Appendix E: Client summary

Introduction

Since 2005, the number of residents in the Carpenter's Estate (CE) have decreased significantly due to relocation by Newham Council. This has led to the deterioration of the neighbourhood both in terms of community kinship and infrastructure, with residents expressing widespread dissatisfaction as stated in the Community Plan (2013). For this reason, the UCL Engineering team have carried out assessments for water and energy options alongside open forums, discussions and surveys with CE residents. This has meant that community aspirations and aims for the future state of their homes and neighbourhood can be included in this project and in the Neighbourhood Plan.

Stakeholders

The main client is Greater Carpenters Neighbourhood Forum (GCNF) that extends their requirements for infrastructure improvement of the CE to the UCL Engineering team. The main sponsor of the project is Just Space. GCNF and Just Space intend for refurbishment to occur for the CE. Other stakeholders include London Tenants Federation (LTF), London Legacy Corporation (LLDC), Environmental Services Design Ltd (ESD) and Newham Council. LTF provides tenants with tools for their aspirations about their homes to be heard by local authorities. Here LLDC (London Legacy Development Corporation) is capable of bringing infrastructure change although seemingly shows little interest on the regeneration project. ESD will work together with the UCL Engineering team to provide technical expertise in the regeneration option assessments.

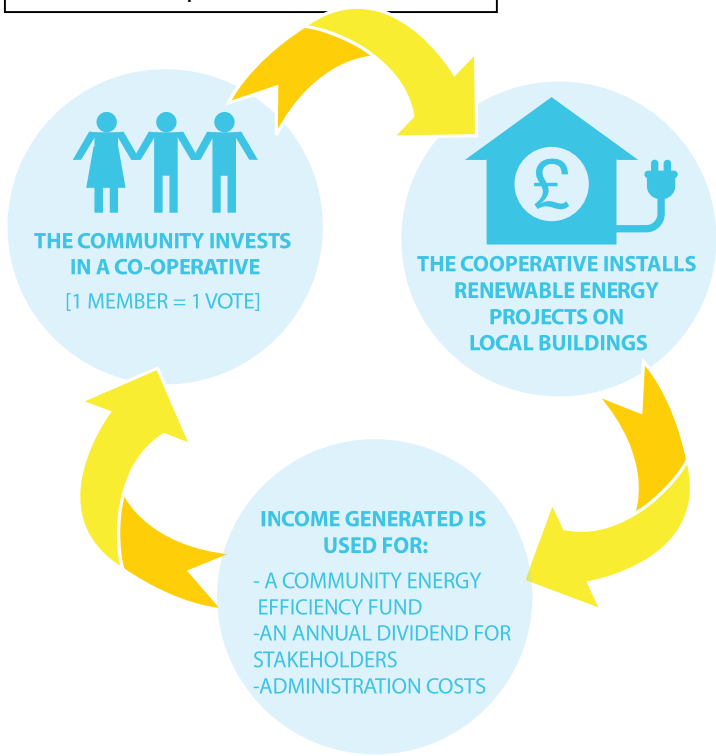
Infrastructure regeneration options

In this project, only water and energy infrastructure options are considered in the tables below (1 & 2). These options are presented in the form of short, medium, and long term strategies. All the options have been assessed in terms of technical feasibility, cost, sustainability, and community acceptability.

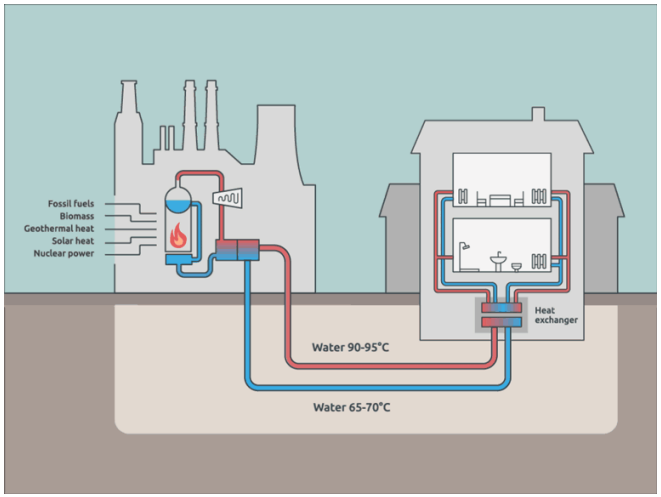
Table 1. Energy options

Option	What is it?
Reducing Energy Demand	Various strategies in Reduction of energy demand in the Carpenters Estate to be implemented. Main one is insulation.
Energy Saving Technologies	A range of cost effective technologies like smart meters, energy saving lamps and energy efficient appliances
Solar Photovoltaics (PV)	Solar panels to be installed on roofs which produce electricity from sunlight. A co-operative is set up by the community and everyone can benefit.
Micro Combined Heat and power (CHP)	Works in the same way as a gas boiler but produces both heat and electricity at the same time, reducing the losses
Air Source Heat Pumps	This is a system which transfers heat from the outside air to inside the house. This can heat up the space and water for taps and showers. It works for outside temperatures of as low as -5 degrees. Uses electricity very efficiently.
Ground Source Heat Pumps (for low-rise)	These are systems that transfer heat from underground to inside the house and can heat up the space and water for taps and showers. Works for very low temperatures and is very efficient.
District Heating	Distribution of heat generated in a centralised location owned by COFELY for residential and commercial heating requirements.

Solar PV Co-op model



Combined Heat and Power



Air-source Heat Pump

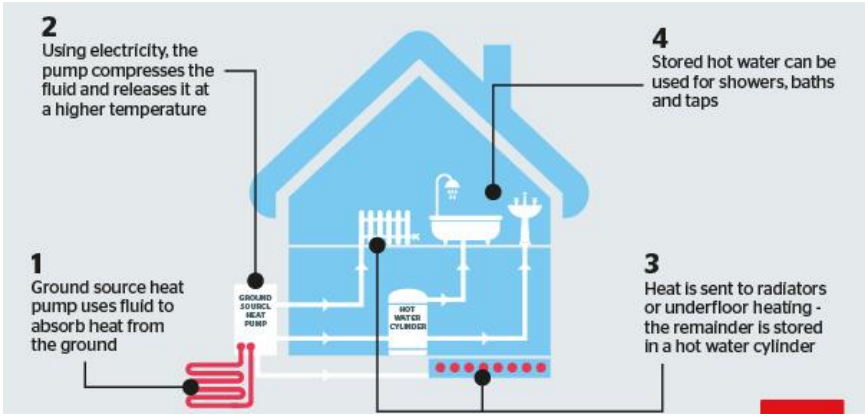
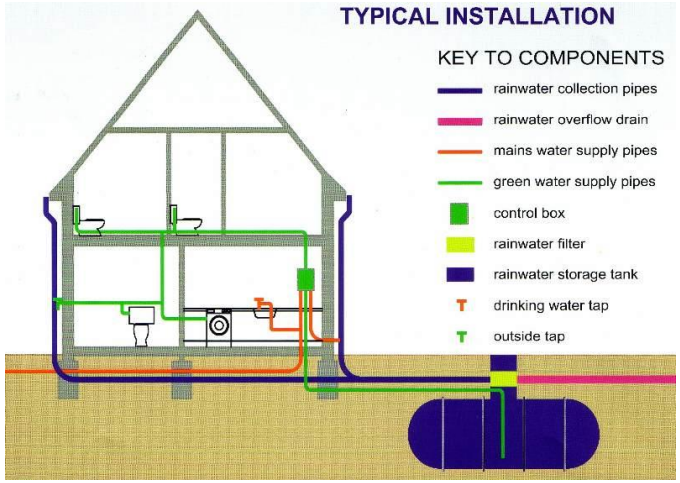


Table 2. Water options

Option	What is it?
Rainwater Harvesting	Collecting rainwater from roofs, which will be treated and stored to be reused. The system contains a storage, pumping, and purification unit.
Retrofitting water-efficient devices in homes	Devices/add-ons which can be easily implemented. They are based on one-off installation. Currently, they are more suitable for low-rise homes.
Sustainable Urban Drainage Systems	Green space landscaped in such a way that prevents drains from overflowing during heavy rainfall. It also helps replenish ground water sources.
Water meter	Devices that logs your water use. Smart meters log automatically with the help of internet connection, whilst conventional meters must be read manually. Hence, smart meter readings are more accurate. It aims to help raise awareness of your consumption behaviour. They are ***free to install*** by Thames Water.

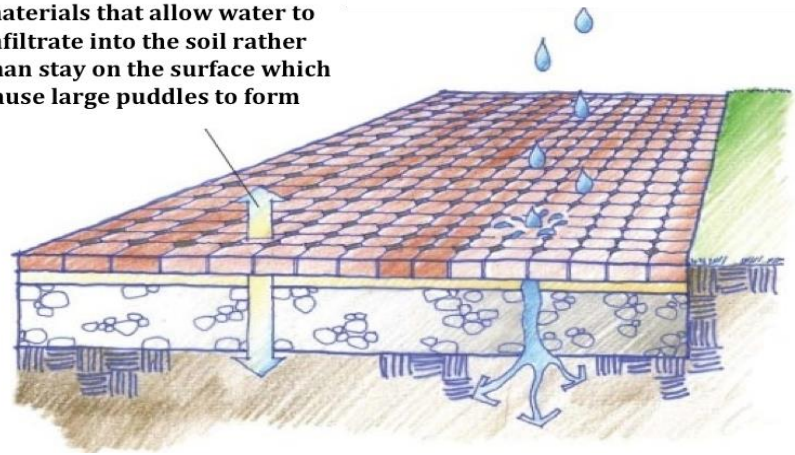
Water efficient device for toilets

Rainwater collection design



Replacing hard surfaces

Permeable Pavements use materials that allow water to infiltrate into the soil rather than stay on the surface which cause large puddles to form



Community participation

A number of forum meetings, surveys, and visits were carried out to involve the residents in the planning stages of the CE regeneration. There was a drop-in Q&A session for the residents to consult with the UCL Engineering team. This was further followed up by feedback from the residents to the UCL Engineering team to determine whether the options provided were accepted or rejected.

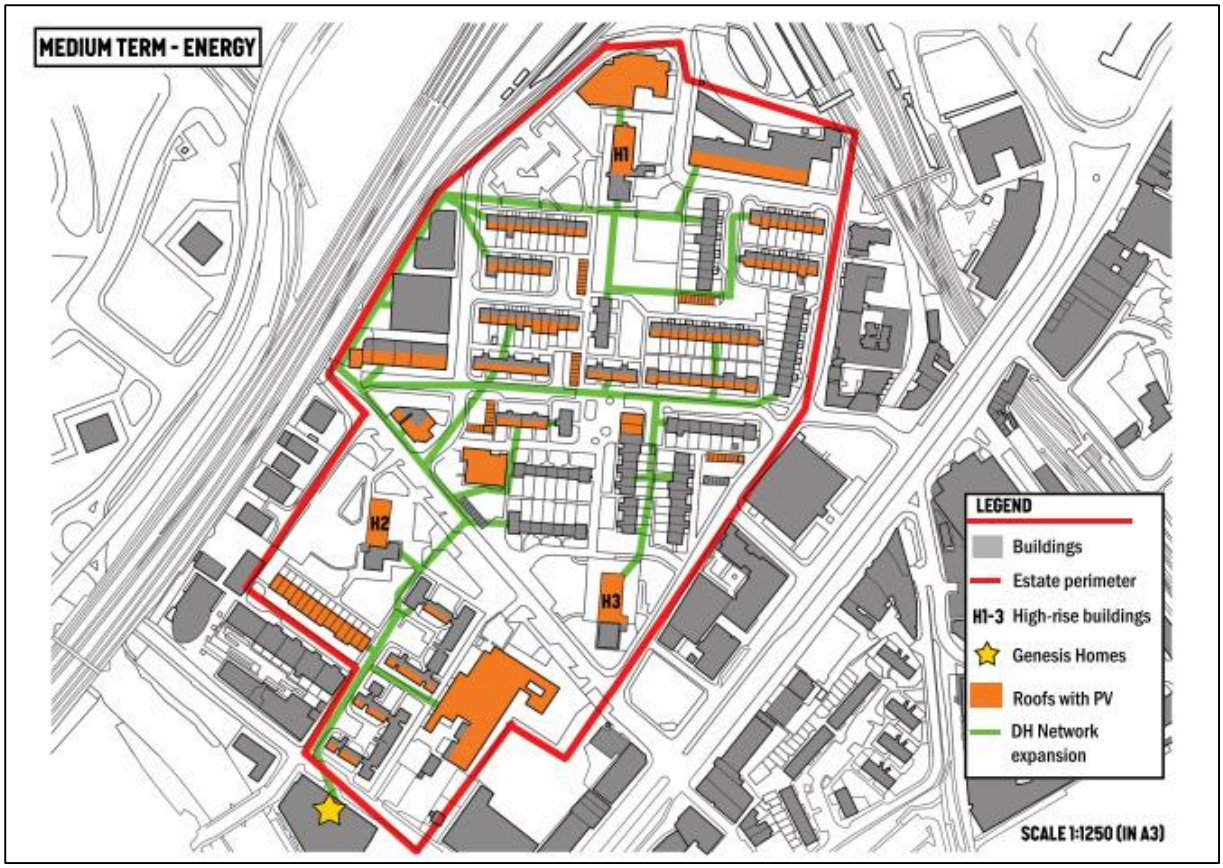
Table 3 lists all the best possible options for the estate subject to the residents' responses, with associated benefits.

Table 3. Water and energy options

Strategy	Infrastructure	Option	Cost	Bill saving	Carbon emission saving
Short term	Energy	Energy efficient appliances, lighting and fittings	£300+/unit for refrigerators, £225+/unit for washing machines	£34.02/year	
		Storage heaters	£700/unit	£200/year	
		Cavity wall insulation for low rise homes	Terraced houses: £370/house; low rise houses: £330/house		
		Boiler replacement with efficient technologies	£2.6 million/scheme		1,500kg CO_2/unit/year
		Energy meters and behavioural change		2-3% reduction in energy	
Medium term		Solar photovoltaics	£1.4 million/scheme		455 tones /year
		Insulation for high rise homes			
		Combined heat and power plant	£3.2 million/scheme		Reduce the CO_2 emissions by 60% compared to conventional gas boilers
		Heat pumps	Air source: £6,000-10,000/unit; ground source: £13,000/installation		Air source: 11,400kg CO_2/year (replacing electric storage heaters); ground source: 2,000kg CO_2/year

Short term	Water	Simple rainwater harvesting system	£100-300/unit	£25.2/year	1,433kg CO_2/year
		Water displacement devices	£2-3.50/unit	£6/year	Depends on carbon intensity of the mains
		Water efficient toilets (e.g. dual flush)	£300/unit	£54/year	
		Low flow showerheads	£30/unit	£187/year	
Medium term		Intermediate rainwater harvesting system	£2,000-3,000/unit	At least £108/year	1,433kg CO_2/year
		Sustainable urban Drainage Systems and Permeable Pavements	£295,000		Alleviates strain on existing drainage infrastructure, minimising flood risk whilst maximising green space and enhancing biodiversity across the CE.

The strategies are integrated to create a holistic solution. The short term strategies are mostly options that take place in domestic scale, therefore how they integrate cannot be shown. See Figure 1 for the integration of medium term strategies of water and energy infrastructures.



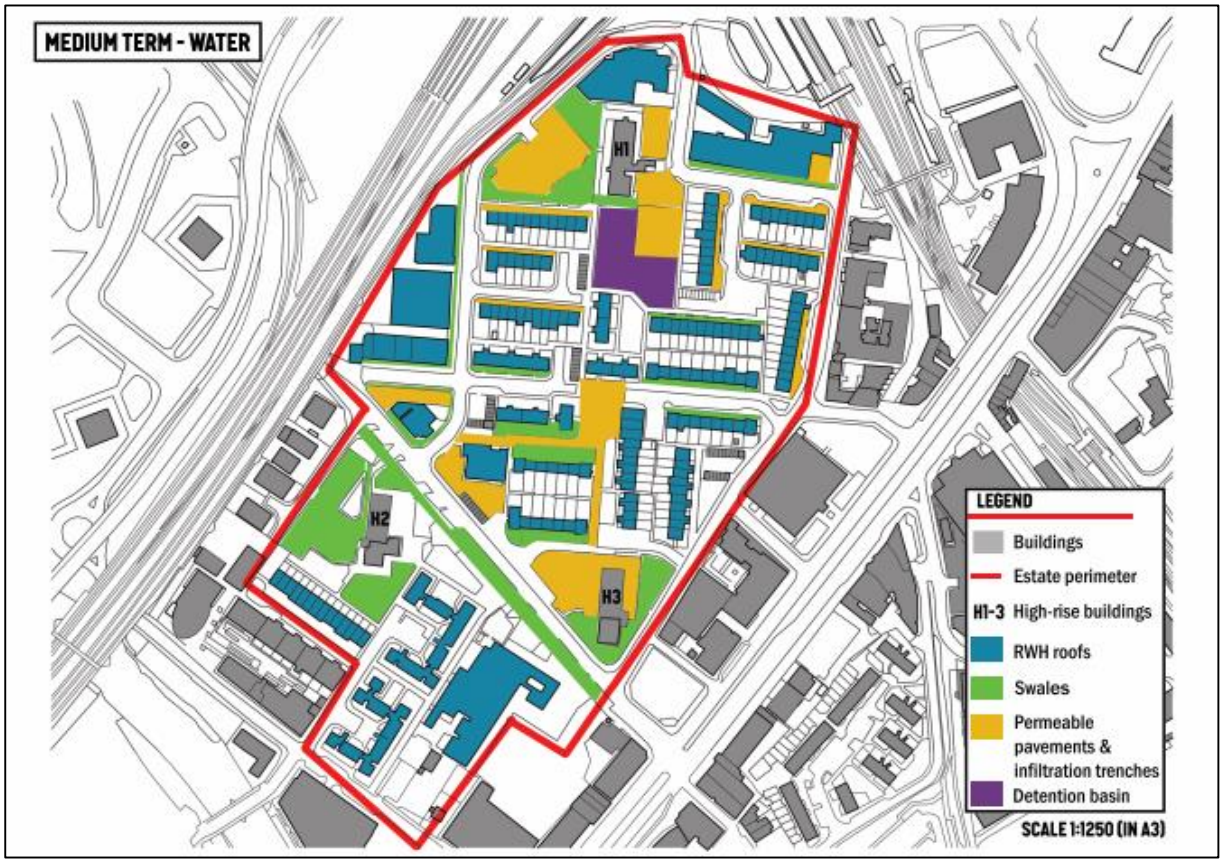


Figure 1. Energy and water medium term options integration

Benefits

Overall, it is important to note that for the water and energy options provided, cost and sustainability is more favourable for redevelopment of existing infrastructure rather than demolition of the CE. In addition, the benefits of the strategies provided this project can be divided into economic, environmental and social.

Economic benefits include:

- Less money is spent on average per home for retrofitting measures than for demolition and new build of same size homes.
- Cost savings on utilities can be received by residents both in the short and long term.
- Opportunity cost of demolition does not feature in this project.
- No loss felt by local businesses for the redevelopment options when compared with demolition.

Environmental benefits include:

- Retrofitting water and energy infrastructure options provided in this report have lower carbon emissions throughout their lifecycle when compared with demolition and new build.
- Green space is kept and increased across the CE, improving biodiversity, air quality and ambiance.
- Rainwater Harvesting and water saving devices reduces the amount of water consumed within the CE.
- The energy saving measures allow for the community to meet government standards and targets with respect to energy sustainability.

Social benefits include:

- Better insulated and more efficient homes improved the quality of life and health by creating a comfortable environment in the living space.
- Community use of alternative energy and water supply can create a greater participation in estate-wide activities such as maintenance works and potentially create job opportunities.
- Creating a community that can work together with a limited 'grid' connection could lead to a sense of community pride and fulfilment.

The annual water and energy bill savings support the fact that refurbishment options possess economic benefits for the residents. However, the residents will also receive societal benefits as the environment that they live in will have been improved, which means an improvement in quality of life. Once implemented, community ownership of the proposed strategies is to be expected to create a homely feel for the residents.

Conclusions and further work

The strategies proposed have undergone the UCL Engineering team assessment and community discussion to address the 2013 Community Plan. Steps to conceive the Neighbourhood Plan should be seen soon, and it will hopefully have been partly influenced by the assessments done by the UCL Engineering team.