# Hoyland Road, Hoyland – Energy Reduction Calculation

This report has been prepared by the FES Group on behalf of Avant Homes Yorkshire to accompany the planning application for the proposed development known Hoyland Road, Hoyland.

The development proposals will see the construction of 100 new dwellings, consisting of two, three and four bedroom dwellings.

## Establishing a Baseline

To adequately ascertain the potential of Avant Homes Yorkshire preferred strategy, a baseline energy consumption associated with the development must be calculated. As such the development was modelled in SAP 2012 to determine the current $CO_2$ emission and associated energy requirement prior to the incorporation of improved fabric efficiencies and renewable technologies. The table below summarises the results calculated.

*Table 1 – Baseline Energy Consumption & $CO_2$ Emission Rate*

| House Type | No | Baseline Emission Rate (kg/year) | Baseline Energy Requirement (kWh/year) |
|---|---|---|---|
| 2 Bedroom dwelling | **16** | 26,440.83 | 112678.4 |
| 3 Bedroom dwelling | **41** | 64,515.17 | 273056.72 |
| 4 Bedroom dwelling | **43** | 87,161.20 | 372554.58 |
| **TOTAL** | **100** | **178,117.21** | **758,289.70** |

The table above confirms the proposed works at Hoyland Road, Hoyland has an approximate site wide energy requirement of **758,289.70 kWh/year** and an associated $CO_2$ emission rate of **178,117.21 kg/year**.

## Fabric and Building Services Specification

Avant Homes Yorkshire propose a series of fabric and building service enhancements that exceeds the minimum requirements of Part L1a. By placing a significant emphasis on the performance of the fabric of each property, reductions in energy and carbon will be achieved. The following table details the anticipated fabric efficiency and building services standards to be incorporated into the design. These measures constitute the **lean** efforts.

*Table 2 – Enhanced Specification Summary & Comparison*

| Element | Part L 2013 | Enhanced Specification |
|---|---|---|
| **Wall** | 0.30W/$m^2$K | 0.22 W/$m^2$K |
| **Roof** | 0.20W/$m^2$K | 0.11 W/$m^2$K |
| **Floor** | 0.25W/$m^2$K | 0.15 W/$m^2$K |
| **Glazing & Doors** | 2.00W/$m^2$K | 1.30 W/$m^2$K |
| **Air Test** | 10$m^3$/h.$m^2$ at 50Pa | 5$m^3$/h.$m^2$ at 50Pa |

The U values above show that the minimum requirements of Part L1A have been exceeded.

In addition to the summary above the following additional measures will be incorporated into the design, constituting the **clean** measures to reduce energy consumption;

- Avant Homes Yorkshire have adopted the APA Constructive Details. These reduce thermal bridging throughout junctions and penetrations through the building fabric, typically producing a dwelling Y-value of between 0.03 and 0.06, these equal approximately a 60% improvement over the Governments ACD details.
- Efficient independent heating systems will be provided, with time and temperature zone control and delayed start thermostats. These will allow the eventual occupants to exercise maximum control over their heating system and thus reduce energy consumption.
- Energy efficient lamps will be installed in each light fitting.
- Water consumption is now included in the calculation of a property's energy consumption. Thus each property will adhere to the requirements of Approved Document G– maximum internal water consumption of 125 litres per person per day.

It is clear that the proposed strategy places a great importance on the efficiency of a buildings thermal envelope and internal building services. This emphasis is to be encouraged. It recognises that it is inherently more sustainable to invest resources in reducing a property's long term energy consumption in contrast to short term generation benefits.

## Reduced Emission Rate & Energy Requirement

To determine the benefits of the proposed specification, the development was again modelled in SAP 2012. The table below summarises the results calculated.

*Table 3 – Reduced Emission Rate & Energy Requirement*

| House Type | No | Actual Emission Rate (kg/year) | Actual Energy Requirement (kWh/year) |
|---|---|---|---|
| 2 Bedroom dwelling | **16** | 24,212.67 | 101,269.12 |
| 3 Bedroom dwelling | **41** | 58,640.44 | 242,908.60 |
| 4 Bedroom dwelling | **43** | 79,394.85 | 332,513.84 |
| **TOTAL** | **100** | **162,247.97** | **676,691.56** |

The calculations summarised in the table above confirm a reduced energy requirement of **676,691.56 kWh/year** and an associated emission rate of **162,247.97 kg$CO_2$/year**. These are respectively **10.76%** and **8.91%** reductions over the baseline calculated previously.

In order to comply with the planning requirements, it is necessary for this development to show measures have been taken to ensure high energy efficiency and best practice with regards to energy consumption.

## Evaluation

*The FES Group* was instructed by Avant Homes Yorkshire to review the performance of the proposed Energy Strategy for the development at Hoyland Road, Hoyland. The energy strategy was detailed previously but can be best summarised as follows;

- Avant Homes Yorkshire has proposed a fabric first strategy which aims to achieve long term reductions in $CO_2$ emissions and climate change.

- The proposed fabric and building services specification will permanently reduce emissions by **8.91%** and the proposed energy demand by **10.76%** This is a significant betterment and demonstrates that the proposed development will have a reduced reliance on national resources (gas and electricity)

- Avant Homes Yorkshire has proposed a fabric and services specification that exceeds the minimum requirements of the now disbanded Code for Sustainable Homes Level 3 certification showing that energy and carbon reductions achieved by the development are over and above minimum requirements of Building Regulations Approved Document Part L1a 2013.

After detailed analysis we can conclude that the preferred energy strategy adheres to the principles and aspirations of sustainable design and construction as advanced by national and local government and the house building industry. We therefore recommend the adoption of the preferred energy strategy by Avant Homes Yorkshire.