URN – L52

Rural Britain has a well-publicised threat to the diversity and sustainability of its communities, as young people opt for urban living above life in the country, and the GPLD area is no exception. We were drawn to the aspiration of addressing this issue within the competition brief, and the unique Burneside site.

Somewhat less publicised, but of equal note, is the lessening availability of affordable workshops, studios and workspaces in the country. These forms of flexible accommodation serve an invaluable role in the nation's start-ups and small businesses, and we feel would be an appropriate form of accommodation to propose within Burneside village.

We seek to deliver a typology of housing and workspace that we name The Longhouse: attractive to younger generations to remain or relocate, live, and work in the village, whilst simultaneously being a positive contribution to Burneside and the wider community. Our longhouse proposal has been designed to achieve the following key criteria to attract young people to live and work in Burneside:

- offers value for money, flexibility and future potential
- offers live and workspace
- enables room for growth as a family and/or business to flourish
- a high-quality environment to form a strong community, alongside individual ownership and expression
- is healthy to live within, and exemplar low energy natural buildings

THE LONGHOUSE

During design development we were drawn to the idea of the longhouse - the communal dwelling. Traditionally a long and narrow structure in form, the longhouse holds its community and a variety of communal activities under one roof. A type of building with roots across this land and many other cultures, in some cases the earliest form of permanent structure. In Cumbria there is evidence of longhouses forming part of the vernacular and local heritage. These early examples consisted of single or multi cell longhouses, that traditionally housed people alongside accommodation for farm animals.

We have reimagined the idea of the longhouse for the 21st century needs. A singular form pitched roof structure with a large overhang. Our proposal consists of a series of these longhouses, of three different typologies, each of increasing size. A narrow single storey typology, then two larger typologies that have the opportunity to install a first floor. Each vary in height, but all no higher than the existing neighbouring buildings in its context.

The design is purposely very simple, with ease of construction, adaptability and build-cost in mind. The longhouses have a straightforward frame and roof structure, combined with high performing natural insulation. The outer walls are proposed to be prefabricated strawbale panels, a further high performing natural building material, and prefabrication allows for fast construction. Since the walls are not structural to the roof, it also allows for greater flexibility of alteration.

The 'bays' under the roofs are offered to market as flexible open plan (somewhat like the popular barn conversion), for the target 25 – 40 age group buyers to purchase and to determine the layout, to meet their means and needs. These buyers might be single, couples or families. Some may be looking for live-work accommodation. We also feel the longhouse typology is not restrictive to the target buyer age group, and could be attractive to older residents, and existing residents of the village. The needs of each household will differ, and as each grows, we see the importance of offering the flexibility so each resident can adapt to these various needs. The buyer can either take on a bay as open shell, or follow a Custom Build model, working with the developer to customise the bay from a catalogue of predesigned options. The buyer has the option to buy additional shell space for future business or home expansion. There is also potential here for the developer to retain a percentage of bays as rentable expansion space for either business or home use.

We believe that this freedom could result in a fascinating variety of use and design approaches within and across each longhouse. As the longhouses are relatively affordable, the buyers can invest more of their money towards a pre-determined 'Kit of Parts' to adapt and personalise their bay. For example, a large generous window with integrated window seat, or an inset roof-level external courtyard to offer private external amenity space and views to the Lakelands. Having a pre-designed series of kit of parts will enable greater economies of scale, helping to reduce the building costs. We believe this would all be hugely attractive to the target young buyers.

We believe the longhouse is a vernacular fully at ease in this rural site and its context, and appropriate in its form, scale and materials, as echoed in the Stage 1 individual feedback. The key external materials are:

- The roofs are proposed as standard metal sinusoidal panels, affordable and in-keeping as a rural material

- The walls – we noted the Stage 1 individual feedback, with concern over the chosen materials, and how they will weather. We took this to imply the cedar shingles. We have since revised the proposed cladding material to ceramic tiles, laid as shingles. Ceramic offers a more durable, long lasting material. We have provisionally selected a range of natural colour tiles, as in-keeping in tone and colour to its rural context. These are offered in a variety of shapes of a shared textural palette. The elevations are an important factor of the overall design. In the next stage we would seek to develop this further, alongside Giles Miller studio as our surfaces sub-consultant.
- Wall plinth - we have defined a plinth line at the base of the longhouse walls, as a stratum of stacked local slate. This natural local material acts as a natural damp proof course and helps raise the strawbale modules off the ground level to a suitable height. It is also a material in-keeping to its context.
- Hard landscaping – we propose the use of local Cumbrian paving stone to all hard-landscaped areas of the site, as an in-keeping local natural material.

COMMUNITY

Each longhouse on its own is a relatively simple proposal, but when multiplied, and arranged in different lengths, it becomes a more complex architectural proposition. To meet the brief development target of around 40 new homes, the masterplan is intentionally a dense arrangement of accommodation. Yet doing so without presenting itself to the village in an imposing manner. The density of the masterplan is not apparent at street level, as much of the view is obscured by the placing of long longhouses parallel along the Holmes Houses and Sharps Lane. Only from up along Sharps Lane past the railway line, and the adjacent hills, will you ever see the overall arrangement of the longhouses, many courtyards and open spaces in a single view.

The longhouses all share a constant datum height of the roof eaves above ground level. This creates a human scale to the building, so to have a welcoming relationship to the street and passers-by. Defined breaks draw you in between the longhouses, and only once within do you get a sense for the intimate and vibrant community of courtyards and passages.

The main opening and pedestrian entrance into the site is along Holmes Houses. An open public green space that welcomes you in off the road, as an area of safe walking for those on foot, with buggies and children, and refuge for cyclists and walkers stopping by. From there, a glimpse of the community asset building. This draws you further in, where the site reveals and opens up to the main courtyard and open public green space, a new village green for Burneside and the wider community.

The community asset building is a building with no defined programme as yet. It is envisaged as a partly open covered external area, as well as with an enclosed open space. It has the potential to serve as many functions, such as shared open flexible workspace, or simply an open flexible community hall building with the facility of a breakout onto open green space, for functions different or outside the capacity of the Bryce Institute. It is an element of the development that falls outside the build cost target. However, together with the shared open spaces, we see it as an important element to the success of the overall development and its integration and collaboration with the existing community. It also has the potential to draw in the younger teenage community of Burneside, that we noted from our conversations with residents, currently have no real place within the village to congregate or socialise.

Car parking is provided to the front, side and rear of the site. A short run of parallel parking bays are proposed alongside the longhouse that runs along Holmes Houses to the corner of Sharps Lane. This parking allocation is seen as for use by passers by and visitors to the site, that could serve the potential customers to the small business and trades, for example a bakery or coffee shop for example. Further parking is provided along Sharps Lane, and the proposed access road at the rear, parallel to the trainline. This would be the main parking allocation for the residents and surplus parking for visitors. The rear parking is envisaged as the main point of access for all trade deliveries to the small businesses, as well as access for any large community events in the communal asset building or open spaces. The rest of the site is then car free. The site would benefit from car sharing schemes and electric cars and car charging stations, future proofing the needs of the target 25 – 40 age group buyers.

The longhouses and their communal spaces are intended to promote communal responsibility and shared use, such as in the allotment gardens, general community planting, communal asset building and the green spaces. The smaller courtyards are of equal importance, where we carefully considered more intimate functions, such as a long communal outdoor table and bench seating, smaller garden spaces, a pond or play spaces for children. We see these community-led shared spaces as an important factor to help the target younger generation to develop a community strength to the scheme.

The projecting roofs of the longhouses create an intimacy to the covered and in-between spaces. These useable covered external areas serve as protected passageway from the elements, as well as potential spill out space from homes and workspaces, encouraging chance encounters between residents, to help further develop a community strength.

We see the longhouses offering a real place-making opportunity for the village, with the potential for a wider regeneration impact to Burneside and its village centre, to offer a real sense of place within this beautiful Cumbrian landscape

THE DETAIL

We took the opportunity within this Stage 2 design phase, to further develop the architectural and structural strategy of the longhouses, and their deliverability. We worked together with structural engineers, Milk Architecture & Design. They helped refine the structural approach and were able to carry out an initial load test of our scheme and confirm some initial sizes and locations of structural members.

The structural design philosophy is simple**,** comprising of two structural components: the external steel frame supporting the roof and the prefabricated straw panel structure below the roof frame. The external steel frame is structurally independent from the prefabricated straw panels which will form the enclosed units. The steel structure is exposed internally, so the steelwork and connections form part of the material palette and architectural approach. Since the walls are not structural to the roof, it also allows for greater flexibility of alteration.

The structural form and construction methods will be homogenous throughout to provide a repeating regularised system of parts, a quick assembly bolt on solution. In summary:

- For the smallest typology, each frame will be constructed in two parts with moment connections at the eaves welded off site. The ridge joint is detailed with a bolted connection and installed on site when the two halves are brought together.
- For the larger two typologies, portal frames will be constructed and delivered to site as individual beams with fully welded endplates to form connections. The ridge endplates will be bolted together with the eaves connection formed from an enlarged endplate bolted to the flange of the column.
- The two larger typologies have the opportunity to install a first floor which will span between intermediate steel beams within the portal frame. These beams also aid restraint of the columns to reduce the steel size. These floors will act as a diaphragm and will stiffen the frame further.
- Columns will be bolted to pad footings and intermediate beams installed to stabilise the frames.
- The portal frames will support the timber roof, with timber rafters spanning between. Beams at the eaves and ridge span between frames to restrain frames and support rafters.
- Below ground steelwork will be galvanised to protect from moisture
- The foundations are to comprise a series of pad footings below column locations with strip footings between to support the external walls.
- Each unit has the potential to reconfigure its floor plans and adapt the spaces to be either live or work units. As a result the floor has been designed for an imposed load of 2.5kN/m^2.
- The first floor structure will be constructed from timber joists which allows for simple global or localised strengthening should the space require increased loading allowances depending on it's future use.
- As the sides of the steel frame will be open, there is a reduced wind load acting on the structure. The frames have been analysed for a wind load of 1.02kN/m^2 applied to the roof and checked for uplift. The straw panels forming the internal units will withstand their own wind forces without relying on the steel frame.
- The British Geological Survey records the site soil conditions to be Till. Therefore a conservative provisional bearing pressure of 75kN/m^2 has been adopted for the foundations. This is to be confirmed on site following a site investigation.

The structure and construction methods have been selected to provide the most economical use of material with a repetitive construction process aiding speed of delivery. Prefabrication can to be utilised in order to improve the finish, reduce on-site risks for irregularity and minimise construction time. Temporary works is also limited to providing frame stability for one bay before cross beams are installed. Therefore they can be removed and reused as the longhouse frame progresses and a new bay is added.

URN – L52

NATURAL MATERIALS

The use of high performing natural building materials was a key factor of the design, to deliver homes that are extremely energy efficient as well as healthy and comfortable living environments.

- The straw bale panels are by Ecococon. Their panels are pre-fabricated easy and fast to assemble modular elements. The panels alone, without additional build-up, have been tested to achieve a U Value performance of 0.13 W/m2K.
- The roof insulation is proposed as by PYC Group, using their WAMRCEL cellulose fibre insulation system. Essentially recycled paper spayed full fill into the void between the timber rafters. The proposed build-up has been calculated to achieve a U Value performance of 0.12 W/m2K. We also saw the opportunity to link up with James Cropper mill to have their waste / recycled paper to form the source of the insulation, reflecting Burneside's rich history of paper-making.
- Or, as an alternative to the above, should it not prove applicable to source local recycled paper of that quantity, then we would propose sheeps wool insulation by Thermafleece. A natural fibre insulation that combines natural sheep's wool and recycled fibres to deliver equally high performing insulation.
- The floor slab is proposed as by Dreieck, a supplier of Bi-Foam glass foam aggregate, made of recycled glass. This is laid in place of a concrete slab. It has a high compressive strength, and a U Value performance of 0.22 W/m2K.
- Internal walls are proposed as clay plaster. The internal floors are proposed as earthen clay floors. These can produce visually impacting finishes, all of natural and good wearing materials.
- All timber work has been designed as C16 allowing for use of sustainable sources in the UK.

The overall benefits of these combined systems are:

- Energy efficient – They can achieve Passive or Zero energy standards, which means long term savings on heating bills for the residents and compliance with the UK net zero emissions target.
- Very low embodied energy - Being inert materials with no off-gassing of volatile organic compounds for a truly healthy home.
- Cradle to Cradle materials (C2C or regenerative design) - All materials are from the earth and can return to the earth in a natural cycle. They do not have to be sent to landfill or otherwise treated after use.
- CO2 (carbon dioxide) negative - All plant materials release oxygen and store carbon dioxide as part of their natural growth cycle. Thus both the straw and wood, being plant materials, sequester (store) CO2 during growth. This means the CO2 remains stored in them throughout the life of the house, making the proposed homes CO2 negative.
- Accessible forms of construction – The strawbales and earthen / clay finishes are accessible forms of construction for all ages. Residents could engage and take part in the building of the longhouses. Possible apprenticeship schemes could be set up to teach these natural building forms of construction to train and skill the target buyers.

CLOSING STATEMENT

There are of course wider issues at play that will determine the success of the scheme.

We feel the scheme would benefit from an overall framework comprising of favourable business rates for workspaces, readily available bank financing, and an open planning policy class use, such that each bay can be subdivided into various arrangements, for either residential use or business use, of varying sub classes.

Transport and infrastructure is another key factor. It was great to be able to visit the site and meet with local residents. Encouraging to hear that there is a move to upgrade the local train line. More notably, the community led scheme - the Broadband for the Rural North Ltd, to bring 1 gigabit service to the village. This will be a massive boost to small businesses and entrepreneurs. Hugely attractive to remain or relocate, live, and work in the village, to build up the economic strength of the scheme and offer wider benefits to the strength of Burneside to remain an active working village.

It is these types of community-led initiatives that will be the ingredients to what we feel will be the success of the Longhouses.