

## 47 Greenleaf Road Retrofit Home

### Walthamstow

**In Waltham Forest we've been taking steps to address the climate emergency for years. But we know we all need to do a lot, lot more and we want to be even bolder in our future initiatives in order to meet our net zero target by 2030.**

**This eco home retrofit of a traditional Victorian terrace dating back to 1902, is in response to the fact that households are the biggest emissions contributor and we want to show how residents can make changes to their own home to deliver energy and cost savings and reduce their carbon footprint.**

In order to demonstrate the improvements that a whole-house retrofit can have upon the energy efficiency of existing housing stock, Waltham Forest Borough Council appointed long-standing partners Aston Group to manage the retrofit of 47 Greenleaf Road, its first-ever eco show home.

47 Greenleaf Road was selected as the ideal property for the project not only because it was unoccupied, but also because it is typical of houses of its age and energy performance.

A report published by Waltham Forest Council in 2019 highlighted that 51% of the borough's carbon emissions were generated by residential properties. Not only that, but the same report also revealed that 14.6% of homes in the area were fuel poor households.

New-build properties with energy-efficient technology are part of the solution to this problem, but it's not feasible to replace Waltham Forest's – or the nation's – current housing stock with new builds.

With 70% of Waltham Forest's 107,216 homes pre-dating 1944, it's vital to find a way to reduce carbon emissions from existing homes. This is where whole-house retrofitting comes in.

The annual heat demand is estimated to fall from 17,219kWh to 7,995kWh per year, while the EPC banding will rise to from E to A.

**For more information visit:**  
[Aston Group whole house retrofit](#)

#### Original statistics

Property: **47 Greenleaf Road, E17**

Age: **1902**

Energy efficiency rating: **E**

Annual heat demand: **17,219kWh**

Bedrooms: **4**

Position: **End of terrace**

Budget for retrofit: **£112,000**

Project start date: **11 January 2021**

Project end date: **23 July 2021**



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### Results

Comparisons and analysis have been undertaken in order to compare the thermal performances between the original building and the design performance (calculated using the government approved SAP methodology). A regime of testing was also undertaken in order to validate the improvements.

Having set clear goals at the outset of the retrofit project, it was important to demonstrate the effectiveness of the measures implemented at 47 Greenleaf Road. Here are some of the top line results.

### Thermal upgrades

#### Wall insulation

External wall insulation (EWI) was installed to the side and rear elevations of the property, using a 90mm EPS slab with a top-coat of render. EWI was not feasible on the street elevation in order to avoid loss of character to the property, therefore, Internal wall insulation (IWI) was installed to this façade using a 57.5mm insulated plasterboard.

#### Roof insulation

The roof was upgraded to 300mm of mineral wool insulation (between and above joists). This is expected to reduce heat loss through the roof by 50%.

#### Underfloor insulation

Floor insulation was installed to the main suspended floor via the Q-bot insulation system. Details can be found in the separate Q-bot impact report, however, was expected to reduce heat loss through the floor by up to 74%.

### Glazing

New high-performance double glazing was installed into the existing window frames.

### Service upgrades

#### Mechanical ventilation

In order to further reduce heat loss and improve internal indoor air quality, a mechanical ventilation system with heat recovery was installed to provide fresh air throughout the dwelling.

#### Heating system replacement

The existing gas boiler has been replaced with an air-source heat pump, and associated hot water cylinder. This was predicted have a dramatic impact on the buildings carbon emissions, especially as the carbon intensity of the national grid is decreased with the uptake of renewable generation.

#### Photovoltaic array

A 3.9 kWp solar photovoltaic array has been installed, with associated battery storage. This should be capable of producing approximately 2,850 kWh of electricity per year, and the battery storage system shall maximise the amount of this energy that can be used by the occupant.

#### Waste water heat recovery system

A heat recovery system has been fitted beneath the bath, in order to recover a percentage of the heat lost down the drain, and recover this to the hot water system.

**The original building reported an EPC E, after works the building has now achieved an EPC A.**

	Cost (exc. VAT)	Cost savings (per year)	CO <sub>2</sub> savings (per year)
ASHP and radiator system	£10,200	£860	4240kg
Solar PV and battery storage	£12,294	£609	853kg
Underfloor insulation	£1,850	£67	287kg
Solid wall insulation	£12,081	£341	890kg
Loft insulation	£829	£120	580kg