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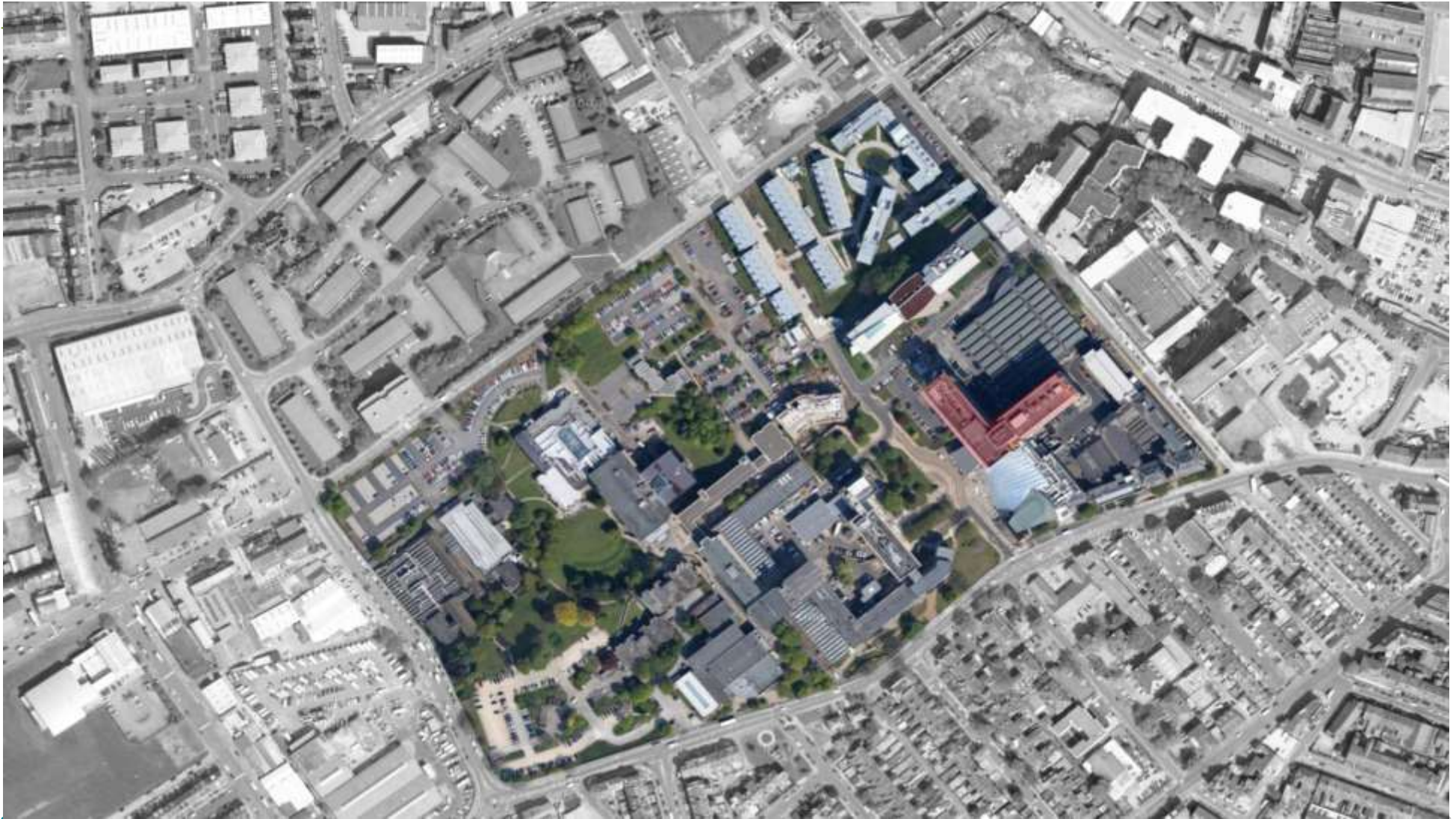
# STEM @ BRADFORD

A SCIENCE PASSIVHAUS BUILDING





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**Size: 124,600m<sup>2</sup> Gross Internal Area**

**GIA ratio: 9.5m<sup>2</sup>/student and staff FTE**

**Covers: 36.7 hectares over 3 sites**

**12,000 Students 2,500 staff**

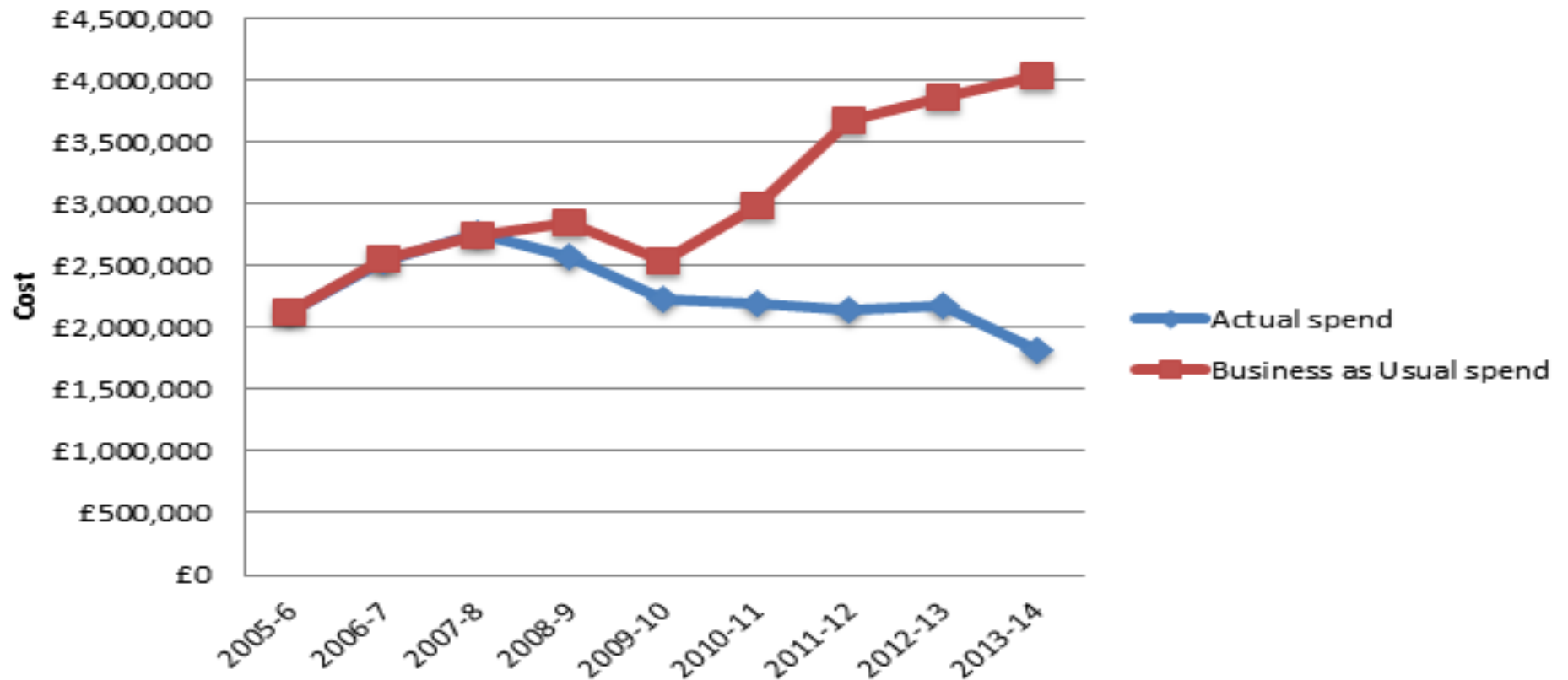
**Emit 11,000 tonnes Co<sub>2</sub>**

**72,000m<sup>3</sup> water consumed**

**460 Tonnes of waste produced**



## "Business as Usual" Utility spend against actual spend per academic year







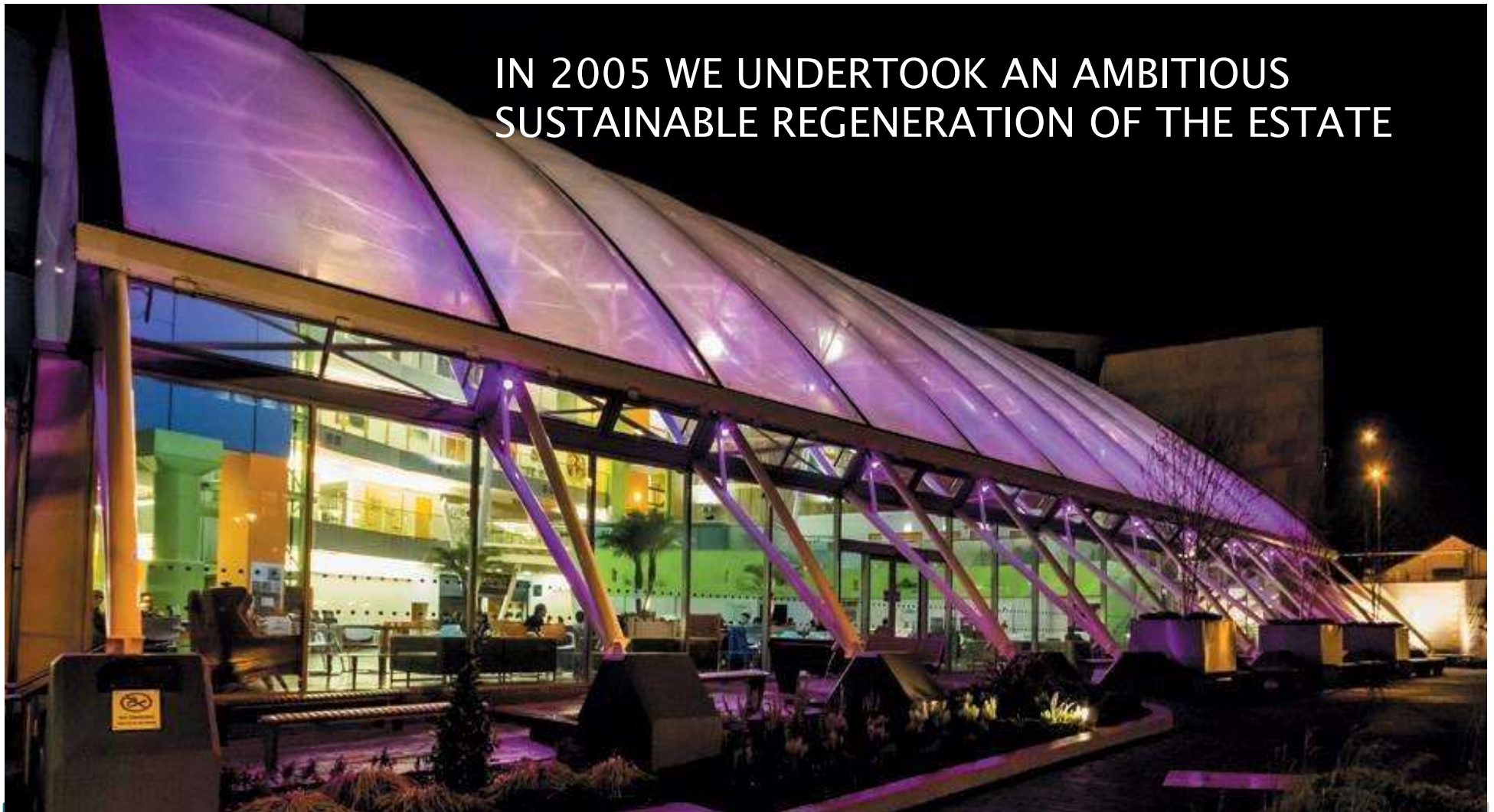
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IN 2005 WE UNDERTOOK AN AMBITIOUS  
SUSTAINABLE REGENERATION OF THE ESTATE





## KEY FACTS

- Science outreach building
- 378 m<sup>2</sup>
- £1.5m total build cost
- Construction Period 7 months
- Offsite timber construction
- Passivhaus
- AECB Silver Standard (Pending)
- BREEAM Outstanding (Pending)





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# THE DESIGN



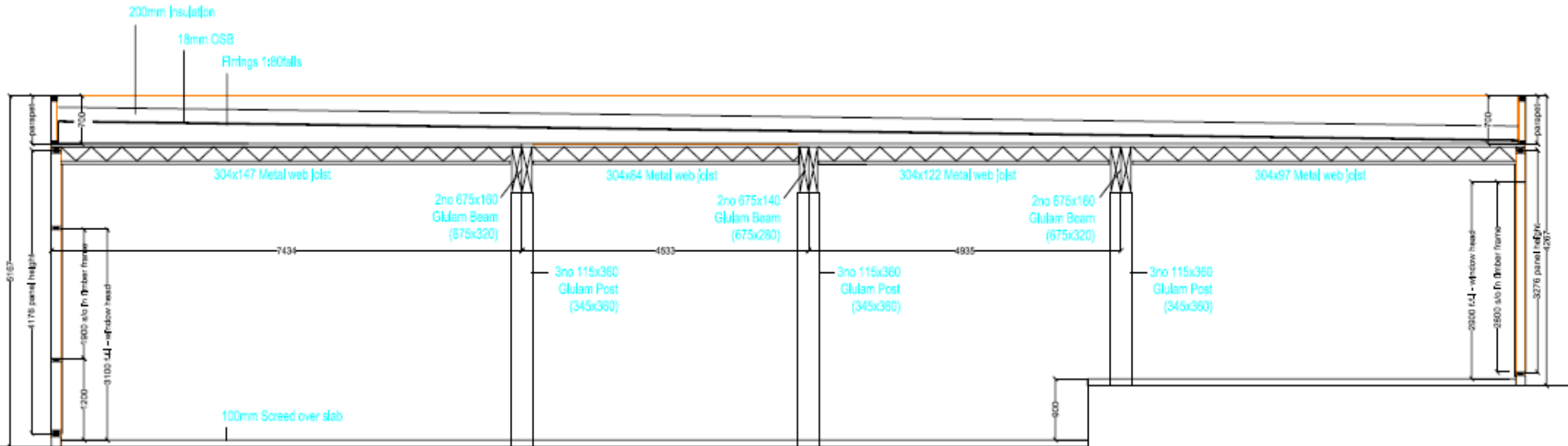


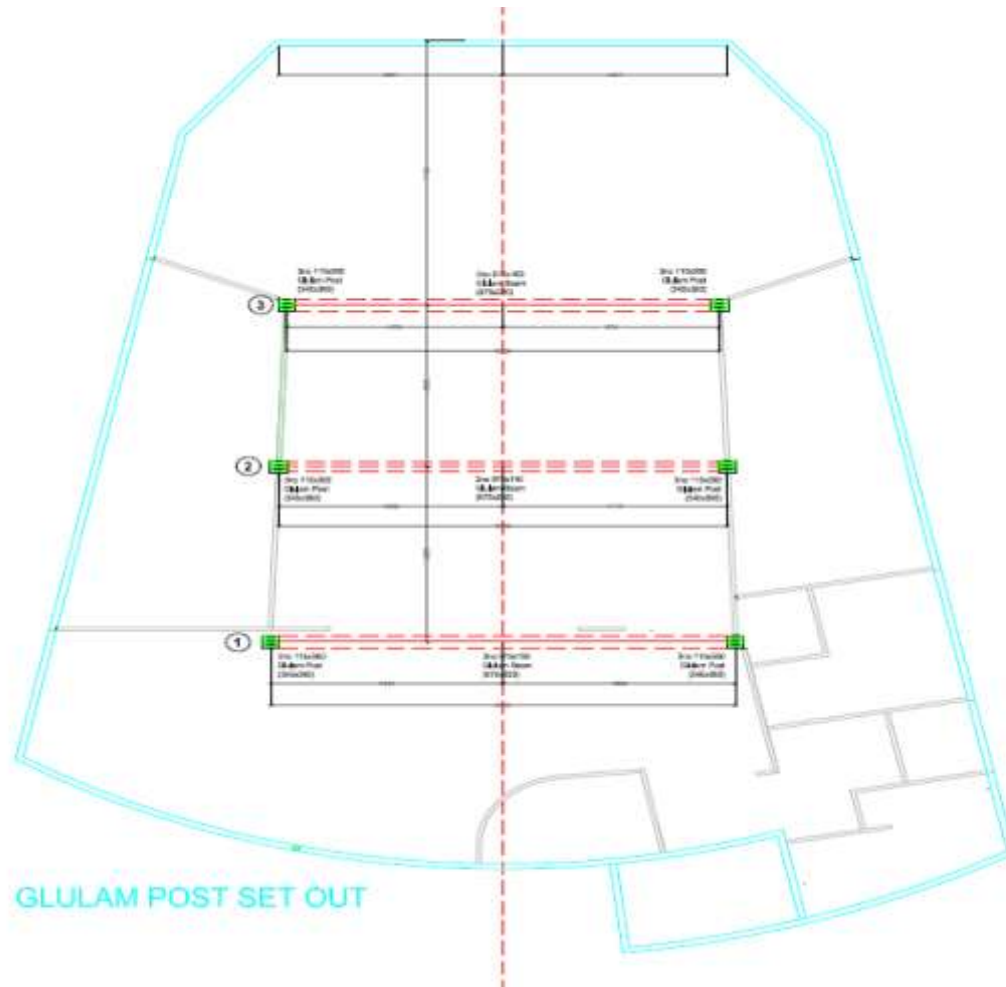


Element	U-Value (W/m <sup>2</sup> .K)
External Wall	0.11
Ground Floor	0.11
Exposed Roof	0.11
Glazing	0.92
Thermal Bridging	Use of accredited robust details or equivalent values assumed



# Construction









120mm Kingspan TW55 Rigid Insulation

35mm Kingspan TW55 Rigid Insulation

Breather Membrane

15mm Ply

70mm Kingspan TW55 Rigid Insulation  
(Inside Shires Timber Panel)

### FIXING THREE

Stainless steel torx head A1S1 316 grade 4.5x32mm screws. With Plastic Cover Caps. Torx head screws fixed at maximum spans of 600mm and 600mm vertical centres.

### FIXING TWO

RG202 - 202mm Phillips Head Screw. Countersunk by 25mm into Batten. 300 Centres into 'Shires Timber Vertical Studwork'

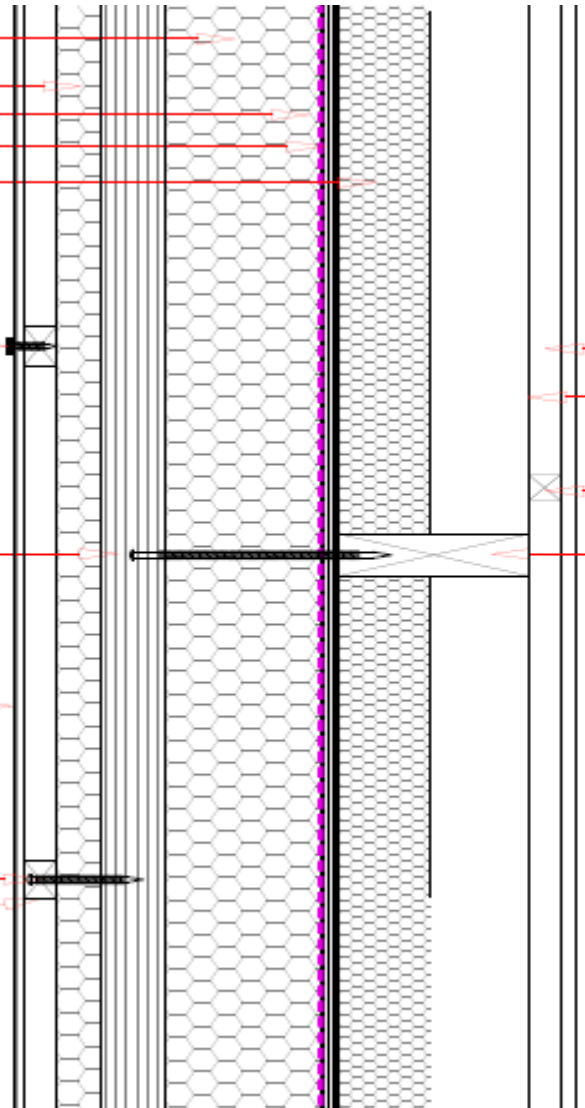
8mm Rockclad Chameleon Cladding

### FIXING ONE

90mm Stainless Steel Countersunk Screw. 300 Centres Horizontally.

25mm SW Preservative Treated Horizontal Timber Batten at 500 c/s

## ROCKCLAD FIXING



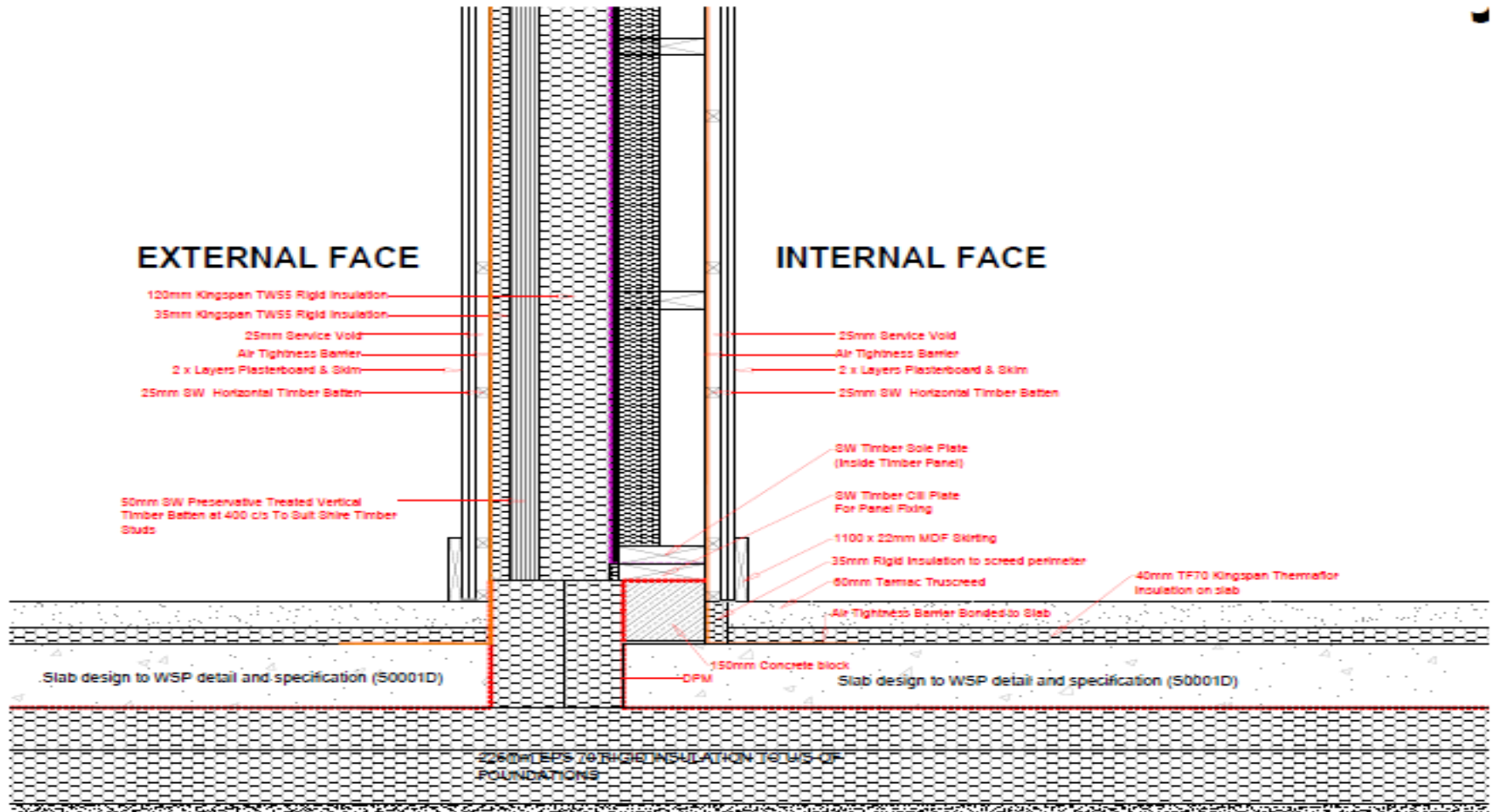
25mm Service Void

Air Tightness Barrier

2 x Layers Plasterboard & Skim

25mm SW Horizontal Timber Batten

Timber Stud to Shires Timber Specification



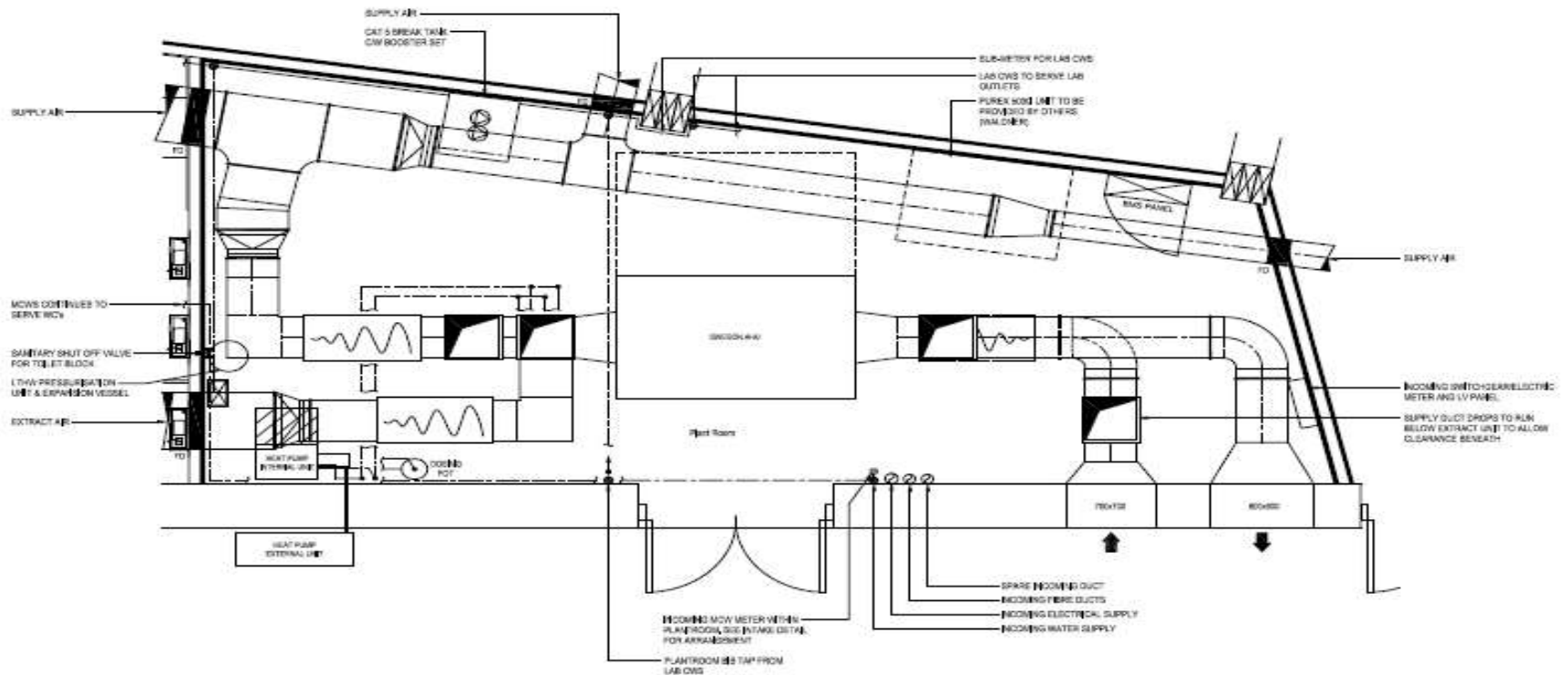
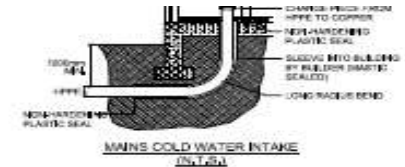


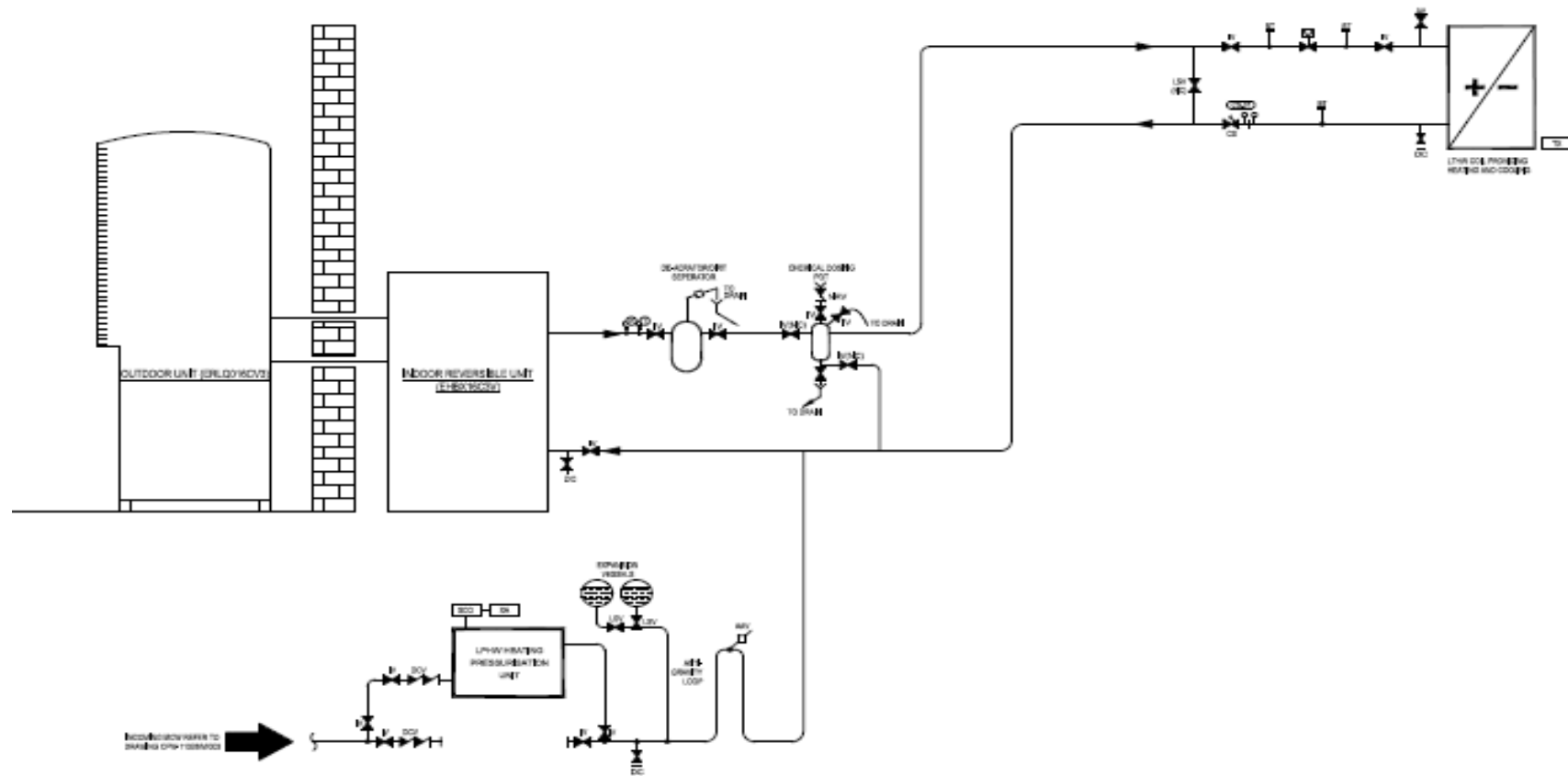
System	Service	Elements	Efficiency	Note
HVAC1	Air Heating and Dirty Supply and Extract with heat recovery	Air Source Heat Pump	259%	
		Ventilation SFP	1.6 W/m <sup>3</sup> /s	
		Thermal wheel exchanger heat recovery efficiency	83%	



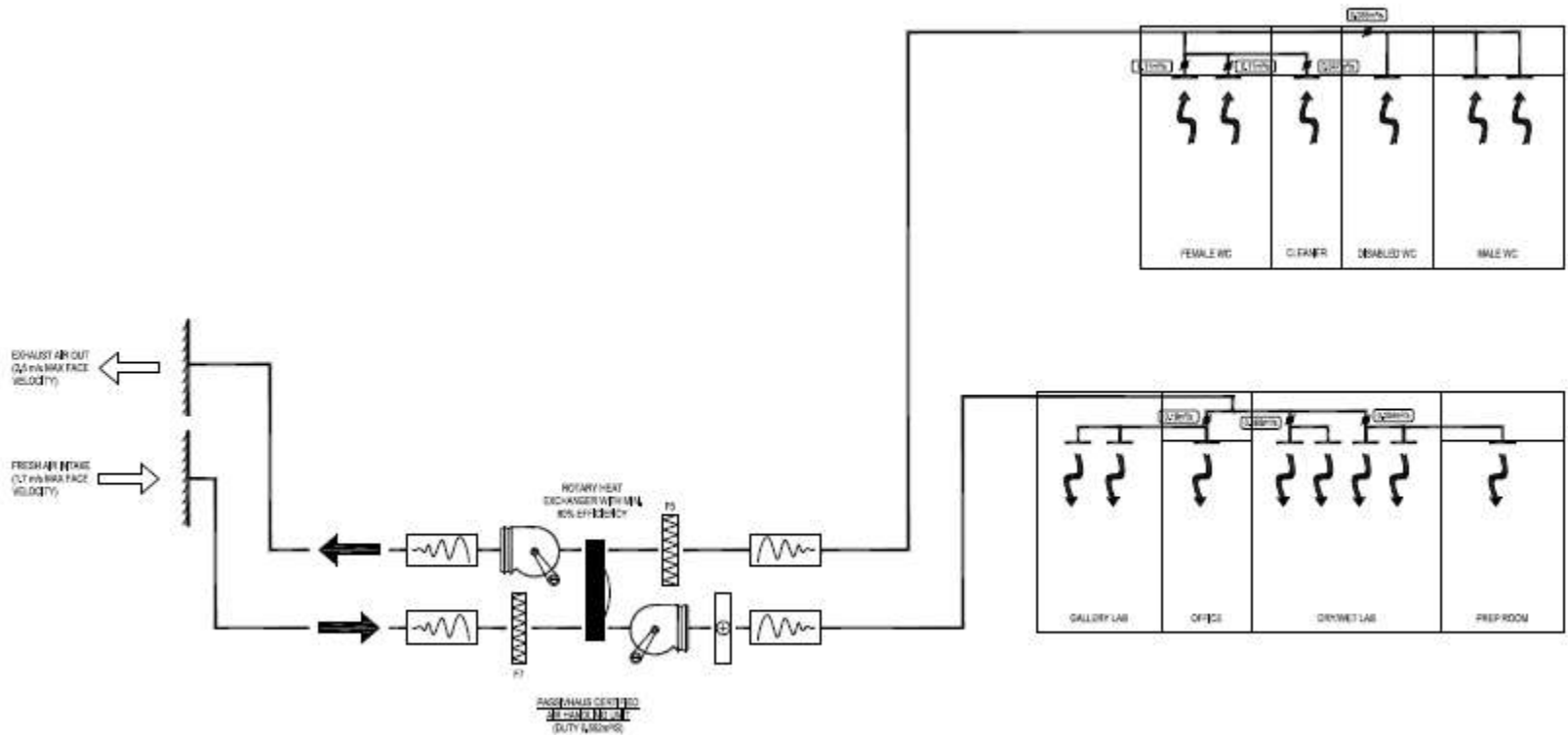


Buildings Emissions Rate (BER)	<b>16.3 kg.CO<sub>2</sub>/m<sup>2</sup></b>
Notional building Emissions Rate	<b>24.2 kg.CO<sub>2</sub>/m<sup>2</sup></b>
Target Emissions Rate (TER)	<b>24.2 kg.CO<sub>2</sub>/m<sup>2</sup></b>
<b>EPC</b>	<b>18</b>











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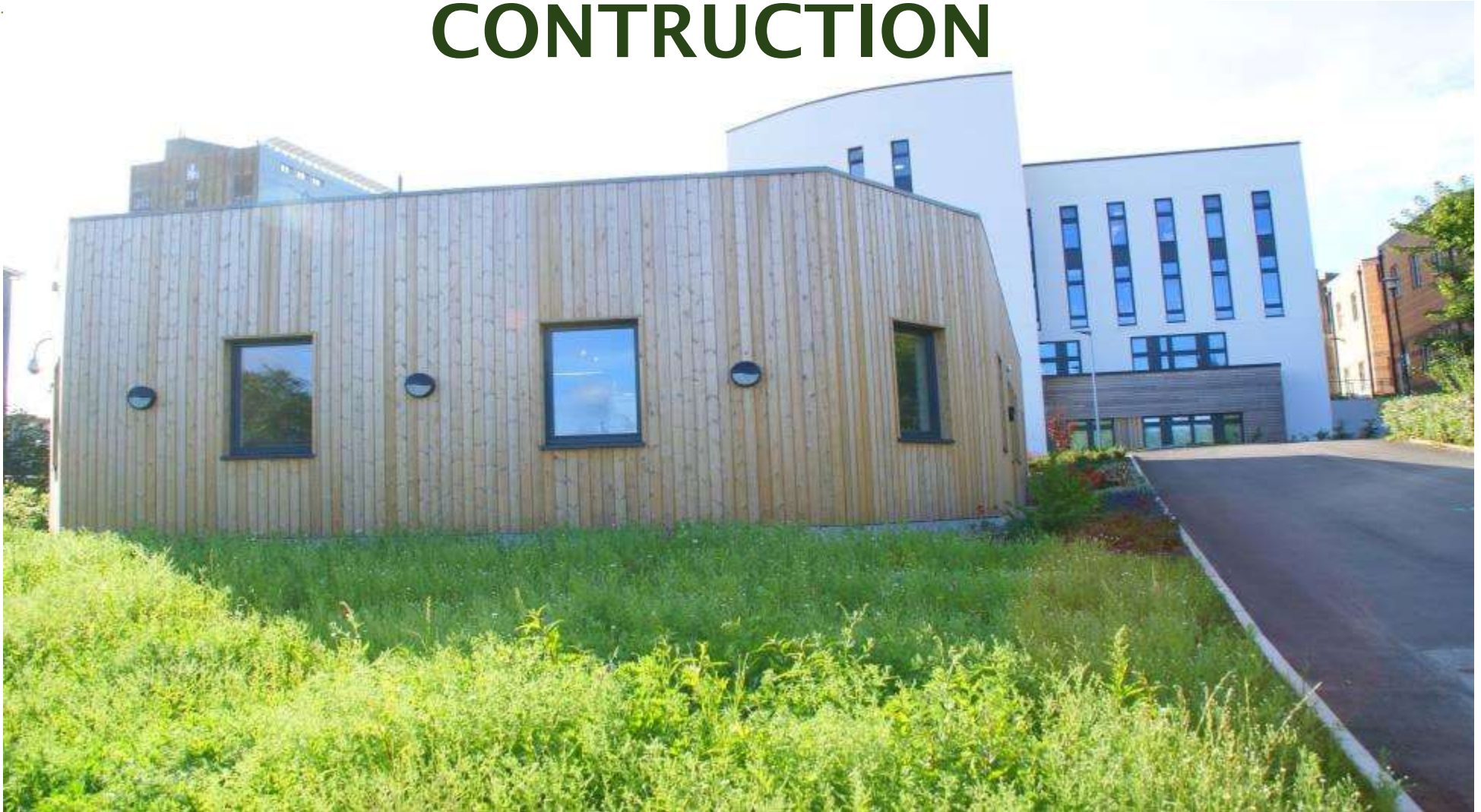






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# CONSTRUCTION













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# IN USE







## Energy Performance Certificate Non-Domestic Building



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University of Bradford  
Richmond Road  
BRADFORD  
BD7 1DP

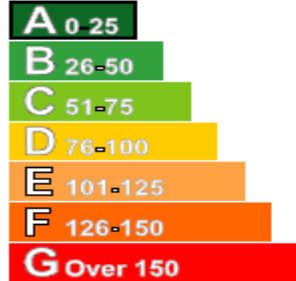
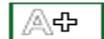
Certificate Reference Number:  
9100-3004-0540-5006-7125

# Primary Energy Demand 112kWh/m<sup>2</sup>

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government's website [www.communities.gov.uk/epbd](http://www.communities.gov.uk/epbd).

### Energy Performance Asset Rating

More energy efficient



Less energy efficient

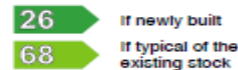
Net zero CO<sub>2</sub> emissions  
18 This is how energy efficient the building is.

### Technical Information

Main heating fuel: Grid Supplied Electricity  
Building environment: Air Conditioning  
Total useful floor area (m<sup>2</sup>): 385  
Building complexity (NOS level): 5  
Building emission rate (kgCO<sub>2</sub>/m<sup>2</sup>): 15.68

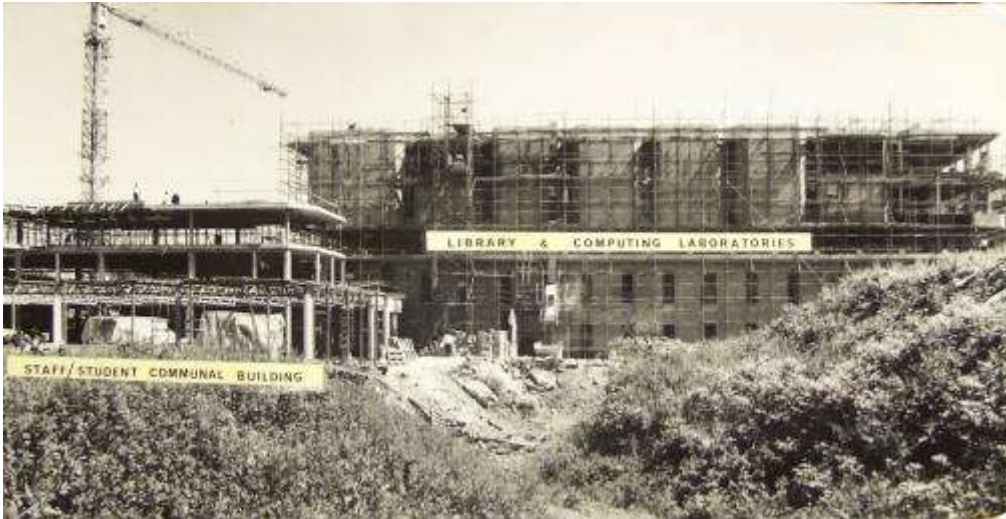
### Benchmarks

Buildings similar to this one could have ratings as follows:



### Green Deal Information

The Green Deal will be available from later this year. To find out more about how the Green Deal can make your property cheaper to run, please call 0300 123 1234.



JBPL 2013-14- B33

JBPL 2009-10 - E116

JBPL 2008-09 - G200

Primary Energy Demand 111kw/m<sup>2</sup>





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