic buildings on which the EIA can draw. Instead, the EIA has had to arrive at independent estimates and deploys two methods to do so depending on the data available – one to estimate multi-residential new build and the other to estimate all other non-domestic new build rates. In both cases, we have had to refer to two or more data sets to arrive at an estimate. The estimates produced are therefore inevitably very approximate.

Method used to estimate office, hotel, warehouse, retail and university new build rates across Wales

4.35 A number of relevant data sets were identified and several methodologies were considered for estimating new build rates. The following method was identified as the optimal. It combines 3 different types of data:

- Total construction spend figures for England and Wales - the latest available figure for public and private spending on new build projects (excluding infrastructure and housing) in Wales is £1,642m in 2014[5]
- But as no breakdown is provided by building type for Wales, we used the aggregated England and Wales data set from the same source as a proxy to estimate the split by building type in Wales
- And to convert spend into floorspace, we divided the above by estimated average new build costs per sq. meter, per building type (provided by AECOM)

4.36 Table 4.11 shows the calculations

[5] Output in the Construction Industry October 2015, ONS http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-358522

Table 4.11: Basis used to estimate non-domestic new build rates (sq. m floorspace) per year across Wales

	Estimate of 2014 new build construction Spending (£m)				Estimate of new Floorspace
	PUBLIC	PRIVATE	Total	£ per SQM	SQM
Warehouses	1.93	45.50	47.44	334	141,840
Schools, Universities & Colleges	392.39	126.86	519.25	2,059	252,201
Offices	32.89	265.11	298.00	1,879	158,583
Entertainment	59.78	178.62	238.40	2,275	104,793
Garages, Shops	12.34	178.75	191.09	764	249,991

Method used for estimating build rates for multi-residential buildings

4.37 The new build construction data does not separate out multi-residential buildings from other residential dwellings. Therefore, these have been calculated on a different basis.

4.38 Multi-residential buildings consist primarily of student accommodation and care homes. We have estimated the amount of new build based on past trends, and estimates of numbers of new bed spaces that are expected to be built. This has then been multiplied by sqm per bed space to arrive at total floorspace.

4.39 Our estimates (based on data supplied by Welsh Government) are that there will be 1445 additional bed spaces built each year, consisting of 1000 student accommodation and 445 care home spaces. The average student residence is 26sqm per bed space (based on research undertaken by Cushman and Wakefield) – which has been applied to the total number.

Results – new build rates for non-domestic building used in the EIA

4.40 Table 4.12 shows non domestic new build rate assumptions we have used in the central scenario

- The EIA assumes no change, year on year, on current estimated build rates
- The high and low build rate scenarios assume 10% plus/minus the central estimate

Table 4.12: Non domestic new build rate projections used in the EIA – in the central scenario (Sq.M)

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Offices	158,583	158,583	158,583	158,583	158,583	158,583	158,583	158,583	158,583	158,583	158,583
Hotels	104,793	104,793	104,793	104,793	104,793	104,793	104,793	104,793	104,793	104,793	104,793
Warehouses	141,840	141,840	141,840	141,840	141,840	141,840	141,840	141,840	141,840	141,840	141,840
Retail	249,991	249,991	249,991	249,991	249,991	249,991	249,991	249,991	249,991	249,991	249,991
University	252,201	252,201	252,201	252,201	252,201	252,201	252,201	252,201	252,201	252,201	252,201
Multi-Residential	37,570	37,570	37,570	37,570	37,570	37,570	37,570	37,570	37,570	37,570	37,570

Scenario Testing

4.41 The EIA process is not a precise science, not least because it relies on a number of assumptions. Therefore, in accordance with Government guidance on policy appraisal, the EIA tests the implications of varying key assumptions in the analysis and provides a total of 9 sets of results, each for a different set of assumptions. These are termed EIA scenarios. Section 12 provides further detail of the need for scenario analysis and the basis of each of the 9 scenarios.

4.42 Each of the following sections set out, for illustration, further detail of the calculations and results for one of the 9 EIA scenarios – the central build, high cost EIA scenario.

5. Security Standards EIA

5.1 The security standards EIA assesses the impact of introducing the features required to meet Secure by Design standards for doors and windows.

5.2 Table 5.1 shows the results of the security standard EIA for the central build, high cost scenario[6]. The analysis shows that costs to the construction industry of compliance with the proposed policy will be greater than with current policy (the counterfactual)

- The counterfactual reflects total build costs without the additional security features and therefore the net figure illustrates the additional costs of introducing these features.
- The Impact Assessment assumes that all RSL housing is currently being built to SBD standards and this is included in both the counterfactual scenario and the policy scenario.

Table 5.1: Security Standards EIA Results

		NPV (@ 3.5%)
Wales	Counterfactual	£505,397,537
Wales	Policy	£520,426,085
Net	Net cost of proposed security standards	£15,028,548

EANC Calculation	
£15,028,548	NPV
10	Years
£1,745,945	EANC

5.3 Table 5.2 shows the full calculation of the security standards EIA

[6] See further on for definition of the high cost scenario

Table :5.2		Start Period	2017										
Period #		0	1	2	3	4	5	6	7	8	9	10	10 year Net Present Value
Year		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	NPV
	Counterfactual_Mid Growth												
Wales	Build Costs	49,111,532	51,895,470	54,822,175	57,891,646	60,675,584	60,675,584	60,675,584	60,675,584	60,675,584	60,675,584	60,675,584	
Wales	Process Costs	15,120	15,977	16,878	17,823	18,680	18,680	18,680	18,680	18,680	18,680	18,680	
Wales	Total Build related Costs	**49,126,652**	**51,911,447**	**54,839,053**	**57,909,469**	**60,694,264**	**60,694,264**	**60,694,264**	**60,694,264**	**60,694,264**	**60,694,264**	**60,694,264**	**£505,397,537**
	policy_Mid Growth												
Wales	Build Costs	49,111,532	52,590,820	55,924,022	59,636,954	62,708,071	62,708,071	62,708,071	62,708,071	62,708,071	62,708,071	62,708,071	
Wales	Process Costs	15,120	17,736	19,666	22,239	23,823	23,823	23,823	23,823	23,823	23,823	23,823	
Wales	Total Build related Costs	**49,126,652**	**52,608,556**	**55,943,688**	**59,659,193**	**62,731,894**	**62,731,894**	**62,731,894**	**62,731,894**	**62,731,894**	**62,731,894**	**62,731,894**	**£520,426,085**
Wales	Difference	-	697,109	1,104,635	1,749,724	2,037,629	2,037,629	2,037,629	2,037,629	2,037,629	2,037,629	2,037,629	**£15,028,548**

6. Domestic Water Standards EIA

6.1 The Domestic Water proposals introduce standards to improve water efficiency in new domestic dwellings to replace the non-energy related elements of CfSH level 3.

6.2 Table 6.1 shows the results of the Domestic Water Standards EIA. The analysis shows that costs to the construction industry of compliance with current policy (the counterfactual) compared with the four proposed options will be greater. Therefore, all four options show a cost saving against the current standard.

Table 6.1: Results of the Water Standards EIA

		NPV (@ 3.5%)	EANC
Wales	Counterfactual (CfSH - non-Energy – Level 3)	£14,309,814	£1,662,446
Wales	Option 1	£4,977,355	£578,245
Wales	Option 2	£4,778,476	£555,141
Wales	Option 3	£4,977,355	£578,245
Wales	Option 4	£4,778,476	£555,141

6.3 Table 6.2 shows the full calculations of the Water Standards EIA

	Table 6.2	Start Period	2017										
	Period #	0	1	2	3	4	5	6	7	8	9	10	10 year Net Present Value
	Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	NPV
	Counterfactual												
Wales	Build Costs	307,619	325,056	343,388	362,614	380,052	380,052	380,052	380,052	380,052	380,052	380,052	
Wales	Process Costs	1,083,352	1,144,763	1,209,324	1,277,033	1,338,444	1,338,444	1,338,444	1,338,444	1,338,444	1,338,444	1,338,444	
Wales	Total Build related Costs	**1,390,971**	**1,469,820**	**1,552,712**	**1,639,647**	**1,718,496**	**1,718,496**	**1,718,496**	**1,718,496**	**1,718,496**	**1,718,496**	**1,718,496**	**£14,309,814**
	policy_Option 1												
Wales	Build Costs	307,619	287,952	284,592	269,483	271,596	271,596	271,596	271,596	271,596	271,596	271,596	
Wales	Process Costs	1,083,352	748,976	582,161	283,617	181,568	181,568	181,568	181,568	181,568	181,568	181,568	
Wales	Total Build related Costs	**1,390,971**	**1,036,927**	**866,753**	**553,100**	**453,165**	**453,165**	**453,165**	**453,165**	**453,165**	**453,165**	**453,165**	**£4,977,355**
	policy_Option 2												
Wales	Build Costs	307,619	278,726	269,974	246,328	244,631	244,631	244,631	244,631	244,631	244,631	244,631	
Wales	Process Costs	1,083,352	748,976	582,161	283,617	181,568	181,568	181,568	181,568	181,568	181,568	181,568	
Wales	Total Build related Costs	**1,390,971**	**1,027,702**	**852,135**	**529,945**	**426,200**	**426,200**	**426,200**	**426,200**	**426,200**	**426,200**	**426,200**	**£4,778,476**
	policy_Option 3												
Wales	Build Costs	307,619	287,952	284,592	269,483	271,596	271,596	271,596	271,596	271,596	271,596	271,596	
Wales	Process Costs	1,083,352	748,976	582,161	283,617	181,568	181,568	181,568	181,568	181,568	181,568	181,568	
Wales	Total Build related Costs	**1,390,971**	**1,036,927**	**866,753**	**553,100**	**453,165**	**453,165**	**453,165**	**453,165**	**453,165**	**453,165**	**453,165**	**£4,977,355**
	policy_Option 4												
Wales	Build Costs	307,619	278,726	269,974	246,328	244,631	244,631	244,631	244,631	244,631	244,631	244,631	
Wales	Process Costs	1,083,352	748,976	582,161	283,617	181,568	181,568	181,568	181,568	181,568	181,568	181,568	
Wales	Total Build related Costs	**1,390,971**	**1,027,702**	**852,135**	**529,945**	**426,200**	**426,200**	**426,200**	**426,200**	**426,200**	**426,200**	**426,200**	**£4,778,476**

7. Non-domestic Water Standards EIA

7.1 The non-Domestic Water EIA assesses the impact of introducing a fittings based water efficiency standard. This would replace the requirement for non-domestic properties to be built to meet BREAAM very-good standards.

7.2 Table 7.1 shows the results of the Non-domestic water standards EIA. The Analysis shows considerably lower costs to the construction industry of compliance with the proposed policy compared with the current situation (the counterfactual, the mandatory water element of the BREEAM Very Good standard).

Table 7.1: Result of the Non-domestic Water Standard EIA

					NPV (@ 3.5%)	EANC
Wales		Counterfactual			£31,756,987	£3,689,375
Wales		Policy			£6,579,307	£764,353

EANC Calculation	
10	Years

7.3 Table 7.2 shows the full calculations of the Non-domestic Water Standards

Table 7.2	Start Period	2017										
Period #	0	1	2	3	4	5	6	7	8	9	10	10 year Net Present Value
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	NPV
Counterfactual Costs												
Wales	Build Costs	2,989,375	2,989,375	2,989,375	2,989,375	2,989,375	2,989,375	2,989,375	2,989,375	2,989,375	2,989,375	2,989,375	
Wales	Process Costs	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	
Wales	Total Build related Costs	**3,689,375**	**3,689,375**	**3,689,375**	**3,689,375**	**3,689,375**	**3,689,375**	**3,689,375**	**3,689,375**	**3,689,375**	**3,689,375**	**3,689,375**	**£31,756,987**
Policy Costs												
Wales	Build Costs	2,989,375	1,931,536	1,402,616	609,236	344,776	344,776	344,776	344,776	344,776	344,776	344,776	
Wales	Process Costs	700,000	420,000	280,000	70,000	-	-	-	-	-	-	-	
Wales	Total Build related Costs	**3,689,375**	**2,351,536**	**1,682,616**	**679,236**	**344,776**	**344,776**	**344,776**	**344,776**	**344,776**	**344,776**	**344,776**	**£6,579,307**

8. Transition costs

8.1 Transition costs are the time costs incurred by the construction industry in getting up to speed with the new standard (i.e. reading/familiarisation with the changed guidance)

8.2 The EIA calculates transition costs for three groups of participants in the construction industry

- Time costs to industry professionals such as architects, QSs etc.
- Time costs to professional firms, over and above time costs to individual professionals, to update internal processes and procedures
- Costs to construction (building) firms to update their internal processes and procedures

8.3 Total transition costs for each of the above groups have been calculated by multiplying hourly cost, per grade/size of organisation by the assumed number of hours involved in getting up to speed with the new standard. Similar metrics to those used in the English assessment have been used where relevant.

8.4 The following tables show the transition costs calculations in detail

Table 8.1: Industry Professionals transition cost calculations

Industry Professionals					
Profession	no of professionals	hours	rate	total	Source (numbers)
Architect	647	2	£ 31.64	£ 40,942	RSAW
Building control surveyor	202	2	£ 24.08	£ 9,728	Welsh Govt
Quantity surveyor	479	2	£ 31.86	£ 30,522	RICS
Building surveyor	552	2	£ 27.84	£ 30,735	RICS
Building services engineer	300	2	£ 33.31	£ 19,986	CIBSE
Tradesman	20500	1	£ 18.06	£ 370,230	BRES
Total				£ 502,144	

Table 8.2: Professional Firm transition cost calculations

Professional Firms				
	No. firms	**hours**	**rate**	Total
Architect	100	2	31.64	£ 6,328
Surveyor	100	2	27.84	£ 5,568
Engineer	50	2	33.31	£ 3,331
Building Control	28	2	24.08	£ 1,348
Total				£ 16,575

Table 8.3: Building (construction) firm transition cost calculations

Building Firms				
Size of firm (employees)	No. firms	Hours/firm	Rate	total
Micro (0-9)	1325	0	31.64	£ -
Small (10-49)	110	1	31.64	£ 3,480
Medium (50-249)	30	2	31.64	£ 1,898
Large (250+)	20	2	31.64	£ 1,266
				£ 6,644

Table 8.4: Hourly rates used in the above calculations

Hourly Rates			
Description	**ONS hourly pay**	**NPS rate**	**Blended hourly rate**
Architect	22.22	41.06	31.64
Inspectors of standards and regulations	16.05	32.1	24.08
mechanical engineer	21.74	44.88	33.31
construction manager	19.09	46.44	32.77
Electrical engineers	21.85	44.88	33.37
building surveyor	18.56	37.12	27.84
Quantity surveyor	20.09	43.63	31.86
Skilled trades	12.04	24.08	18.06

Table 8.5: Transition cost calculation results

Industry Professionals	£ 502,144
Professional Firms	£ 16,575
Building Firms	£ 6,644
Total Transition costs	**£ 525,364**

8.5 Transition costs have been assumed to occur in the first year of the 10-year EIA appraisal period.

8.6 The following table shows how the EIA has taken account of the phasing of transition from the current building standards to the proposed building standards.

Transition phasing

Table 8.6 shows the transition phasing adopted in the EIA. This table illustrates the proportion of dwellings that are expected to be built to the different standards. This phasing reflects that a proportion of building projects will already be in progress and that have been approved based on the 2016 standards. The phasing has been applied to all 3 EIAs

Table 8.6: Transition cost phasing

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
% built to 2016 standards	0%	40%	60%	90%	100%	100%	100%	100%	100%	100%	100%	100%
% built to pre 2016 standards	100%	60%	40%	10%	0%	0%	0%	0%	0%	0%	0%	0%

9. Social Benefits

9.1 The benefits and costs to the construction industry are presented in the preceding sections. This section considers the social benefits/ impacts to occupiers of new buildings, and quantifies/monetises these, where possible.

Water

9.2 Social benefits associated with reduced water use by new building occupiers can be considered in two respects:

- Benefits to occupiers of individual new buildings
- Collective benefits to the wider community

Benefits to occupiers of individual new buildings

9.3 Benefits to building occupiers comprise reduced use of both hot and cold water resulting in reduced water usage costs (where water usage is charged based on quantity (metering)) and reduced heating costs

9.4 However, the savings to individual new buildings/ occupiers are likely to be relatively small and have not been quantified.

Wider community benefits

9.5 At the level of the wider community, benefits from reduced individual use of water will be aggregated and will have implications for:

- Reduced water extraction and processing costs
- Reduced energy use – with implications for climate change commitments.

9.6 Quantification and monetisation of these benefits are not within the scope of this EIA to estimate these.

Security[7][8]

9.7 The principal benefits of improved residential security are reduced burglary and associated damage, loss and trauma

9.8 There is evidence that increase security achieved from more secure design has resulted in reduced burglary, but that a significant problem still remains:

- The latest figures, provided by the Welsh Government, show that households are now broadly a third less likely to be a victim of burglary than in 1995 when such crime peaked, with 3 in 100 households falling victim in the year ending September 2014, compared with around 9 in 100 in the 1995 survey.

[7] The following analysis largely replicates the assessment undertaken in England as part of the 2015 Housing Standards Review

[8] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/418419/150327_HSR_Security_IA_Final_Web_version.pdf

- These trends in burglary (and vehicle-related thefts) are thought to reflect what criminologists describe as 'target hardening', making it more difficult for criminals to commit crime, for example by improving household and vehicle security.
- The requirement for new social housing to comply with the police 'Secured by Design' scheme and the NHBC basic security standard will have contributed towards this[9].
- However, for the year ending June 2015 the Crime Survey for England and Wales (CSEW) estimated there were still 750,000 incidents of domestic burglary and the proportion of people who were emotionally affected by a burglary has remained consistently high for the past decade (around 85%).[10] [11]

9.9 Ensuring appropriate security of new buildings remains an issue therefore.

Two broad types of security by design measure

9.10 Design can help increase security of residential premises in two ways:

- Through better design of the immediate surrounding environment/ public realm which reduces secluded areas and access and which opens up visibility thereby discouraging burglaries
- Through better design of individual houses which leads to increased physical security of individual dwellings

9.11 The planning system remains best equipped to address the former though ensuring better layout of the immediate local environment. This is reflected in the National Planning Policy guidance TAN 12 – Design. The proposals under consideration in this EIA will not change that guidance.

9.12 Building Regulations, the subject of this EIA, are more suited to focus on physical security of individual properties.

9.13 The security proposals under consideration in this EIA would retain the key features of current Secured by Design element of code though requiring that doors and windows meet the Publicly Available Specification (PAS) 24 standard.

9.14 Although PAS 24 does not fully replicate the Secured by Design requirements, it is widely acknowledged amongst security experts that properly specified doors and windows contribute significantly more towards burglary reduction than the remaining elements of Secured by Design. It is therefore reasonable to expect similar security performance from PAS 24 compared with Secured by Design

Estimating the social benefits of PAS 24 security proposals

9.15 There is substantial evidence that good design can significantly reduce the rate of burglary.

[9] http://www.ons.gov.uk/ons/rel/crime-stats/crime-statistics/year-ending-september-2014/sty-stock-take-of-crime-statistics.html

[10] http://www.ons.gov.uk/ons/rel/crime-stats/crime-statistics/period-ending-march-2014/index.html

[11] http://www.ons.gov.uk/ons/dcp171778_419450.pdf

9.16 A number of studies have quantified the potential reduction in crime, providing a range of results. For example the effectiveness of the Secured by Design (SBD) scheme in burglary reduction is estimated to be between 25-70% depending on the study.[12] [13] [14]

9.17 For the purpose of this EIA it is assumed that:

- Physical security standards (Secured by Design and PAS 24) each reduce burglary by 20-50%.
- This protection is expected to last for 25 years, the typical lifetime of a door or window.
- The annual rate of burglaries is 24 per 1000 households, the current average for England and Wales.
- The value of a burglary avoided is £4,248 in 2014 prices, as estimated by the Home Office[15].

9.18 If crime reduction attributable to Secured by Design and PAS 24 is 20-50%, the annual burglary cost reduction will be in the range of £20-51 per household. With a 25-year lifespan, it is estimated that this results in present value benefits of between £336 and £840 per household.

9.19 Applying this estimate of user benefits to the forecast number of new dwellings indicates that the present value benefits of reduced burglaries could range from £16.7m - £48.5m. Even under the low impact assumption of a 20% reduction in burglaries, the user benefits outweigh the costs of the proposed policy.

[12] Caledonian Environment Centre (2009). *Secured By Design Impact Evaluation, Key Findings*. Glasgow Caledonian University. April 2009.
[13] Vollaard, B. and Ours, J. C. (2011). *Does Regulation of Built-in Security Reduce Crime? Evidence from a Natural Experiment*. The Economic Journal 121 (May), 485-504.
[14] Armitage R. (2013). *Crime Prevention through Housing Design: Policy and Practice*. Palgrave Macmillan: Crime Prevention and Security Management Book Series
[15] Sam Brand and Richard Price (2000) *Home Office Research Study 217 The economic and social costs of crime*: Research, Development and Statistics Directorate, Home Office

10. Results – central scenario

10.1 Table 10.1 shows the results for the central build, high cost scenario

10.2 BREEAM and CfSH are identified as savings

Table10.1: Results for the central build, central cost scenario

	10 year NPV
BREEAM	+£ 31,756,987
CFSM	+£ 14,309,814
Water - domestic	-£ 4,977,355
Water - non-domestic	-£ 6,579,307
Security - dom	-£ 15,028,548
Transition Costs	-£ 525,364
Total	**+£ 18,956,228**

10.3 Table 10.2 Shows the annual build-up of cost savings for the central build, high cost scenario

Table 10.2: Annual build-up of cost savings for the central build, high cost scenario

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BREEAM	3,689,375	3,689,375	3,689,375	3,689,375	3,689,375	3,689,375	3,689,375	3,689,375	3,689,375	3,689,375
CFSM	1,469,820	1,552,712	1,639,647	1,718,496	1,718,496	1,718,496	1,718,496	1,718,496	1,718,496	1,718,496
Water - domestic	-1,036,927	-866,753	-553,100	-453,165	-453,165	-453,165	-453,165	-453,165	-453,165	-453,165
Water - non-domestic	-2,351,536	-1,682,616	-679,236	-344,776	-344,776	-344,776	-344,776	-344,776	-344,776	-344,776
Security - dom	-697,109	-1,104,635	-1,749,724	-2,037,629	-2,037,629	-2,037,629	-2,037,629	-2,037,629	-2,037,629	-2,037,629
Transition Costs	-525,364	-	-	-	-	-	-	-	-	-
Total	548,259	1,588,083	2,346,962	2,572,301	2,572,301	2,572,301	2,572,301	2,572,301	2,572,301	2,572,301

11. Impact on small businesses

11.1 The proposed changes will result in a net saving to businesses as a whole. The analysis has found that savings to business will be £21.4m (at 2016 prices).

11.2 The replacement of BREAAM and CfSH with specific standards for water and security are likely to have a disproportionately beneficial impact on small housebuilders that typically work on smaller sites. These small sites typically incur a larger ***process cost*** cost per dwelling than larger sites. For example, the English HDS Review found that CfSH Level 3 typically incurred a process cost of £645 per house for small schemes and only £96 per house for larger schemes.

12. Scenario Analysis and Sensitivity Testing

Scenario Analysis

12.1 We have undertaken comprehensive scenario analysis to test the variation of key assumptions regarding (a) new build rate estimates and (b) various unit cost assumptions. Through this process we have arrived at 9 EIA scenarios, which together, generate a range of results within which future outcomes are reasonably likely to lie.

12.2 The results for the 9 EIA scenarios range from:

- £17.5m to a £23.5m cost saving over a 10 year period (NPV @ 3.5%) with the central estimate being £21.4m
- £2.0m to £2.7m equivalent annual net cost savings EANC with the central estimate being £2.5m

12.3 The results for each of 9 EIA scenarios are shown in the tables below:

Table 12.1: Scenario analysis results – net cost reductions to industry (10 yr NPV £m)

Net cost to industry reductions (10 Year NPV (£m))			
	low build rate	central build rate	high build rate
low unit costs	£20.1	£21.8	£23.5
central unit cost	£19.8	£21.4	£23.2
high unit costs	£17.5	£19.0	£20.5

Table 12.2: Scenario analysis results – Equivalent Annual Net Cost reductions to industry (10 yr EANC £m)

Net cost to industry reductions (10 Year EANC (£m))			
	low build rate	central build rate	high build rate
low unit costs	£2.3	£2.5	£2.7
central unit cost	£2.3	£2.5	£2.7
high unit costs	£2.0	£2.2	£2.4

Assumptions behind each scenario

12.4 The new build rate scenario assumptions have been set out and discussed earlier on. Below are the details of the basis of the unit cost variations adopted in each scenario

Water unit cost assumptions in each scenario

- For both domestic and non-domestic building Policy, unit costs for water fall by 10% each year to reflect the adopting of fittings as standard by manufacturers – so no cost additional to builders
  - = For the sensitivity analysis, the high cost scenario assumes that this doesn't happen and costs are the same throughout the 10 years

- AECOM costed 4 different options for achieving the proposed domestic water standard. Options 1 & 3 have the same unit costs and options 2 & 4 have the same unit costs. In the central scenario we assume that Option 1 & 3 unit costs apply
  - For the sensitivity analysis, the Low cost scenario assumes that Option 2/4 for the water policy are adopted.

Security unit cost assumptions in each scenario

- Unit costs are not expected to vary over time for security costs therefore this has not been altered as part of the sensitivity test

Transition costs assumptions in each scenario

- Transition cost assumptions are based on the amount of time required by industry and regulators to adjust to policy changes
- The largest group affected is tradespersons. The central assumption is that each tradesperson will require 1hr to transition to the new policy
  - For the sensitivity analysis, the Low cost scenario assumes that the average cost for tradesperson is 15mins, reflecting that not all trades people will not spend any more time adjusting to the new standards than they would reviewing the current standards.

Scenario analysis calculations

12.5 The following tables show the detailed calculations for each scenario

		Low Build				Central Build				High Build		
	Table 12.3	10 Year NPV (@ 3.5%)				10 Year NPV (@ 3.5%)				10 Year NPV (@ 3.5%)		
		Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)		Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)		Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)
	BREEAM	29,306,198			BREEAM	31,756,987			BREEAM	34,207,777		
Low Costs	CFSM	13,072,698			CFSM	14,309,814			CFSM	15,133,129		
	Water - domestic		3,657,382	3,583,438	Water - domestic		4,031,937	3,948,914	Water - domestic		4,138,334	4,054,027
	Water - non-domestic		4,677,336	4,677,336	Water - non-domestic		5,088,109	5,088,109	Water - non-domestic		5,498,881	5,498,881
	Security - dom		13,743,656	13,743,656	Security - dom		15,028,548	15,028,548	Security - dom		16,026,392	16,026,392
	Total	**42,378,895**	**22,078,374**	**22,004,430**	**Total**	**46,066,801**	**24,148,594**	**24,065,572**	**Total**	**49,340,906**	**25,663,607**	**25,579,300**
	Transition Costs		247,691	247,691	Transition Costs		247,691	247,691	Transition Costs		247,691	247,691
	Net Benefit		**20,052,830**	**20,126,774**	Net Benefit		**21,670,516**	**21,753,539**	Net Benefit		**23,429,608**	**23,513,915**
	EANC		£2,329,642	£2,338,233	EANC		£2,517,577	£2,527,222	EANC		£2,721,940	£2,731,735

Mid Costs

	Low Build				**Central Build**				**High Build**		
Table 12.4	10 Year NPV (@ 3.5%)				10 Year NPV (@ 3.5%)				10 Year NPV (@ 3.5%)		
	Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)		Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)		Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)
BREEAM	29,306,198	-	-	BREEAM	31,756,987	-	-	BREEAM	34,207,777	-	-
CFSM	13,072,698	-	-	CFSM	14,309,814	-	-	CFSM	15,133,129	-	-
Water - domestic	-	3,657,382	3,583,438	Water - domestic	-	4,031,937	3,948,914	Water - domestic	-	4,138,334	4,054,027
Water - non-domestic	-	4,677,336	4,677,336	Water - non-domestic	-	5,088,109	5,088,109	Water - non-domestic	-	5,498,881	5,498,881
Security - dom	-	13,743,656	13,743,656	Security - dom	-	15,028,548	15,028,548	Security - dom	-	16,026,392	16,026,392
Total	**42,378,895**	**22,078,374**	**22,004,430**	**Total**	**46,066,801**	**24,148,594**	**24,065,572**	**Total**	**49,340,906**	**25,663,607**	**25,579,300**
Transition Costs	-	525,364	525,364	Transition Costs	-	525,364	525,364	Transition Costs	-	525,364	525,364
Net Benefit		**19,775,158**	**19,849,101**	Net Benefit		**21,392,844**	**21,475,866**	Net Benefit		**23,151,935**	**23,236,242**
EANC		£2,297,384	£2,305,974	EANC		£2,485,319	£2,494,964	EANC		£2,689,682	£2,699,476

High Costs

	Low Build				**Central Build**				**High Build**			
Table 12.5	10 Year NPV (@ 3.5%)				10 Year NPV (@ 3.5%)				10 Year NPV (@ 3.5%)			
	Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)		Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)		Counterfactual	Policy (water Options 1&3)	Policy (water Options 2&4)	
BREEAM	29,306,198			BREEAM	31,756,987			BREEAM	34,207,777			
CFSM	13,072,698			CFSM	14,309,814			CFSM	15,133,129			
Water - domestic		4,538,133	4,356,258	Water - domestic		4,977,355	4,778,476	Water - domestic		5,181,027	4,968,943	
Water - non-domestic		6,029,002	6,029,002	Water - non-domestic		6,579,307	6,579,307	Water - non-domestic		7,129,612	7,129,612	
Security - dom		13,743,656	13,743,656	Security - dom		15,028,548	15,028,548	Security - dom		16,026,392	16,026,392	
Total	**42,378,895**	**24,310,791**	**24,128,915**	**Total**	**46,066,801**	**26,585,210**	**26,386,331**	**Total**	**49,340,906**	**28,337,031**	**28,124,946**	
Transition Costs	-	525,364	525,364	Transition Costs	-	525,364	525,364	Transition Costs	-	525,364	525,364	
Net Benefit		**17,542,741**	**17,724,616**	Net Benefit		**18,956,228**	**19,155,107**	Net Benefit		**20,478,512**	**20,690,596**	
EANC		£2,038,032	£2,059,161	EANC		£2,202,244	£2,225,349	EANC		£2,379,096	£2,403,735	

13. Conclusions

13.1 This report sets out the results of the Economic Impact Assessment (EIA) of the Welsh Government's proposed changes to the building regulations regarding security standards for new domestic dwellings and proposed changes to water efficiency standards for new dwellings and new non domestic buildings.

13.2 The EIA calculates:

- the reduced costs to the construction industry of the proposed changes, compared with the current situation (the counterfactual)
- the benefits to dwelling occupiers, where the evidence permits

Cost savings to the construction industry.

13.3 The results of the EIA suggest that the proposed policy changes are likely to result in cost savings to the construction industry of between £17.5m to a £23.5m (calculated over a 10 year period (NPV @ 3.5%)).

Benefits to building occupiers

13.4 The results of the EIA suggest that the proposed policy changes regarding water standards are likely to result in minimal direct benefits to occupiers, but, regarding security standards, that the proposed policy changes are likely to result in significant reduced costs of burglary ranging from £16.7m - £48.5m (calculated over a 10 year period (NPV @ 3.5%)).