BELL
ASSOCIATES
ARCHITECTURE
PLANNING

Roger Bell
dip. arch. tech. Bsc. CAD

Rogerstown,
Rush,
Co. Dublin.

Muchgrange,
Greenore,
Co. Louth

E bellassociates@eircom.net **T** 01-8430267 **T** 042 938 3865 **M** 087 2371984

This inspection report is to provide a report on the general state of repair of the property described below. It is not a Full Structural Survey as it is not practical to examine unexposed or inaccessible areas of the property, but it is a report by the surveyor on those matters expressly set out in this report to establish the general state of repair and the structural condition of the property based on the visible elements as outlined in the report. This report will not detail defects of no structural significance or of a minor on unexposed or inaccessible areas as it is a report on the visible surface only.
The information set out below must be read in conjunction with the marginal notes which form an integral part of the report. You are advised to show a copy of this report to your solicitor.

Report No. 43-03

Name of Client: xxxxxxxxxxxxxxxxxx

Address of property inspected: xxxxxxxxxxxxxxxxxxxxxxxxxx

Date of Inspection: 6th October, 2011

Weather Conditions: Cold, Clear Skies, Windy

Year Property Constructed: 2007

Description:

This report has been prepared to ascertain the reasons for excessive heating bills for the property, and also the damage to the ceilings to bathrooms on the first floor of the dwelling.

On the day of our visit, our client showed us the gas bills for the period 20th Sep. 2010, to 19th July, 2011. These bills amounted to a total of €1740.00 over a ten month period. This averages out to a bill of €174.00 per month.

We feel that this bill is excessive considering the dwelling is some four years old, and would have had to have been constructed in compliance with the building regulations, and specifically Part L Conservation of Fuel and Energy which states:

Conservation of Fuel and Energy
L1 A building shall be designed and constructed so as to ensure that the energy performance of the building is such as to limit the amount of energy required for the operation of the building and the amount of CO2 emissions associated with this energy use insofar as is reasonably practicable.
L2 For existing dwellings, the requirements of L1 shall be met by:
(a) limiting heat loss and, where appropriate, maximising heat gain through the fabric of the building;
(b) controlling, as appropriate, the output of the space heating and hot water systems;
(c) limiting the heat loss from pipes, ducts and vessels used for the transport or storage of heated water or air;
(d) providing that all oil and gas fired boilers installed in existing dwellings shall meet a minimum seasonal efficiency of 86% where practicable.

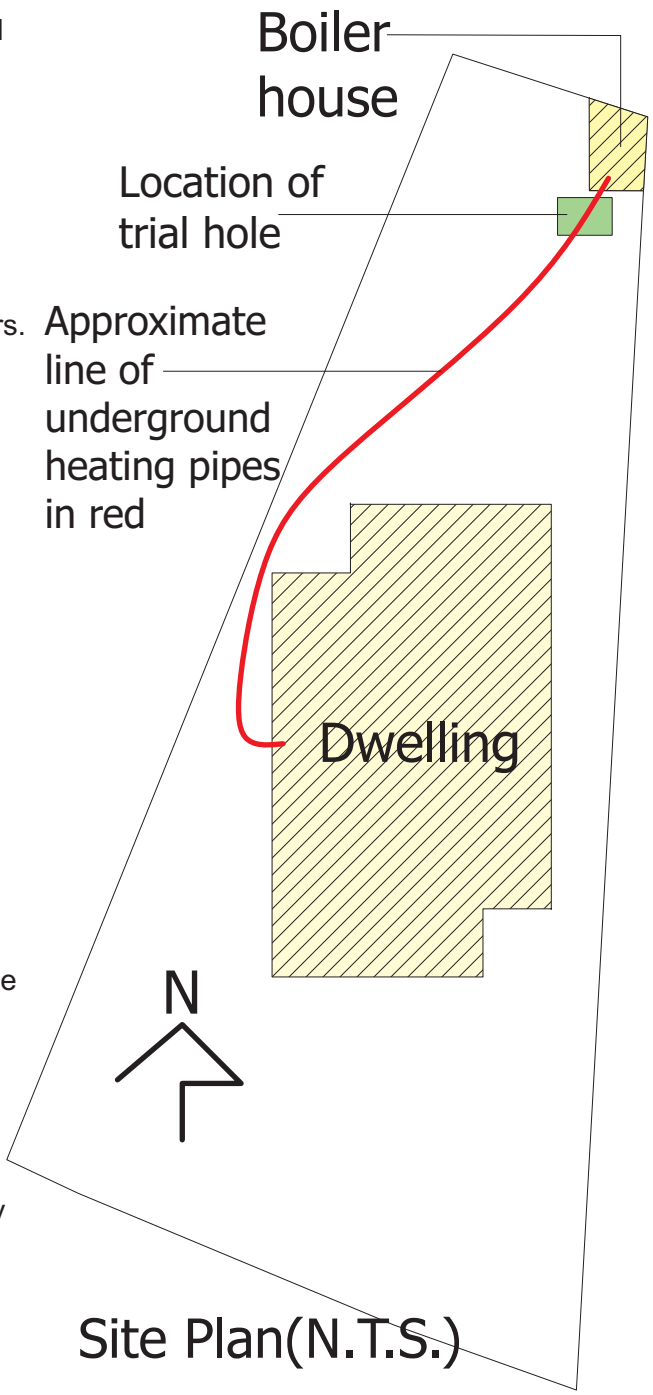
Conservation of Fuel and Energy(contd.)

L3 For new dwellings, the requirements of L1 shall be met by:
(a) providing that the energy performance is such as to limit the calculated primary energy consumption and related CO2 emissions insofar as is reasonably practicable, when both energy consumption and CO2 emissions are calculated using the Dwelling Energy Assessment Procedure (DEAP) published by Sustainable Energy Ireland;
(b) providing that a reasonable proportion of the energy consumption to meet the energy performance of a dwelling is provided by renewable energy sources;
(c) limiting heat loss and, where appropriate, availing of heat gain through the fabric of the dwelling;
(d) providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls;
(e) providing to the dwelling owner sufficient information about the dwelling, the fixed building services and their maintenance requirements so that the dwelling can be operated in such a manner as to use no more fuel and energy than is reasonable;
(f) providing that all oil and gas fired boilers shall meet a minimum seasonal efficiency of 86%.

An inspection of the property revealed that the gas fired heating system, and the hot water cylinder are both contained in a small boiler house at the rear of the garden which is approximately 20 metres from the dwelling. Our clients have made us aware that the heating pipes travel from the boiler house across the garden, and enter the dwelling at the utility room on the western elevation of the dwelling indicated on the site plan adjacent. We have calculated that this run is approximately 50mtrs. Both the boiler, and the hot water cylinder are modern in design and specification, the boiler being a buderus logamax plus gb112 with a manufacturer stated efficiency of 90.1%, and the hot water cylinder being a lycris byrne glass lined steel calorifier with a declared loss factor of 64.

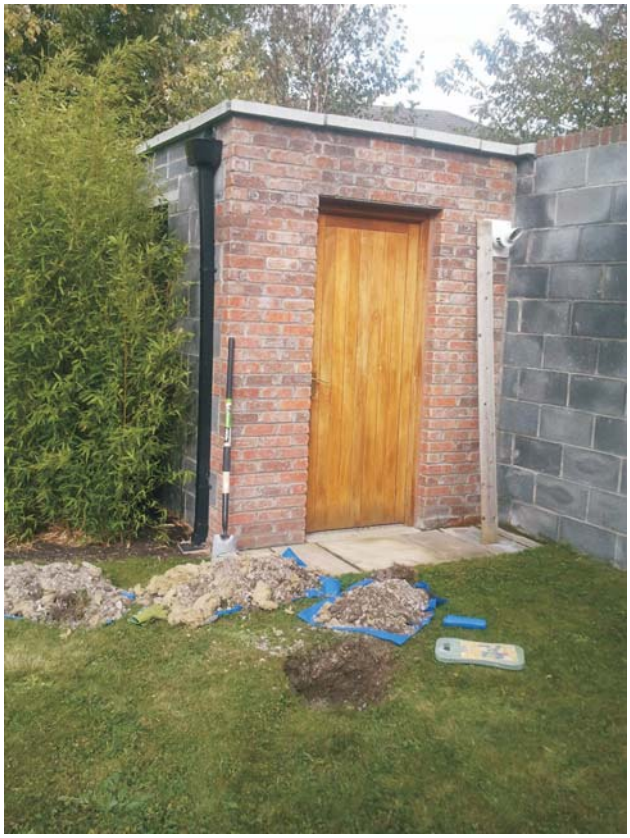
Our client has made us aware that during the cold snap which occured prior to, and during the christmas period Dec.2010 to Jan. 2011, it was noted that an area of snow melted in the garden in the approximate position corresponding to the location of the flow and return pipes from the heating system to the house.
(Please see photographs on next page).

These photographs warranted further investigation, so a small trial hole was dug adjacent to the entrance to the boiler house to reveal the heating pipes. During excavation, pieces of quilt type attic insulation were found placed above the pipes. When exposed the pipes appeared to be contained within a 100mm flexible ducting. The ducting had been broken open, prior to our investigation, and was stuffed with a quilt type attic insulation. Subsequent removal of the quilt insulation revealed that the pipes were lagged with grey sleeve insulation of approximately 12mm.
(Please see photographs on next page)



Line of heating pipe visible via melted snow

Line of heating pipe visible via melted snow



Hole dug adjacent to boiler house

Attic insulation previously placed above 100mm piping dug up as part of trial hole

Attic insulation previously placed above 100mm piping dug up as part of trial hole

Our investigation trial hole has revealed 2 x 100mm flexible pipes each containing a flow & return pipe.
One of these 100mm pipes would serve the boiler run to provide the underfloor heating.
The second 100mm pipe would serve the hot water cylinder providing running hot water to sinks, bath showers etc.
We would speculate that because of the distance between the boiler house, and the dwelling house, as a matter of comfort, hot water cycling may be in place to provide instant hot water at taps, otherwise taps would need to be run for a short time before hot water would eventually arrive at them.

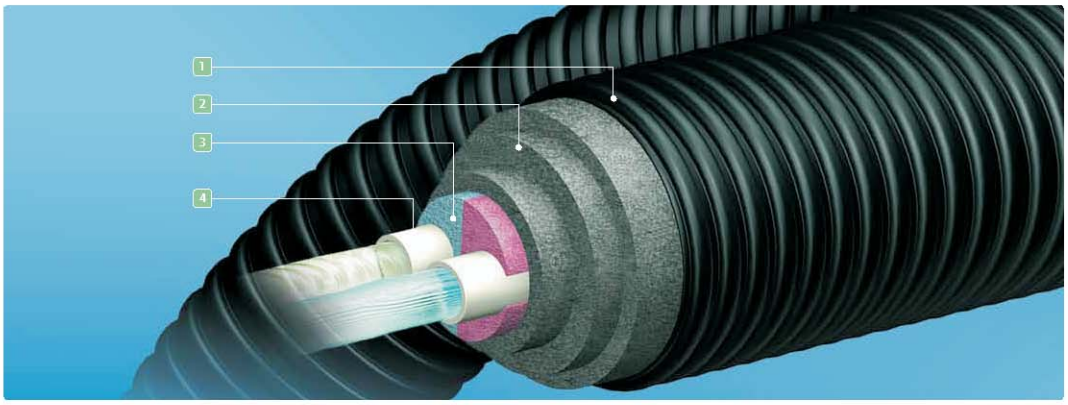
We feel that the specification of piping provided as evidenced at the trial hole is completely inadequate. This inadequate level of insulated piping has led to the quick thawing of snow as per our previous photograph, which in turn indicates an excessive level of heat escape into the ground surrounding the pipe run.

This would lead to the reason why our client has such an expensive heating bill for a relatively new house,and coupled with possible water cycling, this compounds the problem.

We recommend that all flow and return pipes from the boiler house to the dwelling be replaced by a suitable, properly & well specified piping which is fit for purpose.

Please see specification of typical insulated piping below in this case manufactured by Uponor UK.

Design



1 The Jacket pipe

- Special corrugated rib profile provides high flexibility as well as high degree of static load resistance
- Static evidence as per ATV-DVWK-A127 (SLW 60) (Heavy Traffic Load)
- Small bending radius
- High impact-proof HDPE material

2 Insulation

- Very low thermal loss (pipe system "Uponor Thermo" as per VDI 2055, externally monitored by FIW Munich and certified under DIN Certco [6V046] + [6V047])
- Age-resistant
- Closed cell structure, water absorption < 1 Vol %
- Permanently elastic (dimensional stability of more than 30 years has been verified under operating conditions)
- Flexibility in the form of multi-layer insulation, so-called onion skin design
- Compensation of linear thermal expansion (no expansion joints or elbows required)

3 Two-coloured Dog Bone

- Registered design and available solely from Uponor.
- The two-colour Dog Bone prevents the flow and return lines being confused when medium pipes are connected.

4 Medium pipe

- Materials: PE-Xa and PE-100 (Supra)
- Maximum safety and service life
- Free of deposits/encrustation
- Frost-proof and resistant against many aggressive media
- Max. stress crack resistance

Technical data for insulating material

Property	Standard	Unit	Value
Water absorption, 24 days	DIN 53428	vol-%	< 1.0
Elongation at break	DIN 53571	%	204
Volumetric weight	DIN 53420	kg/m³	30
Tensile strength	DIN 53571	N/cm²	24
Tear strength	DIN 53575	N/mm	1.38
Compression hardness (50 % deformation)	DIN 53577	kPa	71
Flammability	DIN 4102		B2

The second issue in relation to the dwelling relates to the peeling of paint from the ceilings in both the first floor bathroom, and the en suite off the master bedroom which too is on the first floor. Both the bathroom, and ensuite are located beside each other.

On investigation, It was noted that a mechanical heat recovery system has been installed in the dwelling, The unit is located in the dormer attic space above the bathroom/en suite.

BATHROOM CEILING

BATHROOM CEILING

EN SUITE CEILING

EN SUITE CEILING

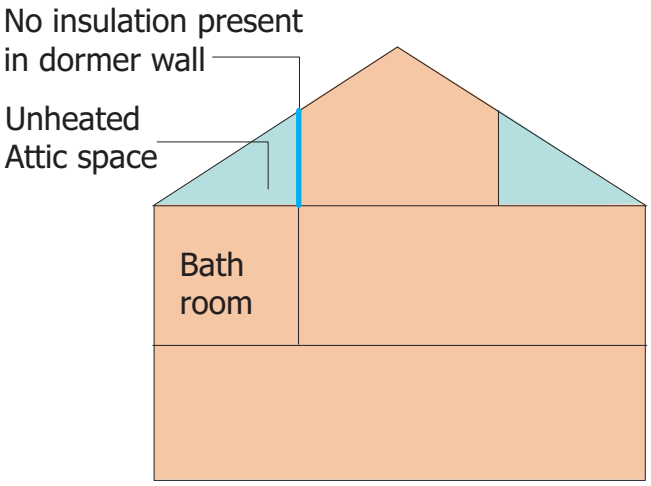
DORMER ATTIC SPACE ABOVE BATHROOMS

DORMER ATTIC SPACE ABOVE BATHROOMS

While both the bathroom and en suite are serviced by the mechanical ventilation system, it was noted that a moisture content of approximately 20% was metered on the ceiling in the vicinity of the shower area.

This would suggest that the mechanical ventilation system cannot adequately cope with the volume of moist air which is being retained in both bathrooms, and that this has led to the excessive moisture penetration into the ceiling above the respective shower areas, leading to paint peeling from these ceilings.

We also noted that on the day of our inspection the attic space above the bathrooms containing the heat recovery unit was considerably colder than the room adjacent to it. While our survey was not invasive, we have to assume that the attic space has been thermally insulated, but due to a strong draught being present at the time of inspection, it obviously has not been draught sealed.



Section through dwelling house

We recommend that a new mechanical rapid extract system be installed in both bathrooms adjacent to the respective shower areas to speedily remove moist air therefore reducing the moisture retention in the ceiling.

We feel that there must be some cold-bridging contributing to this issue, and therefore are recommending that the ceiling be thoroughly insulated with a rigid board insulation above the bathrooms and the attic space be properly draught sealed.

We also feel that based on this inspection, all other attic areas should be suitably thermally insulated and draught sealed.

In summing up our report, we feel that if the two recommendations are properly addressed, they will improve the excessive heating bill, reduce the cold bridging in the attic, and remove excessive moist air from the bathrooms, so allowing redecoration there to remain permanent.

Finally, in accordance with our standard practice statement we confirm that this report is for the use only of the party to whom it addresses, and no responsibility is accepted to any third party for the whole or part of it's contents. The report is prepared on the basis of full disclosure of all relevant information and facts.

Signed

Roger Bell dip.arch.tech. Bsc. CAD. RIAI (arch.tech.) ACIAT Dated : 10th October, 2011.

BELL ASSOCIATES
ARCHITECTURE
PLANNING

Roger Bell
dip. arch. tech. Bsc. CAD

Rogerstown,
Rush,
Co. Dublin.

Muchgrange,
Greenore,
Co. Louth

E Bellassociates@eircom.net T 01-8430267 T 042 938 3865 M 087 2371984