Glasgow & West of Scotland Forum

Social Housing Net Zero Standard
Energy Performance in Practice

Andrew Woodburn
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SHNZS

Introduction
- EPCs across Tenure Sectors
- EESSH1, EESSH2, SHNZS
- Case Study – 25 Holmhead Place, Glasgow
- EPC Property Comparisons
- Clean Energy – Options?
- Conclusions

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Energy Performance across Tenure

Table 21: Mean EER and Broad EPC Band, by Household Characteristics in 2019, SAP 2012 (RdSAP v9.93)

	SAP 2012 Ratings	EPC Band			*Sample*
	Mean	ABC	DE	FG	
Tenure					
Owned outright	62.3	34%	60%	6%	*1,159*
Mortgaged	66.4	51%	47%	3%	*806*
LA	66.7	47%	52%	1%	*425*
HA	71.0	68%	32%	1%	*290*
Private rented	62.0	40%	49%	10%	*317*
Private Sector	63.7	41%	53%	6%	*2,282*
Social Sector	68.5	56%	43%	1%	*715*

Table from Scottish House Condition Survey 2019

Energy Performance across Tenure

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Table from Scottish House Condition Survey 2019

Steps for Improving Energy Efficiency in Existing Stock

		Meeting	Meeting	Meeting
Priority	Installation:	EESSH1	EESSH2	SHNZS
1	Draught Proofing	?	?	✓ LoM
2	Insulate Hot Water Cylinders	✓	✓	✓
3	Low Energy Lighting	✓	✓	✓
4	Insulate Ceiling/Roofspace	✓	✓	✓
5	Fit Condensing Combi Boilers	✓	✓	✓
6	Fit Double Glazing	✓	✓	✓
7	Floor Insulation		✓	✓
8	Wall Insulation		✓	✓
9	Fit Heat Pumps			✓
10	Electric Solar Panels			
11	Solar Hot Water panels			

Sustaining Existing Housing Stock

25 Holmhead Place, Cathcart, Glasgow 2022

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25 Holmhead Place
Project Objectives & Scope

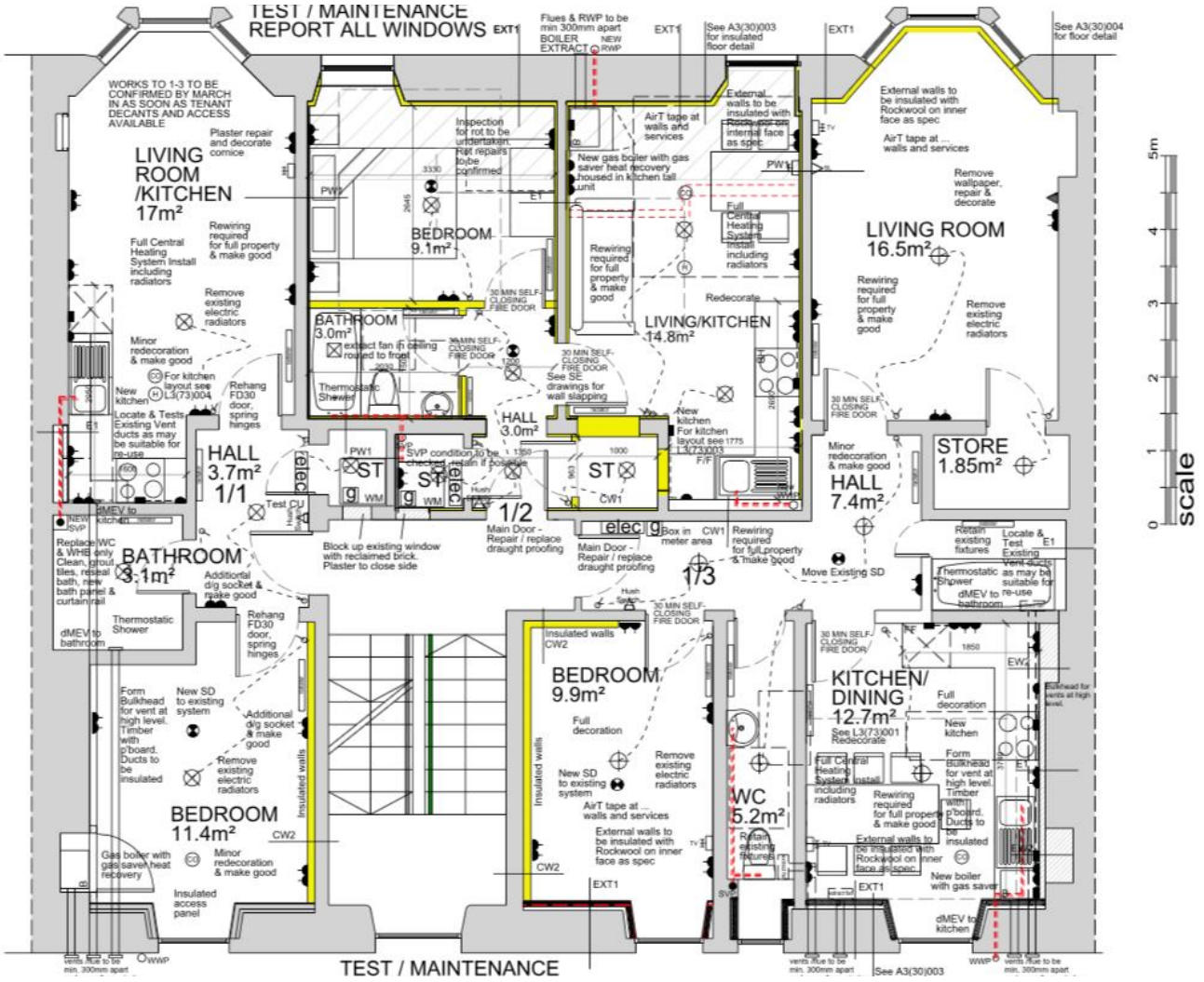
Objectives: Repair/Improve building fabric; Meet EESSH2

- Comprehensive Major Repair – Tenants Decanted
- Common Repairs: Roof works, chimneys, gutters/ downpipes, stonework, stair windows, Structural repairs inc close floor, Close refurbishment, external works.
- Internal Works: new kitchens, bathrooms, forming new layouts & openings, rewire/replumb, ventilation, internal fabric repairs & decoration.
- Amalgamate ground floor Flats 0/1 into 0/2
- Carry out energy efficiency improvements – EESSH2
- 11 Flats on Completion.

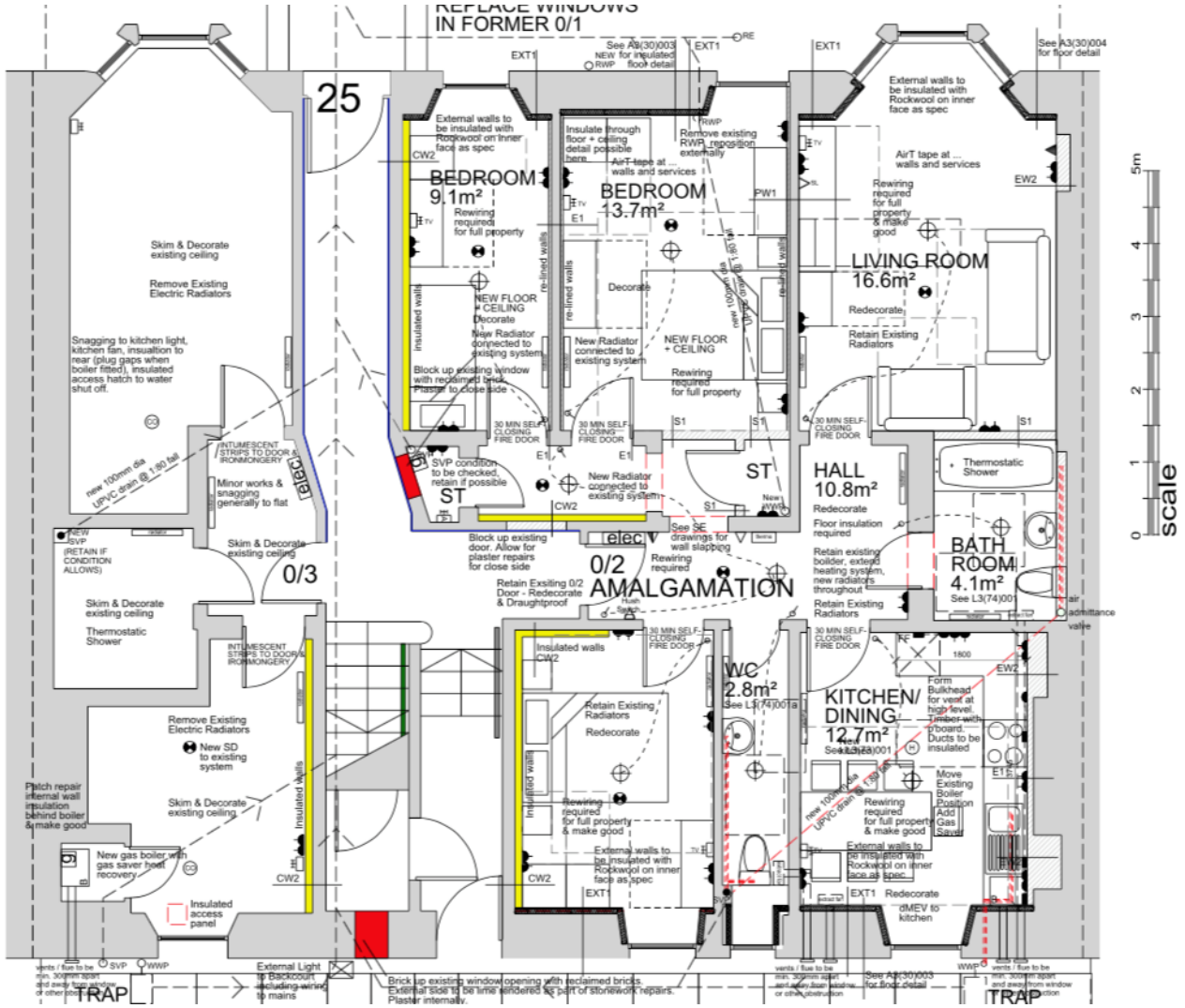
Steps for Improving Energy Efficiency – Pre1919 Flats

Energy Efficiency Measures:
Refurb Existing Double Glazing – seals & frames
Roof Insulation to Top Floors – Top up to 300mm
Low Energy Lighting
Install Gas CH & Condensing combi boilers
Floor Insulation to Grd Floors – 200mm Rockwool
Wall insulation – 90mm Rockwool/Sheepswool
Draught Proofing – Doors; Tescon/ProClima Taping
Gas Saver Units – preheat incoming cold water
All Flats have achieved Max. Potential Values.

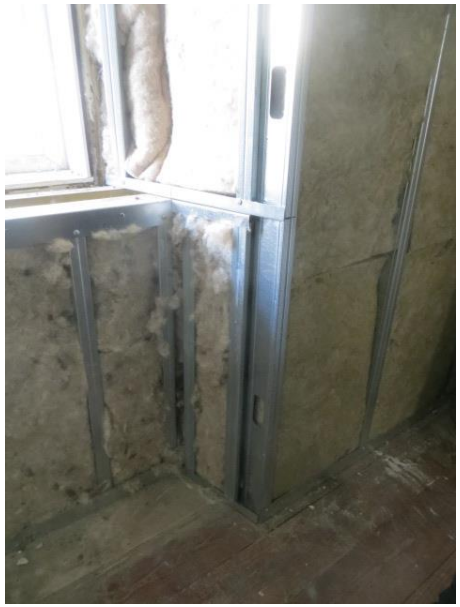
1st Floor Plan



Ground Floor Plan



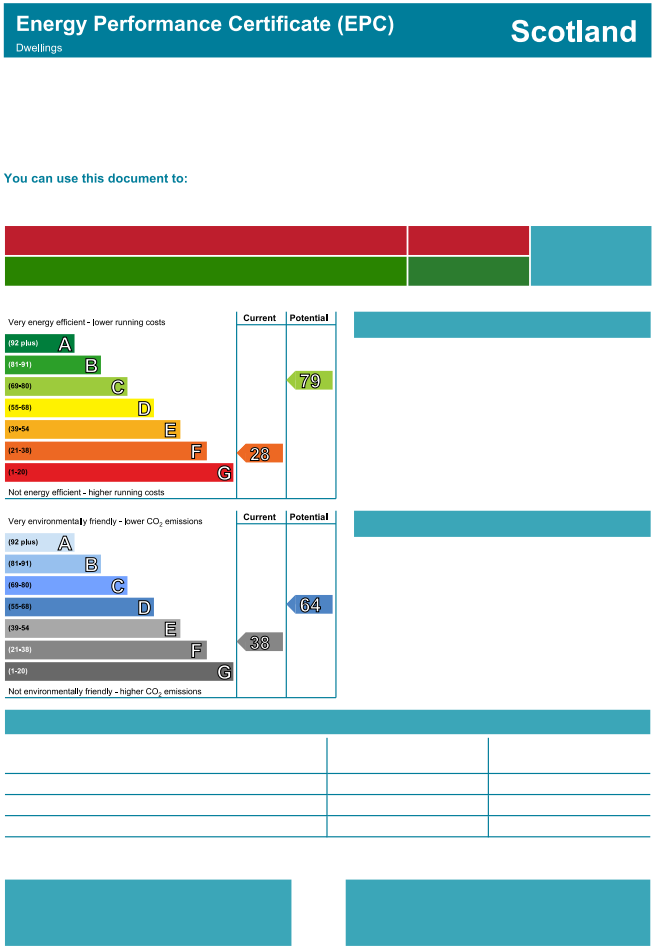
Wall Insulation in Progress

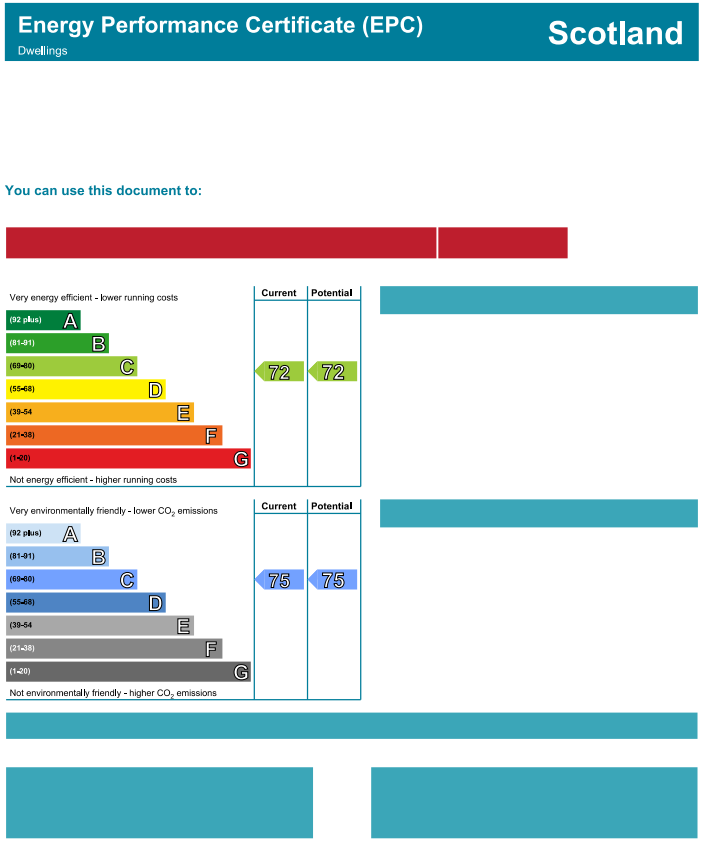


Internal Finishes

25 Holmhead Place Cathcart

Energy Performance Certs Before/After





25 Holmhead Place Cathcart

25 Holmhead Place EPC Table			Energy Efficiency Rating			
			Before	Before	After	After
Flat	**Address**	**Area**	**En Eff Actual**	**En Eff Poss**	**En Eff Actual**	**En Eff Poss**
0-2	25 Holmhead Place	87			75	75
0-3	25 Holmhead Place	36	28	79	72	72
1-1	25 Holmhead Place	37	53	75	79	79
1-2	25 Holmhead Place	37	55	55	80	80
1-3	25 Holmhead Place	66	73	82	81	81
2-1	25 Holmhead Place	37	53	75	79	79
2-2	25 Holmhead Place	37	75	80	80	80
2-3	25 Holmhead Place	66	69	82	81	81
3-1	25 Holmhead Place	37	71	76	76	76
3-2	25 Holmhead Place	37			78	78

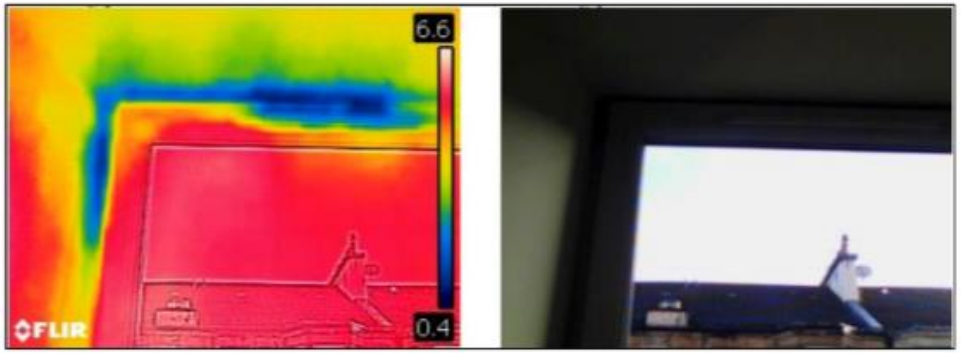
Airtightness - Testing

Air Leakage – External Junctions

Flat 2/2, 25 Holmhead Place

Living Room

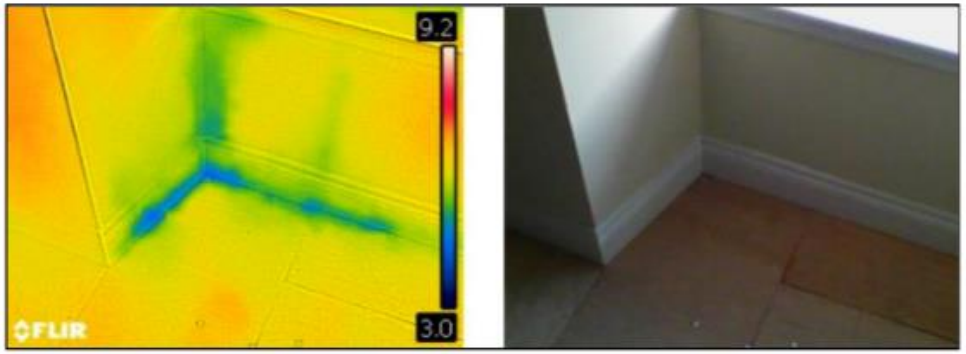
Leakage around frame at window head.



Flat 2/2, 25 Holmhead Place

Living Room

Leakage below skirting boards at window.

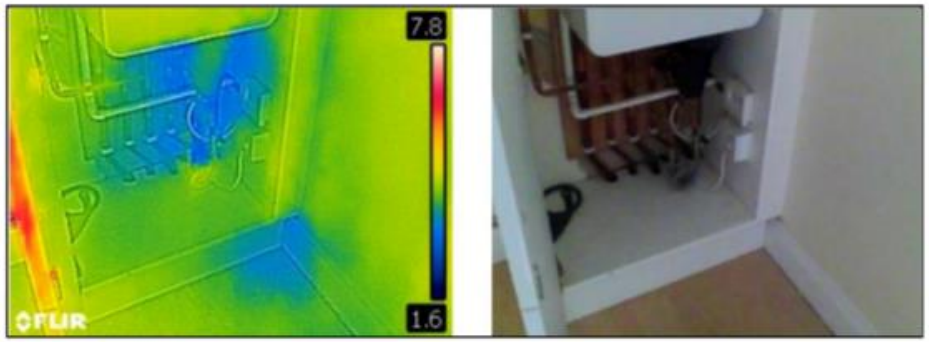


Air Leakage - Service Penetrations

Flat 2/2, 25 Holmhead Place

Living Room

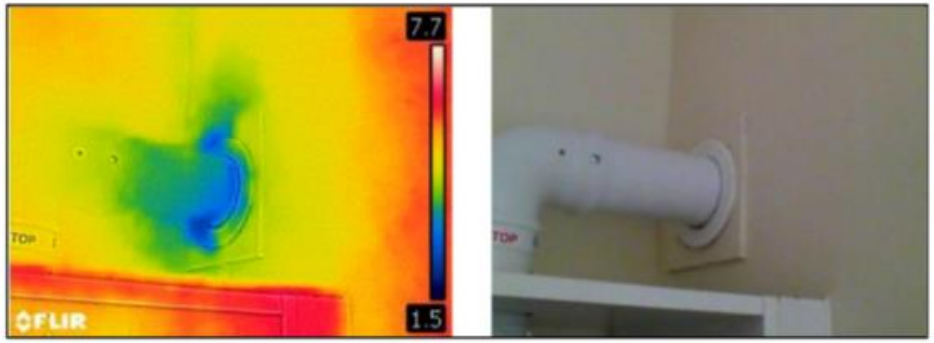
Leakage from below boiler cupboard, likely from boiler pipework penetrations in floor.



Flat 2/2, 25 Holmhead Place

Living Room

Leakage around boiler flue.



Air Tightness Summary

25 Holmhead Place G44 4HD				
Airtghtness Testing Summary				
Flat Position	**Net Floor Area**	**Envelope Area**	**Volume**	**Air Permeability m3/h.m2**
Flat 0-3	37.6	159.3	104.5	**12.85**
Flat 2-1	36.6	158.9	106.1	**12.1**
Flat 2-2	34.7	137.8	91.9	**16.21**
Flat 3-1	36.6	162.9	108.5	**11.04**
Flat 3-3	56.7	209.6	166.2	**13.07**

25 Holmhead Place – Project Costs

Total Project Improvement Costs:	
Common Repair Works	£261k
Internal Works	£550k
Pre Con. Wks & Fees	£104k
VAT	£166k
TOTAL	£1,081k

Costs based on tender February 2022

25 Holmhead Place – Energy Efficiency Costs

Energy Efficiency Costs Per Unit:	
Cond. Boiler & Controls	£2250
Gas Saver	£260
4No. D/G Windows [PVC]	£4030
Wall Insulation 48m2	£3220
Roof Insulation 37m2	£810
Floor Insulation 37m2	£810
Works Total	**£11,380**
Fees 8%	£910
VAT	£2460
TOTAL	**£14,750**

Costs based on tender February 2022

Case Study Conclusions

- 2 out of 11 Flats EPC ‘B’ Rated Energy Efficiency
- Most Others Upper EPC ‘C’ Rating – Average 78.1
- 9 out of 11 Flats ‘B’ rating on Env. Impact [CO2] – Ave 82.7
- Rd SAP favours larger flats –‘B’ Rating easier
- Top and Ground Floor Pre 1919 unlikely to achieve ‘B’
- Spending money on airtightness very good value – improves tenant comfort and energy bills – EPC ‘0’ Pts, SHNZS?
- Unlikely to lead to excessive air tightness in Pre1919s.
- Comprehensive Major Repair – Unlikely with Mixed Tenure

EPC kWh Comparison Table

Proposed Target 71-120 kWh/m2/pa

Flat	Address	Area m2	Space Heat /m2 kWh/m2 /pa	Space Heat /year kWh /pa	EPC EE Actual	EPC EE Potential	EPC score Improved	Cost	Measures
0/1	107 Niddrie Rd	43	57	2466	B-84	B-84	NK	£162k	Enerphit
0/3	25 Holmhead Pl	36	110	3974	C-72	C-72	44	£71k	Max. Installations
1/2	181 Allison St	85	49	4185	B-81	B-81	45	£70k	High Installations
1/1	14 Park Terrace	149	109	16228	D-64	D-68	N/A	N/A	Pre-Improvement

All flats meet 120 kWh/m2/pa proposed target
Park Terrace [very large] meets requirement with no improvement works
Niddrie Rd [Small] and Allison St [Ave/Large] meet 71 kWh/m2/pa proposed kWh
Small flats or homes highly unlikely to achieve 71 kWh/m2/pa

EPC kWh Comparison Table

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All flats meet 120 kWh/m2/pa proposed target
Park Terrace [very large] meets requirement with no improvement works
Niddrie Rd [Small] and Allison St [Ave/Large] meet 71 kWh/m2/pa – but costs?
25 Holmhead Place unable to achieve 71 kWh/m2/pa
Total works costs – significant differences.

Clean Energy Options

- Low Rise – Air Source Heat Pumps
  - Convert when next boiler renewal due?
- Tenement – ASHP & Ground Source HP
  - Not easy to install
  - Mixed Tenure difficulties
- High Rise – GSHP or Super Insulation & elec heat
- All – Heat Networks if available
  - Cost of connection
  - Tenant running costs
- All Options - Space required for HW Storage [0.9m2]
- Tenant Impact:
  - Change gas cooker for electric
  - Disruption

SHNZS Conclusions – 71-120 kWh/m2/pa

kWh/m2/pa basis for Energy Performance Targets:

- Average/larger flats mid-floor and mid-terrace will be easier to make energy efficient.
- Flats at Ground floor, Top Floor and Gables unlikely to comply even with High Spec.
- Single storey homes e.g. sheltered bungalows unlikely to comply
- Standalone properties e.g. rural properties unlikely to comply
- kWh/m2/pa has similar drawbacks to EPCs
- All small homes will be unlikely to comply even with a high spec.
- Mixed Tenure accommodation - harder to meet standards.

SHNZS Conclusions Ventilation

Ventilation and air tightness:

- Assessment [RdSAP?] to support scoring for air tightness improvements. May require AT Tests to demonstrate standard.
- Scoring 10-20 m3/hour.m2 for existing dwellings – good result?
- Limited benefit from MVHR until air change rate reduced further.
- Ventilation to ensure moisture removed from kitchen & bathroom
- With high airtightness – certification of ventilation performance in situ will be good practice.

SHNZS Conclusions - Compliance

SHNZS – Requirements need scope for flexibility re. house type:

- Consider a maximum kWh/pa as a flexible alternative.
- Consider the installation of the approved ‘List of Measures’ as being ’deemed to comply’ – at least for problematic stock. Simple solutions
- Consider EPC with ‘No further improvement recommendations’ as being ’deemed to comply’.
- If focus is on Fabric Performance [Option 1], standard may be based around space heat demand. If PV/Solar Thermal are included, additional flexibility could be achieved by Space & Hot Water standard.
- Compliance via other assessment methodologies e.g. PHPP, IES to be benchmarked against RdSAP.
- RdSAP currently under review to 2024 – unknown impact on SHNZS
- Consider B EPC or kWh/m2/pa standard per HA for overall performance – incentive for high spec to easy hits to offset challenging properties

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