Chippings, Scholes

Passivhaus, Health and Wellbeing

Connect housing

EcoHolmes
Community Land Trust

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GWP AND OUR APPROACH

1.1 GWPA - PASSIVHAUS AND AFFORDABLE HOUSING

GWPA are chartered RIBA Accredited Architects and also Certified Passivhaus Designers.

GWPA specialise in low carbon architecture and have a unique track record of delivering cost effective sustainable projects, including housing.

GWPA have delivered multiple, affordable award-winning housing projects to Passivhaus and Zero Carbon certification including:

- 22 units Annie Lee Close, Manchester.
- 30 units Blackrock Street/Mayton (East Manchester regeneration scheme).
- 2 Units Certified Zero Carbon.

Current live Passivhaus projects include:

- 10 units (Chippings) to Passivhaus LEB.
- 19 units (Ferney Lee, Todmorden) to Passivhaus LEB.

1.2 GWPA - HOUSING

- The housing concept developed is designed to be sustainable and affordable, and it addresses sustainability in its widest sense from the outset, as part of the design. In principle, a passive approach is used to create a highly insulated, airtight building envelope that requires very little energy for space heating.

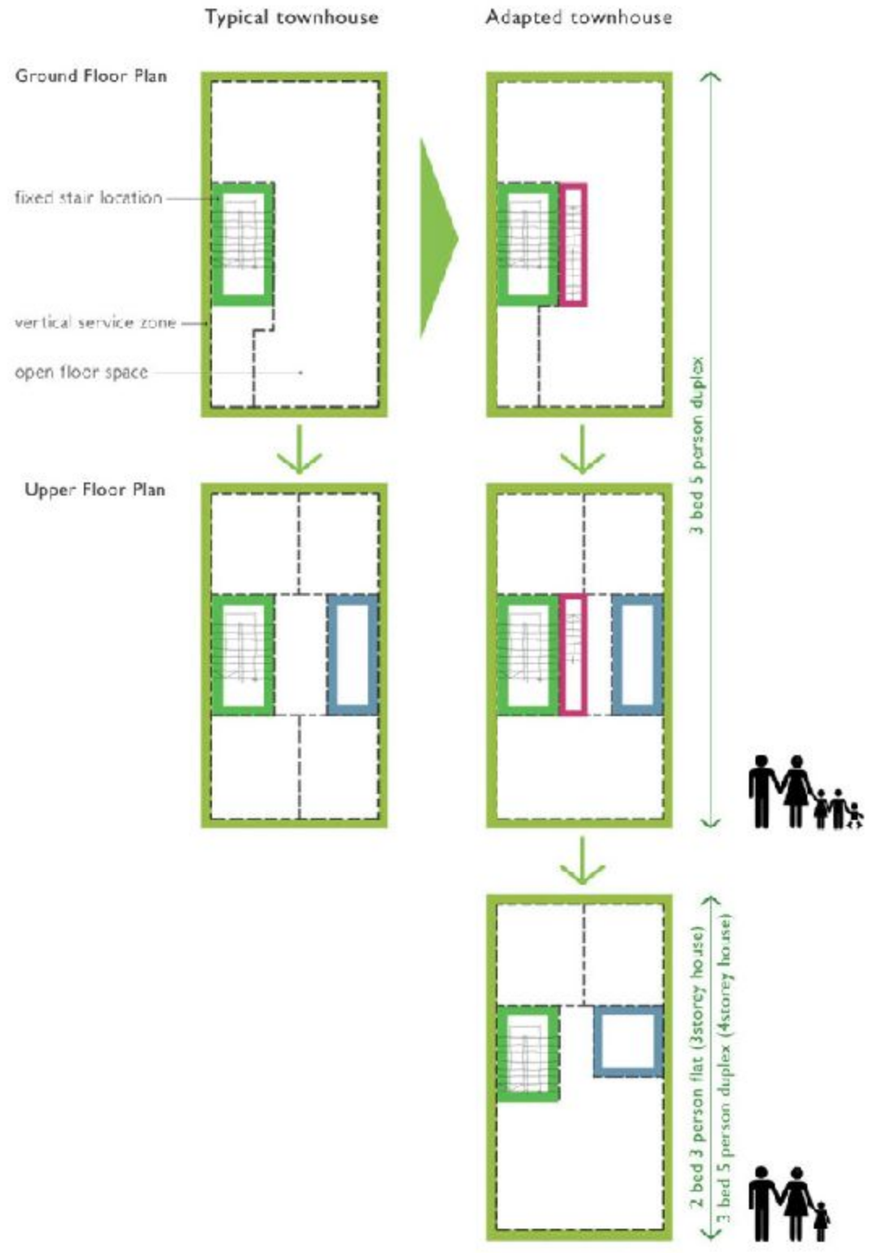
- Particular attention is given to the construction process, incorporating approaches in the design concept that facilitate and speed up the process. Using this approach, considerable cost and programme benefits can be achieved.

- Simple plan forms are adopted, which are efficient in material usage and speed up the construction process.

- Panelised timber frame construction is used to rapidly achieve a weather-tight building envelope, allowing for services/internal finishes to commence early in the construction programme. The use of timber for the building shell is highly sustainable, and timber is the only construction material with a positive impact on the environment.

- Designs are based on the use of modular dimensions, which allow the use of building components at their manufactured sizes, such as plasterboard, OSB, or ply sheeting. This speeds up the construction process as there is a minimum requirement for cutting or fitting components and a significant reduction in waste generation.

- Open web floor joists are used to create a service void within the full extent of the floors, facilitating the installation of services and allowing for future flexibility.



1.3 OUR APPROACH - SUSTAINABILITY

Key Aspects Are:

- Low Energy & Carbon in Use
- Low Levels of Embodied Carbon
- Significant Reduction Vs. Current Building Regulations

Fabric First Design Targeting Passivhaus Levels of Performance

- Mechanical Heat Recovery Ventilation ('MVHR')
- High levels of air tightness (below Part L standards) - More Stringent
- High levels of thermal insulation
- Enhanced glazing solutions
- Highly efficient building massing
- Thermal bridging minimised
- Modelled in (PHPP) to minimise the performance gap

Low Carbon Heat

- Targeting no on site carbon use
- Full electric heat and hot water using low carbon technologies
- Use of Air Source Heat Pumps

On Site Use of Renewable & Energy Efficiency

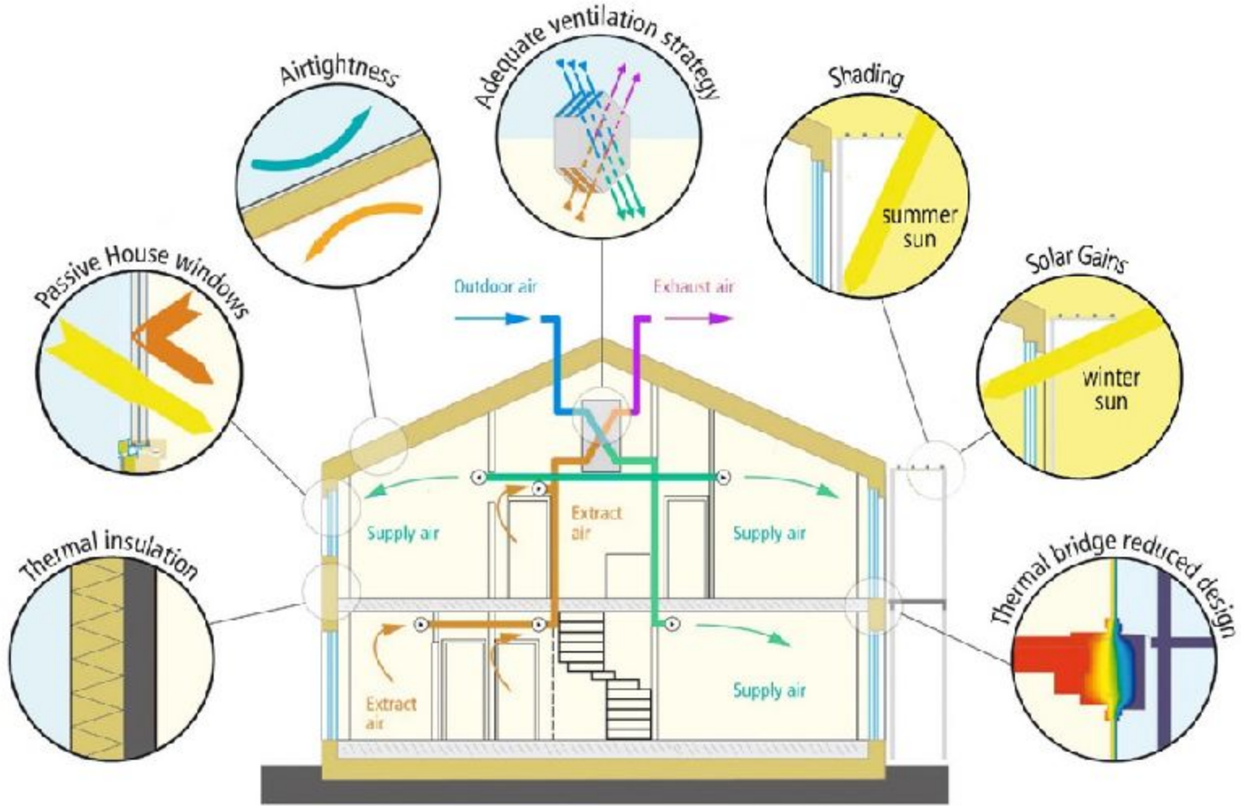
- Electric Car Charging
- Solar Photovoltaic Panels to Generate Electricity
- 100% low energy LED lighting

Low Embodied Carbon

- Use of prefabricated timber frame construction manufactured off site.

Water Saving

- All dwellings will be provided with connected 200l water butts so as to reduce water use in the garden.
- All fittings internally will be low flow / restricted in line with latest Part L guidance.



1.4 OUR APPROACH - HEALTH AND WELLBEING

By using Passivhaus strategies - and other good design methodologies - we seek to provide;

- Eliminates cold homes and associated health impacts.
- Guarantees good levels of ventilation.
- Reduces internal pollutants such as VOCs.
- Deals with internal humidity – eliminates condensation and mould.
- Improves quality of life for people with chronic illness or disabilities.
- Protects against external air pollutants.
- Reduces risk of airborne infection.
- Reduces the impact of external noise.
- Reduces risk of buildings becoming too hot in summer.
- Communal areas for social interaction
- Opportunities from site food/vegetable growth

CHIPPINGS PASSIVHAUS

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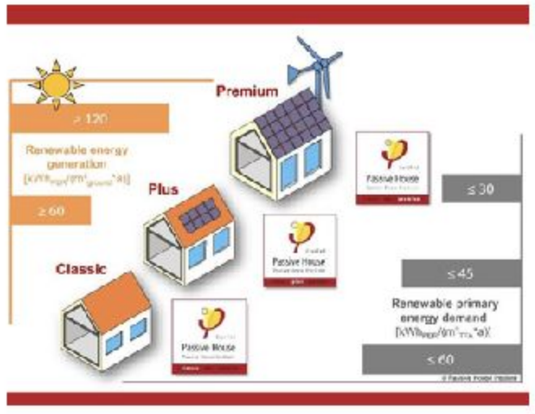
2.1 WHAT IS PASSIVHAUS

Background

- Passivhaus (whole building approach) is a globally recognised standard footprint.
- Certification originating in Germany in the late 1980's but utilised globally now.
- A voluntary standard for energy efficiency in a building.
- Building is assessed and certified to different Passivhaus standards:
  - LEB / Classic / Plus / Premium
- Passivhaus certification covers only design/construction and does not consider occupancy or maintenance.

Passivhaus Designer

Passivhaus Certifier



The key principles of Passivhaus are:

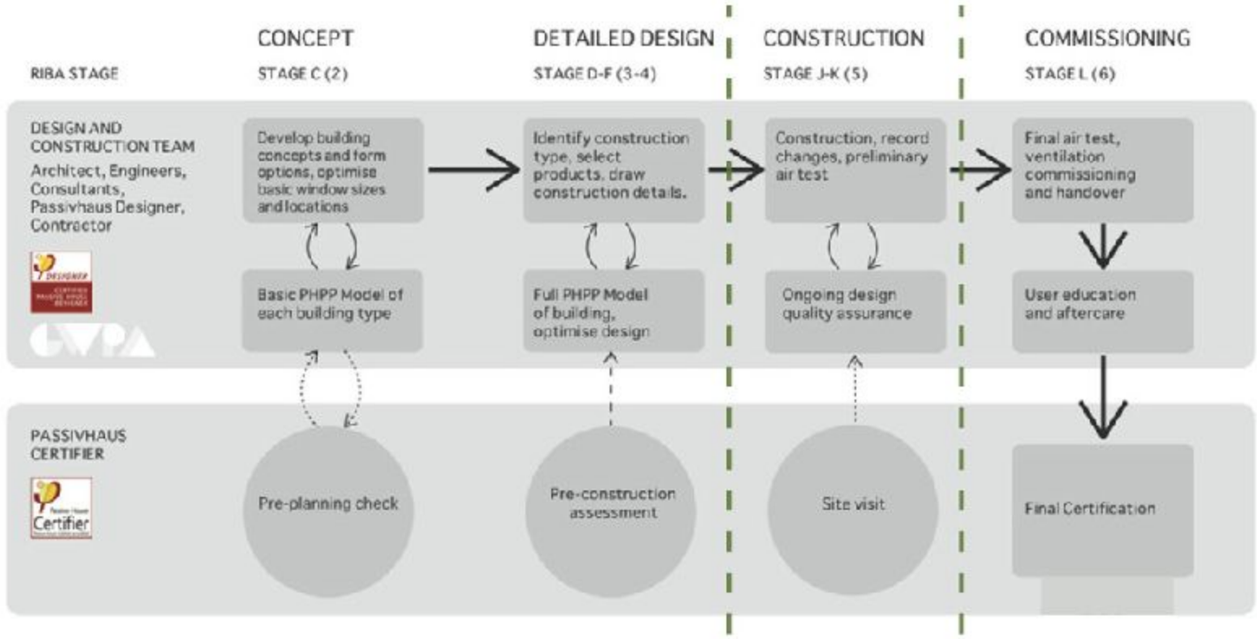
1. Super insulate
2. Airtight
3. High performance glazing
4. Thermal bridge free design
5. Heat recovery ventilation

Process

- Design and model the house by the 'Certified Passivhaus Designer' who inputs into the 'design process'.
- Once design complete, assessed by the 3rd party 'Passivhaus Certifier' and passed.
- On site works, evidence provided of products used/installation quality/air test and MVHR commissioning.
- Post construction review to final certification issue by Certifier.

Maintenance/Whole Life Costs

- One key difference to a standard home is the inclusion of MVHR – which runs constantly, providing filtered fresh air.
- Requires maintenance twice a year (filters) but should be manageable by building occupiers.
- Mechanical services and longer-term replacement cost relevant (as a gas combi boiler) to ensure no noise (bearings)/air valves (efficiency) problems.
- If not maintained, potential air quality issues.



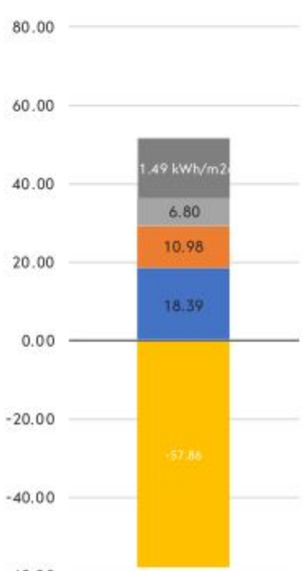
2.2 OVERALL STRATEGY - HEATING/ ENERGY/ VENTILATION STRATEGY

- Significant Improvements over current Building Regulation requirements.
- Fabric first approach – air tightness - key to reduce energy demand.
- Increased insulation to the fabric.
- Renewable energy provided by PV panels to the roof with battery storage.
- Internal ASHP hot water cylinder – hot water generation.
- MVHR (mechanical ventilation heat recovery) system installed to provide managed ventilation and prevent mould growth/good air quality.
- Triple glazed windows, acoustic glazing, and solar control content (reduce overheating risk).
- Electric panel radiator to living space (occupant comfort only) and could be included to bedrooms if so required.
- space heat demand will not excceed 30KWh/m2 along side not more than 75KWh/m2 contribution from renewabls. **(LEB requirment)**

	~Part L 2021*	Passivhaus Low Energy Building (PHLEB)	Chippings Strategy
Ventilation	Local Extract (System 3)	MVHR	MVHR
Wall U-Value	0.21	~0.17	~0.14
Roof U-Value	0.093	0.093	0.09
Ground U-Value	0.123	0.123	0.1
Window U-Value	1.2 / 1.4	0.8	0.8
TB	Trada+	PH	PH
Air Tightness	~2.5	1	1
Heating	Electric Only	Gas / Electric	Electric
Hot Water	ASHP	Combi Boiler / ASHP	ASHP / Cylinder
PV / Renewables	None	None	Roof mounted and battery backup
Waste Water Heat Recovery	None	None	None

PHPP CALCULATION

Energy Use Intensity Per Anum (/PH TFA, Incl. Unreg Energy)



	BLOCK A - Opt 1: PHLEB + ASHPWC + PV
Sum of PV (m2)	-57.86
Sum of Unreg (m2)	15.32
Sum of Reg (m2)	6.80
Sum of DHW (m2)	10.98
Sum of SHD (m2)	18.39

Assumptions

PV - Quantum and type (405Wp) assumed, subject to detailed review by specialist

EUI / Areas based on Passivhaus TFA - m2 GIA likely to give slightly lower results

Unregulated energy from PHPP, likely higher depending on residents/dwelling ratio

DHW, as above

Energy Cost (Per Anum, 35% PV self-use, incl. Unreg Energy)

	BLOCK A - Opt 1: PHLEB + ASHPWC + PV
Sum of Total Less Self Use £	£624.21
Sum of PV Export £	-£117.15

Assumptions

PV - Based on 35% 'sef-use', higher values achievable with use of battery storage

Cost per kWh per lastest OFGEM: 0.27p (import), 0.04p (export), standing charge 0.53p (per day)

Unregulated energy from PHPP, likely higher depending on residents/dwelling ratio

DHW, as above

2.3 OVERALL STRATEGY - PASSIVHAUS/PLANNING

All units identified for Passivhaus benefits

1. South facing / PV optimal.

2. Natural urban grain orientates block west/east.

3. Westerly orientation reduce PV efficiencies.

4. Open aspect to east positive / banking will reduce to east daylight hours (sun setting)

5. Window extents 'controlled' in-line with planning requirements.

6. Units are terrace blocks to maximise surface to volume area.

7. Existing buildings/ cliffs face and trees provide some shelter from cold winds.

CHIPPINGS - FUTURE PROVISIONS AND ADAPTABILITY

3

3.1 OUR APPROACH - ADAPTABILITY AND FUTURE OCCUPATION

2 Bed Dwelling
Part M4(3)

Wheelchair user friendly adaptable dwelling. The dwelling provides reasonable provisions for a wheelchair user to live in the dwelling and have the ability to use any outdoor space, parking and communal facilities

4 person

91m²

Ground Floor

1. Living
2. Kitchen
3. Dining
4. WC/ Wetroom
5. Storage

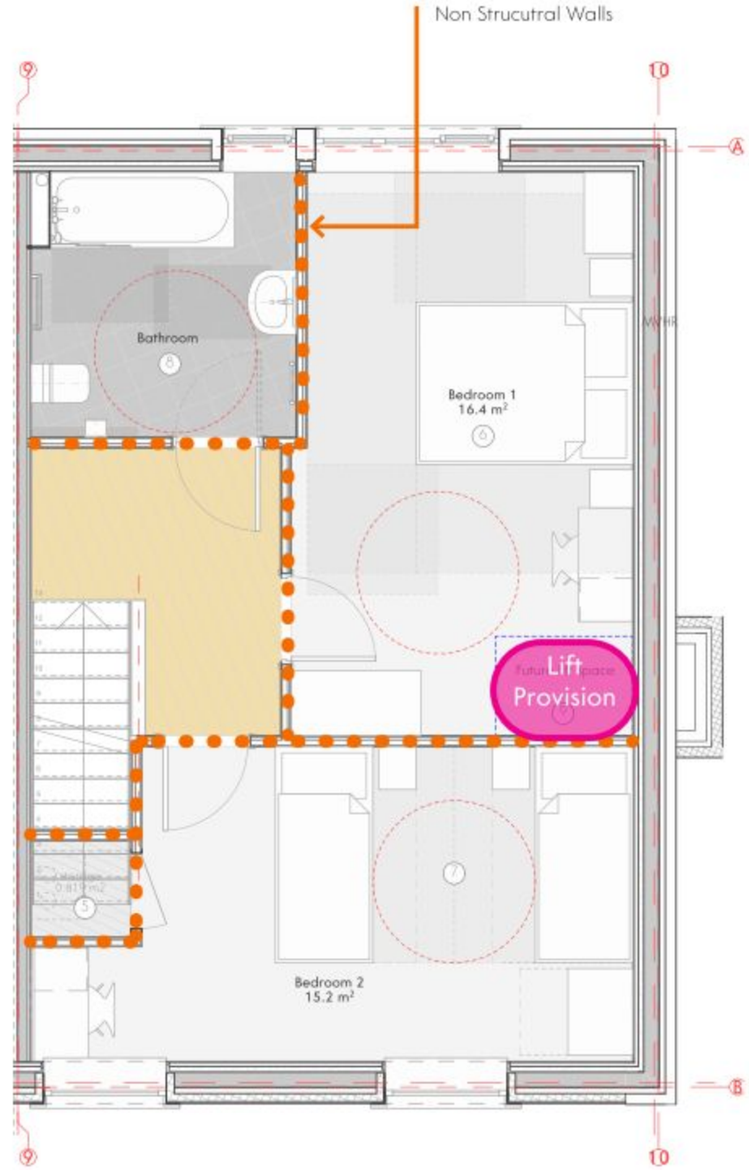
First Floor

6. Master Bedroom
7. Bedroom 2
8. Bathroom
9. Future lift provision

Key

Non Load bearing Walls

'Probably the most sustainable feature of any building is that it enjoys a long and useful life. the housing concept is specifically designed to accommodate changes in user requirements, designed in adaptability will future proof the investment.'



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