Vanguard 6

Proposal for East Midlands Housing Group

Potential Exemplar Dwellings, Town Street Sandiacre, Nottingham

VANGUARD HOMES LTD

Studio UrbanArea LLP

dmu.ac.uk
DE MONTFORT UNIVERSITY LEICESTER

a•hus
ETT FÖRETAG I DEROMEGRUPPEN

This submission has been produced in response to aninvitation from Mike Ewers, Senior Project Manager for Ridge and Partners LLP, on behalf of East Midlands Housing Group.

VHL is a consortium of Vanguard Homes, A-Hus, Studio UrbanArea LLP and the Institute for Energy and Sustainable Development (De-Montfort University). The consortium was formed in 2005, is based in the East Midlands and covers all aspects of off-site construction.

Vanguard homes are experts in MMC and Off-siteconstruction; A-Hus (a Swedish Closed Panel timber frame supplier) produce around 350 homes per year and have been in existence since 1947

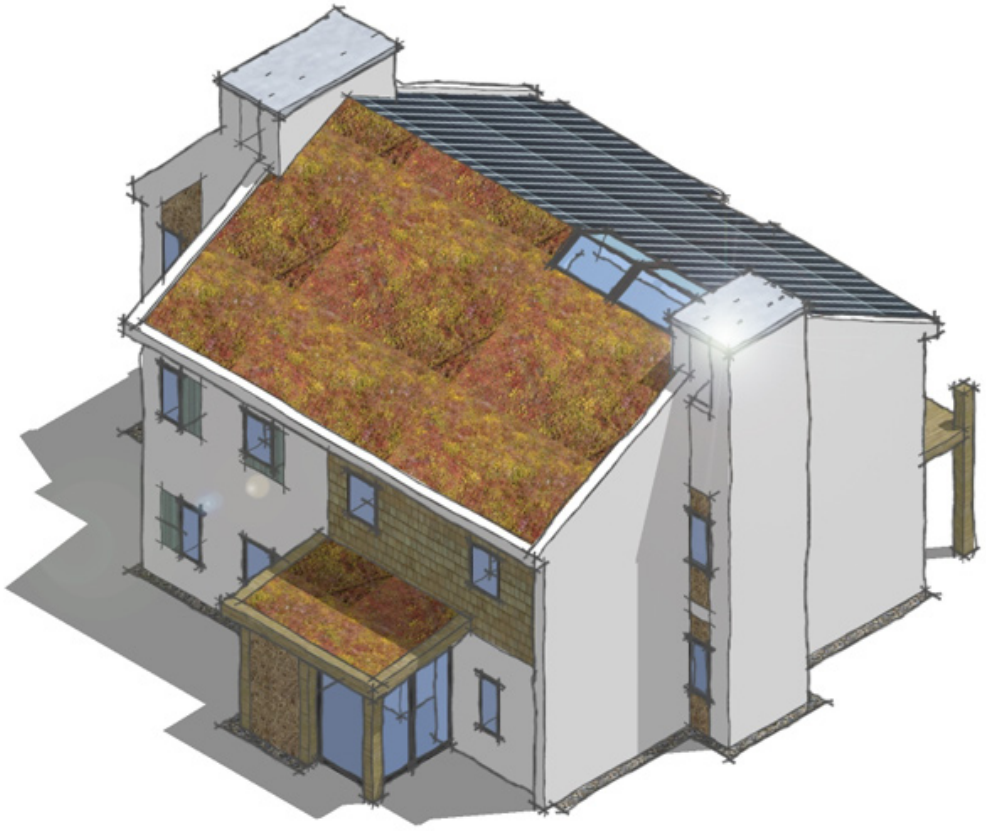
Studio UrbanArea LLP is a sustainable design partnership based in the North of England.

De-Montfort University is one of the largest Universities in the Midlands and the IESD has extensive expertise in low carbon buildings and energy modelling.

The proposal covers the supply, delivery and installation of the superstructure and the mechanical, electrical and engineering elements elements of two dwellings that will achieve the Passive Haus standard.. . Where necessary the design has been modified . toensure that the costed the standard is met.

The total cost within the submission for the two units is £ 215,605.

The submission has been submitted on the basis of an open book approach and we welcome the opportunity to discuss the proposal further. Lead time, from agreement to proceed, is 2 weeks for design, 10 weeks for manufacture and delivery and then two further weeks for installation of the product.



Description of Product

This submission is a consortium approach that brings together a range of sustainability expertise and experience on delivering low carbon housing, both new build Code for Sustainable Homes level 6 and retrofitting to Passivhaus principles. The proposed consortium includes experience in design, MMC systems / building fabrication, renewable energy and waste / water systems as well as energy modeling and monitoring.

We are excited by the challenges of working on an exemplar Passiv Haus that can be developed through an integrated design process involving the client group, the end users where possible but also with the wider supply chain in the East Midlands. Together we are interested in the technical issues of sustainability and how they address the wider social sustainability such as affordability and meeting housing needs now and into the future. It is only by integrated working and innovating with regard to the design, construction and occupation processes we will collectively be able to take the lessons gained from exemplar / proof of concept homes and begin to apply them at the larger scale.

Our collective experience provides an understanding of traditional house building processes and how these become limited when addressing higher performance properties, with regard to air tightness, levels of super-insulation and maintaining quality control. One way to ensure design standards and specifications are maintained through to delivery is the use of modern methods of construction supported by effective project management and quality control process at the manufacture and construction stages.

The **Vanguard 6** system is based on a tried and tested timber closed panel system developed through a join venture with A Hus, a Swedish company. It has been developed as an off-site manufacturing solution specifically for use in the UK domestic and high code systems. This fabric-based system is being developed into a patternbook of property types and elements suitable for a variety of new build and upgrading.

The sketch proposals follow principles for PassivHaus design based on a ‘whole house’ holistic solution to energy reduction and carbon savings for the properties. This addresses the building fabric first, making the property elements well insulated, air tight and avoiding any thermal bridges. The design process has utilised whole house energy and carbon modelling using fSAP and the Passiv Haus Planning Package that allow different options to be considered together with a basic cost benefit analysis for £ per tonne of carbon saved. We would ensure our collaborative approach ensures this information is used to agree the final specification with East Midlands Housing Group as the project client.

Through the use of PHPP, and the embedded u-value calculator, each of the separate building elements is specified to achieve a certain u-value that collectively achieved the optimal solution for the property as a whole. This has been specified and is the basis for the costing contained later in this submission. In practice we were aware of the limitations of PHPP and thus it was used as a guide for specifications. Close collaboration work between the designers and within the supply chain provided a number of possible means for achieving the desired results for each of the different building elements.

In producing our initial sketch designs we have followed the initial client brief. Consideration was given to a simple adaptation of the house types being proposed throughout the development but the requirements of meeting the Fabric Energy Efficiency for a Passiv Haus were of a simplier form with more suitable heat loss parameters and less external surface area for the quantum of internal floorspace. As a result we have added to our developing regional PatternBook with variations on a units that can work as a slightly uneven semi detached property to meet the breif requirements for minimum 2 and 3 bedroom units and that can be extended into a larger and more efficient terraced typology.

In addressing site planning and external works we have looked at both of the potential plots identified and are happy that both can accommodate a pair of Passivhaus units subject to small changes in the plot subdivision.

These limited changes would ensure that the south facing elevations are not subject to any significant overshadowing and that both properties have the potential for an IDP accessible car parking space with minimum distance to the property entrance and with the potential to be widened to 3300mm[1] where necessary.

Internal Space Planning - The aim for both housing units has been the provision of a comfortable internal environment that is of a size[2] that is more than adequate for accommodating typical family furniture and equipment for each room and that also has the potential to be extended, either externally or internally, as the need of the occupants change over time.

1 Meeting requirements for Housing Quality Indicator calculator 8 Accessibility within the unit 4.1

2 We have based our sketch designs on the most current version at; http://www.homesandcommunities.co.uk/hqi and the retained standards within Housing Corporation [April 2007] Design and Quality Standards [Housing Corporation, London].

For each property a study / separate work area is provided within the central 2m wide circulation core, providing adequate wall storage areas with natural day lighting to accommodate home office[3]. Detailed specification will ensure adequate power points to meet requirement under the Code for Sustainable Homes.

Both properties have an external first floor IDP accessible balcony of minimum 6.7m^2 that is suitable for enclosing as winter garden / conservatory at a later stage by the occupants or property manager[4].

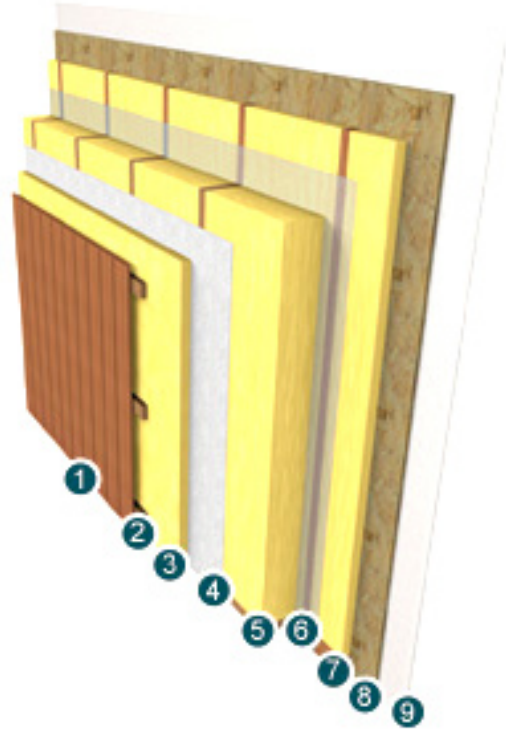
Air tightness strategy - An integrated vapour barrier and air-tight membrane is part of the fabrication process for the system proposed. This far exceeds the requirements for Passiv Haus standard when correctly installed and we would expect our own specialists to undertake the assembly to ensure this is the case.

South Elevation Specification

A level of diagnostic testing with the use of an air blower would be undertaken during the construction process to ensure there are no problem areas arising from joints or gaps within the membrane.

There is a provision of an entry vestibule [air lock] to impede the penetration of wind into the property and increase occupant comfort adjacent to entry space. We have included two separate configurations for the vestibule, one outside the heated space to demonstrate the potential variety in following this approach.

While we have presented some initial sketch designs for consideration, these should be understood as work at a early design stage and will be subject to change through dialogue with the client group, specifically with regard to internal subdivision, external finishes and options.



3 Meeting requirements for Housing Quality Indicator calculator 5 Unit Size Units by living spaces 5.2.5
4 Meeting requirements for Housing Quality Indicator calculator Unit Size 5.2.7 and in combination with the private garden space contributing to the Code for Sustainable Homes credits under Hea3 Private Space.


Private Drive 4
Plot 34
Plot 38
Plot 37
Plot 36
Plot 35
Plot 33
Plot 32
Plot 31
Plot 30
Plot 29
Plot 28
Plot 27
Plot 40
H4.1
H4.2
H4.3
H4.5
H2.3a
H2.3b
H2.3a
upgraded
standards


Drive 5
H2.3a
H2.3a
H2.3a
Plot 39
Plot 38
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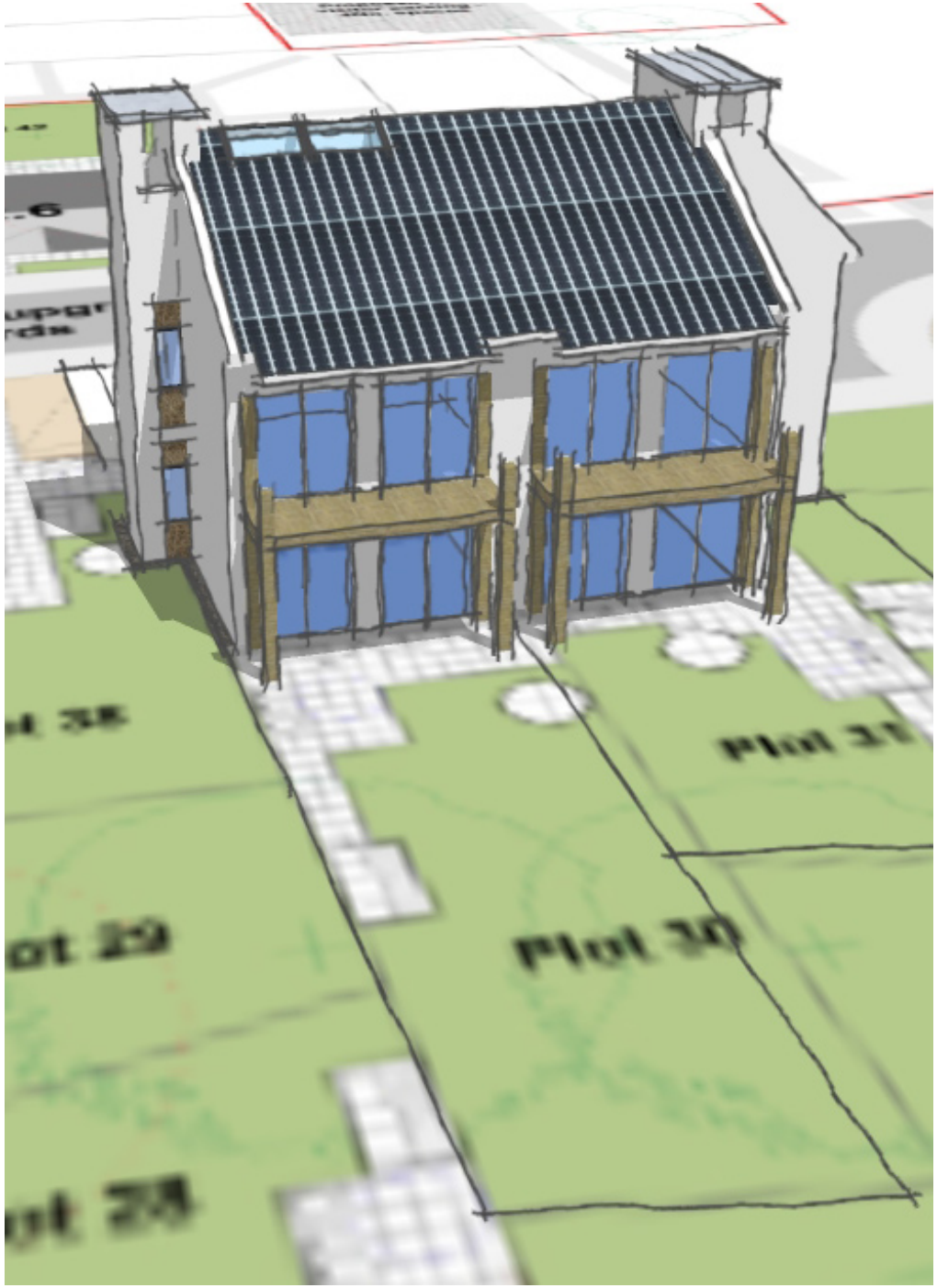
Plot 2
Plot 1
Re-shaped
turning
head
upgraded
standards


Plot 31
Plot 30
Plot 29
Plot 28

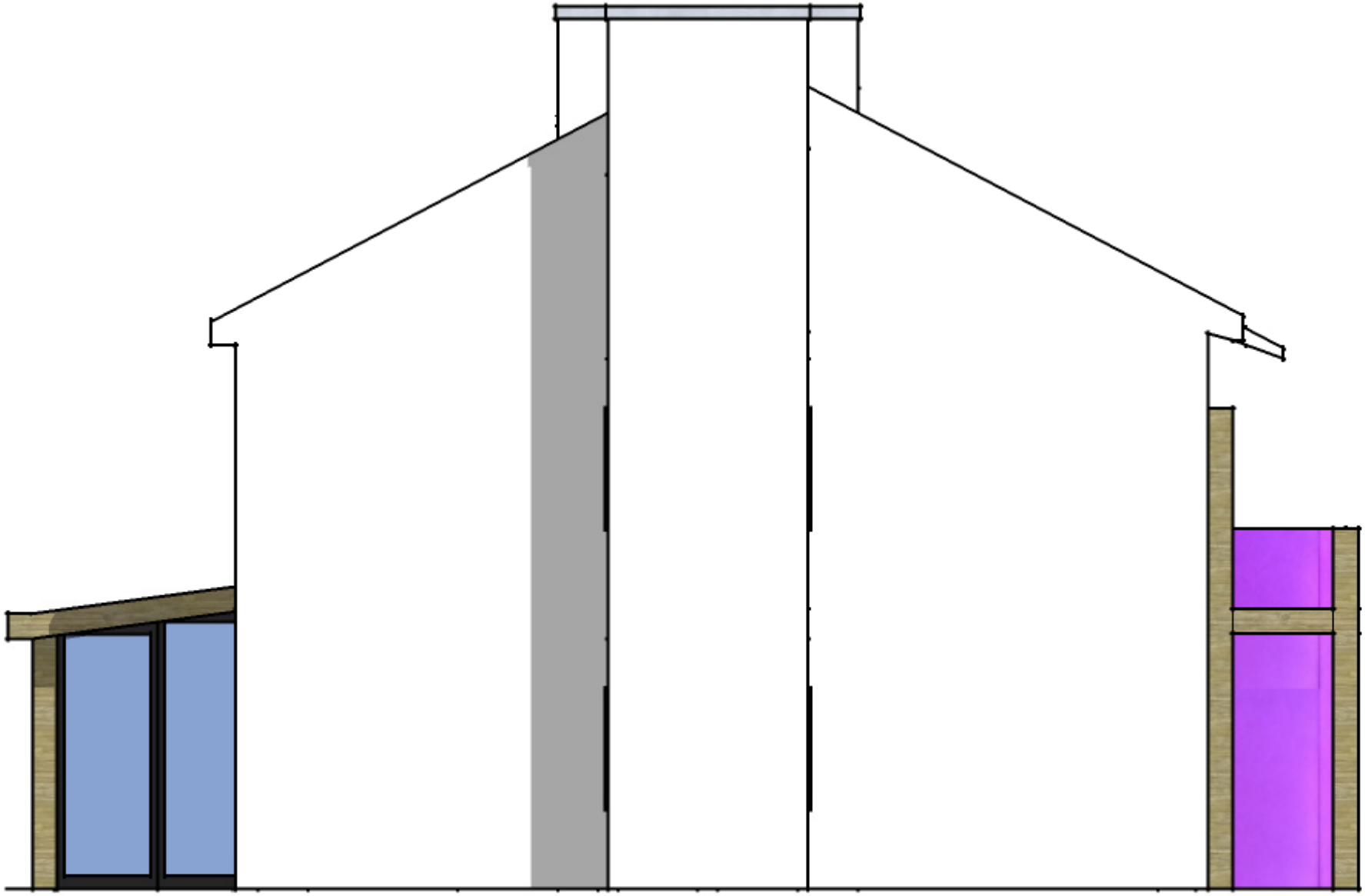
Plans & Elevations

Two Bedroom [minimum] with gable vestibule

Three Bedroom [minimum] with front vestibule

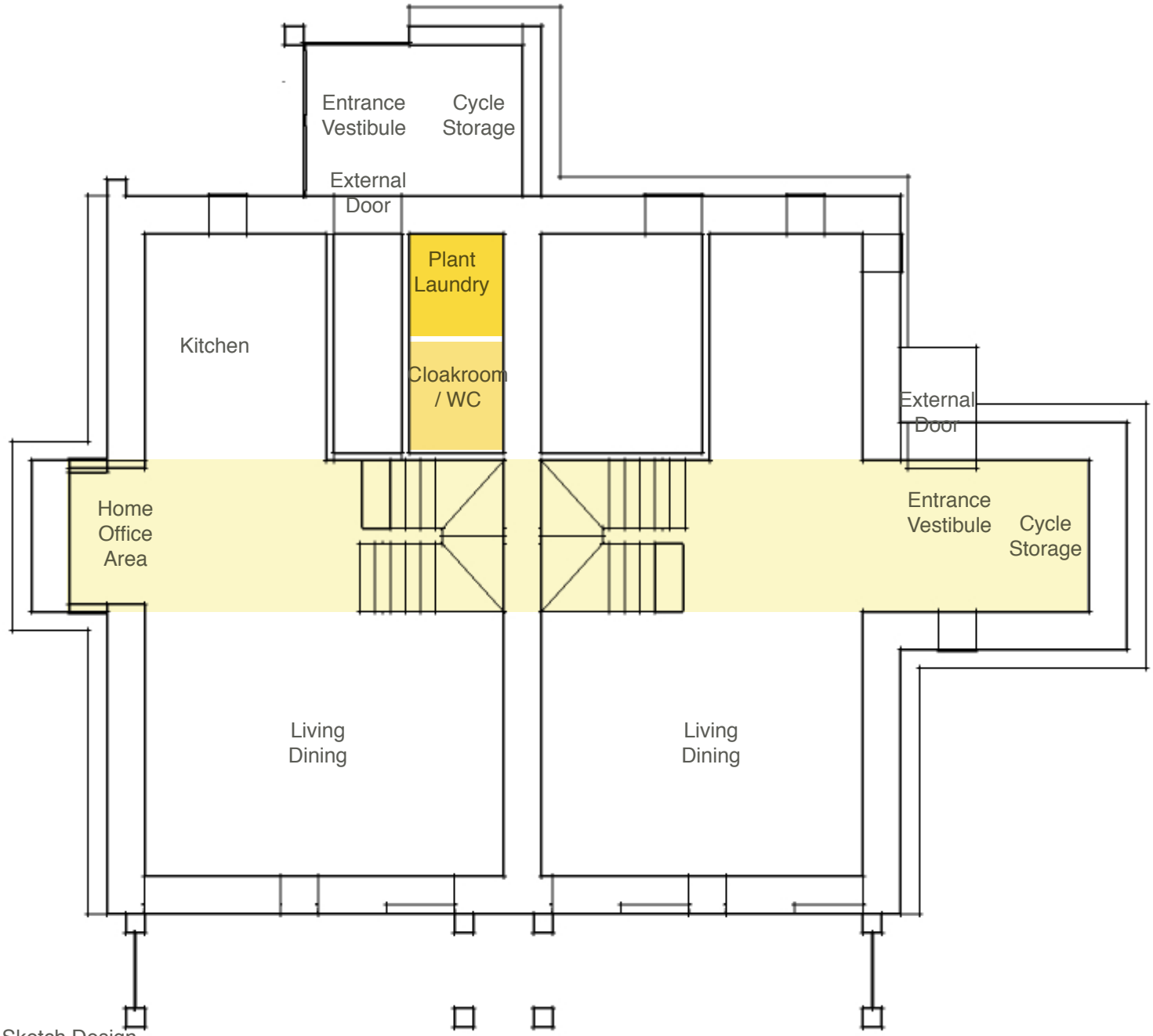
North Elevation Draft Sketch Design

South Elevation Draft Sketch Design

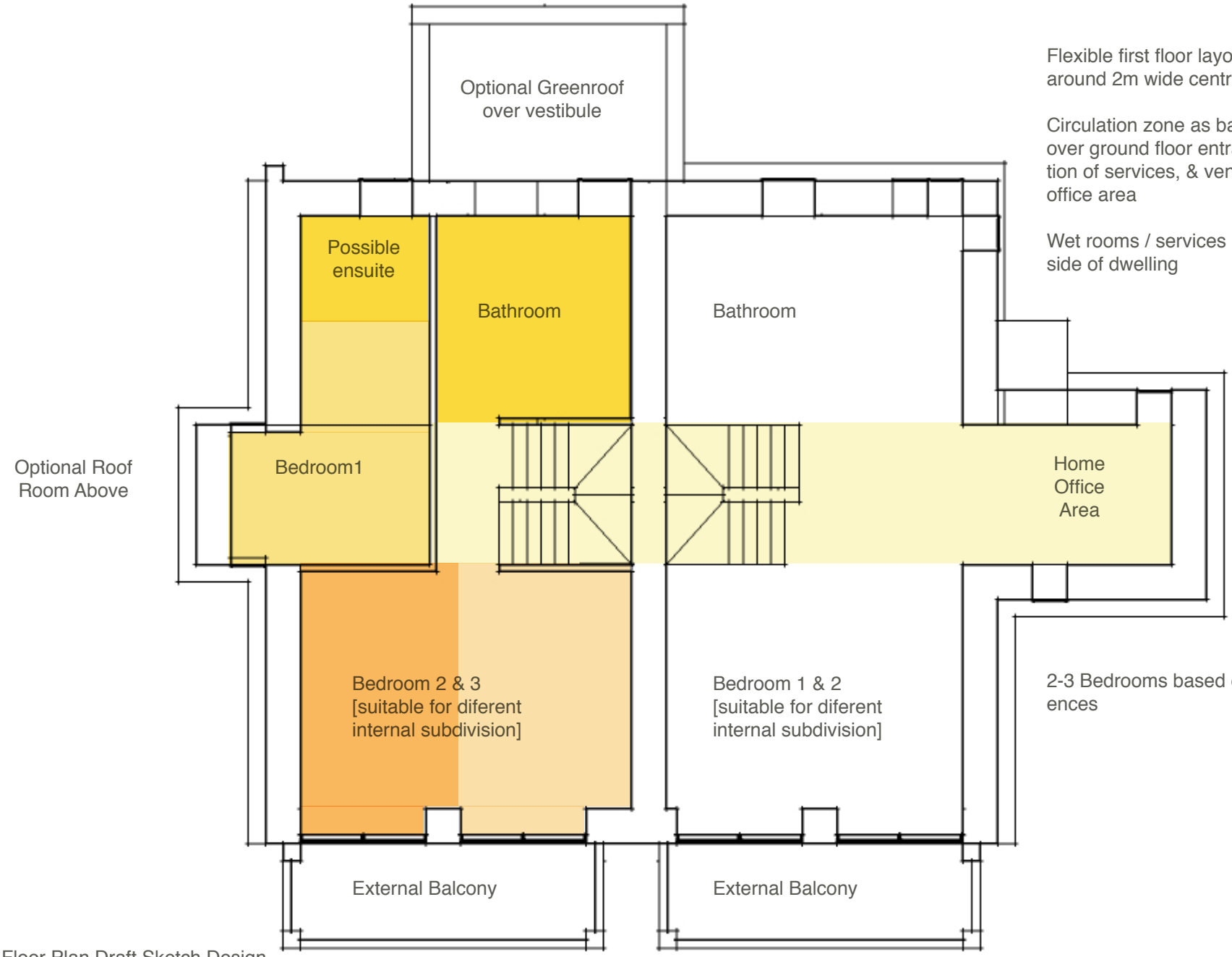


West Elevation Draft Sketch Design

East Elevation Draft Sketch Design



Ground Floor Plan Draft Sketch Design



Flexible first floor layout is possible based around 2m wide central circulation / stair zone.

Circulation zone as basis for side extension over ground floor entrance vestibule / distribution of services, & ventilation / possible home office area

Wet rooms / services best located to north side of dwelling

2-3 Bedrooms based on user bespoke preferences

First Floor Plan Draft Sketch Design

What is included in the product offer

Supply, delivery and installation of the following:

All external closed panel walls including party walls

All intermediate floors

Roof including: felt, battens and specified finish [options and details from green roof, PV tiles or title] subject to client body and local planning authority.

External finishing including; render, timber cladding

All internal walls and doors [subject to end-user internal requirements]

All external windows [including ridgeline rooflight and transluent panel].

All external doors.

1 x staircase to first floor per property

Mechanical engineering including [per property];

1 x Combi Boiler

1 x Solar Thermal Store

1 x set of Solar Thermal panels

Mechanical & Electrical services including [per property];

1 x set of Solar Photovoltaic panels [option requirement that would be subject to funding requirements and sized to achieve a suitable level in the Code for Sustainable Homes]

1 x MVHR system

1 x Voltage optimiser

1 x Energy meter

1 x Smart meter

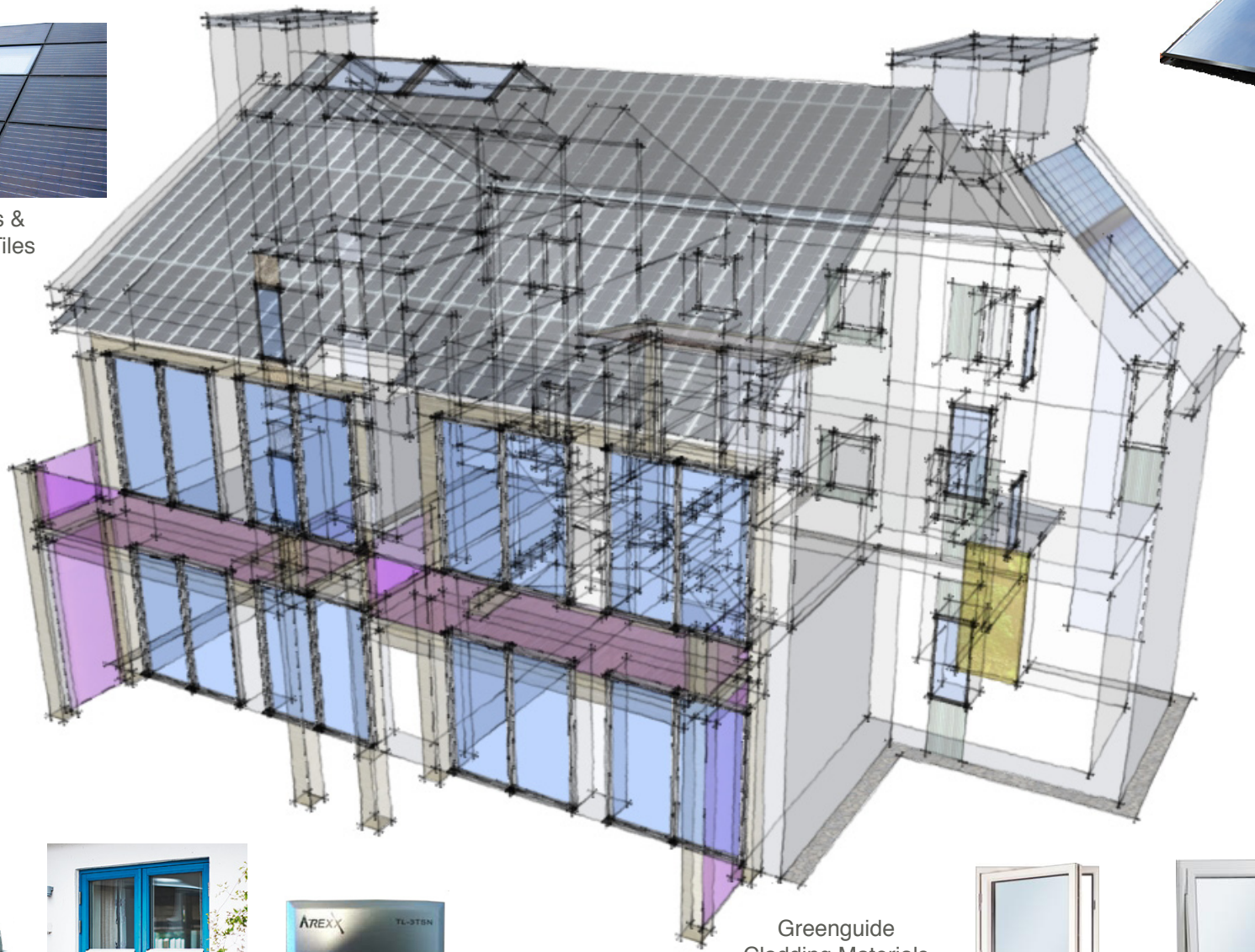
Also included is a Post Implementation monitoring package, supplied by IESD [Institute of Energy and Sustainable Development], De Montfort University which will cover both properties.

Rooflights &
Solar PV Tiles

Flat Panel
Solar Thermal
Collector

Translucent
Skylights

Solarsmart Boiler



MVHR
System

Voltage
Optimiser

Wattbox
Conroller

Optional Grey
Water Recycling

Exterior
French Doors

Monitoring Units

Greenguide
Cladding Materials

High Performance
Windows / Doors

Specification of included items

The following draft specification of the systems describes the solution followed for each of the separate building elements; fabric and optimal systems, to achieve the required technical specification. Some references to the technical specification and tolerances are made as necessary supporting information for understanding the operation and maintenance of the system element and how these different systems interact.

Ground Floor and Foundations - The substructure proposed is separate from the above ground building fabric. This will be specified to high thermal mass and an integrated air-tight membrane. The specified U-value would have to achieve ≤ 0.10 W/m²K. Our preferred approach would be to provide the specification with a set of advanced construction details to the main site contractor to prepare the site in advance of the fabric system being delivered.

External Doors - Vacuum insulation panel front door to provide a minimal door thickness with very high insulation levels. Clifton patio door specified as triple glazed filled withy inert gas. These are tested to Secured by Design scheme standards [BS7950 certification]. Supplier: Clifton range from Jeld-Wen UK Ltd and made to measure and specification. http://www.jeld-wen.co.uk/

Windows - Windows are made to measure, fabricated in sustainable sourced timber and fitted within the factory. These can be tested to Secured by Design scheme standards [BS7950 certification]. They are specified as achieving a minimum U-value of 0.9 W/m²K [timber frame and triple glazed filled with inert gas] and are un-vented and subject to high levels of air tightness that requires ventilation from a mechanical ventilation and heat recovery system. Alternative UK Supplier of all high performance timber windows from the DreamVu range from Jeld-Wen UK Ltd. http://www.jeld-wen.co.uk/

Roof lights - Provided as option for roof room unit and / or additional day lighting for internal stairwells. Neo roof lights specified with super insulated glazing to give a U-Value of up to 0.6 W/m²K [typically 1.2 W/m²K]. Supplier: http://www.therooflightcompany.co.uk Option roof room and for side ‘home office’ pod is a combined semi-translucent single panel roof light gives a ‘U’ value of 0.28 W/m²K to provide additional natural daylight with privacy for first floor working area. Single panel Kalwall + Lumira unit. Supplier: http://www.stoakes.co.uk/pages/kalwall/index.htm

External Cladding – To be specified subject to discussions with the local planning authority and the site design team. Option would be to provide some examples or green guide rated materials for example; in the use of curtain walling with LED back illuminated 100% recycled float glass cladding panels5 to provide the illumination for the front doors.

Mechanical Ventilation and Heat Recovery System - The whole house mechanical ventilation system with heat recovery [MVHR] is designed to extract stale and humid air within the property, draw in fresh air and recover as much heat from the extracted air. The specification for air tightness for the effective operation of the MVHR system is no greater than 5m3/h/m2 with optimal performance at less than 3m3/h/m26. The benefit of this system is dependent upon the overall air tightness of the property being maintained within the range. The MVHR unit specified is the Itho Advance. Suitable for dwellings with up to 115m2 of floor space and five wet rooms with specific fan power (SFP) of just 0.37 W/l/s.

5 Supplier and examples; http://www.greenhouseeffect.co.uk/recycled-glass.php
6 For comparative purposes, the figure of 0.6 ach assumed [passivhaus max allowable] equates to 4.5 3m^3/h/m^2.

This is powered by mains electricity and has a separate switch that is manually controlled. This unit can be laid on its back in a loft or fixed to walls or ceilings in area suitable for occasional access for cleaning the filters. The unit has inlets for fresh air and exhausts for stale air after passing through the system. There is a condensate discharge pipe leading from the unit to an outlet on the east. The unit comprises an integral frost protection device that prevents any moisture from freezing during the colder months. The system includes a number of extraction and intake grilles. These will be located within ceilings. The system has three settings – low, medium and high. The low mode is a continuous background setting, the medium mode can be used for improved comfort and the high mode when cooking, showering / bathing or higher levels of occupancy such as a party. The operation of the system also requires a 5mm gap at the foot of all the internal doors. Supplier: Itho http://www.itho.co.uk

Boiler and Solar Thermal - The solar hot water is sized to provide for the anticipated needs for domestic hot water. The system includes roof mounted flat panel [the Alpha Solar Smart 2.5m2 solar collectors] on the south facing rear roof pitch. This is linked to a hot water storage tank located within the ground floor utility area. This storage tank [insulated 100mm] will be sized for each of the individual units in accordance with the level of occupancy but typically is 210litre for this purpose of hot water for 5 occupants. It is linked to a smaller drain-back unit with DHW plate heat exchanger and built in pump. The combi bolier has been specified as one of the few to accept pre-heated water from the solar thermal store. The expectation is that the boiler will be used to boost the hot water and will have a marginal impact on space heating. These elements are both from the Solar Smart Range - 150 pack. This is linked to a roof mounted flat panel collectors. Supplier: Alpha Heating Innovation http://www.alpha-innovation.co.uk/products/SolarSmart/SolarSmart+150+pack/3443483656

Solar Photovoltaics - Integrated in south facing roof tiling. Specified as the C21 solar electric roof tile, a roof integrated product. Each C21e solar roof tile replaces four conventional roof tiles and is attached straight to the roof cassette. Predicted power output at 133 Wp/m2 providing 3.7kWp for 27.82 m2 of south facing roof space. Supplier: http://www.solarcentury.co.uk/

Voltage Regulator - Provision of voltage optimiser connected to lighting circuits, ring circuit socket outlets and kitchen / utility room sockets. This is a small unit typically located next to the distribution board. This unit is designed to reduce and stabilise the incoming voltage to the property to the optimal 220V. Supplier: VPhase http://www.vphase.com/

Optional Smart Meter Unit and Monitoring Equipment - WattBox is a smart metering and monitoring system. It comprises a Wattbox PC and a data acquisition box. The data acquisition box is located next to the electrical distribution board. The Wattbox PC is a visible touch screen control.. The two units are connected by recessed communication cables. The system is designed to learn occupancy behaviour and patterns of energy use and will, over time, begin to optimise this. As a result the touch screen control can be largely ignored by tenants, however manual override controls can be used to increased room temperature and hot water.

The data acquisition unit can be supplied with a 3G mobile phone network connection for data transmission. Data is saved every five minutes and transferred daily to WattBox server. The data acquisition unit can measure inputs for each utility meters connected by cable, a heat meter linked to the solar thermal collectors and a solar measurer adjacent to PV panels. This would collect data from a series of battery powered temperature and humidity sensors placed within the main inhabited rooms. Supplier: WattBox http://www.wattbox.com/Wattbox/Home.html

To meet the Energy Display Device requirements of CSH we have specified a AlertMe Energy display device. Supplier: http://www.alertme.com/smart_energy AlertMe have recently bought Wattbox and the technology associated with smart control. They are working together to develop a mass-market product that provides a complete low cost “smart home” system competitive with conventional controls. Additional monitoring can be provided as required for NOx, CO2, humidity sensors that are compatible with the current Wattbox as well as the developing “smart home” system product being developed with AlertMe.

Rainwater collection and recycling - Optional rainwater collection system based on typical domestic system for ≤ 80l/p/day as mandatory element for indoor water use levels 5 and 67. Assumptions on the specification of the integrated system based on initial modelling using the current version of the Water Efficiency Calculator for New Dwellings8. Supplier: http://www.rainharvesting.co.uk/pdfs/domestic_systems.pdf

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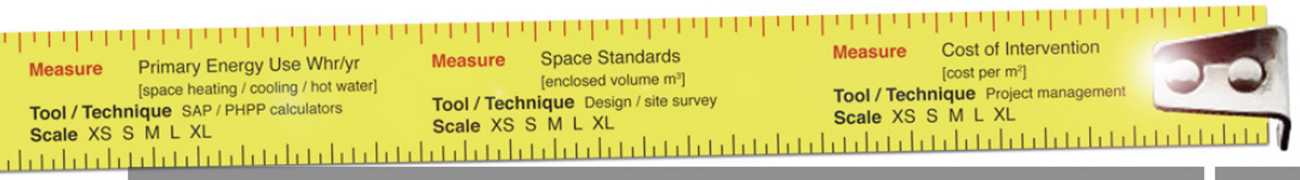
7 Credits achieved under Wat 1 Indoor Water Use for the reduction of potable water and Wat 2 External Water Use. Communities and Local Government [November 2010] *Code for Sustainable Homes: Technical Guide* [Department for Communities and Local Government, London].

8 Communities and Local Government [September 2009] *The Water Efficiency Calculator for new dwellings: The Government's national calculation methodology for assessing water efficiency in new dwellings in support of: The Code for Sustainable Homes, May 2009 and subsequent versions: The Building Regulations 2000 (as amended): The Building (Approved Inspector etc) Regulations 2000 (as amended)* [BRE Global, Watford]. Available for download from; http://www.planningportal.gov.uk/uploads/br/water_efficiency_calculator.pdf



Specification Detail	Performance
Walls External structural frames constructed from a min of 240 mm C16/C24 Timber. Insulated complete with thermal breaks throughout. External sheathing board c/w weatherproof sheet. Internal lining of plasterboard and particle board to facilitate easy and safe fixings of all wall hangings throughout the house.	U-Value ≤ 0.13 w/m²k Wall thickness from internal lining to external vapour barrier 284 mm
Party wall structural frames constructed of 100mm C24 Timber. Insulated. External sheathing board c/w weatherproof sheet. Internal lining of plasterboard and particle board to facilitate easy and safe fixings of all wall hangings throughout the house.	Wall thickness from internal lining to external vapour barrier 156 mm
Internal wall frames engineered to suit application. All wall frames accommodate conduit for services or Plug and Play wiring and plumbing to suit client design.	Typically non-load bearing wall 75 mm or 100 mm stud width and insulated where required. Internal load bearing wall typically 125 mm
Floors Separating cassettes are constructed typically using 225mm depth joists. This allows clear unsupported spans of approx 6m. Where larger spans are required horizontal steel joists are employed. Where required floor cassettes are insulated to suit building regulations.	Typical cassette dimension 351 mm with intermediate floors [fire] 265 mm and [non fire] 250 mm Ceiling typically 112.5 mm
Ground floor Designed to suit site.	U-Value ≤ 0.12 w/m²k
Roof Mineral wool installed to suit U Value and draft paper installed.	U-Value ≤ 0.10 w/m²k
Windows Triple glazes timber windows are supplied as standard to suit clients design.	Average U-Value ≤ 0.9 w/m²k
Doors To suit clients design.	Average U-Value ≤ 0.8 w/m²k

Prior During After

What is required to be provided by others

[a] prior to product installation

Preparation of ground works and foundations [to specifciation] with connections.

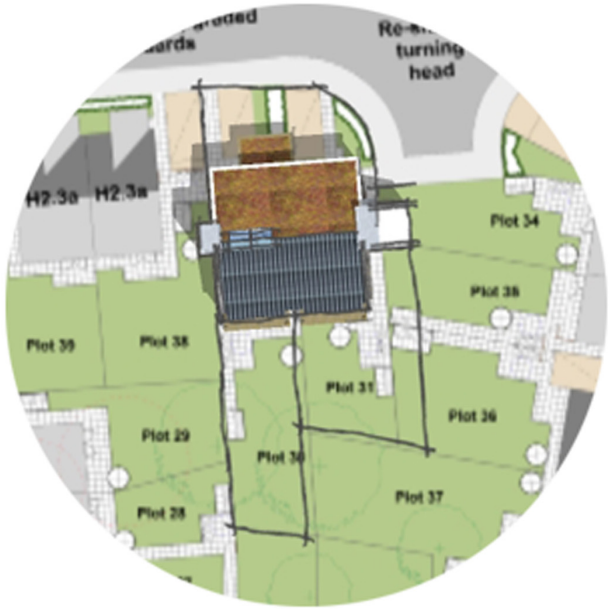
[b] during product installation

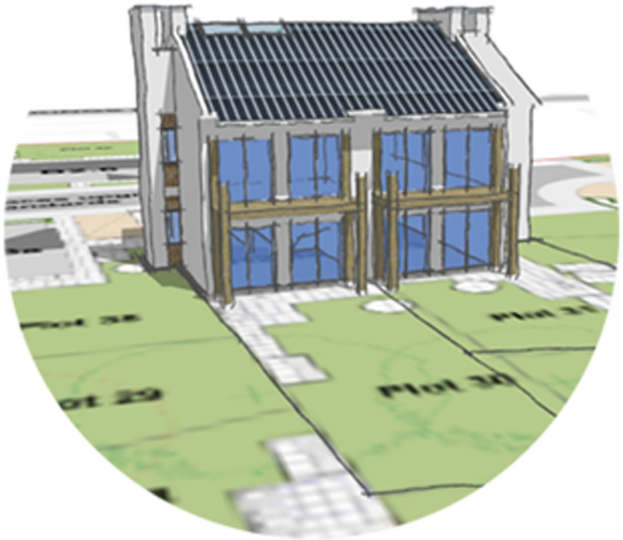
The scope fo work would be open to negotiation but we are happy for the main contractor to have responsibility for Internal finishing and external cladding as specified. Work would be under the supervisoon of our own clerk of works to maintain quality control.

[c] after product installation to enable occupation

Connection of services.

We have included a PC sum for a 2 year monitoring package to work alongside the client group's own aspirations for Passiv Haus accreditation.





Quality Control Process

Within the consortium we have agreed to follow a common quality control and project management process.

Our approach to quality control and project management is based on the principles identified within the Egan Review[9] and the incorporation of the technical and generic skills appropriate for the construction industry in the design, delivery and management of sustainable communities. Within the proposal we have included a post completion review and assessment of the work to demonstrate the application and enhancement of these skills in practice. We understand that it is important to use recognisable and transferable skills and principles as a 'common language' in the operation of interdisciplinary design teams, mixed development consortia and partnerships between different sectors.

Communication - We aim to provide effective communication of messages visually and in reporting, in speaking to a range of audiences and effectively using a variety of communication media. Where appropriate, we will ensure a simple communication strategy is prepared as the basis for all external project communication and dealing with presentations and media.

Leadership - At the initial of the project we will establish a clear vision and objectives that have endorsement and support from all of the client body, project partners and stakeholders. We will use clear and where necessary discrete team roles to meet these objectives[10] within a working culture that is supportive and collaborative.

Business Planning - We will provide a realist project programme and work plan with the appropriate level of detail for individual tasks, times and output requirements. We will use process mapping' techniques to support stages of work, tasks and outputs.

Capacity Building - For major projects we will audit and support the requirements for the full and effective involvement of local organisations, businesses, non-professional groups and governance. In this instance, it is likely to include ensuring that appropriate time is provided to undertake initial training, visits [including to the Swedish factory] and support activities that allow informed decision making that is fully aware of risks and implications.

Performance Management - We will operate on the basis of sound underlying evidence, using mixed qualitative and quantitative sources as appropriate, as the basis for decision making. We will support a heuristic approach to continuous improvement with 'learning by doing', together with learning from mistakes and a willingness to adapt project and processes to the results of evaluation and review.

Project Management - We will use effective and appropriate systems for project management within agreed timescales and budgets. The system used will ensure that effective monitoring and evaluation of the project is undertaken. It will include lines of management decision-making, an awareness of risk assessment and consideration of alternative options. Quality control will be actively managed with the use of checks on the release and circulation of document and files, including a version control. Where useful we will provide web based controlled access to client and team members.

9 ODPM [April 2004] *The Egan Review: Skills for Sustainable Communities* [Office of the Deputy Prime Minister, London].
10 Office of Government Commerce [2007] *Project organisation roles and responsibilities: Achieving excellence in construction procurement guide* [Office of Government Commerce, London].

Financial Management - We will ensure clear and efficient use of financial resources, creative funding sources and budget control. For the project we will put in place a clear and ‘live’ budget management system. We will support all project decisions with a financial realism based on viability testing, supporting an integrated business planning stage with identification of funding sources and addressing financial constraints and requirements.

Partnership Working - We will develop and use tools and techniques to facilitate effective integrated design teams with different professionals and organisational cultures. We will have recognition of the different essential skills and roles within multidisciplinary teams, including leadership, creativity and the generation of ideas, partnership buildings and the importance of stakeholder information and engagement within any project team.

Consultation - We will provide effective consultation with all stakeholders as required by the client body. We have an understanding of the significance of ‘touch-points’ and of research & development, market testing and community consultation as part of the same ‘touching’ process. We will support the principles of ‘active partners’3; capacity, communication influence and inclusivity; in large, complex and sensitive projects as the basis for a systematic approach to equality and empowerment of communities and other stakeholders.

Change management - We will ensure group management and use of staff skills and project resources to the most efficient and effective appropriate to the project or task. This includes support for operational process mapping, diversity and equal opportunities.

Conflict resolution - We will seek to satisfactorily resolve situations where consensus cannot be achieved, where necessary through different approaches to and techniques of negotiation and mediation.

Design Stage - There will be three design reviews. The first will set the criteria that the property/s needs to achieve. Part 2 will be the physical design itself against the industry models, PPHP, CSH, Building Regulations, etc. The third stage will include the following:

- DFM – this is design for manufacture and is aimed at producing a product that is easy to manufacture whilst achieving the design criteria
- DFI – this is design for installation and is aimed at producing a product that is easy to install whilst also ensuring that design considerations are achieved e.g. air tightness
- DFU – this is design for use and is aimed at ensuring the product has an ease of use for the ultimate client
- DFMa – this is design for maintenance and is aimed at ensuring the property can be maintained easily and without the need to disturb the structural integrity of the property

The client signs off the design prior to the production stage. East Midlands Housing Group will be responsible for the sign-off.

Pre-Production - This is the sign-off with A-Hus prior to production being commenced. At this point the design is frozen. VHL will lead this part of the process.

Production - First off production i.e. walls and other elements will be signed-off as correct to specification and tolerance. Once these are signed-off then the rest of the elements can be produced. VHL will be responsible for this part of the process.

Pre-Delivery - VHL will review all the packages at the factory and prior to release from the factory will sign-off the house elements as complete and meeting quality requirements.

Pre-installation - Foundations, and any other pre-agreed elements, will be quality checked, and signed-off prior to erection of the properties. This includes such items as slab tolerances including flatness. VHL will be responsible for signing off this stage.

Post Installation - Once the property has been erected, post installation tests will take place to ensure that the design criteria has been met. The client (EMHG) is responsible for signing-off this element, following prove of acceptance following the tests.

Post Construction

Tenant recruitment - One of the characteristics of Passiv Haus is the expectation that the tenant has an interest in some degree of adapting their own lifestyle and behaviour as a means of achieving the benefits of a ultra low energy home. We would encourage the recruitment of a suitable 'super green tenant' who wants to live in a zero energy property. Part of their role and interest as a tenant would to become involved in the proposed detailed design and specification of the property to fit around a real home life and to collaborate with our energy monitoring to see how far we can go in reducing the household carbon emissions. We would also anticipate a level of cooperation in recording the lifestyle changes that you could use to further reduce the energy use in the property and the carbon emissions.

We would agree with an appropriate strategy for tenant engagement, involvement and occupancy with the East Midlands Housing Group that begins at planning stages and includes an adequate level of post-completion monitoring.

We would gain written agreement to become part of a post-occupancy monitoring programme with potential for occasional open house events as demonstration projects. A small budget would be set aside for an appropriate bespoke package of tenant incentives to ensure active support is maintained.

Building User Guide / Operation and Maintenance Manuel - We would produce a reference manual for the operation and maintenance of the building fabric and building services provided as part of the demonstration project. It would meet current approved building regulations11 requirements under Schedule 1 – Part L Conservation of fuel and power section [c] for "providing the owner sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable". This requirement relates to each element of work that has been carried out to the fabric and the fixed building services. It would also meet the requirements for a Building User Guide as a requirement under the Code for Sustainable Homes.

The proposed quality control and project management process would contain several distinct elements at the post construction stages that would support the development of the 'proof of concept' units into large-scale production.

11 HM Government [October 2010] The Building regulations: L1B Conservation of fuel and power in existing buildings. Online version available for download from http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partl/approved#ApprovedDocumentL1B:ConservationoffuelandpowerExistingdwellings2010edition

Quality assurance programme

• Preliminary design support from Passiv Haus certified designer[s] or similar

• Specific support for skills and training within the regional construction industry to support Passiv Haus standards and advanced construction details and specifications.

• Interpretation and adaptation of details to different scenarios including support for local / regional validation and monitoring.

• Production of ‘product’ based pattern book as output – costed and tested advanced construction details that are specific to the East of England.

Knowledge Transfer Network

• Support for more integration within the regional supply chain – specific join testing / validation / monitoring between different companies

• Testing of the overlapping training and mentoring roles within the East of England supply chain

• Medium term maintenance contracts.

• Development of supporting financial products for Passiv Haus units.

Post Occupancy Monitoring - Aim to test the beneficial assumptions for adopting a Passiv Haus standard for the Registered Provider [higher rent income, additional property value, easier letting, reduced void periods, improved public image] and for the Tenants [significant reductions in energy costs, less vulnerable to energy price rises, increased environmental awareness].

Itemised costing for each house type

Gross internal floor area	2/3 Bed Unit m2 ft2 79 850.35				3 Bed Unit m2 ft2 88 947.22			
Element	Unit m^2	number	Cost per unit	Cost element	Unit m^2	number	Cost element	percentage
Demolition and alterations								
Substructure Assembly		1	3000	3000		1	3000	
Superstructure [frame & walls]	112		231.7	25950.4	125		28962.5	
Intermediate Floors	36		104.7	3769.2	40		4188	
Roof	59		242	14278	59		14278	
Stairs		1	500	500		1	500	
Windows	29		447	12963	29		12963	
External doors		1	730	730		1	730	
Party wall	58		76	4408	58		4408	
Internal walls/ doors / partitions	[PC sum]			4220			4220	
Internal finishes								
Wall finishes Floor finishes Ceiling finishes								
Fittings and furnishings								
Services Sanitary appliances Services equipment Disposal installations								
Mechanical engineering								
Boiler		1	3000	3000		1	3000	
Solar Thermal Store		1	650	650		1	650	
Solar Thermal Panels		1	1150	1150		1	1150	
Electrical engineering								
Solar Photovolatics	21.6		342.88	7406.208	21.6		7406.208	
MVHR		1	870	870		1	870	
Voltage Regulator		1	450	450		1	450	
Energy Meter		1	50	50		1	50	
Smart Meter		1	750	750		1	750	
Monitoring		1	4000	4000	[PC sum for both units]			
Delivery	[PC sum]	1	2000	2000		1	2000	
Connections								
Life and conveyeor installations								
Project management / design	[PC sum]			18028.96			17915.14	20
Total build cost				108173.77			107490.85	
Plot drainage Service connections External works								

Programme including any lead in period

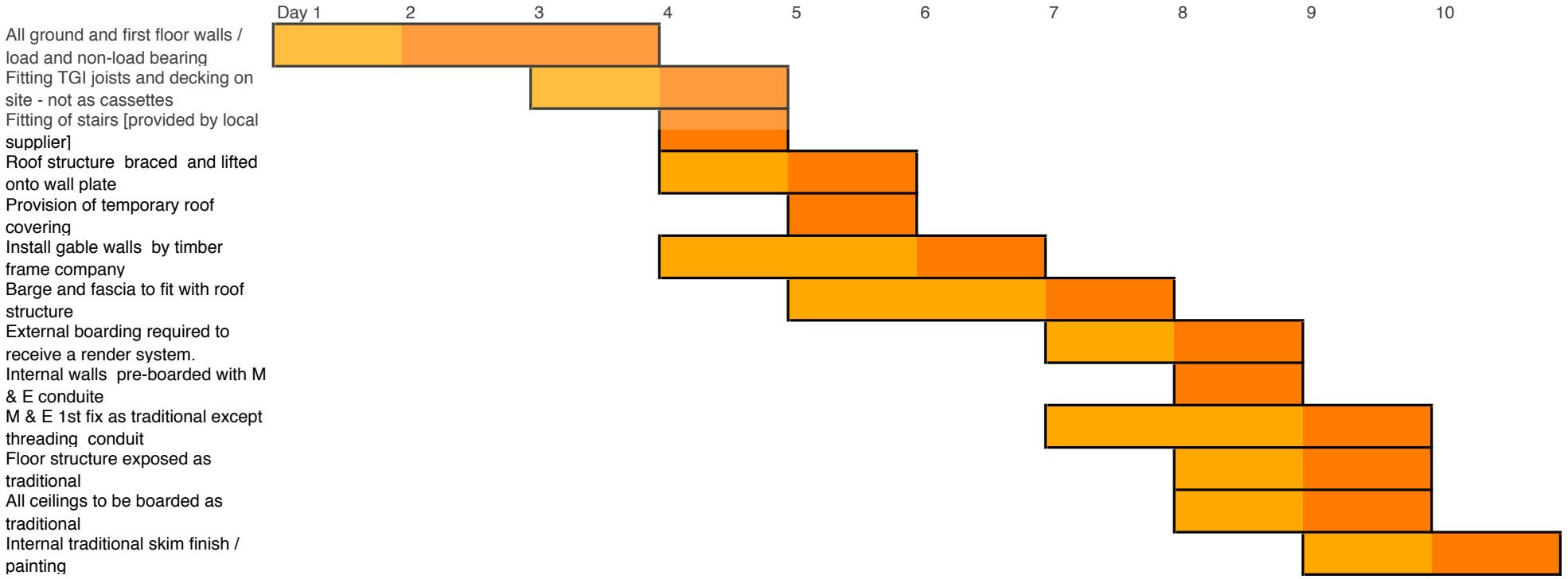
We have anticipated a typical programme of works.

This would have a lead in time of up to 12 weeks, allowing for 2 weeks for design review and progression with the client group and 10 weeks for manufacture [including 2 weeks for delivery from Sweden] prior to the two weeks on site assembly.

Erect all ground and first floor walls - load and non-load bearing. Fitting TGI joists and decking on site - not as floor cassettes. Fitting of stairs as provided by local supplier. Assembly and installation of complete roof structure with trusses and cassettes braced in rear garden and lifted onto wall plate as one complete frame. Install temporary waterproof roof covering.

Attach gable walls - supplied by timber frame company or spandrel panels from truss supplier. Barge and fascia to fit with roof structure. Preparation of boarding to receive a render / curtain walling or cladding system as detailed.

We would expect the principal contractor to follow the erection of the frame this with internal walls supplied and installed as pre boarded and conduited for M & E services, including MVHR system. The M & E first fix would be as traditional build process except threading through conduit in walls. Floor structure and finish exposed as par traditional build. All ceilings to be boarded as traditional. Internal traditional skim finish. Complete work with diagnostic air tightness testing.



Turnkey Approach

Turnkey approach

Our view it that it is unlikely to make financial, managerial or logistic sense to bring in a smaller ad hoc team of the same trades to work independently alongside the others when the exemplar properties are located within the middle of a development of over 40 units being built out over a 12 month period.

The programme for the exemplar units will work better by integrating with the rest of the site programme as there would be no real benefit to East Midlands Housing Group and Three Rivers Housing Association if the proposals was for a Turnkey approach for just up to four properties.

However, if it becomes a requirement of the client, we would seek a partnership with a local contractor for the proposed work outside of the delivery and erection of the frame, which would still be necessarily erected by our own specialists. The provision of a Turnkey product would be most suited for the exemplars being constructed in advance of the rest of the development site. This would be subject to the necessary lead-in time for the negotiation and procurement of an appropriate construction partner.

Throughout a Turnkey process we would require our own independent clerk of works and project manager to ensure quality control and integration of systems whereas if the exemplar units we integrated as part of the overall build programme it would be possible to provide the necessary training / briefing on quality control process for Passivhaus standard to the principal contractor[s] as required.

Legal / Contract Items

[a] Professional Indemnity / Public Liability / Employer's Liability / Product Liability Insurance

We can confirm the following levels of insurance. Where necessary these can be increased to the levels required by the client body.

Public liability [£ million] £10,000,000

Employers liability [£ million] £10,000,000

Professional indemnity [£million] £1,000,000

Other: Contractors' All Risks £25,000,000

This would cover the supply and installation of product, and the site management during the erecting of the first building kit.

[b] Provision of Design Warranties to 3rd Parties

The warranty period of five (5) years shall only apply to prefabricated wooden components manufactured in the Supplier's factory. For all other materials a warranty period of two (2) years shall apply. For materials in the products which have been delivered by external suppliers (such as windows, doors and stair cases), the warranty of the external supplier concerned shall apply.

Regarding air tightness/thermal efficiencies there are no product supply warranties as the performance is subject to quality control during the instillation process on site. The main contractor would be responsible under the supervision of the clerk of works.

[c] Surety Bond provision

11 weeks after undersigning the order, design is locked, production will start and 1:st payment is required.

[d] NHBC provision

Timber frame is a standard building system and as such is covered by the NHBC warranty system. We will work with the NHBC (or similar organisation) to ensure a full year 10 warranty system.

[e] Defects period and rectification proposals

Standard defects period of 5 years on prefabricated wooden components and 2 years on all other components will apply.

[f] Retention and release proposals

100 % Payment guarantee. 10% 11 weeks before delivery and 90% 2 days before loading.

Not on export projects.

[g] Appointment

Either direct or through a sub-contractor is acceptable. However, with the need to ensure part [d] is fulfilled, then it may be more sensible for a direct appointment.

Company / Financial Information

[a] Company Status

Limited company (by shares).

[b] Three years accounts summary

Attached as seperate pdf documents.

[c] Equality & Diversity or Equal Opportunities Policy Statement

The Partnership and each of the individual members of the Partnership Consortium is an equal opportunity employer. As such we collectively seek to observe and comply with the Sex Discrimination Act 1975, the Equal Pay Act 1970, the Disability Discrimination Act 1995 and the Mental Health Act 1983, the Race Relations Act 1976, the Race Relations Act (Amendments) Act 2003, the Employment Equality (Sexual Orientation) Regulations 2003, Civil Partnership Act 2004, Employment Equality (Religion or Belief) Regulations 2003, Employment Equality (Age) Regulations 2006.

The Policy - Responsibility for the policy and its effective operation lies with the individual Partners and Consortium members.

In the provision of services and the employment of staff, associates and / or subcontractors, we are committed to promoting equality of opportunity for everyone. The Partnership and Consortium members oppose all forms of unlawful or unfair discrimination and will treat all people equally whether they are directly employed, or seeking or using the services of the consortium. Our aim is to integrate equality of opportunity into everything that the Partnership and Consortium does. To this end, within the framework of the law, we are committed, wherever practicable, to achieving and maintaining a workforce that broadly reflects the make-up of the community in which we operate.

During the course of its activities the Partnership and Consortium will not discriminate against any individual or group, directly or indirectly, on the grounds of age, colour, marital status, ethnic origin, nationality or national origin, responsibility for dependents, trade union activities, religious beliefs, gender, disability, race, sexual orientation, political beliefs, HIV status, resignation, terms and conditions, training and development, dismissals or redundancies.

The Partnership and Consortium will; ensure that the Equal Opportunities Policy is known to all employees and partners; develops initiatives to promote the policy; encourages all partners to seek ways of incorporating equal opportunities during the course of their work; and takes disciplinary action against those who infringe the policy. This Equal Opportunities Policy is continuous and integral component of the Consortium's working operations.

Monitoring - To ensure that direct or indirect discrimination is not occurring within the Partnership or Consortium, the policy will be regularly monitored and reviewed. If necessary, action will be taken to make changes as a result of the review. If amendments are required to the policy as a result of matters arising or as a result of forthcoming changes to Government Legislation, we seek advice from a specialist advisor.

Provision of Services - In providing services the Partnership and Consortium will; accord with the requirements of the Clients' own Equal Opportunities Policy; ensure that the Consortium and Partners are fully conversant with the Clients' own Equal Opportunities Policy; and promote equality and seek to prevent discrimination. When undertaking a project we will actively seek and encourage the participation of all sectors of the local population in the design and delivery process. All publicity and consultation material produced by the Consortium will be clear, accurate and informative, and will not contain any inappropriate

or discriminatory images. Such material will seek to present good role models and provide positive images and avoid images that reinforce stereotypes. All publicity and consultation material will be written in Plain English, however translation to other languages will be provided to reflect the requirements of Client and local ethnic populations.

When conducting public meetings or workshops the Partnership and Consortium will ensure that adequate arrangements are made to enable and encourage all members of the community to participate. Appropriate information will be provided regarding venue access and facilities.

All written reports will be in Plain English

[d] Health and Safety Policy Statement

The Consortium will work in accordance with the current Regulations for CDM - Construction [Design & Management][12]. The responsibility for undertaking any notifable work will remain the responsibility of a nominated CDM coordinator as will the preparation of any Health and Safety File.

The Consortium will work in partnership with individual members of the supply chain to ensure there is an awareness of health and safety consideration at the project inception and design stages. A record of the pre- construction phase hazards will be identified.

We will highlight issues of overlap with the manufacturer's literature with regard to health and safety as party of any maintenance requirements.

A safe system of work will be devised for any repairs and / or alterations; for example with the use of a ppe system for working at height for safe access and working; will remain the responsibility of the CDM coordinator. The CDM coordinator will be responsible for undertaking the risk assessment. In doing so reference will be made to the manufacturer information for the completion of a risk assessment and considering any issues connected with the safe disposal of materials and equipment.

[e] Safe contractor accreditation status

Interest registered and will be completed as part of this project.

[f] Training Policy Statement

We are committed to ensuring that all our staff has received adequate training in order to be able to carryout their duties safely and without risk to themselves or others. We aim to achieve this by providing induction training for all new employees and on going skills training. The need for training will bedetermined by the requirements of the individual employee's job role. We also constantly assess and review the development needs of our employees and actively encourage all staff, regardless of employment status, language skills and grade, to take advantage of all training opportunities available and to communicate their individual needs and requirements.

Legal position - Providing adequate training to our staff is a requirement of the Health and Safety at Work Act 1974. It is also required by other more specific legislation, which relates to the use of machinery, handling activities, hazardous substances and the wearing of personal protective equipment. The test of adequacy is based on providing sufficient training to ensure that employees can carry out their duties without jeopardising either their health and safety, or that of their colleagues and visitors.

12 2007 Regulations [came into force 6th April 2007] available for download from http://www.legislation.gov.uk/uksi/2007/320/contents/made

Procedures - The following procedures describe the steps that we will take to comply with our obligations to provide adequate training:

All new employees will receive induction training. This training includes Health and Safety, Qualityand Environmental management and covers key areas such as fire safety, first aid and anyworkplace hazards. A signature will be required from the employee to confirm that they haveunderstood the contents. A copy of this form will be kept on their personnel file.

This training will also be provided to other groups who will be working on our premises. Thisincludes agency temps, work experience students and sub contractors

Some training is a statutory requirement, e.g. for manual handling activities. However, where this is not the case, a risk assessment and / or a Training Needs Analysis will be used to determine whether any training is necessary in order to carry out the job role safely. Other training needs will beidentified by using one, or a mixture of, the following tools and is dependant upon the specificneeds of the individual, team or client: Performance Appraisals; Employee Development Needs questionnaires; Key Performance Indicators (KPI); Specific task Training Needs Analysis (TNA).

Where an employee's job involves the operation of tools or machinery, on-the-job training will be provided by the Site or AreaSupervisor. It is the responsibility of the employee's manager to ensure that this is carried out. This training will also be given if an employee changes job. If new machinery or equipment is purchased, further training is likely to become necessary. If so, this will be arranged before on the new machinery etc. commences. If certain training is needed and it cannot be provided in-house, then the individualemployee and their manager will need to identify a suitable course. Staff are expected tofind the most cost-effective training available. All reasonable expenses, such as travelling will be reimbursed.

Effectiveness - The effectiveness of our training policy is measured by using Key Performance Indicators (KPI) which relates specifically to: Quality of work, Customer Feedback and Contract Retention. The results of these KPI's are analysed to ensure that our training policy and procedures are effective and fair and constantly

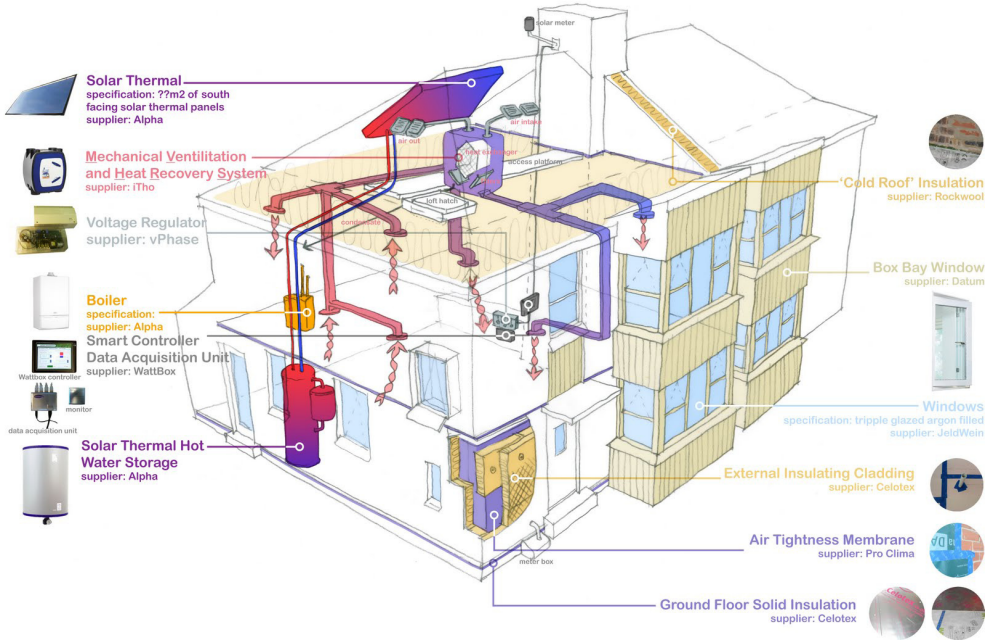
Employee duties - Employees are expected to cooperate with us fully with regard to attending health and safety training courses. We expect that all reasonable effort will be made to attend a course, but if this isn't possible, that we will be notified well in advance. Should an employee fail to attend a course, which is a legal requirement without good reason, we retain the right to treat it as a disciplinary matter.

Retrofit for the Future, Leicester & Newcastle

Client: East Midlands Housing Group, YHN, Technology Strategy Board
Collaboration: Institute for Sustainable Energy, De Montfort University, ARUP, DKS Architects, Energy Saving Trust

Studio UrbanArea LLP and Vanguard Homes are partners in two seperate second stage low / zero carbon national demonstration project producing a 'pattern book' of approaches and architectural details for retrofitting low rise social housing to low carbon / Passiv Haus principles. Roles included initiation of project consortium, stage one funding application, site / property identification, preliminary design proposals, energy modelling and securing funding project delivery for back of pavement solid brick terrace property and interwar semi-detached properties. Implementation, appointment of principle contractor, supply chain and project board and management through to production of building user guide / O & M Manual.

Together we are addressing construction challenges including, meeting the Code for Sustainable Homes, Building regulations and problem resolution [including CSH assessment]. We are also proposing technical knowledge and support on innovative process design and the use of modern methods of construction allowing unique speed of implementation as part of our understanding on integrated design proceses.



Designed for Manufacture Quality and Standards Audit

£60k Home Design Audit

Client: English Partnerships
Collaboration: ARUP, KCA Architects

Studio UrbanArea and Vanguard Homes were supporting lead consultants on the recent review of the Designed for Manufacture programme,responsible for assessment against English Partnership benchmarks for design and sustainability standards – based on the assembly and management of an expert peer review panel. The review included public sector development sites throughout Yorkshire, South East, and the East Midlands.

EcoTech House, BRE Innovation Park

Client[s]: EcoTech, Barratt Homes, BRE Global

Yann Bomken, Director of Vanguard Homes, was the project manager responsible for the construction of the EcoTech House based at the BRE Innovation Park. The approach to construction was based on a timber SIP system to achieve high levels of air tightness and detailing to avoid thermal bridging. The unit achieved the first Code for Sustainable Homes Level 4 rating in the country. In contrast to the adjacent CSH Level 6 'lighthouse', the EcoTech house achieved a similar standard for the building fabric at a significantl lower / affordable price. Responsibility included providing both project and technical support to Eco-tech with their house build at the BRE as part of the Offsite 07 event. This included working with the BRE to determine the requirements of the then recently released Code for Sustainable Homes and designing the technical details accordingly.

pPod Peterborough South Bank Carbon Challenge

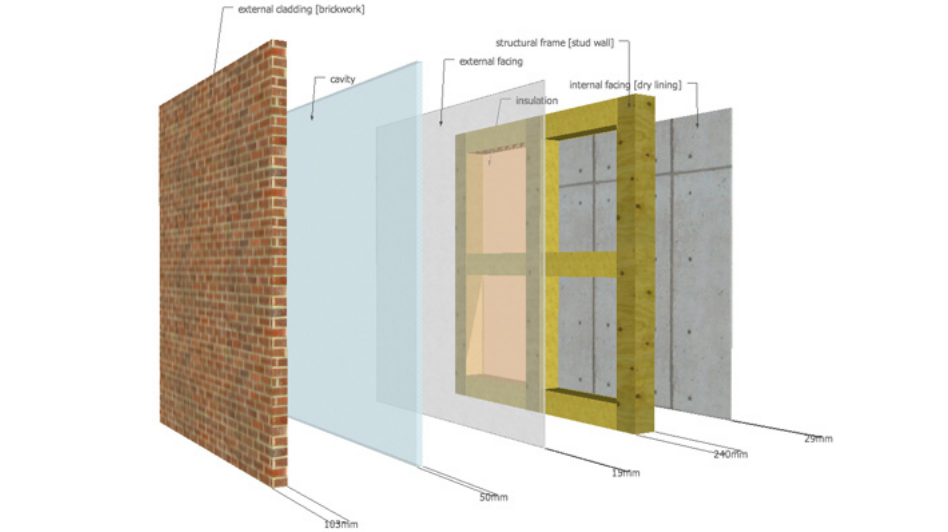
Client[s]: Morris Homes and Gentoo Group
Collaboration: Browne Smith Baker Architects, EcoFys, Ethical Partnership, Vanguard Homes

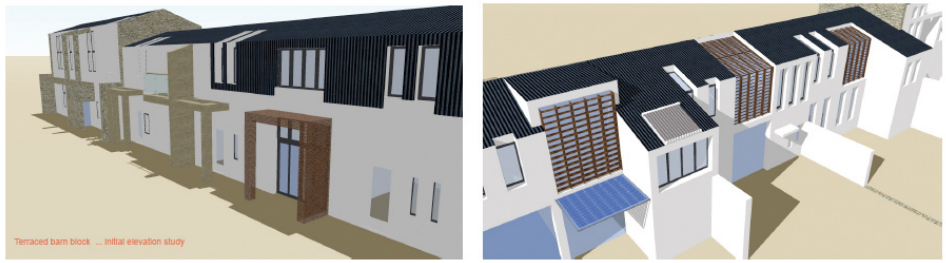
Studio UrbanArea LLP were behind the winning proposal for the Homes and Communities Agency [HCA] Carbon Challenge for Peterborough SouthBank. They initially set up the multidisciplinary consortium to bid for the site and developed the systems approach to planning for a new sustainable community, with responsibility for urban design, masterplanning alongside the inovative approach to a supporting Community Interest Company to take on the longterm management responsibilities attached to a low / zero carbon lifestyle. The approach was informed by a hypothesised approach to the local housing market, lifestyles and existing carbon footprints of households in Peterborough. The development comprises a mix of 350 units with an extreme variety of house types, tenure and uses. The proposal is for all of the 350 units to all achieve Code for Sustainable Homes Level 6, making the scheme one of the first and cetainly the largest scale of carbon neutral devlopment within the UK. The approach required a 'managed' approach to integrated design at three different scales ... masterplanning, the development of a patternbook of sustainable housing typologies, and a technology group. The design development and revision is currently being undertaken in light of the 'credit crunch' impact but with expectation of a planning application, suported by a business plan, within the next few months.

Wombwell, Barnsley

Client / Collaboration: Bernslai Homes, Vanguard Homes

Studio UrbanArea LLP collaborated in a joint venture on urban fringe ‘brownfield’ proposals for low carbon housing based on ‘fabric first principles’ achieved through the use of off-site manufacturing proposals. The preliminary apporach in 2009-2010 was to create a Yorkshire housing patternbook integrating quality and sustainability standards with MMC supply chain.





Off-site Manufacturing - Advance Housing

Client: Advance Housing

Yann Bomken has been at the forefront of the MMC offsite construction sector since entering the industry in 2002, where as General Manager, and reporting to the Chairman and Chief Executive of Barratt Developments, he led the start-up and running of Advance Housing Limited, their Daventry based offsite offering delivering the first closed panel steel frame product in the UK residential housing market. During his time at AHL, he was responsible for pioneering a number of techniques and processes within the industry including the use of ‘plug and play’ electrics as well as improving the production process through the first automatic nailing of boards. Yann then joined Corus Living Solutions, where he directed the module production operations as part of the largest ever UK MOD PFI project, which included achieving a UK quality first, with modules being signed off by the customer directly from the line defect free.

!n 2007, Yann founded Vanguard Homes Limited who have quickly gained a reputation as leaders in low and Zero carbon housing developments including the Code for Sustainable Homes. This has included being Technical Advisors to the pPod consortium.

Chinese Elders Housing, Newcastle

Client / Collaboration: Home Housing Group

Studio UrbanArea Director, Michael Crilly lead on the production of a collaborative development brief to guide statutory planning and developer proposals of mixed sheltered housing for BME community on heavily constrained vacant school site within the west end of Newcastle.

Indicitative capacity study / layout

European Benchmarking Study Tour

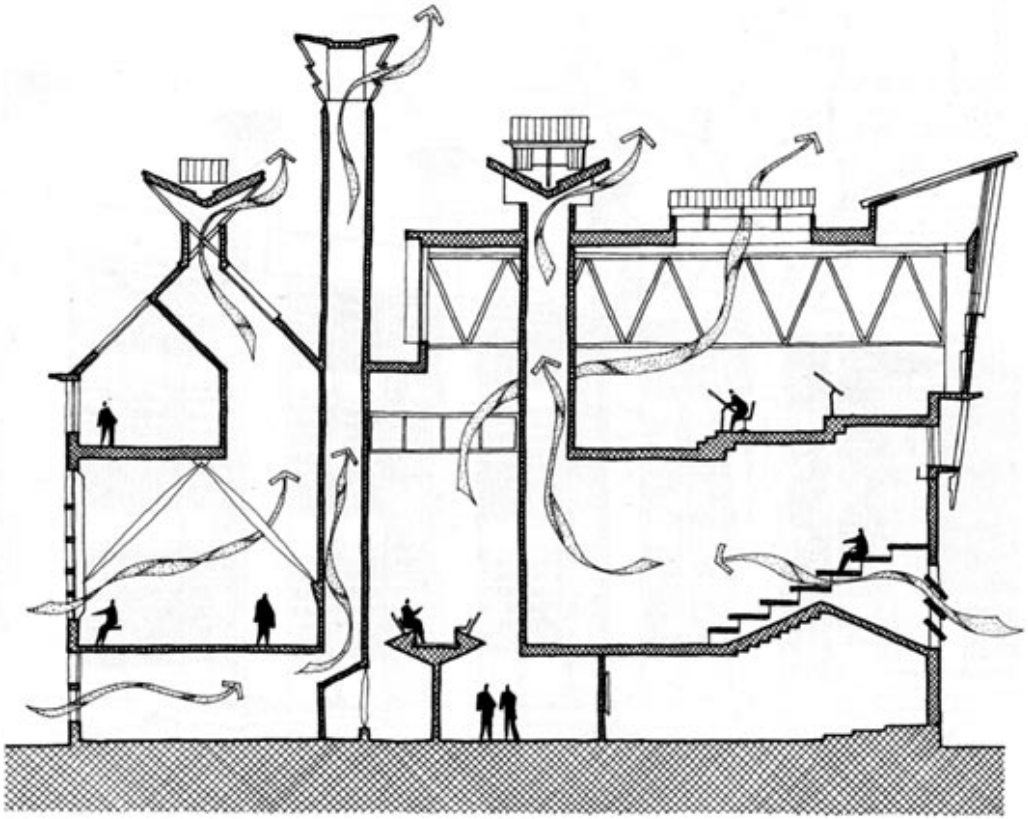
Client[s]: Tees Valley Regeneration TVR / Commission for Architecture and the Built Environment
Collaboration: Urban Splash

Studio UrbanArea LLP, have been responsible for a range of activities regarding community and professional capacity building with a real interest in organising / undertaking capacity building trips. There has been a specific interest in the study of European Housing Expositions in Sweden and Germany and approach to sustainable housing typologies. Evidenced in the case study contributions to CABE / Regional Centre of Excellence Web sites and on-going European partnership working. This has often led to long-term collaboration and partnership working with European regeneration projects, allowing for knowledge transfer and the exploration of external funding possibilities under EU arrangements.

Reduction in Energy Demand in Buildings, Nottingham / Leicester

Client / Collaboration: Engineering and Physical Science Research Council UK

Institue for Energy and Sustainable Development is the lead group in a Univeristy and industry collaboration looking at the relationship between wireless technology and energy use. With a research budget of over £600,000 the project has case study buildings throughout the East Midlands for both residnetial and non residential properties. Outcomes relate to building user feedback and the viability of wireless technology and particularly the ethical and control issues arising from their practical and commercial application in carbon reduction and energy management.



Concerto 6th Framework

Client / Collaboration: European Commission, Hannover, Malmo, Nantes, Kosalin, Newcastle City

Studio UrbanArea LLP Director, Michael Crilly was the UK project manager for a 6th Framework knowledge transfer and research programme addressing the scale and mainstreaming issues of new build and retrofitting sustainable housing, including technical, financial, policy and procedural barriers to delivering large numbers of Passiv Haus projects.

Vanguard Homes in partnership with Studio UrbanArea LLP and the Institute of Energy and Sustainable Development, De Montford University