



STEWART
Milne
GROUP



ADVANCING TOMORROW'S HOMES

GROUP VIEW

The Stewart Milne Group, formed over 30 years ago, has grown by providing quality, high specification, attention to detail, and leading edge thinking in our products to a diverse range of clients across the construction industry.

Central to the Group's success has been investment in the future – in the right people, in the right products and services, and in gauging how the needs of commercial and domestic buyers will evolve.

There is no doubt that one of the major challenges to affect our business today and in the future is climate change.

The UK's 21 million dwellings are responsible for 27% of CO₂ emissions, consume half of water supplies and produce 8% of waste.

We have taken an industry lead by building a potentially commercially viable prototype house that serves the Government's objective to achieve zero carbon homes within a decade.

The Stewart Milne Group utilises advanced timber frame building systems for residential construction and adopting these principles as core to this state-of-the-art prototype underlines our belief in the precise production process and environmental qualities such systems bring.

This innovative project has involved experts at many different levels within the Group, creating a team approach in which skills and experience across all divisions have worked together to produce this end result.

Our decision to create this five-star accredited house as a reality has given us the opportunity to explore the challenges, identify practical solutions and assist key influencers in the housing sector in the feasibility of building near zero carbon homes in an affordable fashion.



“THERE IS NO DOUBT *that one of the major challenges to affect our business today and in the future is* **CLIMATE CHANGE**”

GLENN ALLISON, Managing Director, Stewart Milne Group

THE SIGMA HOME

The Sigma Home constructed at the BRE, Watford, is one of the country's first five star rated homes under the Code for Sustainable Homes. Presented as two semi-detached homes, one is fully finished and furnished as a three but potentially a four bedroom four storey townhouse to illustrate practically how such an innovative design can contribute to contemporary lifestyle. The other is a 'blank canvas' to highlight the technology and the flexibility to produce different layouts. In this case a ground floor, one bedroom apartment/live-work unit with a three storey, three bedroom triplex above.

The Sigma Homes also benefit from a co-ordinated approach using Modern Methods of Construction (MMC), one of the most technologically advanced and sustainable forms of construction to satisfy the demands of Egan led methodologies and recent Government directives.

URBAN DESIGN

- The Sigma Home is envisaged as a semi or terraced property forming semi-continuous urban frontages with associated car parking – in landscaped boulevard or courtyard settings, responding to the CABE agenda of 'Building for Life'.
- Several different variants can be produced, with different layouts, elevations and finishes.
- This demonstration house is externally finished in a combination of high performance insulated acrylic render system and timber cladding.



LAYOUT DESIGN

- The Sigma Home is a contemporary update of the traditional 3 storey townhouse. Arranged over 4 levels to minimise the building footprint and to maximise affordability, the split-level house adopts a semi open plan format suited to today's informal lifestyles. Daylight is plentiful and the circulation core feature adds views and communication between spaces. Flexibility is integral to the house, which has been developed in conjunction with PRP Architects to 'Lifetime Homes' standards. Key to its design is the ability to separate the ground floor from the upper floors to create a self contained apartment or a home office (thus reducing carbon emissions associated with travelling to and from work).

ENERGY

- The Sigma Homes utilise renewable energy by way of heating hot water from solar thermal and photovoltaic roof panels, roof mounted wind turbines and solar gain.
 - A solar stack and 'whole house' mechanical ventilation and heat recovery system controls temperature in a passive system. The stack sits centrally above the stairwell and sucks in warm air as it rises, in a similar way to that of a chimney. A heat sensor opens and closes a vent at the top of the stack to manage the optimum temperature in the building.
- The high levels of insulation provided by the wall, floor and roof elements are coupled with high performance timber windows to give excellent thermal performance of the external envelope. Add to this the airtight construction and detailing, ten times better than current Building Regulations requirements, the resulting design delivers energy performance 100% better than Part L1A.
- All timber and timber products are from managed sustainable sources.
 - All of the homes' internal, external and security lighting (excluding the pod) is low energy and white goods are all A+ or A rated.



WATER

- An in-built Eco-play grey water recycling system reclaims shower and basin water for toilet flushing. All showers, taps and washing machine have low water consumption.

WASTE

- In addition to the waste bin, three 7-litre internal bins are in cupboards and out of site, holding recyclable waste.

CONSTRUCTION

- The Sigma home embraces a hybrid approach to the application of different leading-edge offsite technologies. The smarter build process enabled the construction of two semi-detached four storey structures in 8 weeks from commencement to completion, compared to the traditional timescale of 24 weeks.



MMC - crane erect and pod installation

FAST-FIX FOUNDATIONS

- Roger Bullivant 'System First' modular foundation system enables minimal site excavation with pre-cast piles and beams. From bare site to completed foundations took just 5 days. The system delivers a U-value of 0.18 W/m²K.

ADVANCED CLOSED PANEL TIMBER FRAME WALLS

- The Sigma home's external fabric utilises the Stewart Milne Generation 3 closed panel system which provides a U-value of 0.15W/m²K. The build up comprises 140mm solid timber studwork, 0.035W/mK glasswool insulation between the studs and sheathed with 9mm OSB/3 boards on both faces. The inside face utilises Tyvek Airguard vapour control barrier and Illbruck taping systems. 25mm service battens at 600mm centres completes the internal build up and is ready for services and dry lining.
- The external face is clad in standard breather membrane, and completes the construction which is manufactured in the factory and crane erected as large panels on site.
- The external render is fixed directly onto a recycled backing board, vented cavity and Celotex insulation system.
- The timber cladding features utilise Finnforest thermowood rain screen cladding with a service life of up to 30 years.
- The internal face is finished with two layers of plain plasterboard providing one hour fire performance, eliminating the need for fire doors and fire protected stair enclosures.
- Nordan 'N-Tech' triple glazed high performance timber windows complete the external wall construction and contribute to an overall targeted air tightness of 1.0m³/(h.m²).

FLOOR CASSETTES

- The Sigma Home uses a combination of three different pre-fabricated timber based floor systems to demonstrate the range of options available from Stewart Milne Timber Systems. The upper floors all utilise an underfloor heating system to service the space heating requirements, negating the need for space restricting radiators and therefore enabling further flexibility. The build up on top of the structural deck ensures that finished floors are laid in dry internal conditions, and in addition provides enhanced acoustic values of circa 2-3dB to reduce noise transfer through the floors.

- Stewart Milne Group's dB-50 acoustic floor system is designed over the live/work/play unit to compartmentalise multi-occupancy living spaces. The system utilises a special design of acoustic joist which delivers enhanced sound transfer performance equivalent to Robust Detail levels. The floor system incorporates an integral service void which requires no horizontal overhead drilling or notching of the joists, making easy the installation of services or future access for maintenance or upgrading.
- The floors are designed to clearspan from gable to partywall giving total flexibility of living space. Floor to ceiling heights are designed to suit standard plasterboard and OSB sheeting sizes, eliminating the need to cut sheets and utilising standard timber stud height components. This reduces production and build costs and simplifies manufacture.

RAPID ROOF SYSTEM

- The design of the Sigma Home enables simplified roof construction with factory made roof cassettes and utilises the roof space to create an internal vaulted feature. This enables the roof to be wind and watertight very quickly. The pre-insulated closed roof cassettes are factory produced with factory-fitted roof membrane and airguard vapour barrier to the ceiling side. Factory installed insulation contributes to an overall U-value of 0.15 W/m²K. On this project six roof modules were installed in less than three hours.
- The roof cladding system is a preformed zinc metal system the fixing points for which are designed into the roof cassette.

POD AND PANEL HYBRID TECHNOLOGIES

- Pre-fabricated bathroom pods supplied by Offsite Solutions were delivered in sequence to suit the timber frame erection process and craned into place on site. Each pod incorporates low water consuming items and includes an Eco-play grey water recycling system as noted previously.

SUPPLY CHAIN INTEGRATION

- Stewart Milne Group has developed excellent partnerships with key suppliers over its time in business and these have been central to the Sigma Home project, leading to efficiencies in time and cost, and producing an enhanced end solution.

SAFETY AND SECURITY

- The structure includes an automatic fire detection system together with sprinklers.
- Designed primarily for urban locations the properties are to 'Secured by Design' standards, with particular emphasis on ensuring external public spaces are overlooked by the principal internal rooms.

HEALTH AND SAFETY

- The design and build of the Sigma Home has a number of health and safety features built-in as the result of extensive health and safety thinking during the design process. Early identification of principal build components and hazards, and the adoption of CDM principles, work hand in hand with offsite technologies to deliver a safety conscious project and safe working environment for site operatives.



Artists Impression of Sigma Home Streetscene

THE SIGMA HOME BY STEWART MILNE GROUP
OFFSITE 2007, BRE GARSTON

A MODEL FOR GREEN HOMES



The Sigma Demonstration House achieves Level 5 compliance under the new Code for Sustainable Homes. The Sigma Village proposals demonstrate how Level 6 can be achieved in an expanded development context.

Level 5 compliance – key features

■ CARBON NEUTRAL

The house is designed to be carbon neutral in terms of space heating, hot water, lighting and ventilation fans. High performance insulation and triple glazed windows make it a highly energy efficient design. The house also includes other carbon reducing measures such as low energy appliances, high efficiency condensing gas boiler, a home office and cycle storage to reduce car travel.

■ LOW WATER USE

Water saving devices will be used throughout – washbasin, bath and shower water is collected for flushing the toilets. Water usage is intended to be kept below 80 litres per person per day. Water butts will be provided to collect rainwater from the roof for watering the garden.

■ FLEXIBLE DESIGN

The house is designed with an open-plan layout to suit modern lifestyles. A central core contains bathrooms and other highly serviced areas along with the stairway, which provides vertical circulation. Floor plates are connected onto this core, allowing a flexibility of sizes and uses of space. This also allows the home to change over time along the principles of Lifetime Homes. The adjoining house has been built to show how it can be easily converted to a one bedroom flat or work unit on the ground floor and a 3-bed house above. The house is split-level, which gives interest to the spaces and high ceilings on the ground floor; this also keeps the circulation to a minimum, which is required on this tight site. The open plan design also allows views, daylight and ventilation across the levels. Safety and security is enhanced by using a domestic sprinkler system combined with fire and security alarms.

■ HIGH DENSITY

Maximising family living in city centres is essential for true sustainability and we believe that this four storey family home uses significantly less land than a traditional four bed home, making the proposal more affordable and in line with Government's current thinking on increasing housing density.

THE SIGMA HOME BY STEWART MILNE GROUP

OFFSITE 2007, BRE GARSTON

Level 5 compliance – key features (cont.)

ENERGY STRATEGY

- Increased levels of insulation 'U' value of walls, roofs and ground floor of <math><0.15\text{W/m}^2\text{K}</math> 'U' value of triple glazed windows $0.7\text{W/m}^2\text{K}$.
- Airtight construction (designed to achieve less than $1.0\text{m}^3/(\text{h.m}^2)$).
- High efficiency whole house ventilation and heat recovery system, fresh incoming air recoups heat from the extracted air.
- Careful use of solar gain.
- Solar Collectors on the roof of the solar chimney preheat the hot water cylinder.
- Wind turbines attached to each house; exporting electricity to the national grid.
- Photovoltaic panels offset the remaining CO_2 associated with space heating, hot water, lighting etc

SOLAR CHIMNEY

On the roof of each house is a solar chimney positioned above the staircase. The roof is orientated south at 36° from the horizontal to allow maximum solar gain for the solar collectors positioned on it. The north-facing window allows daylight into the stair and ventilation of hot air out in the summer. By using the stack effect in the stair core, we can draw air through the house for cooling.

OTHER FEATURES

- Careful selection of materials.
- Airborne sound insulation values that are at least 8dB higher than the Building Regulations.
- Ecological enhancement of the site.
- Internal and external recycling facilities.
- Compost bin.
- Best practice construction management in reducing waste, low energy usage and recycling.
- Smart technology will provide monitoring of water and energy in use; the construction water and energy will also be monitored.
- Designed to Secure by Design standards.
- Extensive outdoor spaces have been built into the design at upper levels.
- Minimal requirement for wet trades on site, speeding up the build process.

www.stewartmilne.com



Level 6 compliance – The Sigma Village

The demonstration house has been fully assessed on the basis of the as built conditions for one house on site at the BRE. Level 6 compliance would require two significant adjustments to the Code assessment;

ZERO CARBON DESIGN

Level 6 requires zero carbon design – i.e. over and above the level 5 requirements, the offsetting of electrical loads for all domestic appliances. This requires additional onsite electrical generation which could be achieved either by high efficiency roof mounted photovoltaic panels or large scale wind turbines. Our level 6 proposal assumes communal biomass heating supply and the omission of the small-scale wind turbines in consideration of the increased PV or large-scale wind outputs.

IMPROVED ECOLOGY SCORING

The exhibition house scores poorly in this area of the code assessment due to particular constraints of the BRE site. Level 6 compliance would require improved scoring, which might be achieved through, for instance, through the remediation of a brownfield site or by delivering special ecological enhancements.

Technical information developed in conjunction with
PRP Architects
www.prparchitects.co.uk



THE SIGMA HOME BY STEWART MILNE GROUP

A GUIDED TOUR

SIGMA I



The Sigma Home I is a 4/5 person open plan, split level townhouse which is fitted out as a showhouse:

Entrance area

- **GLAZED ENTRANCE SCREEN**
Entrance to The Sigma I Home is through a high performance triple glazed entrance screen which provides a large amount of daylight into the interior and also permits passive surveillance of the external public realm to help create a safe and secure environment. The timber glazed screen, along with all windows in the house, is triple glazed and argon filled and achieves an impressive U value of 0.7W/m²K.

- **INFORMAL LIVING SPACE**
The front entrance opens into an informal family living space with a 1½ storey ceiling height, and which has views through to the rear of the house and also up to the formal living area at first floor level, which is open plan to the ground floor. The house layout is designed to suit contemporary, informal lifestyles and provide an innovative, dramatic interior space.

- **STAIR**
A feature of the house is the open tread stair manufactured from steamed beech, which was designed and assembled within the Stewart Milne Timber Systems factory. The stair was craned into position during the structural timber frame erect process, and was fitted with temporary treads during the house fit out to avoid damage.

- **CLOAKROOM**
The cloakroom is designed to Lifetime Homes standards, which allows sufficient space for the fitting of a shower by occupants at a later date if required. The sanitaryware is from the White and Silver range by Ideal Standard. Pressure limiters are fitted to the taps to minimise unnecessary water consumption.

- **UNDERSTAIRS CUPBOARD**
The cupboard houses the hub for the category 5 wiring system, which facilitates a network for computers and entertainment systems throughout the home, along with the infrastructure for a building management system.

through to:

Kitchen/Dining room

- **KITCHEN LAYOUT**
The layout incorporates an informal coffee bar area as well as space for a dining table, and is arranged on open plan with the family living room which allows for a bright interior regardless of the building orientation. Access to the rear garden and deck area, along with the external recycling store and bicycle store, is from the rear kitchen door.

- **KITCHEN SPECIFICATION**
The lacquered kitchen units are manufactured in Germany by Nobilia, and incorporate a concealed recycling facility beneath the kitchen sink. A high efficiency gas boiler is concealed at high level within the tall larder unit of the kitchen.

- **KITCHEN APPLIANCES**
Highly energy efficient appliances have been specified in terms of both energy consumption (A and A+ rated) and also water consumption (the dishwasher uses 10 litres of water per cycle, the washing machine uses 40 litres). The kitchen tap is fitted with a flow restrictor to minimise wasted water.

upstairs to:

Living room

- **LAYOUT CONCEPT**
The main living space is located at first floor level, but is designed on open plan with the ground floor spaces to avoid the isolation of this room from the other 'public' areas of the house, and to allow views and communication between the spaces. The living room has a feature window formation overlooking the rear garden.

THE SIGMA HOME BY STEWART MILNE GROUP

A GUIDED TOUR

■ FIRE STRATEGY

Key to allowing the open plan layout design has been the engineered fire strategy to ensure occupant safety in the event of a fire, to at least the equivalent of Part B Building Regulations. There is an automatic fire detection and alarm system to warn occupants of a fire incident, and also a system of sprinklers to quench any fire detected. This is to replace the traditional smoke detectors and fire rated partitions and doors.

■ PASSIVE VENTILATION STRATEGY

The open plan layout within the ground and first floors allows the cross flow of fresh air through the house from openable windows on both levels, as well as funnelling warm exhaust air up through the open stairwell to the 'thermal lantern' at roof level where it is dispelled through an automatically controlled window.

upstairs to:

Study/additional bedroom

■ LAYOUT CONCEPT

The study is intended as a bright room with views over the street below to create an attractive working environment. The extent of natural light reduces the requirement for artificial lighting during the day. Artificial lighting throughout the home is provided by recessed low energy downlighters.

■ FLOOR FINISH

The Faenza Clip Tile floor finish throughout the house is a dry fix interlocking ceramic tile which requires no adhesive or grout and significantly speeds up the fit out period on site as a result.



upstairs to:

Bedroom 2

■ LAYOUT CONCEPT

The window configuration allows for the possible subdivision of bedroom 2 to form two single bedrooms (by fitting an additional door from the hall), which along with the master bedroom, and potential use of the study as another bedroom would create a 4 bedroom townhouse.

■ WALL FINISH

The walls are finished with Nutshell Super Eco emulsion which is a microporous, biodegradable and virtually odour free paint, and can be tinted with earth & mineral pigments to give a variety of natural hues.

Family bathroom

■ BATHROOM PODS

The steel framed bathroom pods were manufactured and finished off site by Off Site Solutions. The finished pods were craned into position during the timber frame erect process, and saved time for finishing trades on site whilst achieving high quality standards in a factory environment.

■ HEAT RECOVERY SYSTEM

Extracts for the mechanical ventilation system are fitted to wet areas such as bathrooms, which extract warm, moist air to a heat recovery unit where the heat is transferred to pre-warm fresh incoming air, which is then supplied at low pressure to habitable rooms.



Services distribution cupboard

■ SERVICES

Adjacent to the bathroom pod (and ensuite bathroom pod above) is the main services riser and cupboard, which houses the heat recovery unit, the drainage runs, the hot water cylinder and the manifold for the underfloor heating system.

■ SOLAR THERMAL PANELS

The black elliptical pipework is the supply and return pipework which goes to the roof level solar thermal panels, which preheat the hot water for heating and domestic use and thereby reduce carbon emissions from the boiler. Solar thermal panels are amongst the most efficient and cost effective of microrenewable energy technologies currently available for the domestic market.

upstairs to:

Sun terrace

- The generous sun terrace is located at a high level within The Sigma Home to provide a calm, external retreat away from potential noise at street level, and to maximise the exposure to daylight free from overshadowing by surrounding buildings that can occur in high density urban locations.

upstairs to:

Landing

- The thermal lantern located above the top floor landing is an integral part of the passive ventilation strategy for The Sigma Home, allowing for the exhaust of warm air when required, by means of the natural 'stack effect'. The window in the lantern is controlled automatically as climatic conditions dictate.

Master bedroom

■ LAYOUT

The master bedroom is positioned at the top level of the building to increase the privacy and quiet for The Sigma Home's principal owners/occupiers. The master bedroom has its own private external terrace and ensuite shower room, which is similar to the family bathroom below it in that it was manufactured off site as a steel framed pre-finished pod and craned into position.

■ ROOF SYSTEM

The ceiling is vaulted to increase the feeling of space in the room, and as a result of the use of the Stewart Milne Timber Systems cassette panel roof system above, rather than traditional roof trusses which can create dead space in the roof zone.

■ ELECTRICITY INVERTORS

Located within the closet of the master bedroom are the invertors for the roof mounted Swift wind turbines and the photo-voltaic panels, which are roof mounted and also arrayed on the external gable wall of the Sigma I Home. The photo-voltaic panels and the wind turbines produce electricity for the house. Along with the solar thermal roof panels which pre-heat hot water for the domestic hot water and heating systems, these technologies offset by 100% the CO₂ emissions that would otherwise be generated by the home, and are one of the principal elements in allowing The Sigma Home to achieve a 5 star rating in the Code for Sustainable Homes. The wind turbines can be viewed from the external terrace.

through the door in the party wall to:

SIGMA II

The Sigma Home II is a flexible 3 bed triplex home with the same footprint and shell as Sigma I, which is demonstrated here with the ground floor as an integral work space. There is also the option to completely subdivide the ground floor and create an additional Sigma III unit, which would be either a stand alone office space or a compact starter flat. This is intended to give occupants some future flexibility and a potential income stream from the ground floor, as well as possibly assisting first time buyers onto the property ladder.

Master bedroom

■ PARTY WALL

A portion of the plasterboard has been omitted from the party wall around the pass door used to enter the Sigma II house. The party wall consists of two leaves of timber frame walling and meets the fire and acoustic levels of Robust Details standards.

■ FLOOR CONSTRUCTION

Please refer to the cutaway panel in the floor highlighting the Stewart Milne Timber Systems dB-50 acoustic floor system, which is designed to achieve Robust Details levels of acoustic performance between flats, but without the need for a secondary ceiling void for services, or a floating floor construction.

■ AIRTIGHT CONSTRUCTION

Please refer to the cutaway panel in the window sill highlighting the airtight construction techniques used throughout the homes, which achieve an impressive airtightness value of 1.0 m³/(h.m²), and reduces heat loss through the building fabric.

■ HEAT RECOVERY UNIT

Located at high level and left exposed for exhibition purposes, a heat recovery unit transfers heat energy from warm exhaust air to pre-heat incoming fresh air as in The Sigma Home I.

THE SIGMA HOME BY STEWART MILNE GROUP

A GUIDED TOUR

downstairs to:

Sun terrace

- In the Sigma Home II, the sun terrace is located a half level above the principal living area for ease of access

downstairs to:

Living/dining room

- LAYOUT
The living room has a space for dining adjacent to the stairwell, or alternatively this space could be used as a study
- SERVICES
The services riser has been left exposed, showing the drainage runs, vertical cabling distribution, underfloor heating system manifold, and the mechanical ventilation ductwork
- WALL FINISH
The plasterboard walls have been finished with the Knauf MP75 spray applied plaster system, which has a reduced time and labour requirement compared to a traditional skim plaster coating.

downstairs to:

Kitchen/ breakfasting room

- LAYOUT
The kitchen units would extend in two strips on both sides of the room from the window wall to the entrance wall, leaving space at the window for dining.

downstairs to:

Family bathroom

- GREY WATER RECYCLING
The Ecoplay grey water recycling unit has been left exposed in this room. The Ecoplay unit takes grey water from taps and showers, and cleans and filters it for re-use in flushing wc's. The system is self monitoring, and stores grey water for a maximum of 24 hours before purging the system, to ensure that hygiene standards are never compromised.

Services cupboard/riser

- The services cupboard contains the manifold for the underfloor heating system, and also the hot water cylinder

Bedrooms 2 and 3

- LAYOUT
Bedrooms 2 and 3 are both single bedrooms. Bedroom 3 contains two cutaway panels as follows:
- EXTERNAL WALL CONSTRUCTION
Please refer to the cutaway panel description for the wall build up which is based on a 140mm timber frame. An innovative prototype product is being trialled within some of The Sigma Home walls, an 8mm thick panel manufactured by Dupont, which is located behind the double layer of plasterboard and acts as a store for thermal mass to limit heat build up internally within the home during hot weather. The Energain board changes its inner properties from semi solid to semi liquid depending on heat gain, thus storing energy for release at night when temperatures drop. Also of note is the absence of the traditional outer skin of concrete blockwork within the wall build up, with the use instead of a combination of sustainable timber cladding and a Sto thermal render system as used extensively throughout Europe. This approach speeds up the build process on site.
- FLOOR CONSTRUCTION
The floor cutaway demonstrates the Stewart Milne Timber Systems I beam acoustic separating floor system, suitable for reducing noise transfer between properties to Robust Details standard.

downstairs to:

SIGMA III

As demonstrated here with the ground floor as an integral work space, the Sigma III unit is wholly integrated into the Sigma II home above. There is also the option to completely subdivide the ground floor and form Sigma III as an independent unit, which would be either a stand alone office space or a compact starter flat. This is intended to give occupants some future flexibility and a potential income stream from the ground floor, as well as potentially assisting first time buyers onto the property ladder. Please refer to the graphic panels showing the possible layout options for the ground floor.

- UNDERFLOOR HEATING SYSTEM

The cutaway panel in the floor shows the underfloor heating system, which is a wet system embedded within insulation placed on top of the floor slab, thus directing the heat upwards through the floor finish. Underfloor heating is a highly efficient heating system as it operates at a lower temperature than conventional radiator systems and provides radiant heat rather than convective heat. There are clear marketing benefits in having no radiators on walls which frees up space within homes and allows freedom in furniture placement.

- ENERGY USAGE MONITOR PANEL

A prototype version of a user awareness system for energy usage within the home is shown, wall mounted, towards the rear of the Sigma III layout. The EWGECO panel monitors and displays the energy usage for Electricity (E), water (W) and gas (G) and advises the building user accordingly, which will likely lead to a reduction of the energy load through behaviour change.



CAD/CAM Production Facility



Innovation for Health & Safety



Timber Frame during the construction and completion phases

Stewart Milne Timber Systems is one of the UK's leading providers of timber frame solutions. The company designs, manufactures and erects a range of quality timber frame products for the UK construction industry.

The company currently has two manufacturing facilities, one in Aberdeen, which was opened in 1975, and the other, a fully automated facility in Witney, which opened in 2001. Substantial investment has enabled leading edge design capabilities and the very latest manufacturing techniques to produce floor, wall & roof components and joinery manufacture, including stairs and doorsets and roughing material package items.

The joint capacity from the factories is 12,000 units per annum for the housing and commercial markets and there is a strong commitment to the continuing advancement of off-site construction capability. A third manufacturing facility is already planned to meet increasing demand.

In response to market forces and regulatory changes, Stewart Milne Timber Systems also is able to offer clients a closed panel wall system, roof cassette systems and a variety of floor systems.

Stewart Milne Timber Systems offer timber frame solutions for all types of accommodation including:

- *Private housing*
- *Affordable Housing*
- *English Partnership Projects*
- *Student Accommodation*
- *Inner city regeneration schemes*
- *Care Homes*
- *Key worker Accommodation*
- *Hotel bed spaces*

A complete service is provided, combining concept design information and guidance with a full design service, through manufacture, delivery and construction. The process is thoroughly managed by dedicated project managers.

THE STEWART MILNE GROUP

With £283m turnover and an annual net profit of £27m in 2006, the Stewart Milne Group is an emerging force within the UK construction industry.

The Stewart Milne Group encompasses four divisions:

- * Stewart Milne Homes
- * Stewart Milne Timber Systems
- * Stewart Milne Construction
- * Stewart Milne Developments

The largest part of the continually expanding Stewart Milne Group is Stewart Milne Homes, which in 2007 is on course to complete over 1200 new homes throughout Scotland and NW England.

The Timber Systems division continually sets the standard and harnesses the latest technology to ensure its position as a market leader UK-wide. A pioneer of the timber frame concept in its early days on the market, Stewart Milne Timber Systems is at the forefront of this fast evolving industry.

The Construction division provides the skills and resources for a wide range of commercial building projects, from single bespoke developments to major mixed-use ventures and the Developments division undertakes a range of commercial investments.

Key to the Group's development is its foresight and innovative approach, investment in the future and commitment to recruiting and developing the right people.



Sumptuous dual staircase



Manufacturing facilities at Witney



Union Plaza: A Stewart Milne Group development in central Aberdeen to provide 12,500sqm offices and 225 parking spaces below



Contemporary apartment designs



Kepplestone Award-Winning Apartments, Aberdeen



Luxury villas, Kepplestone, Aberdeen



Custom designed kitchens



Trencherfield Mill, Wigan – a mixed-use regeneration project



Villages Collection – a standard range of contemporary housestyles



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