

**Project Name: Ravensbury Estate Regeneration :: Existing Stock Refurbishment Appraisal**

**Revision A      Date: 11 February 2016**

The Ravensbury Estate regeneration project aims at transforming the estate into a new sustainable place responding to the ever increasing need for building energy efficiency and enhancing the environmental features that make the neighbourhood an enjoyable place to live.

Ravensbury Estate was built in the early 1950's and consists of 187 dwellings in a mixture of semi-detached and terraced houses, flats and maisonettes. The semi-detached houses are of Orlit concrete construction. The flat block and the terraced houses have a brickwork construction. In order to be able to assess the different regeneration options, HTA carried out a survey measuring a sample set of dwellings in the estate and collecting information on the fabric and heating and hot water services. These dwellings were then modelled in RdSAP, the tool derived from the government's national calculation methodology for the energy efficiency of existing dwellings. Their current energy performance was estimated as well as their potential for improvement with the application of different energy efficiency measures. The purpose of this study was to see what energy performance level the homes at Ravensbury Estate can reach if retrofitted to improve their performance.

The dwelling types that were surveyed and assessed were:

Orlit construction semi-detached house

Brick construction flat

Brick construction maisonette

These dwellings are representative of their types as the construction is the same and the maintenance level -if tenant occupied in particular- is quite similar as well, therefore the results of these assessments can be used to draw conclusions for most of the dwellings of the same type in the estate.

The study was carried out in line with the following methodology:

1. Representative dwelling types were selected to be measured and surveyed
2. The selected dwellings were surveyed according to the Domestic Energy Assessment methodology
3. The existing Energy Performance Certificates [EPC's] that had been issued for the selected dwellings were downloaded from Landmark and new draft EPC's were produced based on the surveys
4. A number of measures or combinations of measures to improve energy efficiency were assessed
5. The guidance in BREEAM Communities [G01 - Consultation and RE02 - Existing buildings and infrastructure] was taken into consideration

6. A assessment against Part L1B [Conservation of fuel and power in existing buildings] was carried out

7. The results were discussed and evaluated

#### A. Existing dwellings EPC survey

The three dwelling types were assessed in RdSAP and their draft EPC's were produced. The EPC's predict the energy rating of the dwelling as well as the estimated energy costs over 3 years. These figures are given below for each assessment and they show how much the average household would spend in the respective property for heating, lighting and hot water [regulated energy use]. Energy use for running appliances is excluded.

#### Orlit semi-detached house



#### *Heritage and local identity*

Orlits are prefabricated reinforced concrete [PRC] houses which were common after the Second World War. Several more PRC house types were developed, such as Boot, Cornish Unit, Unity, Wates and Woolaway. They were seen as a quick and cost efficient way to provide much needed housing after the war. The 17,000 Orlit houses that were constructed in the UK in the 1950's, as well as other PRC house types, were meant to be a temporary solution to the housing shortage problem, however they were retained for a much longer period than intended. Many PCR houses have been declared defective under the Housing Defects Act of 1985, as by the 1980's they were presenting noticeable signs of deterioration.

#### *Domestic Energy Assessment*

Representative dwelling: Semi detached orlit construction house. The energy assessment was carried out in RdSAP on the basis of information on the building fabric and services collected during the site visit. The

existing dwelling achieved an energy rating of E52. This result is very similar to the one of the EPC we retrieved from Landmark which indicates that the energy rating of the dwelling is E53.

We assessed this dwelling again having assumed that the walls could be insulated externally or internally as part of an energy retrofit and the predicted rating was D63. The result of the third assessment, which included an upgrade of the heating and hot water system, was an energy rating of C74.

Floor insulation was considered as well as a final measure, given the fact that it requires a procedure with significant disturbance to the occupants. The energy rating that was predicted after this measure was C75, only 1 above the previous stage.

The maximum potential of improvement of the energy performance of the Orlit house type is 23%, with an energy rating of C75. The estimated energy costs of this home would be £1,749 over 3 years. This indicates a significantly better performance compared to the current performance of this house type, however it is still low compared to the energy performance a similar house would have had it been designed and constructed to the current building regulations.

#### Brick construction flat



#### *Heritage and local identity*

The majority of houses and low-rise flats in Britain have traditionally been of brick or brick and block wall construction, with pitched roofs. Solid brick wall construction was a particularly popular method of construction pre 1850 to 1950, therefore the brick dwellings at Ravensbury Estate are amongst the latest examples of this construction type.

### *Domestic Energy Assessment*

Representative dwelling: Ground floor flat in one of the small flat blocks of the estate. The dwelling at its current status achieved an energy rating of D65 in RdSAP. The information used for the assessment was collected during the site visit, when the dwelling was measured and the specifications of the fabric and services were identified. The energy rating deviates from the one achieved in the EPC we retrieved from Landmark, but not significantly. The existing EPC shows an energy rating of C69, probably because of the lighting assumptions [100% low energy].

We assessed this dwelling again including the impact of external or internal wall insulation and the energy rating improved to C72. The suggested measure by RdSAP for further improvement is floor insulation, which will contribute to achieving a rating of C76. However, floor insulation is a measure that is more complicated in the sense that it might mean that more measures need to be employed, for example if the internal heights are slightly changed or if the air vents need to be adjusted to restore full cross flow.

The maximum potential of improvement of the energy performance of the ground floor flat type is 11%, with an energy rating of C76. The estimated energy costs of this home would be £1,155 over 3 years. This indicates an improved energy performance, however it is still significantly lower compared to the energy performance a similar dwelling built nowadays to meet the current Building Regulations.

### Brick construction maisonette



### *Heritage and local identity*

The flat block at Ravensbury Estate comprises of 59 maisonettes split in two levels externally, making up a 4 storey high block. The flat block is constructed of solid brickwork [Flemish brickwork] and it has a pitched timber roof. A strong community and neighbourhood identity is one of the major characteristics of Ravensbury Court from an urban design point of view.



### *Domestic Energy Assessment*

Representative dwelling: Upper floor maisonette at Ravensbury Court. The dwelling has been assessed to predict its current energy performance. The energy rating from RdSAP was D67. The rating on the EPC that was retrieved from Landmark was C70. The assessment was rerun with the assumption of internal or external wall insulation and the rating was C75, which indicates a significant improvement compared to the current performance. Further improvement could be achieved with the employment of measures such as increasing the loft insulation and drought proofing the openings. The potential energy rating would be C79, which is a 12% improvement compared to the current energy performance.

The estimated energy costs of this home at its greatest improvement potential would be £1,224 over 3 years. This indicates an improved energy performance, which is still lower compared to the energy performance of a similar dwelling built nowadays to meet the current Building Regulations.

There are good arguments why existing buildings need to be retained and maintained, especially those constructed with durable materials. However, another very important consideration is that old dwellings need to be affordable to occupy and maintain and even more importantly comfortable for their occupants. For some of the existing buildings energy efficient upgrades might be less feasible especially if the comfort levels and carbon reductions do not balance out the financial investment.

Below is a table that summarises the suggested measures and the energy performance they are expected to achieve.

	Current	Wall insulation	Boiler and cylinder upgrade	Floor insulation	Roof insulation upgrade
<b>Representative Orlit Construction House</b>	E52	D63	C74	C74	
	£3,438	£2,667	£1,869	£1,749	
<b>Representative Brick Construction Flat</b>	D65	C72		C76	
	£1,704	£1,368		£1,155	
<b>Representative Brick Construction Maisonette</b>	D67	C75			C79
	£1,968	£1,497			£1,224



## B. Building Regulations Part L1B standards and compliance

According to Part L1B of the Building Regulations, where a thermal element is subject to a renovation the performance of the whole element should be improved to achieve or better the relevant U-Value set out in column b of the table below. This is subject to the area to be renovated being greater than 50% of the surface of the individual element or 25% of the total building envelope. The threshold U-Values are given in column a in the table below and reasonable provision would be to upgrade those thermal elements whose U-Value is worse than the threshold value.

The economic feasibility is another factor that influences potential retrofit strategies. If the target U-Values set in column b cannot be achieved due to serious technical or functional constraints or if the simple payback time of the measures needed to achieve the target U-Values is exceeding 15 years then the elements should be upgraded to the best standard that is technically and functionally feasible and which can achieve a simple payback of 15 years or less.

Element	[a] Threshold U-Value W/mK	[B] Improved U-Value W/mK
Wall - cavity insulation	0.7	0.55
Wall - external or internal insulation	0.7	0.3
Floor	0.7	0.25
Pitched roof - insulation at ceiling level	0.35	0.16
Pitched roof - insulation between rafters	0.35	0.18
Flat roof or roof with integral insulation	0.35	0.18

## C. Embodied carbon in existing materials

In cases where refurbishment is a consideration, it is believed that the embodied carbon of the dwellings after the refurbishment measures will be higher than the current figure. However, the cost of heating and maintaining the dwellings so that they are comfortable for their occupants is contributing to the carbon footprint of the dwellings and this is very significant as it has an impact directly on the occupants' quality of life.

In cases of demolition and new construction, re-using materials from the demolished stock can be less carbon intensive than using new materials, however thermal performance and condition are still key considerations. Existing materials can fairly easily be used in infrastructure.



#### D. Potential uses of buildings and infrastructure

If the dwellings were to be reused the only applicable use would be residential. Both the character of the area and the fact that housing demand in the area is high would mean that a different use would not be sensible.

The Greater London Authority's policy regarding the supply of new homes targets to deliver 420,000 homes over ten years. Merton's share of London's housing target is 3,200 homes over 10 years.

#### E. Possible use of materials

If any of the house types of Ravensbury Estate are to be demolished, the materials could potentially be used in the new development. This would be subject to the materials being free from asbestos or other harmful minerals and would be separately assessed by suitably qualified engineers.

Recycled materials could be used both in the construction of new buildings [e.g. brick] and in infrastructure works [e.g. concrete], such as roads, raising the level of parts of the development to respond to flood risk requirements, etc.

#### F. Consultation

Consultation events at Ravensbury Estate commenced in the summer of 2013. The project is now at Pre-application stage and the first phase of consultation events looking at the character of the estate, its positive characteristics and its problems has been completed. It will be followed by a second phase of consultation events looking into options for regeneration based on the comments and input of the occupants in both phases. The consultation events are organized by HTA Design and Circle Housing.

The first phase targeted at determining community reaction to the possibility of refurbishment and redevelopment of the estate. Residents' workshops were also arranged with selected residents representing the community in order to develop ideas and look at particular issues of the estate. Focus groups were also formed to discuss older peoples' needs within the estate and the residents' views on refurbishment. A residents' site visit also took place for people to see new developments and share their views on exemplary newly constructed estates.

The second phase of the consultation events which is ongoing, includes presentations of options to the residents so that their feedback is being used throughout the design process.

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## APPENDIX