



FRONTLINE SELF-BUILD

# **SELF-BUILDING A LOW CARBON FUTURE FOR OTLEY AND THE UK**

EXAMINING THE OPPORTUNITIES, BENEFITS, AND MODELS OF  
LOW-CARBON SELF-BUILD



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BIXBY, 2019

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# PURPOSE STATEMENT

This report has been written for Otley 2030 in order to determine the opportunities for the input of custom and self-build into the East of Otley Development.

The current proposals for Otley do not include any plot for self-build. This report will determine that there is a space for self-build to be integrated into the development proposal.

The purpose of the report is threefold.

- 1.To inform and persuade authorities of the benefits that exist in the rising self-build trend - nationally and in particular reference to the East of Otley site;
- 2.To discuss market opportunities and barriers to low-carbon self-build;
- 3.And to provide some direction for any prospective self-build groups and community land trusts.





# CHAPTER 1

## WHY SELF BUILD?

### 1A. CURRENT DEVELOPMENT ISSUES

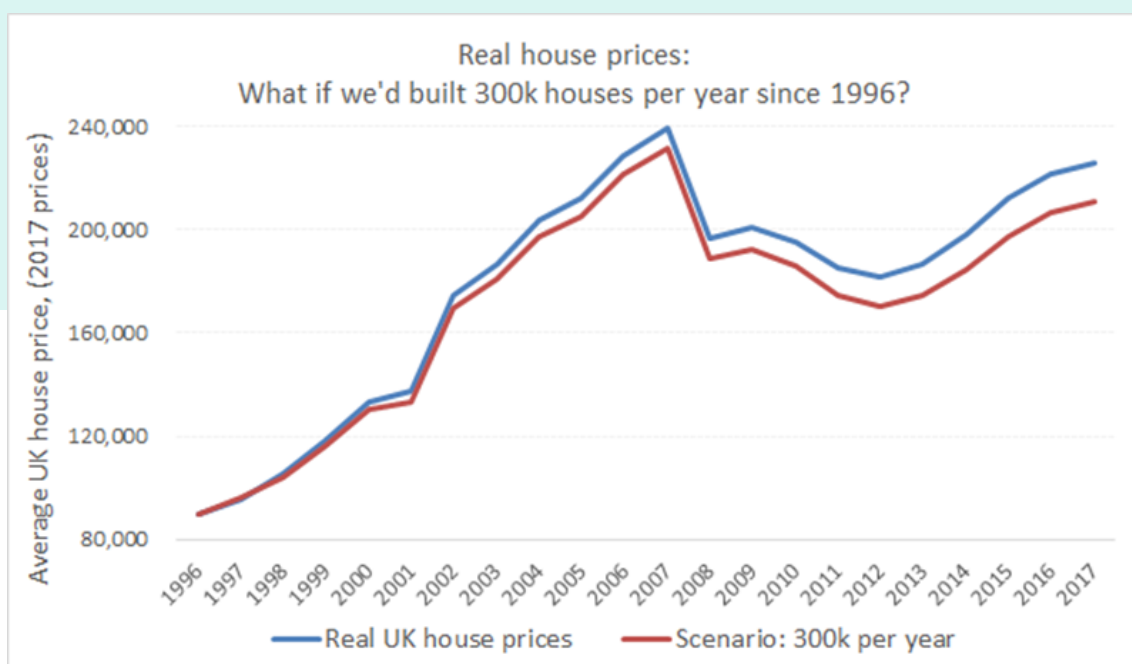
UK housing construction is a sector that is facing multiple issues, not least in respect to the housing crisis that sets the landscape for construction. Experts find that interlocking problems in the sector have contributed to and have deepened the crisis we find ourselves in.

A key government response has been to get rid of red tape and empower volume housebuilders to let loose in order to build to the tune of 300,000 homes a year. Unfortunately, according to key government reports, the housing and construction sector is fragmented and under skilled for the task of delivery both the quality and the amount of housing we need (Callcutt, 2007; Lantham et al., 1994; ODPM, 2004).

Contrary to the idea that simply building more homes will help, this graph shows, according to the government's own estimations, that if 300,000 homes were built each year, the price of homes would be only marginally lower. (Mulherin, 2018).

Looking back to the liberalisation of the housing market in the Thatcher era, we can observe an economic philosophy that has treated housing as an (increasingly private) asset market, more than a social provision (Naqvi et al, 2021). As such, the housebuilding model today has been successful in providing profits for shareholders (Callcutt, 2007), but has failed on delivering enough houses, quality housing, and housing that is fit for a sustainable future (Parvin et al, 2011).

Volume speculative housebuilders (such as Persimmon, and Lovell Homes, who will build the Otley East site) make up 'anywhere between 70% and 80% of the total housing output in any given year' (Payne et al., 2019, p.8). Whilst there is some focus in changing policy to greater regulate and incentivise this sector to invest in innovation, more radical change is needed to change the status quo.



MULHEIRN, 2018



# POOR DESIGN QUALITY

“

“The hard fact is that, across most of the current market, aiming for high quality is questionable commercial strategy which often adds little to shareholder value.” (Callcutt, 2007).

”

Since speculative volume builders are designing for a sale value to generate shareholder profit, the business model of the majority of the UK's housing provision is based upon minimising costs and maximising profit. At the same time, housebuilders are facing pressures to expand supply to deliver to the government's target of building 300,000 homes a year. This has resulted in shortcuts to design quality, with houses that are smaller and poorer quality than the rest of the EU (Ball, 2003).

# SUSTAINABILITY

Under the Climate Change Act (HMSO, 2008), the UK government committed to a legally binding reduction in CO2 emissions of 100% compared to 1990 levels by 2050.

Housebuilding in the UK is a major contributor to greenhouse gas emissions, through the embodied energy use – that of the material construction of the – and the operational use – occupational energy use for heating and appliances (Iddon and Firth, 2013). The current housebuilding regime has not sufficiently innovated in these two areas to seriously address the challenges set out in the Climate Change Act of 2008.

Since 2015, the UK has failed to induce the paradigm shift needed in the housing market, instead encouraging technological solutions that ‘can be readily incorporated by the existing building and construction regime’ (Gibbs, and O’Neil, 2015, p.14). A deregulatory trend of largely performance-based building regulation, alongside weak state enforcement has led to this (Fischer and Guy, 2009). In failing to address behavioural change, policy has continued to encourage or ignore high consumption lifestyles that increase operational carbon costs (Reid and Houston, 2013).

“

“Current approaches, which require housing developers to reduce the carbon emissions of the homes they build through a mixture of energy efficiency and renewable energy systems, do not sufficiently contribute to the carbon emission reductions which are necessary for meeting UK Government targets and to avoid dangerous climate change.” (Broer and Titheridge, 2010)

”

The Otley East development scheme proposal entails 5ha of employment land situated away from proposed housing. The housing is spread over a large space and caters primarily for a driving mode of mobility. Large areas of the greenfield site will be given over to tarmac and private driveways, increasing runoff from rainfall in an already flood-prone area.

Situated on the River Wharfe, and under the beautiful Chevin Park, Otley has a particular consciousness and need for sustainable solutions. Flooding took place in the town as this report was being written and serves as a keen reminder of the ecological issues we face today.



School Land

Employment Land

Relocated Rugby Pitches

Resurfacing land under sports for pavilion  
to relocation of existing sports pitches

Existing sports pitches under option with Pavilion





# 35%

*of public sector managers rate the skills shortage in their area as 'bad' or 'severe'*

*Sustainability in the Supply Chain Survey 2016*



THE SCAPE GROUP, 2016

## SKILLS SHORTAGE

The construction sector faces a skills shortage that acts as a barrier to building high-quality homes. Importantly, this shortage is particularly acute when it comes to building low-carbon homes. England has historically had a shortage of qualified professionals with the skills to deliver sustainable communities (ASC, 2007), and this remains prevalent today. Killip (2020) states that The UK construction sector currently operates in a low-skills equilibrium which negatively impacts the capabilities to produce low-energy buildings.

When assessing demands and barriers to housebuilders achieving on zero-carbon homes prior to the zero-carbon homes by 2016 policy, Heffernan et al (2015) found that skills barriers are the most important difficulty that disabled uptake of sustainable practices.

Otley has become a town dependent on 'retail service and hospitality', with 'little industry remaining' (Otley BID, 2021). As such, any focus on bringing construction industry skills and job opportunities to the local people of Otley would greatly benefit and diversify employment in the area.

# PLACE AND COMMUNITY

Envisioning a typical new development, we might picture clean streets, plenty of parking space, and individual detached or semi-detached family houses. This vision could be the same for any UK citizen regardless of region or place. Critics of volume housebuilders state that new developments 'have no sense of place, do not encourage community spirit and offer extremely low space and design standards' (Nash, 2019). Often cut up by roads, and characterised by low-density, they are difficult to walk around, and suit a nuclear view of community, where humans, serviced by the car, move around at 30mph not 3, drive to large supermarkets, and drive to work and school.



TYPICAL GREENFIELD DEVELOPMENT (TIESDELL AND ADAMS, 2004)



INDICATIVE STREETSCAPE FOR OTLEY DEVELOPMENT

This results in places that lack thriving streets where interaction takes place amongst neighbours, and in the case of Otley would contribute to the town becoming a commuter village outside of Leeds. As a greenfield site, it is particularly at risk of lacking in 'character and identity', considering the track record of new sites that are 'indifferent to context' (Tiesdell and Adams, 2004). This kind of development would do little to support Otley's 'rich historic built legacy, which the community is keen to preserve' (Otley Town Council, 2018, p.46).



# 1B. A CASE FOR SELF-BUILD



ARCHITYPE, 2022

Self-build housing is understood legally as

*‘the building or completion by  
(a) individuals  
(b) associations of individuals...*

*of houses to be occupied as homes by those  
individuals’ (Self-Build and Custom  
Housebuilding Act, 2015).*

There are many stages, from architectural design to labour to interior design, that an owner may take part in in order for the build to constitute as self-build, as we shall see in chapter 2 of the report.

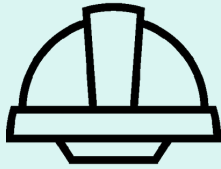
Self-build has a unique opportunity to contribute to the improvement of house construction in the UK and in the Otley East Development. There are a wide range of self-build case studies that have shown important fixes for some of the problems posed above.

The improvement of housing built in this way hinges on the inclusion of ‘use-value’ in the economy of construction, as opposed to the majority private market’s focus on pure short-term exchange value. The fact that important design decisions are made by future occupants stands in contrast to homes that are speculatively designed for the market.

As such, self-builds are imbued with extra value and meaning that ‘extend beyond mere economic rationalities’ (Benson, 2018, p.268). Priorities for self-builders don’t exclude exchange value (Brown, 2008; Bossuyt, 2021), but they also include identity, liveability and comfort, and sustainability (Ehwi et al, 2022).

“Currently there are around 15,000 custom and self-build homes built every year – an increase of 50% in 2 years” (Hayes, 2020)

# SKILLS



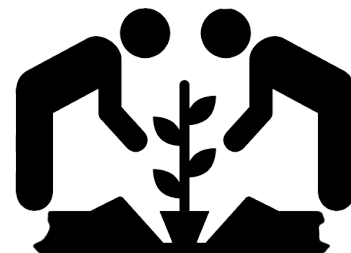
Self-Build has the opportunity to address part of the skills shortage in the construction industry. Through the process of building your own home, you can gain skills of design, project management, and construction (Brown, 2008). The skills gained by self-builders are often then input into the labour market as a beneficial effect of the project.

In the case of self-help schemes (chapter 2), this is fed directly into the career opportunities of builder occupants. Members of the scheme are given the opportunity to first train with a college, then can gain NVQ qualifications on-site through the building of their own home, as in the example of Frontline, Leeds (Hendrickson and Hoey, 2021).

Furthermore, self-builds focused on design quality and low-carbon outcomes will aim to contract local suppliers and local labour where possible. This will strengthen the region's ability to deliver high-quality housing beyond the singular development through deploying capital locally, investing in local industry and labour, rather than whisking it away to shareholders.

# PLACEMAKING AND COMMUNITY

Self-Build plots deliver a diversity of building styles and techniques which often contribute a sense of identity and community to an area. This diversity can lead to 'urbanism whose overall quality maybe considered greater than the sum of its constituent elements' (Hamiduddin, 2018, p.17).

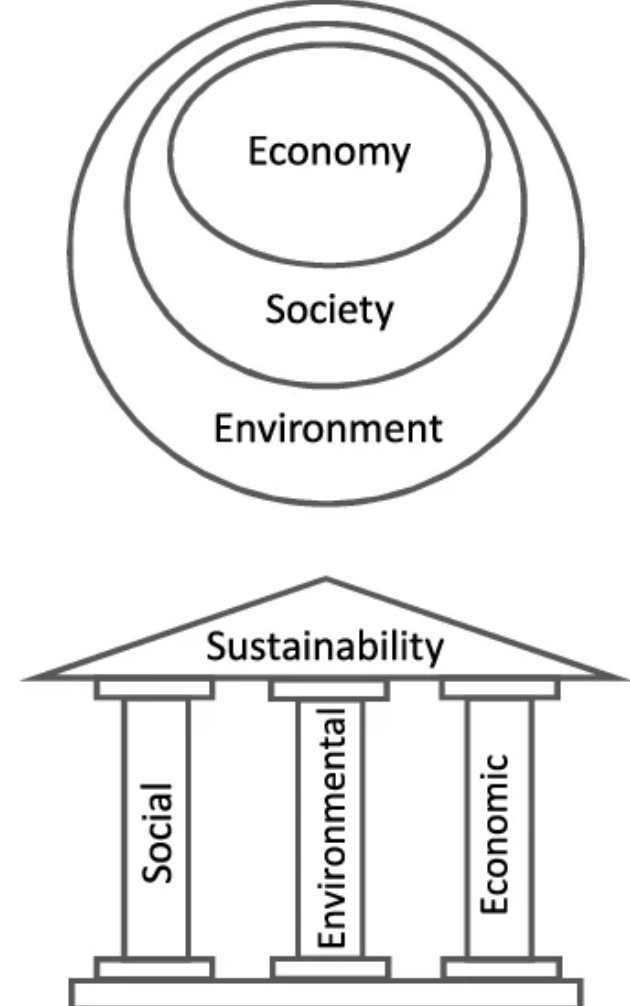
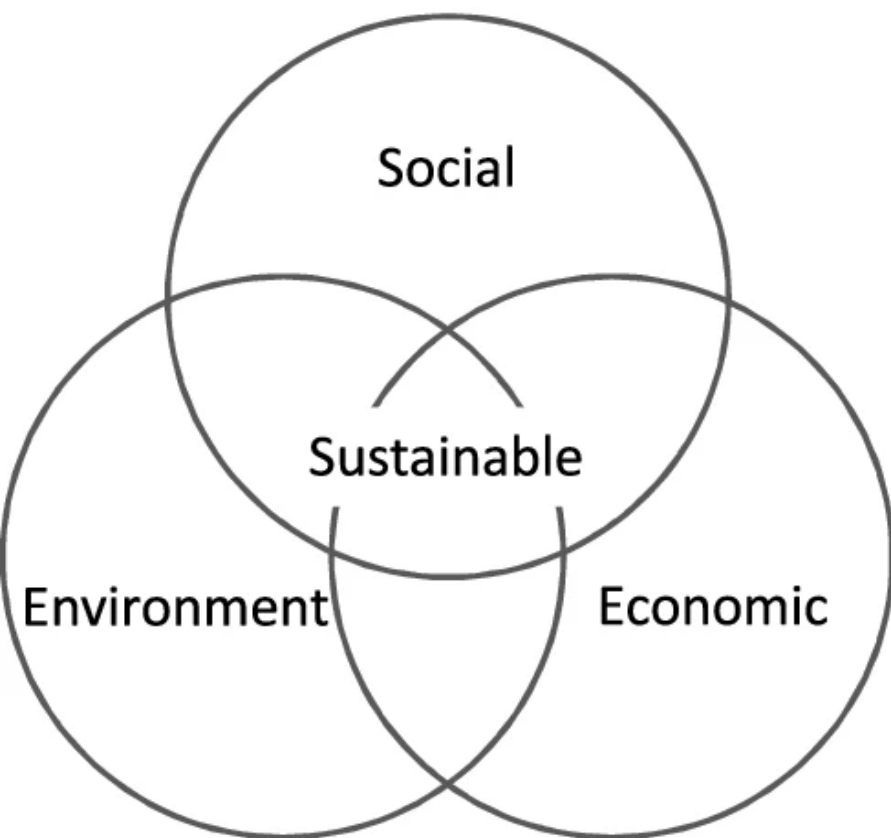


This doesn't mean that all self-build plots are quirky, individualistic territories that stand out from their surroundings. In developer-led scenarios, for example, planning permission is often sought for an entire site before plots are given to individuals, therefore setting parameters within which design decisions can be made. Given the opportunity to move away from the volume housebuilder model, communities of self-builders may choose to imitate the regional vernacular housing, or to innovate in respect to local heritage.

Self-build communities usually come together before houses are fabricated and create community by building up the physical environment they will live in together. At a minimum, they share advice and support networks, and in more community-led builds they collaboratively decide on macro-design issues, the creation of community resources such as walkways, common houses, and carparks.

“People are alienated from their physical environment if they are unable to leave their personal imprints on their immediate surroundings. Relegating human beings to the role of passive spectators of their environment threatens their mental equilibrium, and robs them of the opportunity to assert their authority, to develop mastery over their places of habitat.” (Linn, 1969)





CONCEPTUALISATIONS OF SUSTAINABILITY AS THREE INTERSECTING DIMENSIONS (PUVIS ET AL, 2019)

## SUSTAINABILITY

Since self-builders come to housebuilding projects with values beyond profit, they are able to invest more in the sustainability of builds – be that social, economic, or environmental sustainability. Sustainability is a multi-faceted concept, which self-builds work towards in more ways than one. This can be by active investment in low-carbon build techniques, the building of community, or the provision of affordable housing.

In our case studies we see schemes that are built around ideals of taking housing away from the speculative market (Lilac; Springhill), providing affordable housing to underserved communities (Frontline; Fusions Jameen), and envisioning ecological communities (Bright Green Futures; Lilac). In terms of carbon, the kind of communities that are created have the ability to reduce carbon emissions not only through the embodied construction methods and materials (as discussed in chapter 3), but also by delivering low-carbon lifestyles (Broer and Titheridge, 2010).

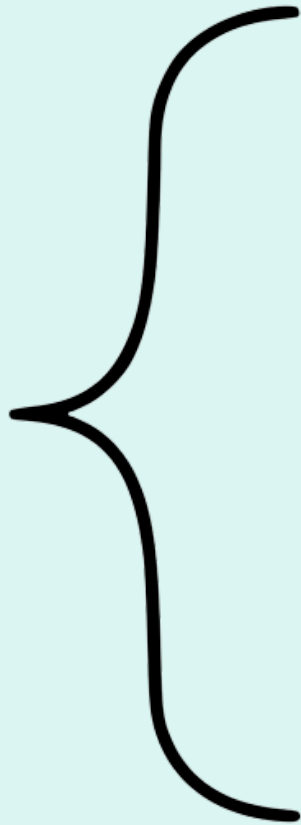
“self-build as a housing practice is one imbued with values, investments and meanings that extend beyond mere economic rationalities, and into the social and affective” (Benson, 2018 p.268)

# CHAPTER 2

## SELF BUILD MODELS

In this section of the report, we'll look in more detail at some of the different models available for self-builds. Punctuating each with case studies, this will show some of the potential options for the Otley east Development.

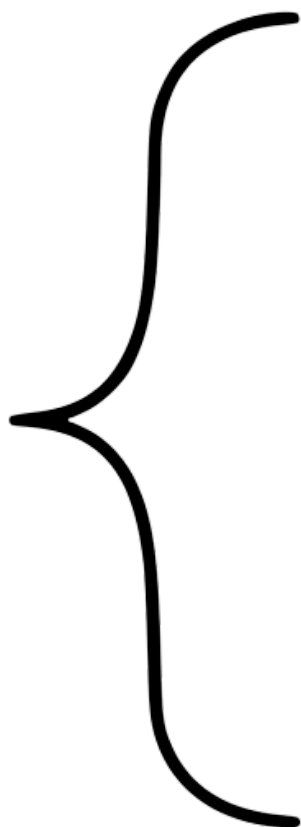
### DEVELOPER-LED



Serviced plots  
"Golden Brick"

Eco Self-build  
communities

### COMMUNITY-LED



Self-build  
Co-housing

Collaborative  
Mutual Build  
Schemes

Individual  
Self-build

Self-Help  
Self-build



## 2A. DEVELOPER-LED MODELS

### SERVICED PLOTS

Serviced plots refer to schemes in which a developer buys a whole site and applies for planning permission on behalf of future occupant/builders. In this model, people buy a plot from a developer and then construct a new home within a set of pre-agreed parameters that determine permissible house size, design components, materials and tenure. This is facilitated by a Design Code, and builders are usually given the option to work with a partnership of architects and contractors to help streamline and homogenise the build process.

A more developer-led version of this model, often dubbed a 'Golden Brick' scheme, is the custom homes model. These allow purchasers the opportunity to make more minor adjustments to a predesigned home. Usually focused on giving autonomy over interior space and walls, flooring, doors and other aesthetic choices, custom builds allow for individuality within a fixed set of outcomes for self-builders who may desire less responsibility for the entire build process. This is also called self-finish housing. Custom builds may also offer a number of prefixed designs for plottolders to choose between.



GRAVEN HILL SERVICED PLOTS (HAYES, 2019)

# ECO SELF-BUILD COMMUNITIES

The emergence of eco centred examples of the serviced plots model can be related to the strong motivations of self-builders to pursue sustainable living. On average, conventional self-builders and custom-builders 'would be willing to pay 27% more for a highly sustainable home than the average UK new build' (Newberry et al, 2021).

For many, this is because living in a 'sustainable' home will lower operational carbon costs in the future. However, ESBC schemes also exploit values of community spirit and ecology to attract customers, not just construction quality. Therefore, we find common houses, community benefit societies, integration with existing communities, and awareness of low consumption living tied into this portion of the serviced plots market.

The benefits of such schemes are that they are accessible for ordinary people without skills.. A developer can easily uphold high, low-carbon design standards.

Conversely, the skills gained by residents do not allow them to enter the construction workforce. Housing under these schemes generally costs more than a DIY approach.

## Case study: Water lilies



BRIGHT GREEN FUTURES, 2022

**A masterplan for 33 homes was designed by Bright Green Futures. The housing shell and exterior was prebuilt, with residents able to design the inside of their homes. Focus was put on building a community and inputting sustainable features into the development, including a traffic-free site, a large, shared garden with pond, and renewable technologies.**



# 2B. COMMUNITY-LED MODELS

## SELF-BUILD CO-HOUSING

PATTERN	MEANING	HOW PROVIDED
HOUSING CLUSTER	People will not feel comfortable in their houses unless a group of houses forms a cluster, with the public land between them jointly owned by all the householders.	Houses cluster around a street and there are shared gardens throughout.
CONNECTED BUILDINGS	Isolated buildings are symptoms of a disconnected, 'sick' society. Connected houses forces the occupier to interact with neighbours, which is healthy.	The terraces are connected and clustered around public land, jointly maintained and owned.
POSITIVE OUTDOOR SPACE	Outdoor spaces which are merely 'left over' will, in general, not be used. This could be combined with the pattern 'South Facing Outdoors'.	This is provided by the small green, facing south over the valley, which, by also attenuating rainwater run-off, has a double use.
INDOOR SUNLIGHT	If the right rooms are facing south, a house is bright and sunny and cheerful; if the wrong rooms are facing south, the house is dark and gloomy.	Living rooms all face south, but, as is the problem sometimes with terrace housing, the kitchen faces north. This means that it is often dark. Though the open-plan spaces give views out towards the south from the kitchen, the space was really too long to get enough light into the kitchen.
FARMHOUSE KITCHEN	The isolated kitchen, separate from the family and considered as a hangover from the days of servants.	All of the kitchens are open plan.
COMMUNAL EATING	Without communal eating, no human group can hold together.	This pattern can be seen in the common house, which hosts communal meals three times a week.

Co-housing is where people come together to create a community through a neighbourhood of housing that embodies a shared collective vision – sometimes referred to as intentional living. Co-Housing has a focus on communal living, and usually includes a common house and shared facilities like a washroom or a car-share scheme.

The houses are usually designed and built not as individual plots, but as an intentional neighbourhood by the co-operative of people who may contract services out. Many co-housing schemes are inspired by Christopher Alexander's A Pattern Language (left) which emphasises connection, openness and street life.

DRAWN FROM NASH, 2019

Communities form around the basis of a vision for a scheme and then look for a plot of land to buy in order to build it. Financing these projects is difficult, but it can be gained through grants, loans and community loanstock. Loans can be sought from building societies and councils. Various grants can be accessed through the Department of Levelling up and the Ministry of Housing, as well as Homes England.



# Case study: Springhill co-housing



ARCHITYPE, 2022

Completed in 2004, Springhill was an intentionally formed co-housing community, planned, owned and managed by residents. Residents share many activities together such as childcare and cooking, as well as sharing a common house, which all houses look onto.

Despite embodied carbon, and original design standards being less robust than other eco developments, the social practise of 'having residents integral to the design and delivery of their own homes' resulted in better energy use and carbon emissions through the operational phase, showing the importance of the social element of sustainability (Architype, 2022).

## COLLABORATIVE MUTUAL BUILD SCHEMES

These schemes are examples where communities can collectively fund the purchase of land, then individuals who contributed develop plots themselves according to more conventional individual self-build. There may be a central design model or vision, but unlike co-housing, there is less focus on communal living. Community nevertheless often plays a large part in the creation of these sites. Since 2016, groups wishing to self-build have been able to register on the local councils 'Right-to-Build' register and the demand for self-builds must legally be met with land opportunity from Councils.

### Case study: Ashley Vale

THE ACADEMY OF  
URBANISM, 2017



Local people, in protest to a volume builder developing a plot of 35 houses formed an action group that purchased the site in 2001 and went on to develop the site with 20 individual self-build plots and six housing association plots. The self-builders formed a community, advising and assisting one another, with building times varying roughly from one year to five. Issues were encountered when members disagreed about the kinds of housing being built (Morris, 2005), highlighting the importance of having a design ethos and values for builders to refer back to.



# SELF-HELP

Self-Help schemes focus on providing for disadvantaged members of society by providing affordable housing and upskilling people through the process of building their own home. Pairing with a building college, apprenticeship scheme, or small construction company are options for giving vulnerable people the chance to build their own homes and gain on-site qualifications at the same time. Many who go through these schemes end up working in the construction centre following completion.



“It was more than just about housing to me. It was about creating skills” (Claude Hendrickson, 2021)



## Case study: Frontline



Established in 1987 Frontline was a pioneering self-build scheme that enabled a group of local unemployed African-Caribbean men to build 12 semi-detached houses and learn the skills of construction along the way. The builders were enabled to gain NVQ qualifications, and Frontline became a working construction company post-build. The build challenged racist stereotypes at the time alongside battling land issues and issues with finance.

# CHAPTER 3

## BUILD MATERIALS

Considering how we build our homes is important for reducing embodied and operational carbon emissions and future proofing communities from unnecessary retrofits. Brilliant examples of achievable housing are abound, and there are many standards to choose from when it comes to optional low-carbon certification. However, it is often understood that achieving such certification is tricky and expensive. So, is it possible that self-builders have the capability to build low-carbon, affordable developments?

In Berlin in 2014, a sixth of all newly constructed homes were built by collectives, and these group projects 'are nearly always built to Passivhaus standard or above' (Stevens, 2017). Passivehaus buildings can be built mostly using basic building materials found at any builders' merchants. For the remaining specialist elements (windows, heat exchangers, and thermal seal), West Yorkshire benefits from a local supplier of Passivhaus products, advice and training, the Green Building Store.

Alternatively, buildings could be constructed utilising a pre-fabrication method, such as Ecococon – a timber panel system that uses a straw infill for high thermal insulation – or that of CITU, who built over 800 homes and apartments in a modular on-site workshop. In fact, Farmer's 2016 government review highlights the importance of transitioning away from conventional methods to pre-fabricated modular building, since they improve productivity, predictability and sustainability. Modular and pre-fabricated construction can reduce environmental impact during the production stage of a project by approximately 36% compared to conventional construction methods (Jang et al, 2022).

Ecococon panels are produced in a workshop off-site allowing the houses to be built modularly. The housebuilding consists primarily in assembly, which simplifies the job for a self-builder. If a self-built plot restricted itself to a pre-fabricated technology such as this, it would make sense to have a workshop close to the site in order to reduce transmission costs. Timber makes a good choice for a low carbon building solution, as well as having a positive aesthetic quality.



ARCHDAILY, 2019



HOUSE PLANNING HELP, 2022



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