



Sustainability Report

This report provides a sustainability review of the proposed Phase 2 development at
Dukes Meadow – the former Old Park Farm, Waterloooville.



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Planning Conditions

The purpose of this Sustainability Report is to demonstrate how the equivalent of the 10% site wide energy by renewable technology can be achieved by improvements to the building fabric. It is also the intention to demonstrate that this strategy is considered to provide an economically and technically feasible solution.

Predicted Energy Requirements

Modelling of four house types from Phase 1 was undertaken.

The modelling strategy used a baseline specification, which equates to a specification of build which achieves building regulations. Comparison was made against this of two further specifications:-

Phase 1 specification, which incorporated improvements in air leakage, ventilation and with the addition of renewable technology.

Phase 2 specification, which incorporated greater improvements to the fabric specification, as well as to the air leakage, ventilation and heating system.

Please take note that these figures are based on single house types with orientation and other characteristics as defined for these units in Phase 1. It will be necessary to take account of variations in house type beyond the basic four house types and configurations, of window configurations or of any necessary changes to the construction details of the fabric.

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Specifications

The figures for the Baseline specification have been based on a fabric construction comprising windows with a Uvalue of 1.5 and Gglass of 0.71, air leakage of 10.0, wall uvalue of 0.24, ceiling uvalue of 0.11, ground floor uvalue of about 0.15, a gas boiler of 86% efficiency, with standard controls, accredited construction details using a γ value of 0.08; a cylinder of relevant size; and intermittent fans to wet rooms. These fabric specs relate closely to the build on Phase 1, but with modifications that result in Part L compliance being achieved.

The Phase 1 specification is an improved fabric construction comprising windows with a Uvalue of 1.5 and Gglass of 0.71; air leakage of 5.0; wall uvalue of 0.24; ceiling uvalue of 0.11; ground floor uvalue of about 0.15; a gas boiler of 90% efficiency with zone control and load or weather compensation; enhanced construction details using a γ value of 0.04; a cylinder of relevant size; and mechanical ventilation with heat recovery. Renewable technology has also been installed to this phase, being Solar Thermal systems and PV.

The Phase 2 specification is a further improved fabric construction comprising windows with a Uvalue of 1.32 and Gglass of 0.71; air leakage of 5.0; wall uvalue of 0.22; ceiling uvalue of 0.08; ground floor uvalue of about 0.15; a gas combi boiler of 91% efficiency with flue gas heat recovery system, zone control and load or weather compensation; accredited construction details using a γ value of 0.04; and improved mechanical ventilation with heat recovery. No renewable technology is installed.

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Results

Tabulated specifications are shown in Table 1, below.

Tabulated results are shown in Table 2, below.

These results illustrate that a greater benefit has in fact been gained by improving the overall fabric specification, and thus obviating the need for renewable technology. In all cases modelled the percentage improvement of DER over TER due to fabric improvement exceeds that achieved through installation of renewables.

It should be noted that the overall improvement due to greatly improved fabric for Phase 2, is a 13% betterment over the specification for Phase 1, when considering overall CO₂ emissions.

This is due principally to the fact that improved fabric specification will require the employment of enhanced construction details (refer to <http://www.energysavingtrust.org.uk/business/Business/Housing-professionals/Interactive-tools/Enhanced-Construction-Details>) which makes a major contribution to the heat retention properties of the dwellings. This has the further effect of requiring a lesser expenditure of energy with resultant lower emissions.

The overall effect to the properties is reduced running cost, reduced emissions and reduced energy usage for the lifetime of the building. Although similar improvements can be achieved by the installation of renewable technology, these are additional to the building with consequent issues associated with them as regards, maintenance, length of lifetime and eventual replacement. The usually accepted lifetime for such technology is between 15 and 25 years. That for the fabric of a building is in excess of 50 years.

For these reasons improving the fabric is a strategy that is endorsed and encouraged by CLG and DECC as well as BRE and EST.

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Plot No	House Type	Configuration	Wall U Value	Plane Ceiling U Value	Ground Floor U Value	1/2 Glazed IG Front Door U Value	Windows U Value	BFRC Gwindow	Air Tightness	Thermal Bridging SAP 2005	Space Heating	Heating Controls	Load or Weather Compensation	Cylinder	Measured Heat Loss	Flue Gas Heat Recovery	Ventilation	Solar Panel Area	PV - kWp
Baseline																			
carbon - 4907-0001-0872-055	Type J ET	E	0.24	0.11	0.15	1.10	1.50	0.71	10	0.08	86% System Boiler	Programmer, Stat and TRVs	FALSE	300	2.31	No	Intermittent Fans	No	No
carbon - 4907-0001-0872-065	Type L Det	D	0.24	0.11	0.15	1.10	1.50	0.71	10	0.08	86% System Boiler	Programmer, Stat and TRVs	FALSE	180	1.6	No	Intermittent Fans	No	No
carbon - 4907-0001-0872-066	Type K Det	D	0.24	0.11	0.15	1.60	1.50	0.71	10	0.08	86% System Boiler	Programmer, Stat and TRVs	FALSE	300	2.31	No	Intermittent Fans	No	No
carbon - 4907-0001-0872-082	Type C ET	E	0.24	0.11	0.16	1.10	1.50	0.71	10	0.08	86% System Boiler	Programmer, Stat and TRVs	FALSE	180	1.6	No	Intermittent Fans	No	No
Renewables																			
4907-0001-0872-0055	Type J ET	E	0.24	0.11	0.15	1.10	1.50	0.71	5	0.08	Ideal ICOS System HE15	Time & Temp zone controls	TRUE	300	2.31	No	Greenwood HRV1	3.3	No
4907-0001-0872-0065	Type L Det	D	0.24	0.11	0.15	1.10	1.50	0.71	5	0.08	Ideal ICOS HE 18	Time & Temp zone	TRUE	180	1.6	No	Greenwood HRV1	1.65	No

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												controls							
4907-0001-0872-0066	Type K Det	D	0.24	0.11	0.15	1.60	1.50	0.71	5	0.08	Ideal ICOS HE 18	Time & Temp zone controls	TRUE	300	2.31	No	Greenwood HRV1	3.3	No
4907-0001-0872-0082	Type C ET	E	0.24	0.11	0.16	1.10	1.50	0.71	4	0.08	Ideal ICOS HE12	Time & Temp zone controls	TRUE	180	1.6	No	Greenwood HRV1	1.94	No
No Renewables																			
4907-0006-0872-055	Type J ET	E	0.22	0.08	0.15	1.10	1.32	0.71	5	0.04	Ideal Logic Combi 33	Time & Temp zone controls	TRUE	none	n/a	No	Greenwood HRV2	No	No
4907-0006-0872-065	Type L Det	D	0.22	0.08	0.15	1.10	1.32	0.71	5	0.04	Ideal Logic Combi 33	Time & Temp zone controls	TRUE	none	n/a	No	Greenwood HRV2	No	No
4907-0006-0872-066	Type K Det	D	0.22	0.08	0.15	1.10	1.32	0.71	5	0.04	Ideal Logic Combi 33	Time & Temp zone controls	TRUE	none	n/a	No	Greenwood HRV2	No	No
4907-0006-0872-082	Type C ET	E	0.22	0.08	0.15	1.10	1.32	0.71	5	0.04	Ideal Logic Combi 33	Time & Temp zone controls	TRUE	none	n/a	No	Greenwood HRV2	No	No

Table 1 – Construction and technology specification.

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Plot No	House Type	Target Emission Rate (kg per square metre per year)	Dwelling Emission Rate (kg per square metre per year)	% reduction	Carbon Footprint Standard Case SAPs (Tonnes per year)	Carbon Footprint with renewables (Tonnes per year)	Carbon footprint with Improved fabric (Tonnes per year)	% Carbon Savings over standard with renewables	% Carbon Savings over standard with improved fabric	% Carbon Savings improved fabric over renewables
Baseline										
carbon - 4907-0001-0872-055	Type J ET	20.99	20.22	3	2.21					
carbon - 4907-0001-0872-065	Type L Det	23.01	21.15	8	2.95					
carbon - 4907-0001-0872-066	Type K Det	22.60	21.52	4	2.38					
carbon - 4907-0001-0872-082	Type C ET	25.56	25.12	1	1.86					
With Renewables										
4907-0001-0872-0055	Type J ET	20.99	15.29	27		1.58				
4907-0001-0872-0065	Type L Det	23.01	17.16	25		2.26				
4907-0001-0872-0066	Type K Det	22.60	16.55	26		1.73				
4907-0001-0872-0082	Type C ET	25.56	19.10	25		1.33				
Improved Fabric										
4907-0006-0872-055	Type J ET	20.99	14.80	29			1.55			
4907-0006-0872-065	Type L Det	23.01	15.30	33			2.02			
4907-0006-0872-066	Type K Det	22.60	15.59	31			1.64			
4907-0006-0872-082	Type C ET	25.56	18.55	27			1.30			

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Plot No	House Type	Target Emission Rate (kg per square metre per year)	Dwelling Emission Rate (kg per square metre per year)	% reduction	Carbon Footprint Standard Case SAPs (Tonnes per year)	Carbon Footprint with renewables (Tonnes per year)	Carbon footprint with improved fabric (Tonnes per year)	% Carbon Savings over standard with renewables	% Carbon Savings over standard with improved fabric	% Carbon Savings improved fabric over renewables
Summary										
4907-0006-0872-055	Type J ET				2.21	1.58	1.55	28	30	6
4907-0006-0872-065	Type L Det				2.95	2.26	2.02	23	31	25
4907-0006-0872-066	Type K Det				2.38	1.73	1.64	27	31	12
4907-0006-0872-082	Type C ET				1.86	1.33	1.30	28	30	6
Estimated % average savings based on above 4 plots.								27	31	13

Table 2 Results Summary of Modelling

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