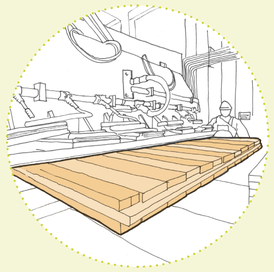
Flexible, crafted and energy-efficient homes

ON SITE

CLT Construction Process

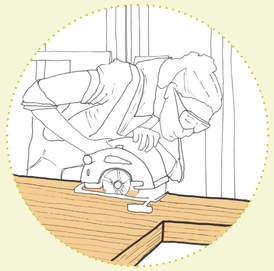
RAW MATERIALS

- Coniferous evergreen softwoods are harvested from sustainable forests
- The timber is a renewable resource, and a carbon store that can be readily replenished



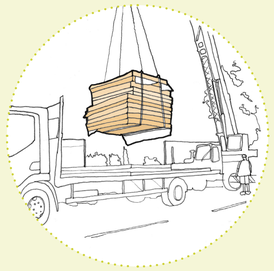
PROCESSED

- Raw material is brought to the on-site construction skills factory, providing local jobs and training
- CLT panels are made from glued and pressed boards of timber



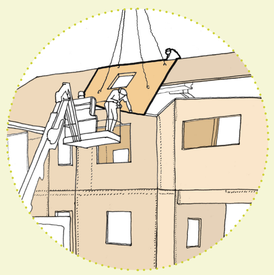
PROCESSED

- Openings for doors windows, and services are routed out of each CLT panel



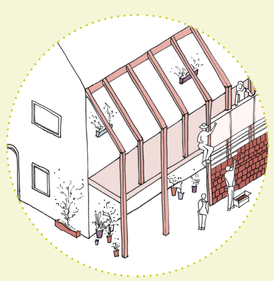
TRANSPORTED

- The CLT panels are sized to fit on a standard lorry bed
- They are transported the very short distance to each housing plot



INSTALLED

- Each CLT panel can be installed easily, safely and quietly
- This results in an accurately finished and thermally efficient structure



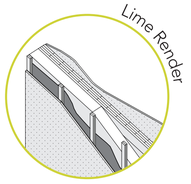
ADAPTED

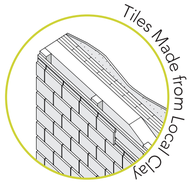
- The second envelope provides an opportunity for each homeowner to customise their home differently

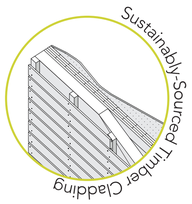
HEALTHY ACTIVE LIFESTYLES

The aspiration of healthy living was one of the driving forces behind the original Garden City principles – "Health of the country, comfort of the town" was a popular expression to describe the original development of Letchworth Garden City. The development is intended to promote the health and wellbeing of its inhabitants at three different scales of inhabitation.
At the level of the home, each house will be made with healthy non-polluting materials (such as timber) and designed using passivhaus principles which ensure a high level of natural ventilation, daylight and thermal comfort for every inhabitant. The core thermally efficient envelope of the house can be added to over time to create spaces for the home to connect to its environment without affecting its thermal performance.

Possible cladding details







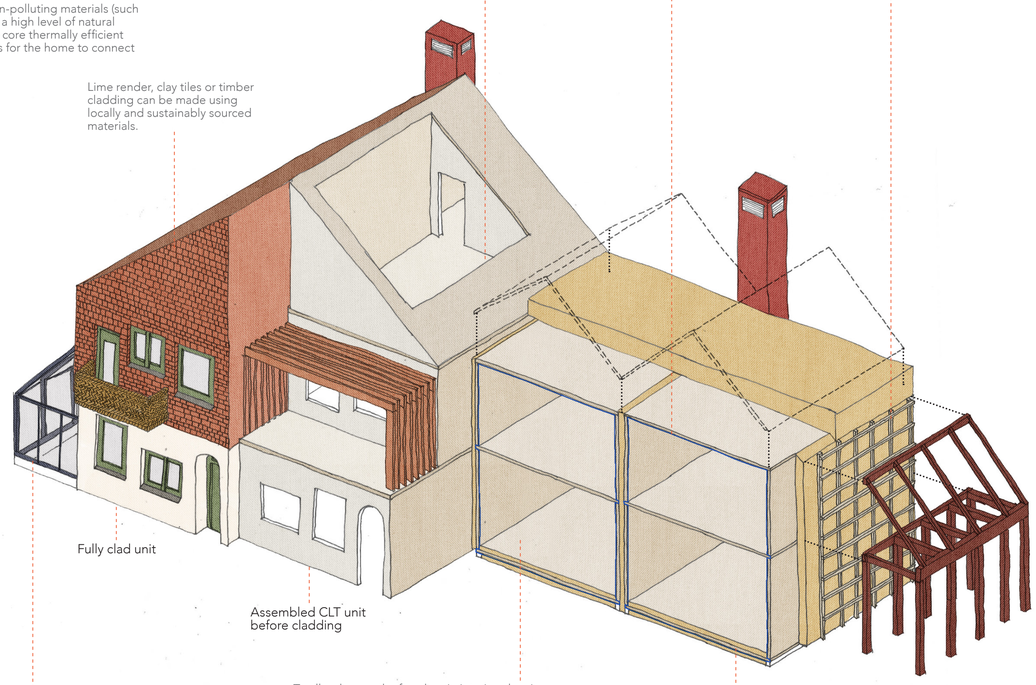
Possible interior configurations

Secondary spaces such as balconies, pergolas, decking, sun rooms, greenhouses and lean-to storage areas can be provided as supplementary to the structural and thermal envelope of the building.

Good air tightness can be achieved wit this kind of structure which will allow for the desired level of thermal comfort, regulated with heating systems and mechanical or natural ventilation.

A standard wall buildup on all homes can accommodate many different types of cladding that can be adapted over the life of the building.

Lime render, clay tiles or timber cladding can be made using locally and sustainably sourced materials.



Fully clad unit

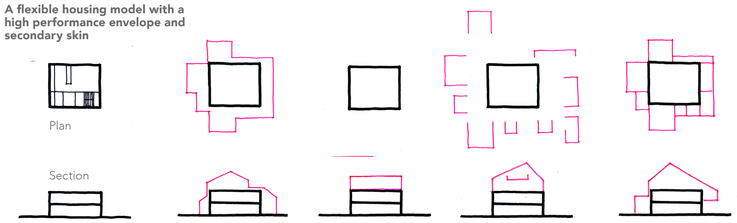
Assembled CLT unit before cladding

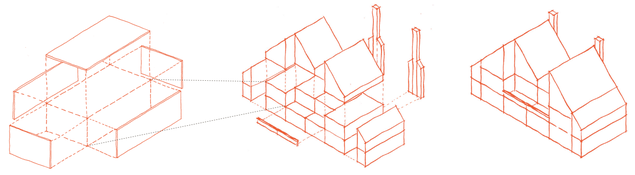
Semi-external spaces such as sun-rooms can be added to the highly insulated and efficient thermal envelope of the building to connect it to its surroundings without affecting its performance or comfort levels.

To allow buyers the freedom in interior planning and to restrain purchase costs, all of the houses are to be offered as shells without internal partitions or room divisions. A wide range of internal configurations carefully positioned service risers, fenestration and staircases that support.

The primary CLT structure of the building can be insulated using non-polluting insulation materials such as wood fibre.

A flexible housing model with a high performance envelope and secondary skin



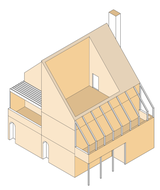


A standard unit is made up of CLT panels made in the on-site factory.

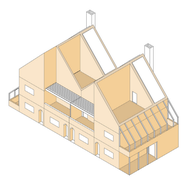
These are assembled into different typologies and configurations.

The standard CLT thermal envelope can be added to over time with self-built supplementary structures.

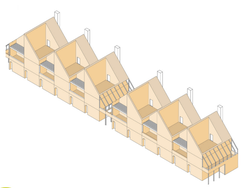
Possible Configurations of the Standard House Typology



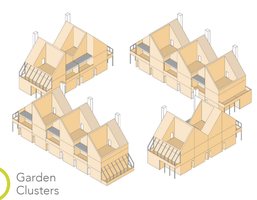
1 Individual Home



2 Semi-Detached Homes

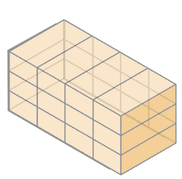


3 Terraced Homes



4 Garden Clusters

Assemblage of the Courtyard Community Typology



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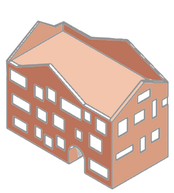

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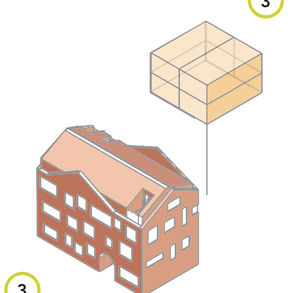

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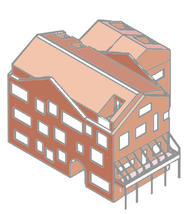

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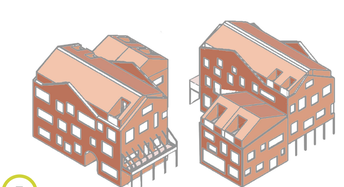


5

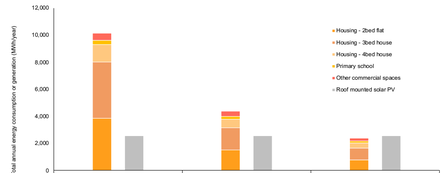
Site land use diagram

- Commercial
- School
- Community
- Self-build housing
- Courtyard Community housing 2/ 3 bed flats or maisonettes
- Terraced housing 2/ 3 bed houses
- Garden Cluster housing 2/ 3/ 4 bed houses
- Semi-Detached and Individual housing - 3/ 4 bed houses

Growing letchworth - target 900 homes	Area (m2)
Total site area	45ha
Total building area	85,555m2
Total building footprints	17,725m2
Residential	
Range of homes 1b,1p - 3b,5p or 4b,6p	50 - 110m2
2 bed flats (450 homes - 50%)	27,450m2
3 bed starter home (360 homes - 40%)	29,880m2
4 bed large family home (90 homes - 10%)	9,900m2
Total residential allowance	67,230m2
Total residential footprint	26,892m2

Infrastructure & Amenities	
2FE primary school	2,300m2
Community landscape training centre	1500m2
Sheltered market space/ factory	1125m2
Plant nursery/food hall	700m2
Commercial space	900m2
Workspace/commercial	1000m2
Community spaces	600m2
Parking shelters	10,200m2

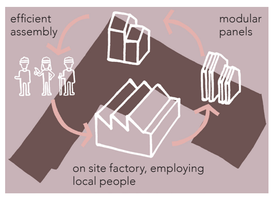
Building fabric efficiency diagram
Consumption vs Generation of energy



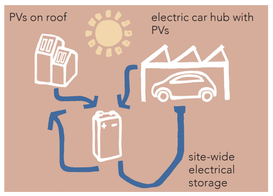
Assumptions	
PV generation	
30% of total building footprint PV coverage	
20% shading factor	
330W f-facpn panels with DC optimisation	
Heat pump efficiency	3.9
Electricity carbon factor	254

Use	*Quantity*	*Area*	*Total area*
Housing - 2bed flat	450	61	27450
Housing - 3bed house	360	83	29880
Housing - 4bed house	90	110	9900
Primary school	1	2300	2300
All commercial spaces	8	4675	5125
Generation	50%	26892	13446

RESOURCE EFFICIENCY



The homes will be of modular construction, with assembly taking place in a factory on site. This will generate training and employment opportunities for local people, securing knowledge and expertise within the community, and reducing transportation during construction. CLT modular timber construction will be used to lower the carbon footprint, reduce construction time and create less wastage. This type of construction also lends itself well to self build. The factory building will be re-purposed as a community facility, such as a sports hall.



The site-wide energy strategy is based around on-site energy generation and storage. Photovoltaic tiles (PVs) on south-facing roofs of the houses generate electricity, which is used by households and stored during periods of low demand in batteries distributed throughout the green corridors. The solar roof of the car hubs generates electricity to charge electric cars at a reduced rate for residents, creating additional incentive to park in the hubs.

The materials used are influenced by the ecology and history of Hertfordshire. Chalk is used to make a breathable and natural lime render finish and clay finds its form in long-lasting tiles. Both are applied by hand and create a variety of textures and colours. Tiles offer opportunities for on-site manufacture, training and customisation. Also at the hand-made scale, willow bunches from the managed coppice will be used to create low level garden fencing and natural touches.