

# Module 12.1

## Improvement exercise

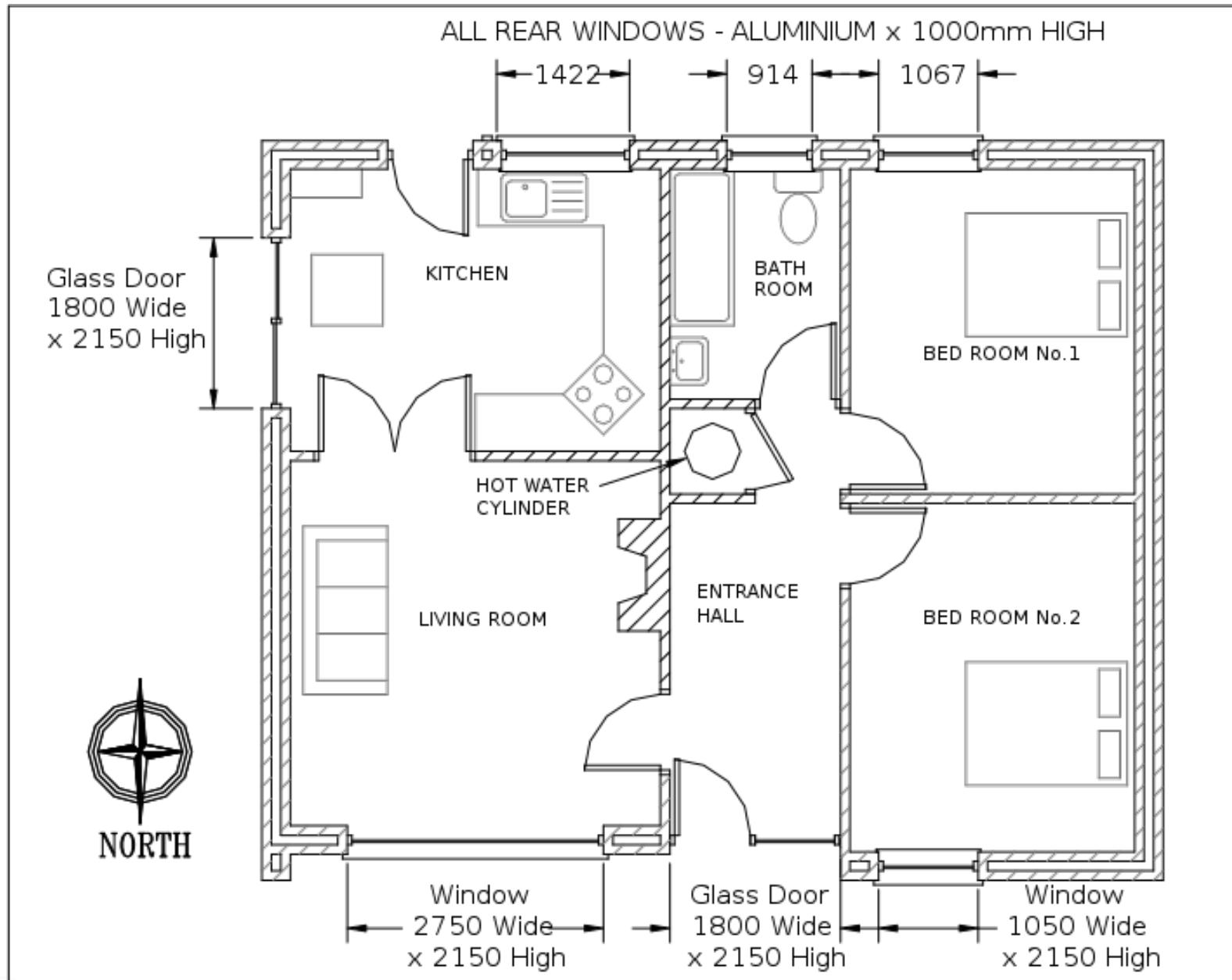
# Learning Outcomes

- On successful completion of this module learners will be able to
  - Demonstrate an application of the combined knowledge gained in previous modules.

# Introduction.

- A friend has approached you for advice.
- They show you a set of plans for a single storey two bedroom dwelling.
- The dwelling was originally built more than 10 years ago.
- The specifications for the construction details, insulation, ventilation, space heating and water heating, etc are not up to date.
- You are asked to write new specifications.
- Sorry – “do not build this style of house” is not an acceptable reply.

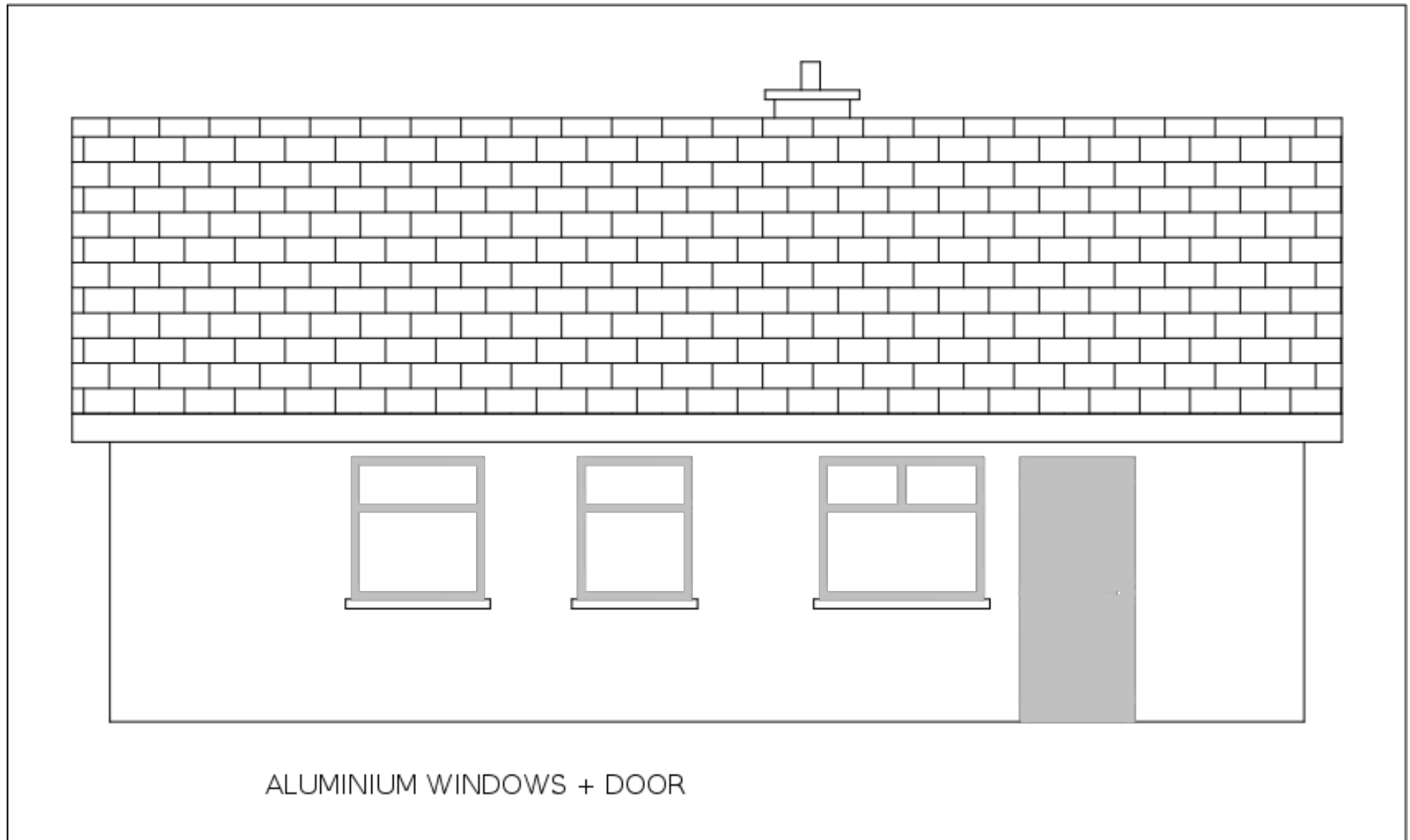
# Plan view



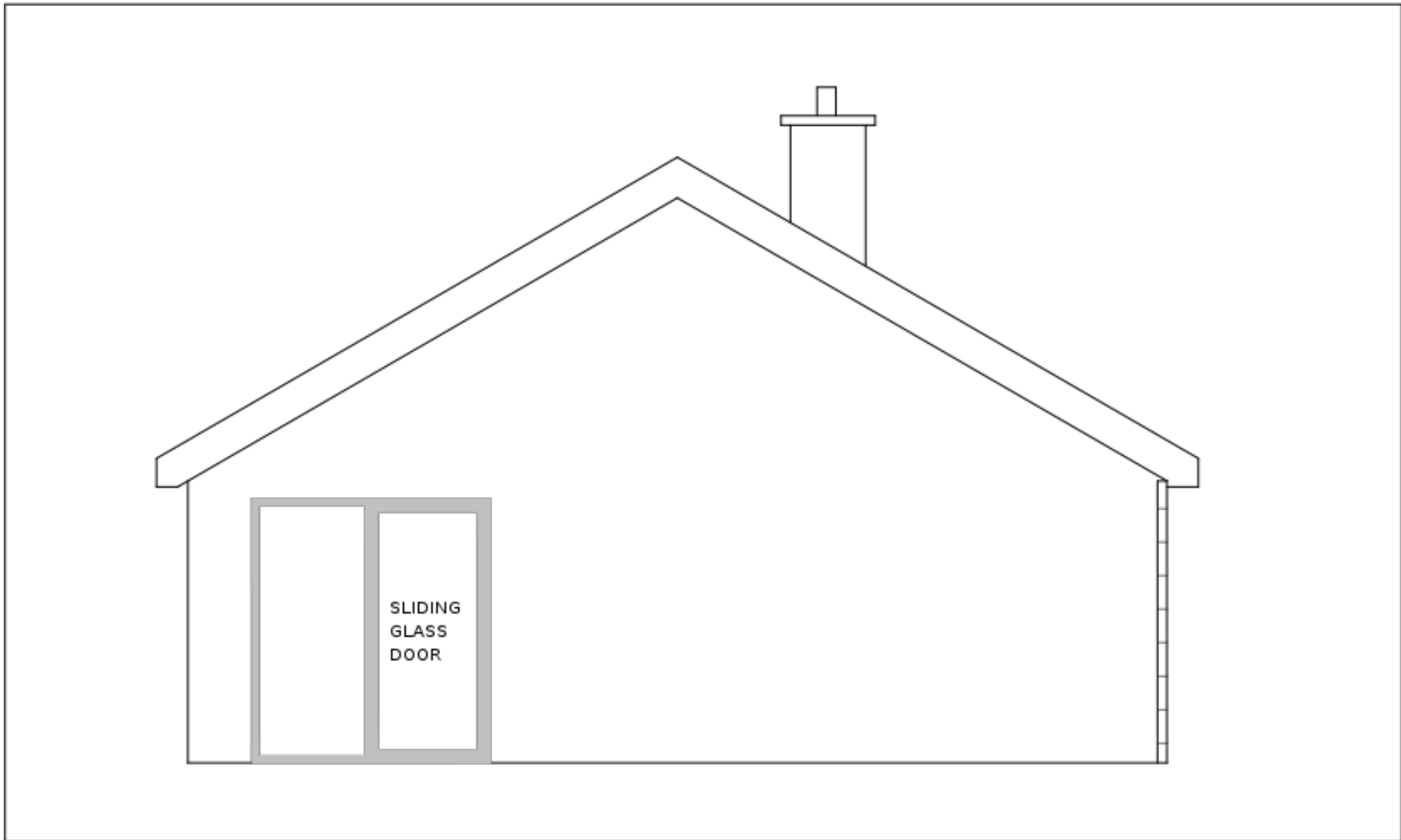
# Front elevation - north



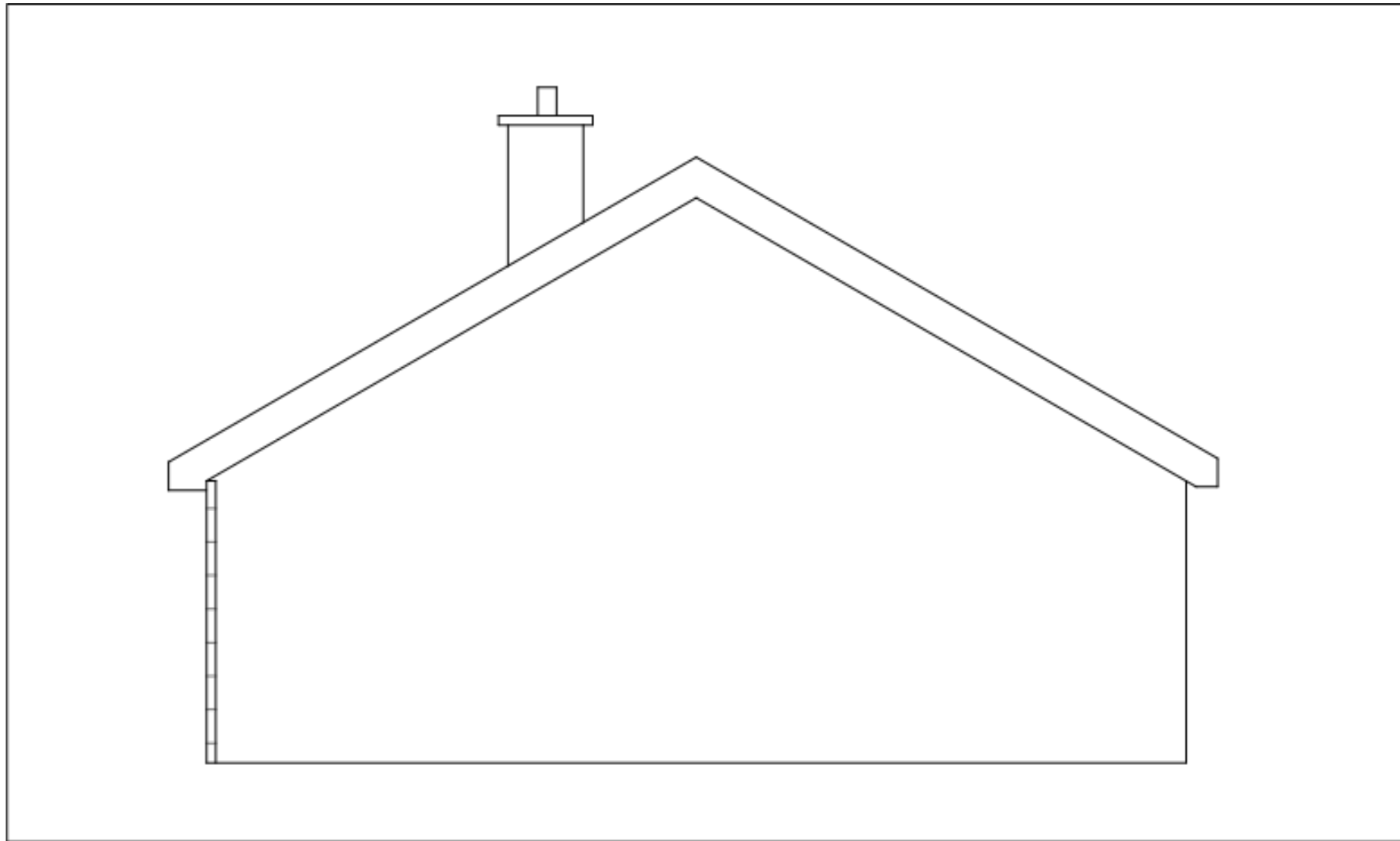
# Rear elevation - south



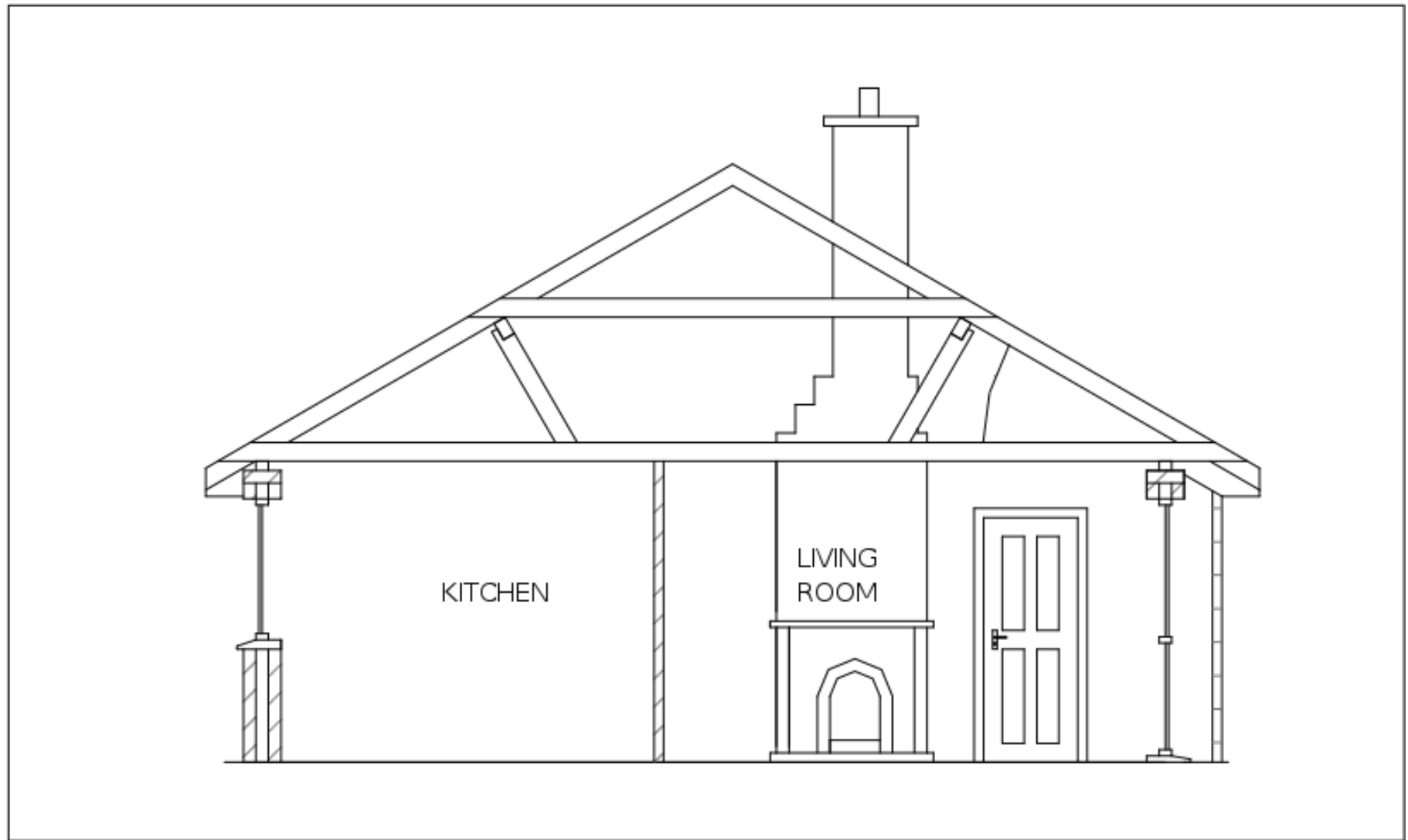
# End view – east.



# End view - west



# Sectional elevation.



## Existing specifications.

- Floor insulation.

Concrete floor slab with 50mm insulation.

U-value  $0.33 \text{ W / m}^2 \text{ K}$ .

- Wall insulation.

Cavity block work wall.

100mm cavity and 50mm partial fill insulation.

U-value  $0.40 \text{ W / m}^2 \text{ K}$ .

- Roof insulation.

150mm mineral wool insulation between ceiling joists. Ventilated roof space.

U-value  $0.27 \text{ W / m}^2 \text{ K}$ .

# Existing specifications - continued.

- Ventilation.

Natural ventilation.

- Windows + glass doors.

Aluminium frame without thermal break.

Double glazing with 16mm air filled gap.

Overall window U-value 3.0 W / m<sup>2</sup> K.

- Lighting.

100% incandescent bulbs.

# Existing specifications - continued.

- Water heating.

Primary water heating.

Electric water heating inside a 100 litre cylinder.

Secondary water heating.

From a back boiler at the open fireplace in the living room. (winter period only).

Fireplace using a mix of coal and wood fuels.

# Existing specifications - continued.

- Space heating.

Primary space heating.

Electric storage heaters in all rooms.

Secondary space heating.

From a back boiler at the open fireplace in the living room. (winter period only).

Fireplace using a mix of coal and wood fuels.

# Improvement – floor insulation.

Original U-value	0.33 W/m <sup>2</sup> K.
Current local building regulations?	
Passive house specification?	
Recommended construction detail?	
Consider also thermal bridging and air tightness.	

# Improvement – wall insulation.

Original U-value	0.40 W/m <sup>2</sup> K.
Current local building regulations?	
Passive house specification?	
Recommended construction detail?	
Consider also thermal bridging and air tightness.	

# Improvement – roof insulation.

Original U-value	0.27 W/m <sup>2</sup> K.
Current local building regulations?	
Passive house specification?	
Recommended construction detail?	
Consider also thermal bridging and air tightness.	

# Improvement – ventilation.

Original ventilation method	Natural
Originally building pressure test.	No test.
Current local building regulations?	
Passive house specification?	
Recommended ventilation detail? Pressure test?	

# Improvement – windows.

Original windows - aluminium	3.0 W/m <sup>2</sup> K.
Current local building regulations?	
Passive house specification?	
Recommended window detail?	
Consider also thermal bridging and air tightness.	

# Improvement – Lighting.

Original lighting.	Incandescent.
Current local building regulations?	
Passive house specification?	
Recommended lighting detail?	

# Improvement – primary water heating.

Original primary water heating	Electric
Current local building regulations?	
Passive house specification?	
Recommended primary water heating detail?	
Consider renewable energy and controls.	

# Improvement – secondary water heating.

Original secondary water heating	Fire place
Current local building regulations?	
Passive house specification?	
Recommended secondary water heating detail?	
Consider renewable energy and controls.	

# Improvement – primary space heating.

Original primary space heating	Electric
Current local building regulations?	
Passive house specification?	
Recommended primary space heating detail?	
Consider renewable energy and controls.	

# Improvement – secondary space heating.

Original secondary space heating	Fire place
Current local building regulations?	
Passive house specification?	
Recommended secondary space heating detail?	
Consider renewable energy and controls.	

# Improvement – others.

Original	
Current local building regulations?	
Passive house specification?	
Recommended detail?	

# Improvement – others.

Original	
Current local building regulations?	
Passive house specification?	
Recommended detail?	

# Improvement – others.

Original	
Current local building regulations?	
Passive house specification?	
Recommended detail?	

# Module summary

- None.

# References.

- None.