



## **Welsh Building Regulations Sustainability Review**

**Cost Report**

**February 2016**



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## 1 Introduction

AECOM was appointed by the Welsh Government to undertake a cost estimating exercise to support an economic impact assessment of proposed changes to the Welsh Building Regulations. These changes relate to the inclusion of security and water standards into regulations for new domestic buildings and the inclusion of water standards for new non-domestic buildings.

This report considers the estimated cost differences between the current standards and the standards proposed by the Welsh Government and Mott Macdonald.

### General basis of Costs

The study includes assessments of preliminaries costs and contractor overheads and profit, based upon average, percentage allocations currently typical in the market place.

The study is based on average data taken from recently tendered schemes, together with information extracted from our building cost databases and those obtained from specialist suppliers..

Costs are indicative of those currently being experienced in the market but will vary depending on exact specification, particular products, discounts achievable, general market conditions etc.

The cost study aims to compare likely additional capital costs related to application of the proposed new standards. No adjustments have been made in the figures for inflation or life cycle costs.

2 Security Standards Residential Security

Cost Summary

Additional Costs	Building Type >	1 Bed Flat	2 Bed Flat
		187.26	225.82

Additional Costs	Building Type >	2 Bed Terrace	3 Bed Semi
		358.62	463.34

Additional Costs	Building Type >	4 Bed Detached	
		519.99	

All costs exclude VAT

**2 Security Standards Residential Security**

**Basis of Costs**

This cost study covers the following typical residential layout types

Typical Dwelling:	Costs to be applied to:
1 Bed Flat	1 Bed Flat
2 Bed Flat	2 Bed Flat
2 Bed Terraced House	1 Bed Terrace 2 Bed Terrace 1 Bed Semi 2 Bed Semi 1 Bed Detached 2 Bed Detached
3 Bed Semi Detached House	3 Bed Flat 3 Bed Terrace 3 bed Semi Detached 3 Bed Detached
4 Bed Detached House	4 Bed Flat 5 Bed Flat 6 Bed Flat 4 Bed Terrace 5 Bed Terrace 6 Bed Terrace 4 Bed Semi Detached 5 Bed semi Detached 6 Bed Semi Detached 4 Bed Detached 5 Bed Detached 6 Bed Detached 7 Bed Detached

Provisions contained within Secured By Design - New Homes 2014 have been used as the basis of calculations.

The study compares basic standard details with enhanced Secured By Design (SBD) features.

Calculations are based on typical dwelling layouts, with assessments of numbers for doors/windows for each dwelling type.

Costs are compared in the following categories:

- External Doors
- Windows
- Security lighting

It is assumed only ground floor windows will need SBD enhanced specification.

## 2 Security Standards Residential Security

### Basis of Costs - cont

The study is based on typical national house builder costs in January 2016.

It should be noted that many social housing schemes are currently already being designed to comply with Secure By Design standards.

Costs relate to a typical medium sized mixed estate residential development of 50 units, on the following basis.

Residential units varying from 1 Bed Flats to 4 Bed Detached Houses, in two storey construction.

Costs are based on typical house type designs.

One off designs have not been considered.

Housing Association/RSL schemes already comply with SBD and have been excluded in this analysis.

In addition to the increases in capital costs consequent upon the introduction of the proposed security and water efficiency standards, there will be transitional costs associated with compliance with the new requirements relating to the additional required by developers in:-

- sourcing compliant components
- revising specifications and Home User Guides

Whilst these costs will be relatively minor, by nature 'one-off' and over time, will be absorbed within normal processes they have been separately assessed in this analysis.

### Conclusion

The extra cost for enhanced security standards range from £187 - £520 per unit.

In addition to these costs, one-off transitional costs have been assessed at £16.20/dwelling.

### Assumptions

Specification assumed for study, where applicable:

- Softwood windows
- Hardwood front doorsets
- Hardwood patio doorsets
- Softwood rear doorsets
- Solid core 30 minute fire resistant doorsets to integral garages
- Solid core 30 minute fire resistant doorsets to flat entrances
- Hardwood common entrance doorsets to flats
- Double glazed units - factory finished sealed units, for installation on site
- Basic ironmongery

The following variations in specification are cost significant but not included in this study:

- PVCu doorsets
- Aluminium doorsets
- Steel doorsets
- Triple glazing
- Specialist glazing
- Upgraded ironmongery

We have assumed that patio doors to 3 Bed Semis; 3 Bed detached and larger

We have assumed garage doorset entries to 3 Bed Semis; 3 Bed Detached and larger

## 2 Security Standards Residential Security

### Specification Enhancements

Brief Notes Extracted from Secured By Design - New Homes 2014. Items not considered have been lined through for clarity

#### 21.0 Front Doors

- 21.1 Doorsets to be certified to PAS 24:2012 or equivalent
- 21.2 Timber Doorsets certified to BS 644:2009
- ~~21.2 PVCu Doorsets certified to BS 7412:2007~~
- ~~Aluminium Doorsets certified to BS 4873:2009~~
- ~~Steel doorsets certified to BS 6510:2010~~
- ~~Composite doorsets certified to BS 8529:2010~~
- 21.3 Doorsets with internal thumbturn required Ref DKT - see also 21.7
- 21.4 Recognised certifying authority
- 21.5 Proof of certification required
- 21.6 Doorsets to be permanently marked with product identifying data
- 21.7 Potential for latch withdrawal (split spindle operation). If required by DOCO
- 21.8 Doorsets supplied with clear instructions
- 21.9 Door frames to be securely fixed to surrounds
- 21.10 Doorsets in recesses more than 600mm to be avoided
- 21.11 Any glazing to incorporate laminated glass to one pane of double glazed units.  
This will also apply to associated windows/side screens
- 21.12 Windows/side screens to be part of the manufacturers certified range.  
Alternatively where manufactured separately they should be certified to PAS 24:2012
- 21.13 Outward opening doorsets must be part of the manufacturers certified product range
- 21.14 Doorset with fitted door chain/opening limiter
- 21.15 Doorset with doorviewer
- 21.16 Doorset letter plates are not recommended to be installed. Secure letter boxes or through wall delivery system
- 21.17 Doorset letter plates installed must form part of the certified doorset  
Retro-fitting of letter plates will invalidate the certified doorset
- 21.18 Door hardware to meet Technical Standard 008 (TS 008)
- 21.19 Letter boxes - alternatives to 21.17 & 21.18

#### 22.0 Side/Back Doorsets

- 22.1 To meet similar standards as 21.1 to 21.6 and 21.8 to 21.13

#### 23.0 Sliding Patio/Bi Fold Doorsets

- 23.1 To meet similar standards as 21.1 to 21.6 and 21.8 to 21.13
- 23.2 Glazing as 21.11
- 23.3 Door frames to be securely fixed to surrounds as 21.9
- 23.4 Doorsets in recesses more than 600mm to be avoided as 21.10

#### 24.0 Doors to Communal Dwellings

- 24.1 Shared doorsets controlled by key/or access controls, as 21.1 to 21.13
- 24.2 Not used
- 24.3 Communal doorsets with separate adjacent access control panels certified to STS 202 Issue 3:2011  
Burglary Rating 2 (minimum) or equivalent  
Communal doorsets to be certified to PAS 24:2012 or equivalent
- 24.4 Glazing in communal entrance doorsets, as 21.11

## 2 Security Standards Residential Security

### Specification Enhancements - cont

#### Windows

- 28.1 Windows to be certified to PAS 24:2012 or equivalent to apply to ground floor; basements/easily accessible windows  
Windows to incorporate key lockable hardware (unless designated emergency egress)
- 28.2 Timber windows certified to BS 644:2003  
~~PVCu windows certified to BS 7412:2007~~  
~~Aluminium windows certified to BS 4873:2009~~  
~~Steel windows certified to BS 6510:2005~~  
~~Window performance to BS 6375 parts 1 & 2~~
- 28.3 Installation to be certified by a recognized certifying body
- 28.4 Windows falling outside scope of the British Standard, to be assessed/certified by an accredited body
- 28.5 Windows to be securely fixed to surrounds
- 28.6 Window glazing to meet Building Regulations  
Laminated glazing requirements  
Accessible emergency egress
- 28.7 Fail safe mechanism to automatic opening window/venting systems controlled by sensors
- 28.8 In some regional locations - additional laminated glazing requirements to ground floor; basement, easily accessible above ground floor



**3 Domestic Water Standards**

**Cost Summary**

Additional Costs	Building Type >	1 Bed Flat	2 Bed Flat
Fittings Option 1	Total Additional £	19.40	25.32
Fittings Option 2	Total Additional £	17.73	21.99
Fittings Option 3	Total Additional £	19.40	25.32
Fittings Option 4	Total Additional £	17.73	21.99

Additional Costs	Building Type >	2 Bed Terrace	3 Bed Semi
Fittings Option 1	Total Additional £	25.32	25.32
Fittings Option 2	Total Additional £	21.99	21.99
Fittings Option 3	Total Additional £	25.32	25.32
Fittings Option 4	Total Additional £	21.99	21.99

Additional Costs	Building Type >	4 Bed Detached	
Fittings Option 1	Total Additional £	43.02	
Fittings Option 2	Total Additional £	38.02	
Fittings Option 3	Total Additional £	43.02	
Fittings Option 4	Total Additional £	38.02	

All costs exclude VAT

**3 Domestic Water Standards**

**Basis of Costs**

This cost study aims to identify specific additional costs related to improving water efficiency, following a fittings approach by incorporating performance levels for each component type for new dwellings.

The cost study is to cover the following typical residential layout types

Typical Dwelling:	Costs to be applied to:
1 Bed Flat	1 Bed Flat
2 Bed Flat	2 Bed Flat
2 Bed Terraced House	1 Bed Terrace 2 Bed Terrace 1 Bed Semi 2 Bed Semi 1 Bed Detached 2 Bed Detached
3 Bed Semi Detached House	3 Bed Flat 3 Bed Terrace 3 bed Semi Detached 3 Bed Detached
4 Bed Detached House	4 Bed Flat 5 Bed Flat 6 Bed Flat 4 Bed Terrace 5 Bed Terrace 6 Bed Terrace 4 Bed Semi Detached 5 Bed semi Detached 6 Bed Semi Detached 4 Bed Detached 5 Bed Detached 6 Bed Detached 7 Bed Detached

Costs associated with baths are excluded. There is a great variance in the cost of a bath depending on specification but, the capacity, in litres, appears to create very little variance in the costs.

Costs for WCs are included on the basis of cistern costs only, as it is this component that controls the flow rates. Costs for pan, seat etc are therefore excluded.

The cost study aims to compare likely additional capital costs related to the installation of fittings to give 4 performance levels of improved efficiency, as detailed over.

Calculations are based on typical dwelling layouts, with assessments of numbers of fittings for each dwelling type.

### 3 Domestic Water Standards

#### Basis of Costs - cont

The study compares basic standard details with enhanced specification.

Costs relate to a typical medium sized mixed estate residential development of 50 units, on the following basis.

Residential units varying from 1 Bed Flats to 4 Bed Detached Houses, in two storey construction.

Costs are based on typical house type designs.

One off designs have not been considered.

There are very few, if any, transitional costs associated with compliance with the new requirements for water standards that can be identified and therefore no allowances have been deemed necessary.

#### Conclusion

The extra cost per dwelling for the enhanced fittings ranges from £17 - £43.

#### Assumptions

An analysis of typical layouts indicates the following provision of fittings affected by the proposed standards.

##### *1 Bed Flat*

- 1 WC
- 1 Wash hand Basin
- 1 Shower
- 1 Kitchen Sink
- 1 Bath

##### *2 Bed Flat*

- 2 WCs
- 2 Wash hand Basins
- 1 Shower
- 1 Kitchen Sink
- 1 Bath

##### *2 Bed Terrace*

- 2 WCs
- 2 Wash hand Basins
- 1 Shower
- 1 Kitchen Sink
- 1 Bath

##### *3 Bed Semi*

- 2 WCs
- 2 Wash hand Basins
- 1 Shower
- 1 Kitchen Sink
- 1 Bath

##### *4 Bed Detached*

- 3 WCs
- 3 Wash hand Basins
- 2 Shower
- 2 Kitchen Sink
- 1 Bath

### 3 Domestic Water Standards

#### Specification Enhancements

The specification enhancements have been based upon 4 alternative performance criteria.

##### Option 1

WC – Dual Flush - 6/4 litres per flush  
WC – Single Flush - 4.5 litres per flush  
Wash hand basin tap - 4 litres per minute  
Shower - 8 litres per minute  
Kitchen taps - 5 litres per minute  
Bath 170 litres capacity  
TOTAL (with dual flush) 105.90 litres per person per day  
TOTAL (with single flush) 105.26 litres per person per day

##### Option 2

WC – Dual Flush - 4/2.6 litres per flush  
Wash hand basin tap - 5 litres per minute  
Shower - 8 litres per minute  
Kitchen Taps - 6 litres per minute  
Bath - 170 litres capacity  
TOTAL 101.32 litres per person per day

##### Option 3

WC – Single flush - 4.5 litres per flush  
Wash hand basin taps - 5 litres per minute  
Shower - 7 litres per minute  
Kitchen taps - 6 litres per minute  
Bath - 185 litres capacity  
TOTAL 104.62 litres per person per day

##### Option 4

WC – Dual flush 4.5/3 litres per flush  
Wash hand basin taps - 5 litres per minute  
Shower - 9 litres per minute  
Kitchen taps - 5 litres per minute  
Bath - 170 litres capacity

4 Non Domestic Water Standards

Cost Summary

Additional Costs	Building Type >	Offices	Hotel
<b>Small</b>	Area m2	100 m2	625 m2
	<b>Total Additional £</b>	<b>45.84</b>	<b>626.15</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>0.46</b>	<b>1.00</b>
<b>Medium</b>	Area m2	862 m2	3,750 m2
	<b>Total Additional £</b>	<b>149.15</b>	<b>3,755.22</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>0.17</b>	<b>1.00</b>
<b>Large</b>	Area m2	4,800 m2	7,500 m2
	<b>Total Additional £</b>	<b>503.24</b>	<b>7,510.45</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>0.10</b>	<b>1.00</b>

Additional Costs	Building Type >	Multi Residential	Warehouse
<b>Small</b>	Area m2	450 m2	300 m2
	<b>Total Additional £</b>	<b>266.80</b>	<b>34.36</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>0.59</b>	<b>0.11</b>
<b>Medium</b>	Area m2	2,250 m2	700 m2
	<b>Total Additional £</b>	<b>1,333.99</b>	<b>68.01</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>0.59</b>	<b>0.10</b>
<b>Large</b>	Area m2	4,500 m2	1,300 m2
	<b>Total Additional £</b>	<b>2,667.98</b>	<b>105.78</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>0.59</b>	<b>0.08</b>

Additional Costs	Building Type >	Retail	University
<b>Small</b>	Area m2	25 m2	500 m2
	<b>Total Additional £</b>	<b>26.68</b>	<b>139.93</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>1.07</b>	<b>0.28</b>
<b>Medium</b>	Area m2	500 m2	2,000 m2
	<b>Total Additional £</b>	<b>65.00</b>	<b>433.14</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>0.13</b>	<b>0.22</b>
<b>Large</b>	Area m2	5,000 m2	5,000 m2
	<b>Total Additional £</b>	<b>330.67</b>	<b>1,066.10</b>
	<b>Additional Cost £/m2 GIFA</b>	<b>0.07</b>	<b>0.21</b>

All costs exclude VAT

#### 4 Non Domestic Water Standards

##### Basis of costs

This cost study aims to identify specific additional costs related to improving water efficiency following a fittings approach, by incorporating performance levels for each component type for new non domestic buildings.

The cost study is to cover the following building types for small, medium and large developments:-

- Offices
- Hotels
- Multi-Residential
- Warehouse
- Retail
- University

The cost study aims to compare likely additional capital costs related to the installation of fittings to give 2 performance levels of improved efficiency, as detailed.

##### *WC*

Performance Level 1; Effective flush volume 5 litres per flush

Performance Level 2; Effective flush volume 4.5 litres per flush

##### *Wash Hand Basin Taps*

Performance Level 1; 9 litres per minute

Performance Level 2; 5 litres per minute

##### *Showers*

Performance Level 1; 10 litres per minute

Performance Level 2; 8 litres per minute

There is very little cost differential between the costs of implementing measures to achieve the different flow rates noted above therefore only the lower rates have been considered in assessing costs.

Calculations are based on Mott Macdonald schedule of fittings typically utilised in different types of buildings, generally based on BS 6465/1.

Costs associated with baths are excluded. There is a great variance in the cost of a bath depending on specification but, the capacity in litres, appears to create very little variance in the costs.

Costs associated with urinals are also excluded. Investigation shows that typically urinals are automatic flushing and the frequency of the flushing can be adjusted to reduce water usage. However, latest trends are for the introduction of waterless urinal caps to reduce usage, or PIR operated flushing, which would require greater detail in specification to identify any typical cost increases.

Costs for WCs are included on the basis of cistern costs only, as it is this component that controls the flow rates, Costs for pan, seat etc are therefore excluded.

BREEAM considerations have been ignored in considering counterfactual costs but would need consideration, particularly if considering publicly funded developments.

#### **4 Non Domestic Water Standards**

##### **Basis of Costs - cont**

There are very few, if any, transitional costs associated with compliance with the new requirements for water

##### **Conclusion**

The extra cost equate to an additional £0.07 to £1.07/m<sup>2</sup>

##### **Assumptions**

Areas used in this report and the numbers of individual fittings for each property type and each development size have been taken from Mott Macdonald figures prepared in general compliance with BS 6465/1