

balehaus[®]

beautiful, affordable, sustainable
a zero carbon housing solution



BaleHaus Custom Homes

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a zero carbon housing solution

Living more sustainably requires us to develop ways to live within our environmental means, especially in relation to our carbon footprint, maintain a healthy and comfortable quality of life and build strong cohesive communities. BaleHaus addresses these challenges and offers a straightforward and practical way to reduce our footprint on the earth.

BaleHaus uses ModCell straw panels to provide a super-insulated home, made from locally available materials that are designed to be dismantled, re-used and recycled at the end of a typical 75+ year life. This super insulating system meets the PassivHaus specification for zero heat homes.



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straw technology

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‘Home Manufacturer’

Our home manufacturer team brings together three key companies who share common values of sustainability, quality, excellence and performance to provide the BaleHaus product.

A highly customer-focused team will manage all the requirements of custom build, making it an enjoyable experience for our client, and delivering a dream home that fulfills their needs and aspirations.

All of the team members have residential experience, and our technologies and designs are proven and deliverable.

BaleHaus is a real, tangible product, not simply a concept.



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BaleHaus is an entirely renewable home, made from beautiful, affordable and sustainable natural materials. BaleHaus is a living, breathing home that is cool in summer and warm in winter. It is intelligent in design as well as operation and, at every turn, simply and effectively helps people reduce their CO₂ emissions without compromising how they choose to live their lives.

BaleHaus is a light, airy, spacious and comfortable home, which has a minimal impact on the environment. The designs are fully customisable, including options for external treatments, internal layouts and fittings. We can also offer a range of renewable and energy saving technologies to save you money on your bills.

BaleHaus is an enabler of 21st century living, dispelling the myth and popular misconception that one's lifestyle must be compromised in order to achieve a low carbon existence. Welcome to the world of low carbon chic!

We can help you build a lasting beautiful home that protects the environment, reduces carbon emissions through lower energy use, encourages biodiversity and promotes safe, healthy family lifestyles and cohesive communities.

Lasting & Beautiful Homes

Built from local and natural resources that will last a whole lifetime; the BaleHaus is a stunning modern eco-home



finished with meticulous detail and quality that families and communities are proud to call home.

Safe & Healthy Family Lifestyles

Positive attitudes to life and the environment are encouraged and promoted; BaleHaus is designed to be flexible and responsive to various lifestyles such as the needs of a growing family, and rooms are ideal for multitasking. The interiors flow easily into the terraces and gardens to allow you to make the most of a healthy outdoor lifestyle. These outdoor oases are important social spaces where families can gather in the fresh air for barbecues in the summer or where parents can escape for a cool drink while reading the newspapers. Where appropriate homes are built in accordance with 'secured by design' and encourage a healthy, safe and cohesive communities.

Future-proofing the future

We consider the BaleHaus to be a 'home for life' that changes and grows with you. Our designs have built-in

resilience for new future technologies and are easily extendable and adaptable.

Environmental protection

Our homes are built from sustainable, responsibly-sourced materials. Straw and timber are renewable resources that can provide a continuous renewable supply of building material, replacing high embodied energy (i.e. "CO₂ generating") materials such as steel and concrete. As straw and timber grow they absorb CO₂ through photosynthesis, keep the carbon atom to make cellulose and give the oxygen atoms back to atmosphere. This is how we "bank" the carbon into the structure and fabric of each BaleHaus. The properties will also harvest the rainwater that falls onto them for use in toilets, washing machines, irrigation and car washing.



Reducing carbon emissions

BaleHaus is built using super-insulative straw and designed using strict airtight details, meaning we are able to offer PassivHaus standard certification on our homes. This results in lower energy consumption and in



conjunction with the other renewable technologies we are able to offer a superior eco home.

Biodiversity

We feel it is important to actively encourage nature in all its forms to flourish as part of a healthy eco system. Each house has its own private outdoor space, and our design approach is flexible to enable terraces at upper levels. These are designed to support green roofs and micro allotments.

BaleHaus - technical

BaleHaus is constructed from pre-fabricated straw bale panels (ModCell). This innovative, off-site manufactured envelope solution can be quickly and efficiently installed, creating buildings with thermal performance up to three times higher than the current building regulations require. In a world struggling to deliver solutions for the low carbon future, this solution stands out as the leading renewable, carbon-neutral building product designed to help meet the challenges we all face.

BaleHaus has been designed as a stand alone dwelling in its own right, and suitable for individual custom build plots. However, it is in a terrace that it shows its true versatility. The BaleHaus design can be adapted to suit a 2, 3 or 4 bedroom configuration and arranged over two or three storeys in height.

The simple plan form of the BaleHaus allows for a variety of room configurations, allowing bathrooms and kitchen locations to be customized. The roof can accommodate solar hot water and PV panels if required.

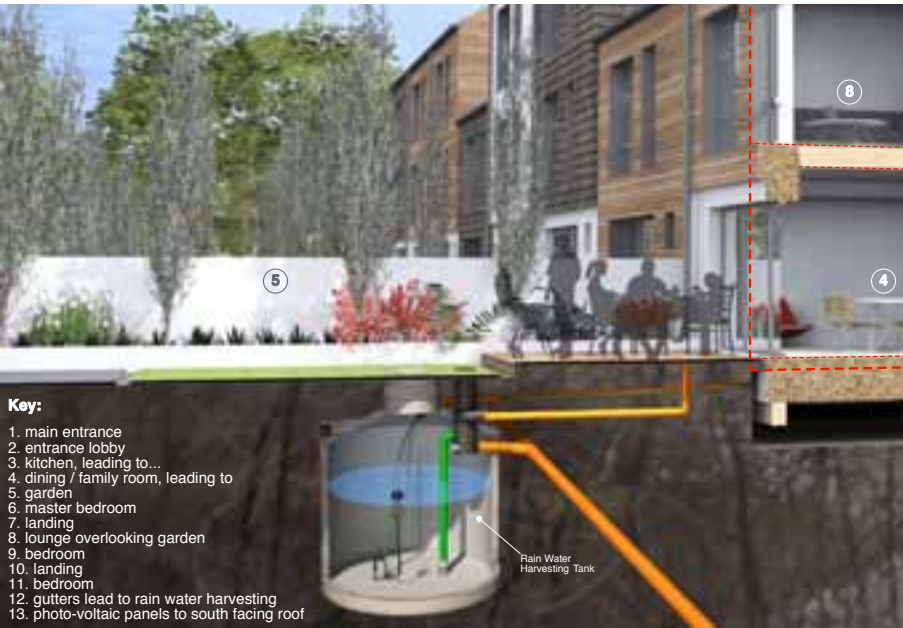
This flexible planning provides arrangements to suit differing lifestyles and changing needs of a family.

Our design considerations provide a ‘baseline’ of requirements:

- ~ Houses based on 2, 3 and 4 bedroom homes with 10m x 6m footprint
- ~ Designed around families with two or three children
- ~ Future proof to allow for expansion laterally and vertically or improvements i.e. extensions, additional bedrooms or DAT cabling etc



- ~ Enclose balconies or similar to the rear with glass/ metal/timber options
- ~ South facing pitch roof systems to incorporate flush fitting Solar PV panel or solar roof system. Consider proprietary systems and/or solar PV roof
- ~ Window sizing and aspect to maximise thermal gain but prevent overheating



- ~ Rainwater harvesting and MVHR to be a integral part of fabric and roof system
- ~ Piling and suspended rafts to be used to promote SUDS and natural water attenuation
- ~ Configured to provide greater recreational use of gardens and shared open spaces
- ~ Elimination of ‘wet’ trades through use of dry fix panelling, cladding or clip on systems with voids for services

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Home Designs



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Home Design

The BaleHaus family of dwellings have been designed to offer a sustainable family lifestyle to the custom build client. This includes optimum amounts of flexibility and aesthetic freedom. Generous open plan kitchen / dining spaces flow seamlessly through to the garden. By utilising the ModCell system of building and maximising the footprint of the building on the plot, we have developed a layout that works well for 2, 3 and 4-bed units.



The 2-bed house accommodates all kitchen, dining and living space downstairs, with bi-fold doors leading out to the garden space. The staircase winds upwards to two generous size bedrooms with a main bathroom centrally located. A roof terrace version results in the stair continuing for a further storey to provide access to a decked space for relaxing and entertaining, or for positioning PV panels and planters. For the standard pitched roof version, attic space is provided for further storage, whilst the bedrooms benefit from high ceilings.

This 2-bed version can be adapted to become a 3-bed house by simply splitting one of the large double bedrooms into two single rooms. The layout to the ground floor remains the same.



The 3-bed house has a large utility and store to the front (ideally positioned for depositing wet and sandy dogs and children after a day at the beach), but flexibility allows this to be converted to a home office should client preference dictate. The kitchen is larger than the 2-bed option and this is open to a dining and family room with bi-fold doors leading out to the garden space. The staircase winds upwards to the lounge (overlooking the garden) and master bedroom with en-suite. On the top floor are two generous size bedrooms with a main bathroom centrally located. A roof terrace version results in the stair continuing for a further storey to provide access to a decked space for relaxing and entertaining, or for positioning PV panels and planters. For the standard pitched roof version, attic space is provided for further storage, whilst the bedrooms benefit from high ceilings.



This 3-bed version can be adapted to become a 4-bed house by simply splitting one of the large double bedrooms into two single rooms. The layout to the lower floors remains the same.

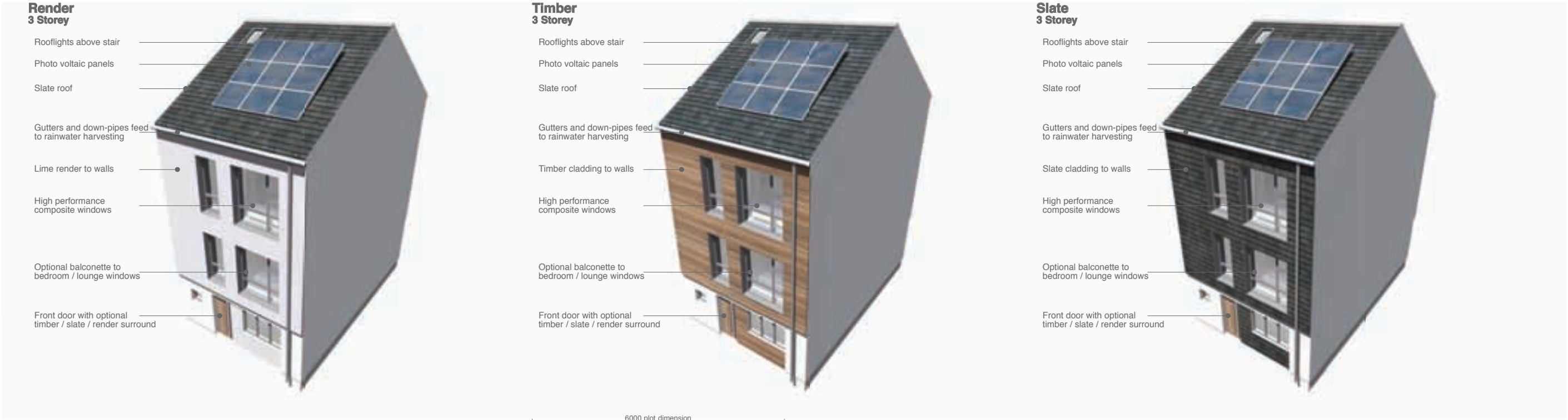


With regard to the elevations, materials have been chosen for their local relevance drawing inspiration from the nearby Heartlands development as well as the Cornish vernacular. Lime render walls and slate roofs provide the backdrop, with a combination of timber cladding, timber shingles and wall hung slate offering variety. These materials, coupled with the different roof profiles and number of storeys, result in a cohesive and yet diverse street- scape.

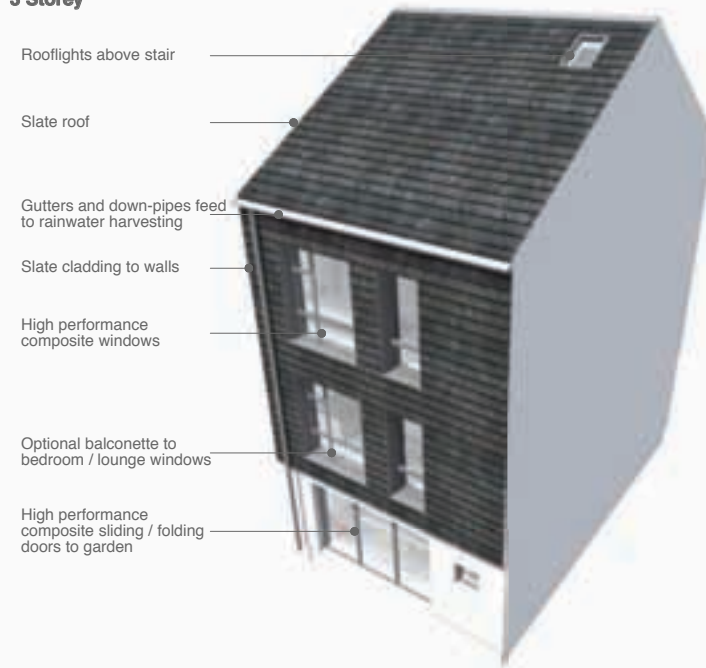
The natural materials dovetail well with the overall sustainability credentials of the straw bale construction, low energy BaleHaus designs.

A typical BaleHaus street

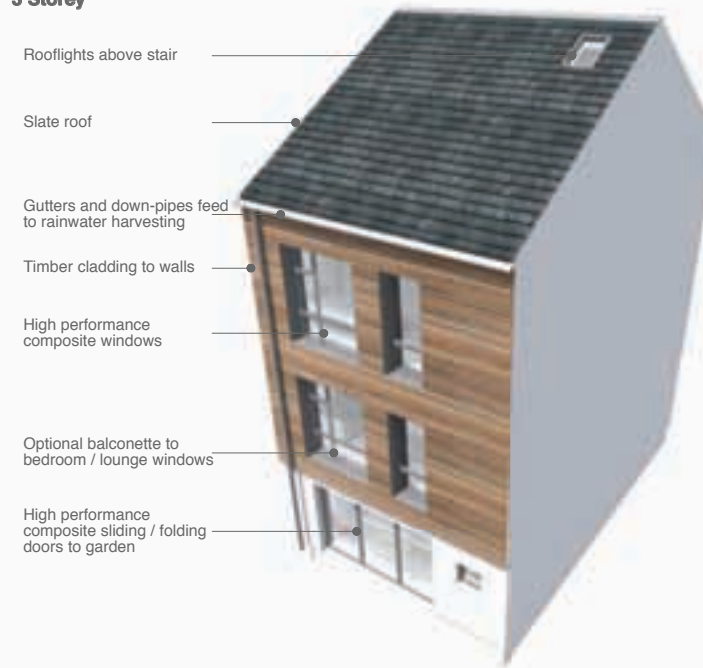




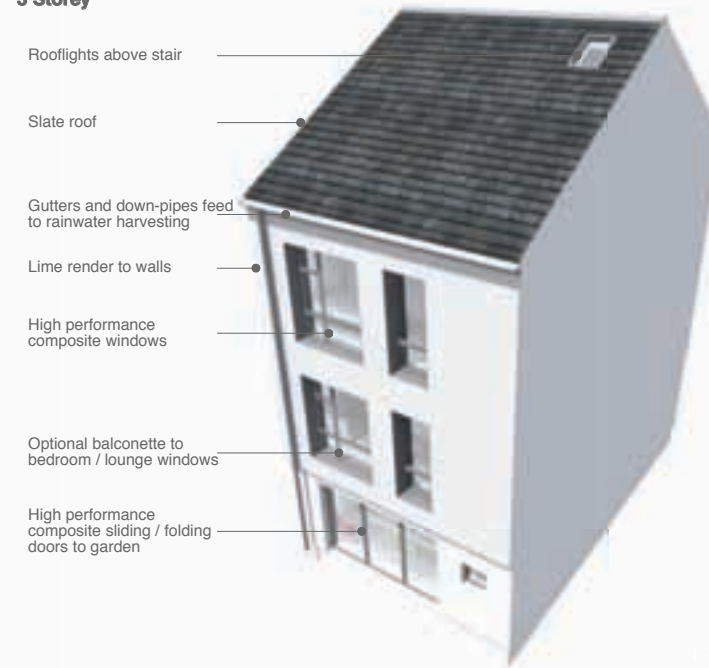
Slate
3 Storey



Timber 3 Storey



Render 3 Storey

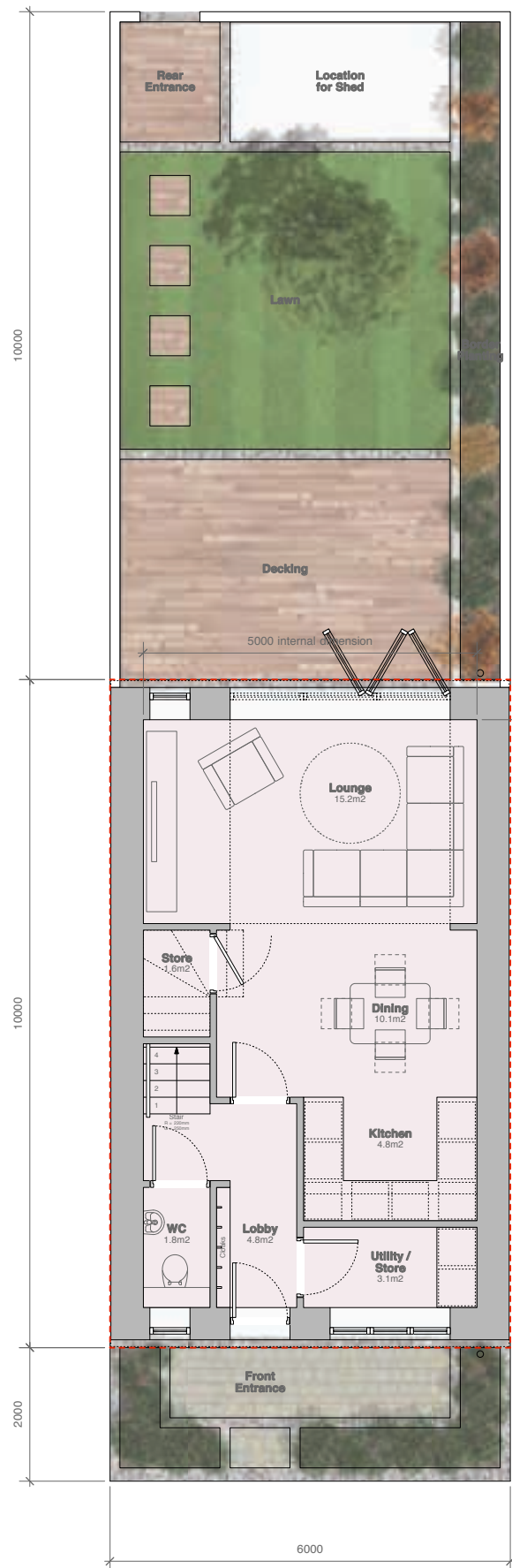


6000 plot dimension



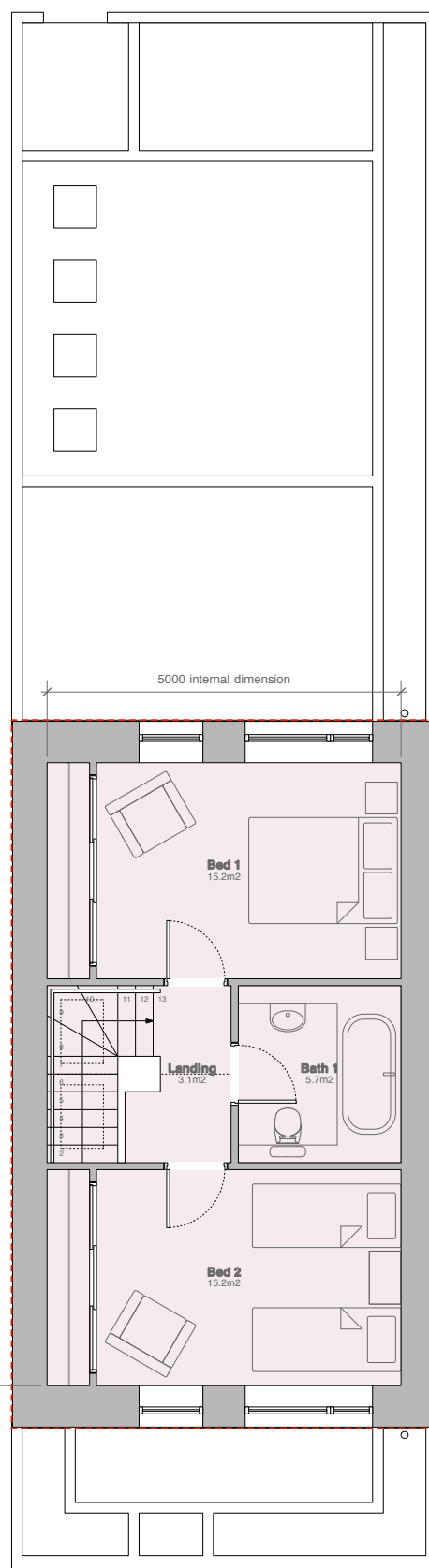
Rear Elevations Various Options



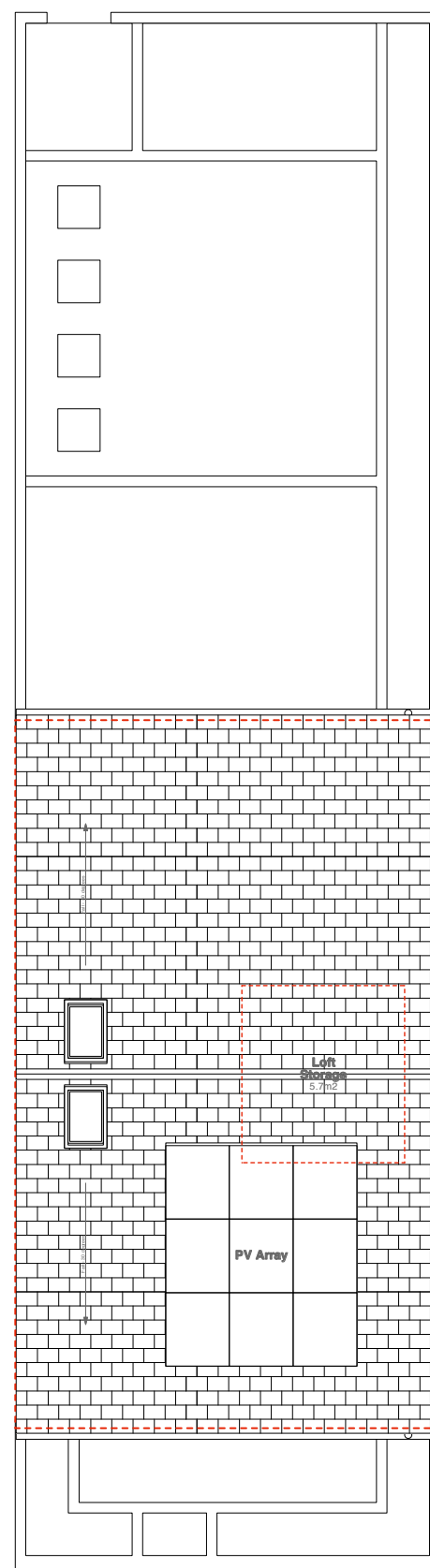


Level 0
44m²
FFL +0.000m

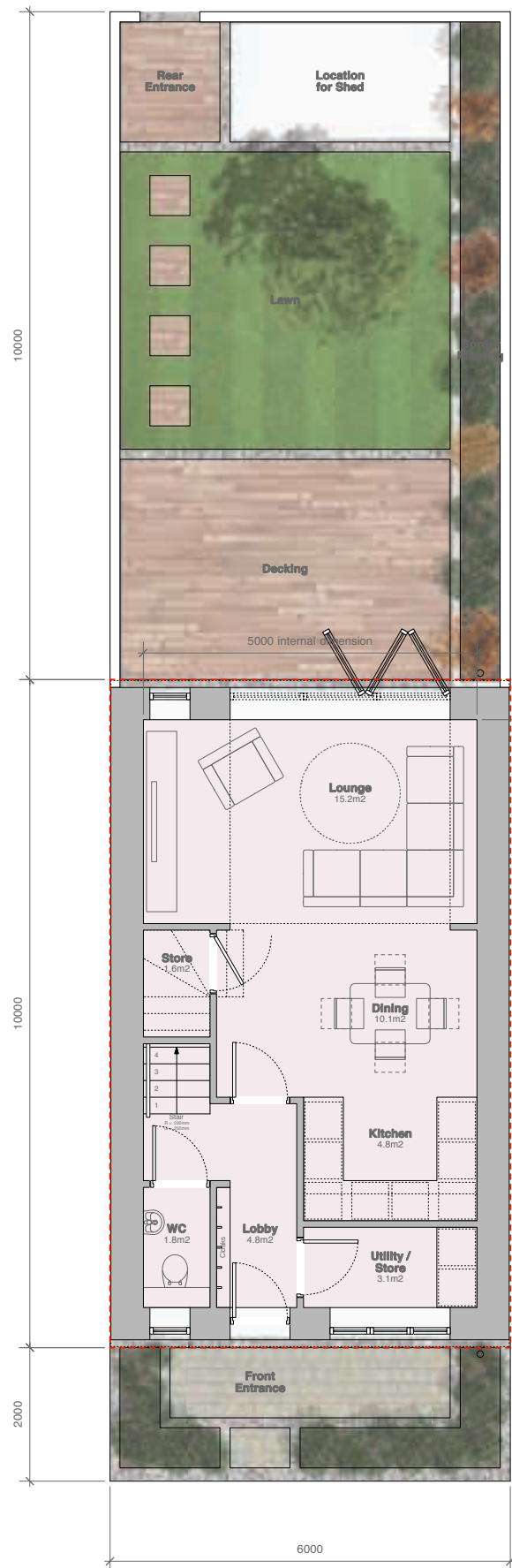
2 Bedrooms
88.00m² GIA



Level 1
44m²
FFL +2.860m



Level 2
Roof

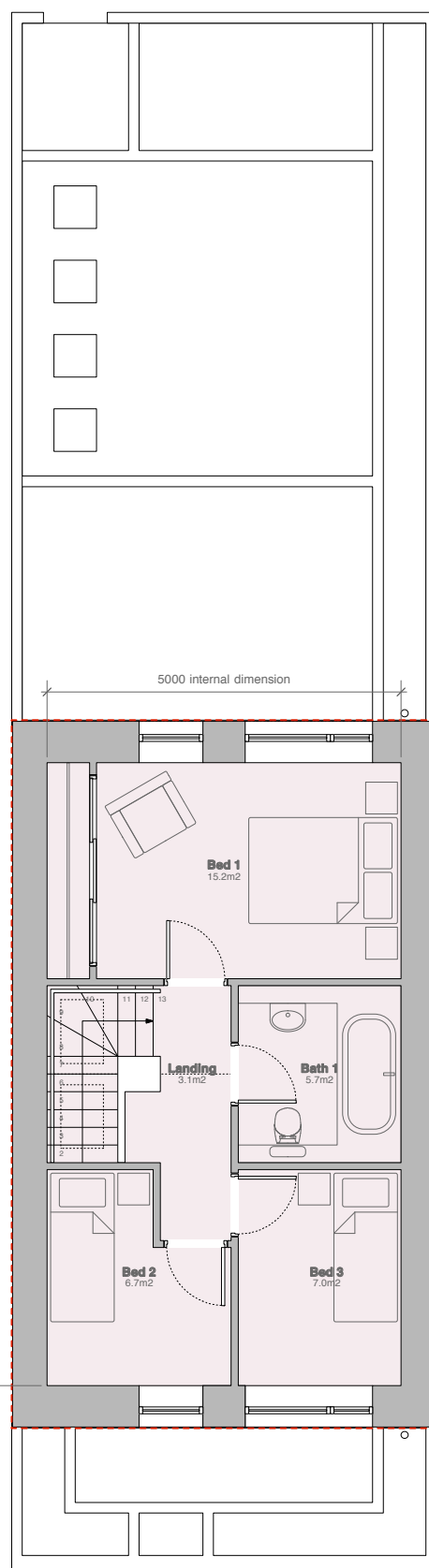


Level 0
44m²
FFL +0.000m

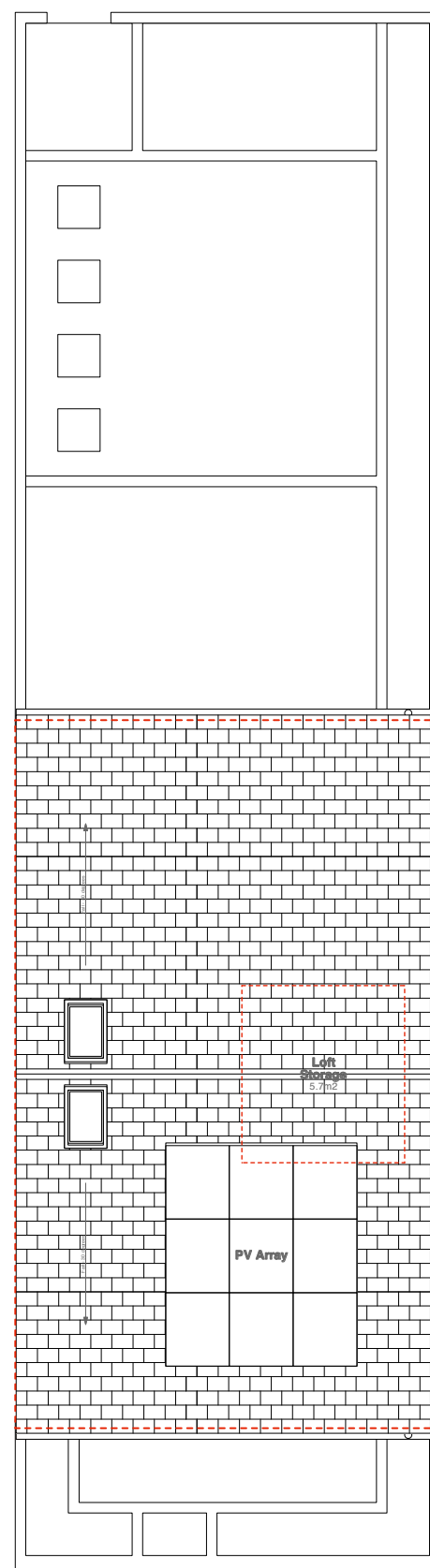
3 Bedrooms
88.00m² GIA



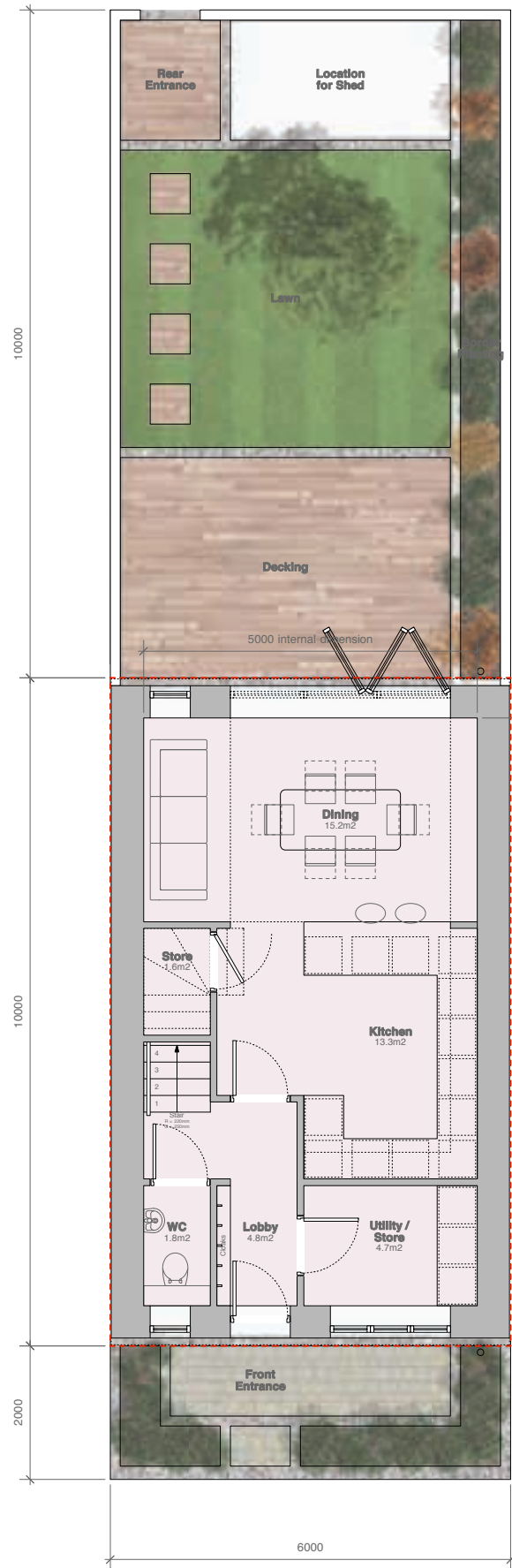
8800 internal dimension



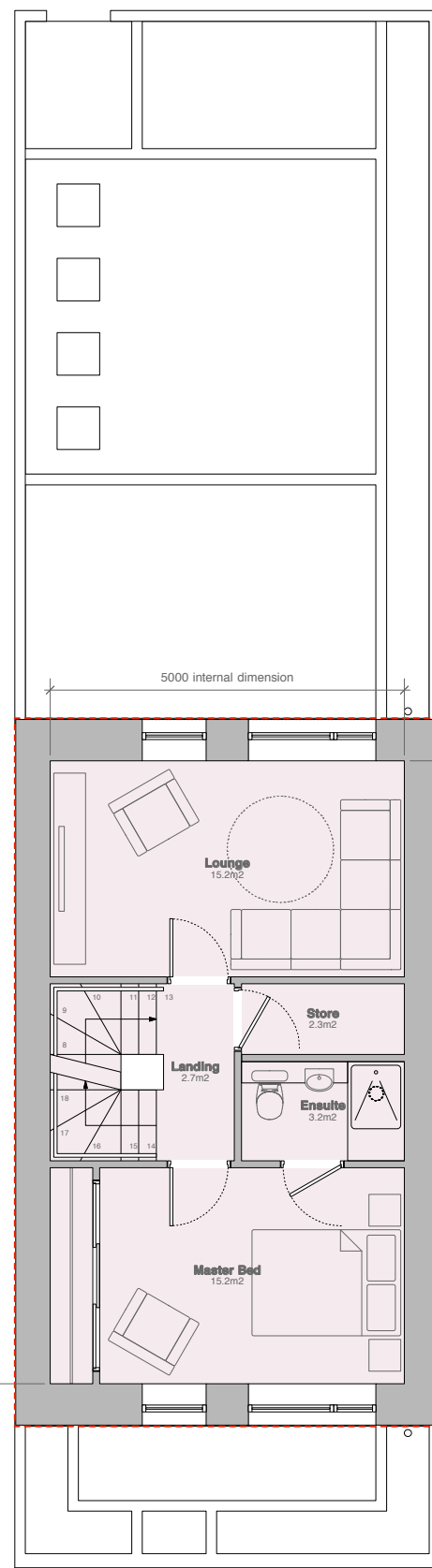
Level 1
44m²
FFL +2.860m



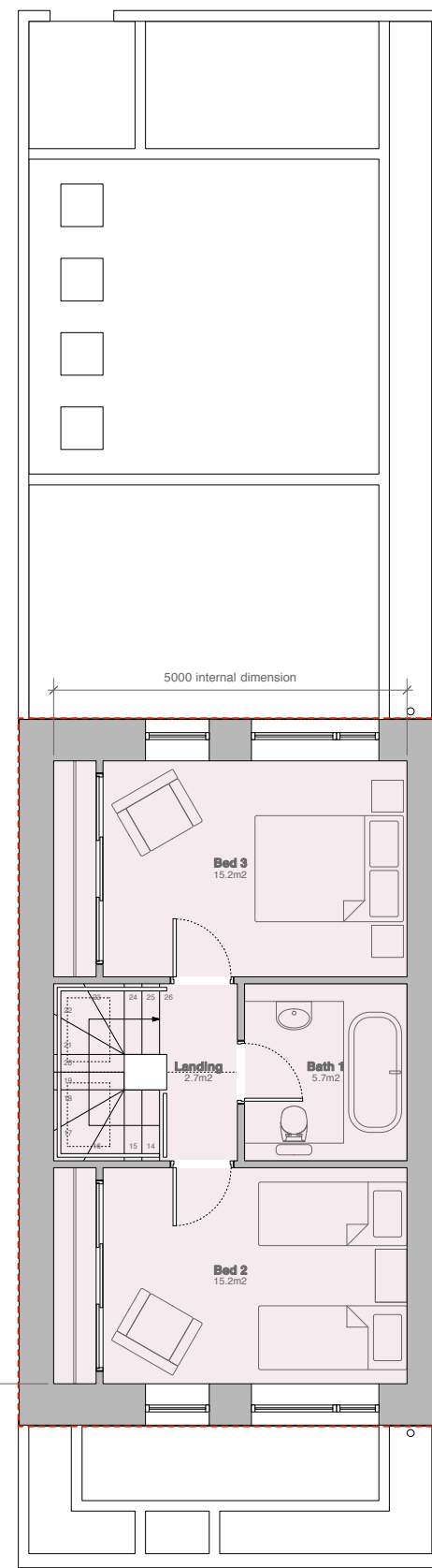
Level 2
Roof



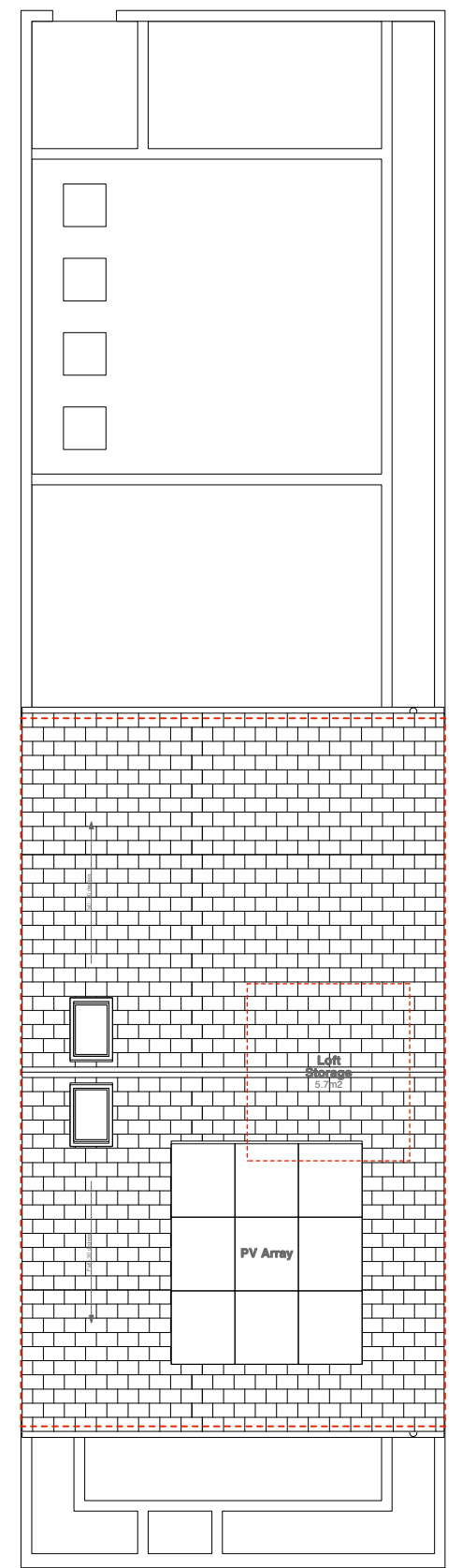
Level 0
44m²
FFL +0.000m



Level 1
44m²
FFL +2.860m



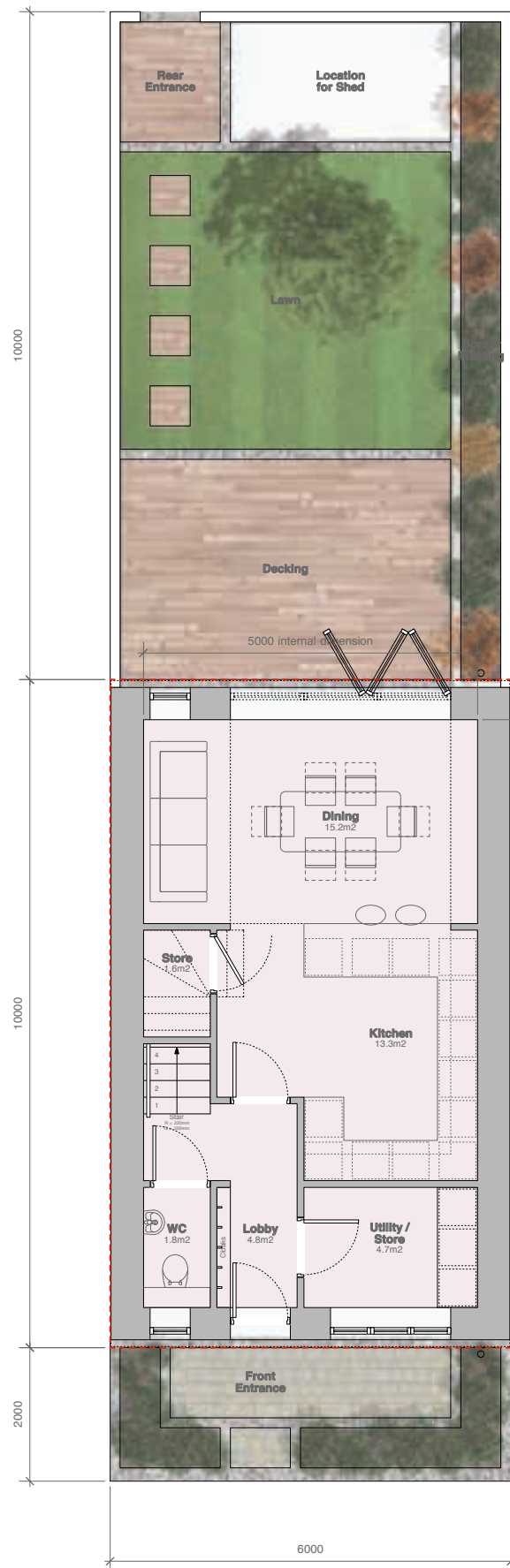
Level 2
44m²
FFL +5.720m



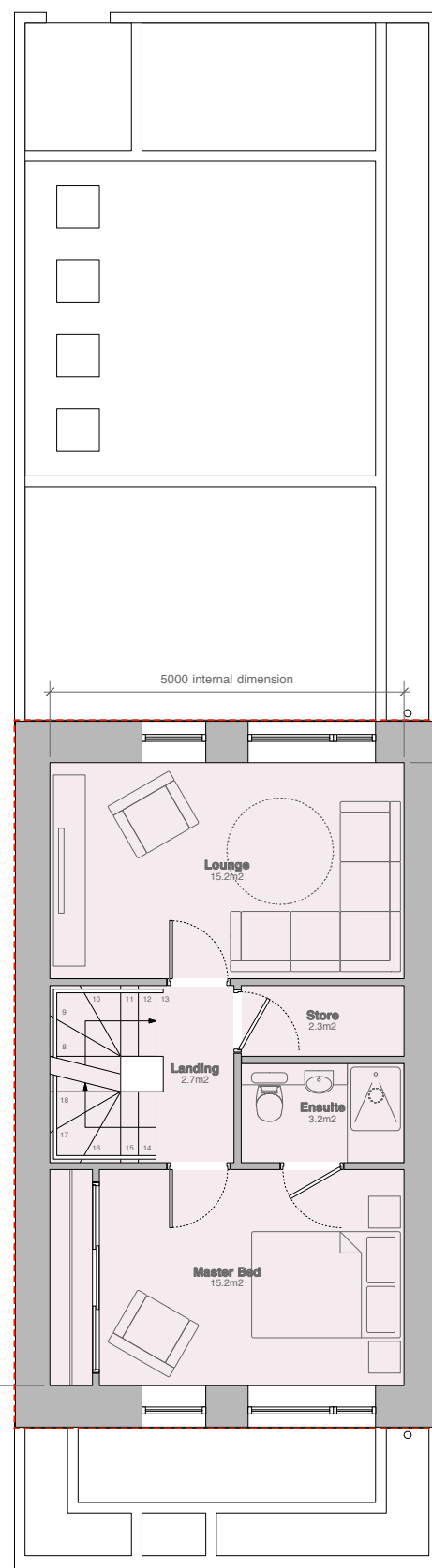
Level 3
Roof

3 Bedrooms
132.00m² GIA

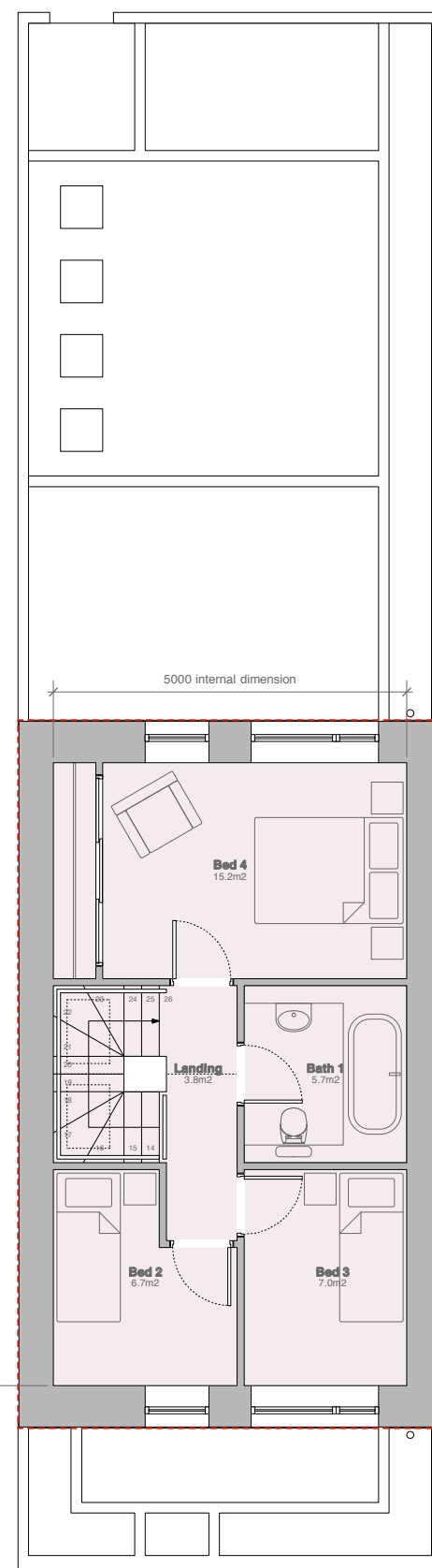




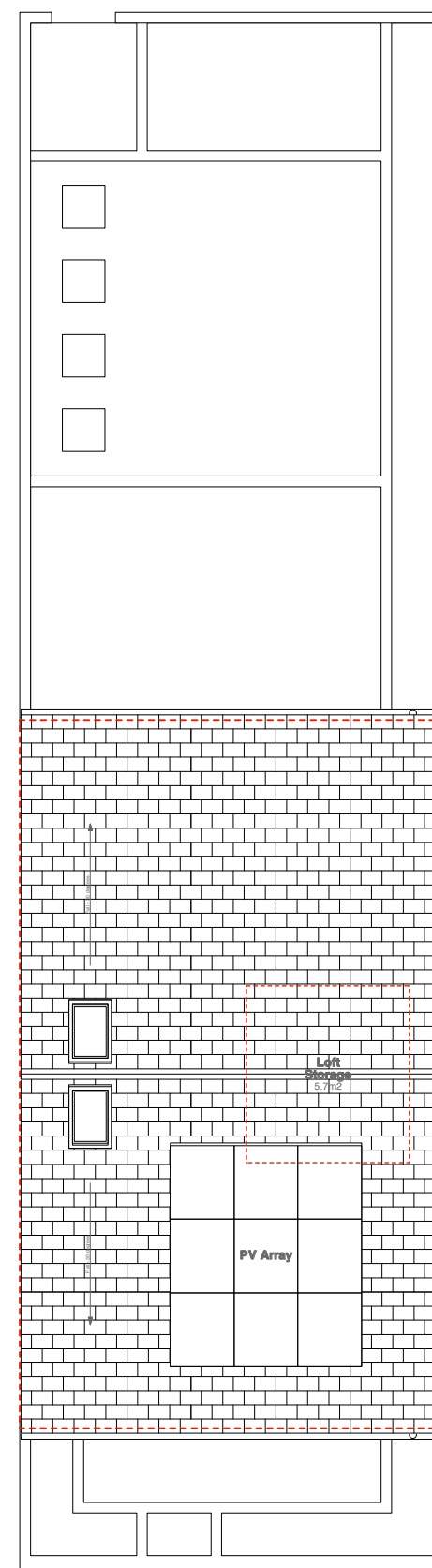
Level 0
44m²
FFL +0.000m



Level 1
44m²
FFL +2.860m



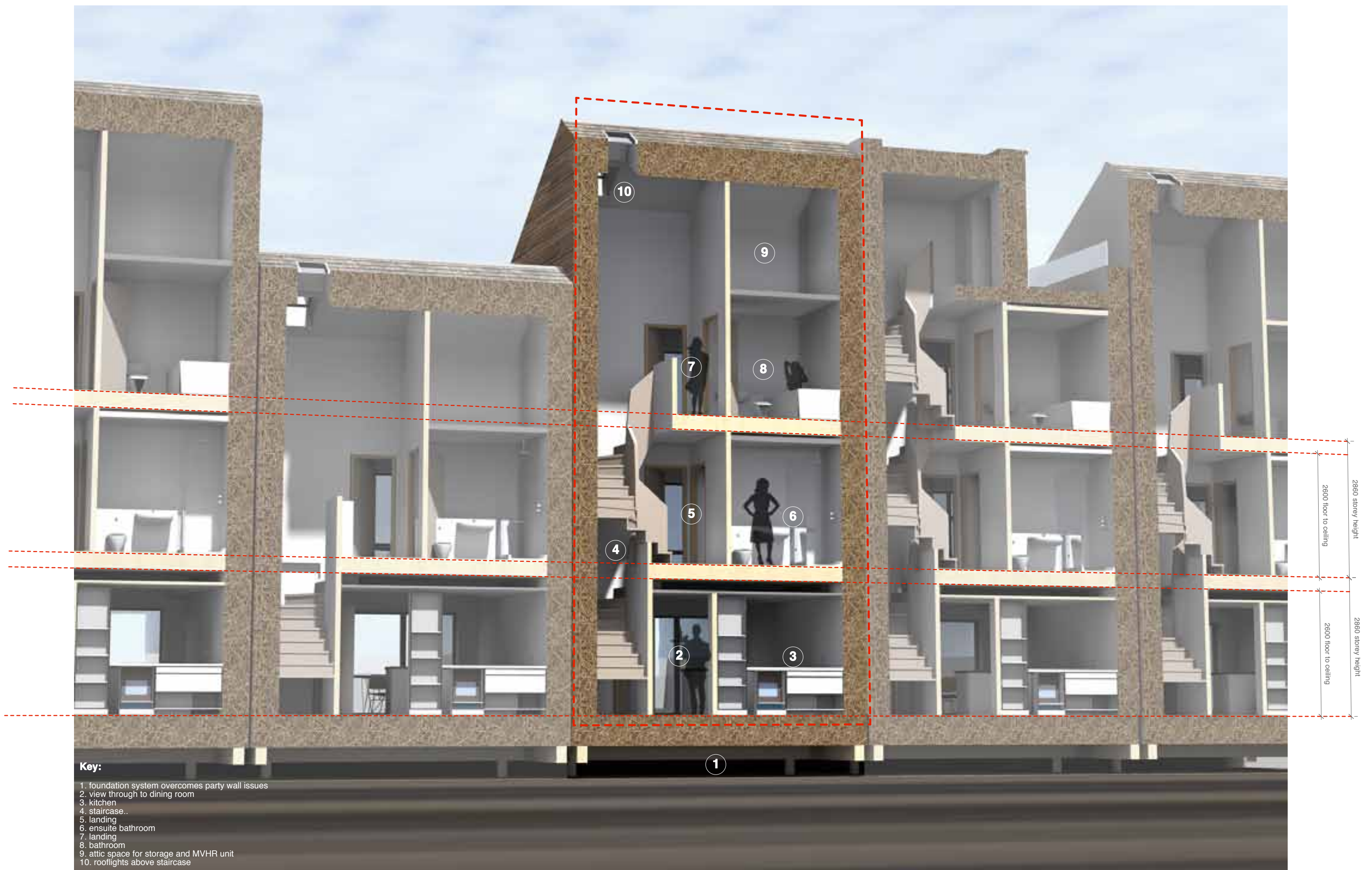
Level 2
44m²
FFL +5.720m



Level 3
Roof

4 Bedrooms
132.00m² GIA





Cross Section 3 Bedroom Standard Option
132m² GIA
Timber cladding, lime render base, slate roof



Long Section 3 Bedroom Option
132m² GIA
Timber cladding, lime render base, slate roof

BaleHaus boat house

Let your imagination run wild



ground floor plan
gia = 120m2



key

- | | | | |
|---|---------------------------|----|---------------------------|
| 1 | entrance area | 8 | boat store & utility room |
| 2 | dining / entertaining | 9 | below stair storage |
| 3 | kitchen | 10 | stair |
| 4 | living area & family room | 11 | south facing decking |
| 5 | home cinema / snug | 12 | steps to swing |
| 6 | shower & wc | 13 | ramp up to decking |
| 7 | cloakroom | 14 | jetty to lake |



first floor plan
gia = 93m2



key

- | | | | |
|---|---------------------|----|-------------------------------|
| 1 | master bedroom | 9 | bedroom |
| 2 | ensuite | 10 | bedroom |
| 3 | bedroom | 11 | sun terrace to master bedroom |
| 4 | void to entrance | 12 | balcony |
| 5 | stair | 13 | balcony |
| 6 | bridge | 14 | sun terrace to bedroom |
| 7 | void to dining room | 15 | decking below |
| 8 | bathroom | | |





key

1. slipway for boat access to lake
2. minimal windows to east and west for privacy
3. PV array on west facing roof
4. roof profile to aid natural ventilation and light
5. biodiverse green roof
6. rope swing over water... why not?!
7. generous decked area extending out from living spaces
8. living spaces have generous glazed screens
9. jetty to lake
10. house located close to lake to maximise links to water and retain generous garden to rear



key

1. main entrance to BaleHaus
2. access to boat store
3. combination of untreated and charred / stained timber
4. lime render to ground floor
5. balcony to bedroom
6. balcony to bedroom
7. slipway to lake for boat access, plus ramp to decked area overlooking lake
8. parking area

cross section
through living spaces and bedrooms



key

- 1 lime render to lower floor
- 2 kitchen with living spaces beyond
- 3 double height entrance foyer
- 4 boat store / workshop
- 5 ramp to decking
- 6 stair
- 7 bedroom
- 8 bedroom
- 9 bio-diverse green roof

long section
through double height space



key

- 1 boat store entrance
- 2 entrance courtyard
- 3 balcony
- 4 charred / stained timber to upper floor
- 5 untreated timber cladding
- 6 bio-diverse green roof
- 7 decking
- 8 main double height living space
- 9 bridge between bedroom wings





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Customisation Options



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- ~ a Regional Director of a local estate agency;
- ~ a Director of a local development company;
- ~ a sales employee of a national housing developer;
- ~ architects from White Design and other local architectural practices;
- ~ families and couples generally;
- ~ families and couples who attended the consultation event at Heartlands in April.

Hi, we are **BaleHaus**, a crack team of eco designers and builders who are working with Igloo to help transform Hearsland into the UK's largest custom build development. Hopefully by now you have learnt a little bit about what custom build means, so to help us refine our designs we would like to ask you a few questions. This shouldn't take too long and it will make us very happy indeed....

So, first off, would you mind telling us a few things about yourself?

Your age

☐ < 30 ☐ 30 - 44 ☐ 45 - 60 ☐ 60 +

Your family

☐ 1 adult ☐ 2 adults ☐ 3 adults ☐ 4 adults

☐ 1 child ☐ 2 children ☐ 3 children ☐ 4 children

What is your understanding of Custom Build as a method of buying a new house?

☐ unknown...
☐ it's a bit like pimp my ride but with bricks.
☐ do you help me to build a house specifically to my requirements?
☐ it's similar to self build but I don't have to get my hands dirty.
☐ I can choose my dream home from a menu of options and you do all the hard work for me.

What size house are you looking to move into?

☐ 2 roomed
☐ 3 roomed
☐ 4 roomed
☐ more

When are you looking to move?

☐ within the next year
☐ within the next 2 years
☐ within the next 3 years
☐ not sure

Would you be prepared to pay more for a house if it could guarantee you savings on your utility bills?

☐ no, no way, not now, not ever
☐ maybe, what's the payback time?
☐ sure thing, utility bills are only heading one way!

How much input would you like to have in the design of your new custom build house?

☐ none thank you, just tell me when I can pick up the keys!
☐ let me pick from a choice of standard designs in a brochure
☐ ooh, can I choose the kitchen and bathroom specification please?
☐ I'd like to choose a combination of external finishes and materials from an approved palette
☐ let me loose on the whole thing baby!

Okay, now we're half-way through... it's time for the quick-fire round:

What do you prefer?

Would you like...

☐ open plan living / dining / kitchen
☐ separate rooms for living / dining / kitchen
☐ a separate utility room for washing / drying
☐ all appliances incorporated into the kitchen
☐ not really
☐ yes!

How important is adaptability?

☐ not at all
☐ a little
☐ quite a bit
☐ very important

How important is the use of Cornish materials?

☐ not at all
☐ a little
☐ quite a bit
☐ very important

When would you like to view your house while it is being built?

☐ once I've picked my house from a brochure, just let me know when I can move in
☐ I'd like to see it near the end so I can start thinking about furniture
☐ beginning, middle and end should do it
☐ once a month please
☐ just by and keep me away, how about every week?

How sustainable?

☐ definitely, we're all doomed anyway
☐ not by recycling my copious wine bottles and copies of the Guardian each week
☐ no need my heating and electricity bills to a minimum
☐ reduce my carbon footprint... can my new custom home help me do that?
☐ I want to go to zero carbon dead-end!

Any of the following renewable energy technologies on your new custom build?

☐ generating electricity
☐ saving water
☐ solar panels
☐ electric watering gardens and washing bikes / cars

What would make you go wow! ooh! and aah! all at the same time?

☐ a garden
☐ a swimming pool
☐ a garage
☐ a driveway
☐ a parking space
☐ a garden shed
☐ a garage
☐ a driveway
☐ a parking space
☐ a garden shed

BaleHaus

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~ many people were already aware of what Custom Build meant;

-

BaleHaus Questionnaire Results

Age	Understanding of Custom Build	size of house	when	pay more to save on bills	design input	prefer	like
< 30	ummm...!	2 bed	1 year	no	none	open plan	separate utility
30 - 44	pimp my ride	3 bed	2 years	maybe	pick from standard designs	separate rooms	all in kitchen
45 - 60	help to build	4 bed	3 years	yes	choose kitchen and bathroom		
60 +	similar to self build	more			choose finishes		
	you do the hard work				design whole thing		

adaptable	
not important	10
important	20
cornish materials	
not important	15
important	15
site visits	
just let me know when i can move in	1
see it near the end	2
beginning, middle and end	10
once a month	10
every week	15
sustainability	
not important	0
i recycle	5
keen to minimise bills	10
reduce my carbon footprint	10
show me the way to zero carbon	15
renewables	
none	0
pvs	10
solar thermal	10
rainwater harvesting	10
slap on the eco bling	15
other comments	
no gas or electric bills	0
ongoing sustainability	0
not overlooked	0
roof terrace	0
sea view!	0
terrace / balcony off the master bedroom	0
no render!	0
more space than the usual noddy houses	0
good links to the garden, not just a pokey back door	0
balcony please!	0
natural and local materials	0
low running costs	0
open plan living / dining area and connection to garden	0
high ceilings	0
number of responses = 30	



Customisation Options

Internal

Floor finishings
 Door furniture
 Lighting styles (LED)
 Kitchen & Bathroom upgrades
 Instant hot/chilled water taps
 Paint systems ie Organic
 Remote control/rain sensitive Velux windows
 Partition walls that can be relocated/reconfigured

Externals

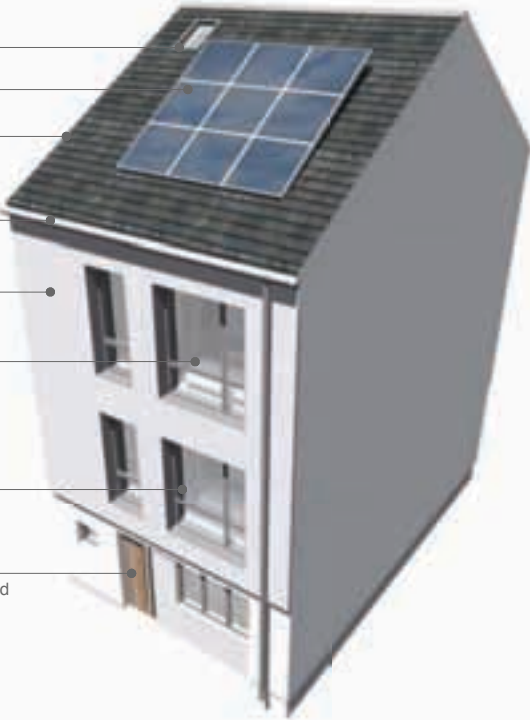
Composite roof decking
 Triple glazing
 External cladding materials e.g. Zinc, Accoya, Oak/Chestnut
 Roof coverings e.g. Seamed zinc, concrete/stone/slate/plane tiles
 Solar thermal and solar PV roof panels
 Air Source Heat Pumps, Ground Source Heat Pumps, Rainwater harvesting
 Render/Facias e.g. Lime/K-Rend/Thru Colour

Gardens

Garden Decking eg Sepelle/Twinson
 Composite/slabs
 Fencing eg shiplap/feather edge
 Turfing and landscaping

**Render
3 Storey**

- Rooflights above stair
- Photo voltaic panels
- Slate roof
- Gutters and down-pipes feed to rainwater harvesting
- Lime render to walls
- High performance composite windows
- Optional balconette to bedroom / lounge windows
- Front door with optional timber / slate / render surround



**Timber
3 Storey**

- Rooflights above stair
- Photo voltaic panels
- Slate roof
- Gutters and down-pipes feed to rainwater harvesting
- Timber cladding to walls
- High performance composite windows
- Optional balconette to bedroom / lounge windows
- Front door with optional timber / slate / render surround



**Slate
3 Storey**

- Rooflights above stair
- Photo voltaic panels
- Slate roof
- Gutters and down-pipes feed to rainwater harvesting
- Slate cladding to walls
- High performance composite windows
- Optional balconette to bedroom / lounge windows
- Front door with optional timber / slate / render surround



**Metal Standing Seam
3 Storey**

- Rooflights above stair
- Photo voltaic panels
- Standing seam roof
- Gutters and down-pipes feed to rainwater harvesting
- Standing seam cladding to walls
- High performance composite windows
- Optional balconette to bedroom / lounge windows
- Front door with optional timber / slate / render surround



**Timber Shingles
3 Storey**

- Rooflights above stair
- Photo voltaic panels
- Timber shingles roof
- Gutters and down-pipes feed to rainwater harvesting
- Timber shingles to walls
- High performance composite windows
- Optional balconette to bedroom / lounge windows
- Front door with optional timber / slate / render surround



**Profiled Metal
3 Storey**

- Rooflights above stair
- Photo voltaic panels
- Profiled metal roof
- Gutters and down-pipes feed to rainwater harvesting
- Profiled metal to walls
- High performance composite windows
- Optional balconette to bedroom / lounge windows
- Front door with optional timber / slate / render surround



**Front Elevations
Various Options**

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Sustainability



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Introduction

A BaleHaus home is designed with the expressed purpose of reducing carbon emissions, which in turn saves its owners money. Balehaus is not a concept, it is a proven approach to home building as has been demonstrated at our project at LILAC.

Proof of concept:

We have delivered developments using the BaleHaus concept across a range of sectors including housing commercial and education. The project that embodies this proof most completely is the LILAC project, a 20 BaleHaus scheme in Bramley Leeds. This community led development is the UK’s exemplar of sustainable living. LILAC is multi award winning and we will bring all of the learning captured in LILAC to this project.

LILAC has produced evidence of energy and carbon reduction of up to 90%. Residents have been so excited by this that they have self published photographs of their energy bills on Twitter & Facebook. At LILAC the winter quarter heating bill for a one bedroom flat was as low as £18.00, a four bedroom house was £50.00. The BaleHaus is significantly addressing the issues of fuel poverty and carbon reduction.

Our expertise in the delivery of low energy, low carbon construction is second to none and is backed up with extensive capability in design, modeling and research. To date we have carried out over £3m of research, testing and modeling and our evidence base for this is available in stage 3.

A BaleHaus custom home has one of the lowest carbon footprints of any type of construction. The use of a predominately renewable and locally sourced materials palette of straw, timber and lime means that BaleHaus actually has a carbon negative footprint. Our LCA shows that a typical BaleHaus has banked in to its fabric 34 tonnes of atmospheric CO2. The illustration shows this captured CO2 as a volume of gas.

BaleHaus custom homes will capture similar and larger amounts.

Actual Tweets from LILAC residents.



Sustainability upgrades:

Dependent on site context and orientation the following options are available as customisable upgrades:

PassivHaus project certification.

Renewable energy package, house by house to reduce carbon footprint.

Clustered and Community renewable energy options to achieve economy of scale on purchase price, systems efficiency, running costs and carbon reduction. Both systems will significantly reduce servicing visits and thereby reduce resource use and carbon emissions.

ModCell to set up localised ‘Flying Factory’ using local skills, labour and materials.

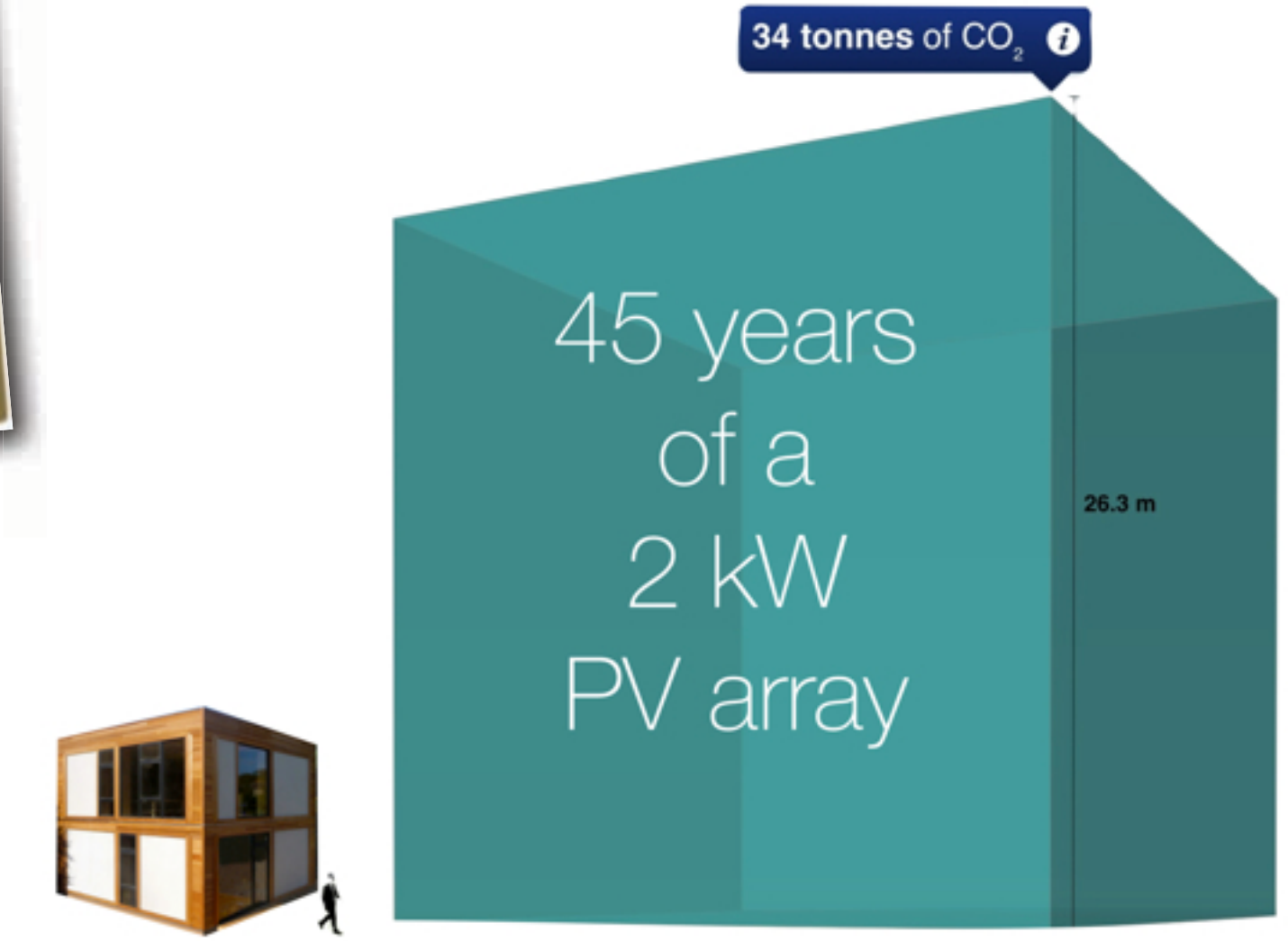
We currently engaging with the CITB and local education establishments to explore skills, training and education opportunities.

If a local Flying Factory can be established custom home purchasers can be involved in the making of the ModCell system. This is not dissimilar to an Amish ‘barn raising’ that promotes community cohesion.

At a community level we have experience of car pooling, electric vehicle charging, allotments, SUD schemes etc. Our experience at LILAC in Leeds demonstrates the wider ‘triple bottom line’ sustainable outcomes achievable when designing and delivering group and co-housing projects.

LILAC (<http://www.modcell.com/completed-projects/lilac-affordable-ecological-co-housing/>)

We have in-house experience of sustainable community landscape design that would extend beyond the footprint of the custom home purchaser.



Standards, fabric performance and energy demand

The following tables demonstrate the BaleHaus performance in terms of Building Regulations, SAP ratings and the Code for Sustainable Homes.

	Standard achieved	Supporting evidence
Building Regulations 2013	Yes	Balehaus 2 storey 3 bedroom -Predicted EPC Balehaus 2 storey 3 bedroom -SAP Worksheet Balehaus 2 storey 3 bedroom -Checklist Balehaus 3 storey 3 bedroom -Predicted EPC Balehaus 3 storey 3 bedroom -SAP Worksheet Balehaus 3 storey 3 bedroom -Checklist
Code for Sustainable Homes: Level 3 Level 4 Level 5 Level 6 AECB Silver	4	Balehaus 2 storey 3 bedroom - CSH Report Balehaus 3 storey 3 bedroom -CSH Report
AECB Gold	N/A	N/A
Passive House	Yes	PHPP worksheets**

	Building Regulations 2013 limiting fabric parameters		Our values		% Improvement over Building Regulations 2013
U values	Walls, W/m2K	0.3	Walls, W/m2K	0.15	50%
	Roof, W/m2K	0.2	Roof, W/m2K	0.15	25%
	Floor, W/m2K	0.25	Floor, W/m2K	0.15	40%
	Windows/doors, W/ m2K	2	Windows/doors, W/ m2K	1.16	42%
	Party wall, W/m2K	0.2	Party wall, W/m2K	0.15	25%
Air tightness	m3/hour/m2 at 50 Pa	10		2	80%
Thermal bridging	W/m2K	0.15		0.08	175%
Approach to thermal bridging:	The ModCell system is currently being certified by the PassivHaus institute all thermal bridging will be subject to that standard				
Fabric Energy Efficiency Standard (FEES), kWh/m2/ year	(Based on notional dwelling in SAP 2012 Appendix R)		2 storey 3 bedroom = 47.4 kWh/m2/year 3 storey 3 bedroom = 40.7 kWh/m2/year		
Dwelling emission rate, kg/CO2/m2/ year	(Based on notional dwelling in SAP 2012 Appendix R)		2 storey 3 bedroom = 5.56 kg/CO2/M2/year 3 storey 3 bedroom = 6.18 kg/CO2/M2/year		
Primary Energy (excluding any renewable generation) kWh/m2/year			2 storey 3 bedroom 63.76kwh/m2/yr 3 storey 3 bedroom 40.81kwh/m2/yr		
Unregulated Emissions estimate (based on standard occupancy), kg/CO2/year			850 kg/CO2/year		

Renewable technologies

Specify technology below (e.g. solar PV)	Estimated generation (electricity or heat), kWh/year	Estimated reduction in CO2 emissions per year
Solar PV	2 storey 3 bedroom: Energy 1288kWh/yr	Carbon savings: 681kgCO2/yr
	3 storey 3 bedroom Energy 1288kWh/yr	Carbon savings: 681kgCO2/yr

Ventilation strategy

A low voltage DC MVHR system with a flat duct system can incorporated in to the straw bale wall and ceiling cassettes at the time of production. It provides an all-year all-weather solution that recovers heat, provides fresh air ventilation during the winter and cool fresh air during the summer months.

As part of a connected Solar PV system, the running costs will be extremely low. Maintenance and access is safe, simple and systematic and as approved and trained Nuaire MVHR technicians, BaleHaus is able to provide a fully costed and easy to install system that has been proven to meet all the required standards.

All windows are openable by occupiers to allow for user controlled natural ventilation. Spaces are designed for interconnectivity of ventilation.

Where mechanical ventilation is specified, provide the heat recovery efficiency (%) of the MVHR unit:	Nuaire MRXBOX95 high duty system has ultra-low Specific Fan Power (SFP) recovers up to 95% to meet the Code for Sustainable Homes level 3 or above and achieve a high score on SAP Appendix Q. It incorporates a low voltage, low energy DC fans to provide ultra-quiet running and long life motors. • Meets Building Regulations - SAP Q recognised, meets the 'Code for Sustainable Homes' level 3 or above, and meets Part F & L of Building Regulations. • Optimum performance - Low SFP and high efficiency results in a high SAP Q score. • Highest efficiency - heat exchanger is up to 95% efficient. • Extremely low noise levels - quiet running unit ensures occupant acceptability. • Optional summer bypass available - provides cooling during warmer months. • Optional Humidistat Sensor - measures humidity/moisture in kitchen and bathroom(s) and automatically boost when above normal. • 5 year warranty
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Water

Rainwater harvesting systems will be standard equipment on all 132m2 properties and available as an optional extra on the 88m2 properties. This will supply approximately 50% of all house-hold water requirements, providing non-potable water for toilets, washing machines, cars and garden use. It will also assist with water attenuation and help reduce flood run off water.

Instant hot water taps, as an optional extra would reduce the energy demand on the domestic hot water system.

Target water consumption in litres, per person, per day:	40 litres of potable water 40 litres of non-potable water
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balehaus[®]

Team



modcell[®]
straw technology

whitedesign



Cadfan Developments is the award-winning contracting partner and will manage all other construction to complement the BaleHaus frame. Cadfan will co-ordinate the build process, engaging with the customer on finishing touches, right through to handover.

The Cadfan Team has over 33 years experience in the construction industry and a track record of building exceptional, bespoke and high quality properties. The company is dedicated to providing a total eco-home package of outstanding quality that caters for all tastes, requirements and budgets.

As an NHBC registered company and an official build partner with LABC, Cadfan have been named as finalists in the LABC Awards for Excellence in Building two years running (2013 & 2014).



Cadfan Sustainability, the sister company to Cadfan Developments Ltd, is a company established and dedicated to deliver a total solution for renewable energy and eco home requirements.

Cadfan Sustainability's design principle is; "To build lasting beautiful homes that protect the environment, reduce carbon emissions through lower energy use, encourage biodiversity and promote healthy diverse family lifestyles and safe cohesive communities".

Cadfan will deliver complete satisfaction, exceptional value for money and a home built to our customers' exacting standards.

modcell[®]
straw technology

ModCell is an established provider of sustainable envelope solutions and brings our straw technology and experience of the residential market into the BaleHaus Custom Build solution. ModCell will provide and manage the timber engineering, design, fabrication and installation of the envelope: maintaining the quality of construction and control of programme.

The multi award-winning ModCell system utilises the excellent thermal insulation and carbon-capturing qualities of timber and straw bales to make large-scale, carbon-negative building a commercial reality. This innovative, super-insulated, offsite-manufactured wall and roof envelope system can be quickly and efficiently installed, creating buildings with thermal performance up to three



times higher than the current building regulations require. ModCell panels can meet the demanding PassivHaus specification and can have zero heat requirements, saving money and CO₂ emissions.

whitedesign

White Design will provide the architectural design solutions required by the custom builder for the individual plots.

White Design is a values-led, innovative design practice and sustainability consultancy that designs buildings, spaces and places that respect people and the planet. We are an award-winning design practice dedicated to high quality, affordable design, innovation and sustainability in the built environment. Our approach to sustainability overarches, underpins and threads through all our work.

Through our talented and experienced team and our 15 years of practice, we have had experience across public, commercial and community buildings to education and housing and have completed over 130 projects to date.



White Design is committed to aiding and supporting clients in making a positive contribution to sustainability by jointly developing the design of low energy, low environmental impact buildings. This creates a healthy, productive and efficient working and living environment for users, whilst minimising the life cycle costs of ownership and occupation. We focus on affordability, innovation, design quality and value-adding; resulting in sustainable design solutions that respond precisely to our clients needs today and tomorrow.



Structural Solutions is a firm of Consulting Engineers based in Bristol and Wiltshire in the UK, with the aim of providing a practical and creative structural design service for medium sized building projects. They have been involved in a huge variety of structures in almost every form of construction, new build and refurbishment projects, and have a particular interest and expertise in timber frame construction.



Progetic is a free-thinking, services engineering company, specialising in the design and construction of healthy, comfortable buildings with low running costs. Working with the BaleHaus team, they advise on the optimum mechanical and electrical services solutions that work in harmony with the overall design. Progetic are also Passivhaus designers and certifiers, working with the ModCell building system to achieve Passivhaus status.



Local Cornwall Office

White Design has an office in Truro, just 14 miles from the site at Heartlands. The team members based in Truro have experience in dealing with the Cornwall Council Planning Authority, as well as knowledge of local supply chain members. The BaleHaus Custom Homes team will be based at White Design's Truro office for the duration of the Heartlands Custom Build development.



Commercial Risk and Corporate Structure

The legal entity that will deliver projects will be BaleHaus Custom Homes, a limited liability company (BCH). White Design, ModCell and Cadfan will be the three organisations that provide the products and services that will allow BCH to deliver homes. White Design, ModCell and Cadfan have established track records in the delivery of innovative and sustainable housing projects and can provide the necessary accounts on request. In terms of working capital risk management the largest risk would reside with ModCell as the entity that will have to deliver the greatest capital expenditure on any one home. To reduce this risk to an acceptable minimum, BaleHaus Custom Homes is underwritten by the bristol based developer Connolly & Callaghan (C&C). C&C can provide the necessary accounts and parent company guarantees for the Custom Build Housing projects.

balehaus®

beautiful, affordable, sustainable homes

lifestyles for the future in harmony with the environment

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