
College Farm, Shortstown: Climate Change Strategy

Prepared on behalf of Gallagher Developments

December 2021

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1.0 INTRODUCTION

- 1.1 This report sets out the climate change strategy for the promotion of residential-led development comprising approximately 1,000 homes with associated primary school, local centre, and mobility hub on land known as College Farm in Shortstown.
- 1.2 Addressing climate change is central to the design vision. The Climate Change Strategy outlines the approach to delivering a sustainable, net-zero carbon development.
- 1.3 The Strategy considers both climate change mitigation (reducing the development's adverse effect on climate change) and climate change adaptation (ensuring that the development is resilient to the changing climate).
- 1.4 The Strategy sets objectives and key performance indicators for the proposed development that provides a route map to be followed as the design vision progresses to a planning application and beyond, to demonstrate how the development would achieve net zero carbon and be adaptable and resilient to climate change.

2.0 METHODOLOGY

Climate Change Strategy Themes and Objectives

- 2.1 This chapter outlines how the objectives for the Climate Change strategy have been derived and sets the framework for key performance indicators (KPI) that will be monitored, reviewed and updated over time. This will allow changes in regulation, policy, technology and lifestyle to be accommodated so that the strategy remains live and current. As the development has a c.6-7 year build out period (based on an average rate of 150 homes per year for 1,000 homes allowing for initial site works and any short-term dips in the market), it is critical that the strategy is kept flexible to accommodate future technology that may emerge.
- 2.2 Four climate change mitigation themes have been selected for the Climate Change Strategy. They are derived from the UK Environmental Accounts.
- 2.3 The main contributors to carbon emissions from a household in the UK are heating, electricity, transport and waste. With regards to achieving net zero for the proposed development, it is important to realise what interventions will yield the greatest reductions in greenhouse gas emissions. Design can affect the level of household emissions from a scheme. In tackling these sources of household emissions through design, the climate change strategy will be most effective. The following themes are therefore taken forward:
- Building and Infrastructure design and Performance (covering heating, electricity, materials and waste);
 - Energy Supply (covering heating and electricity);
 - Connectivity (covering transport and communications infrastructure); and
 - Waste.
- 2.4 Climate change adaptation will consider measures embedded into the scheme to ensure comfortable and safe living conditions within the bounds of the UKCP18 scenarios. Carbon sinks and carbon sequestration are important factors that can be addressed through a green and blue infrastructure strategy and assist with climate change mitigation and adaptation. Vegetation absorbs carbon dioxide from the atmosphere, keeps carbon locked up and contributes to maintaining more comfortable living conditions through the forecast warmer periods through natural shading and cooling. Blue and green infrastructure also provides climate change resilience by attenuating more intense rainfall events that are forecast. These measures have wide ranging benefits including towards biodiversity gains

and health and wellbeing. Green and blue infrastructure design does not fit within the themes above, which are derived from the UK Environmental Accounts, but is a critical part of the strategy and highlighted where appropriate.

Definitions

2.5 What is net zero?

- The UKGBCⁱ defines two terms: one for construction and one for operation.
 - Net zero carbon – construction:
 - *"When the amount of carbon emissions associated with a building's product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy."*
 - Net zero carbon – operational energy:
 - *"When the amount of carbon emissions associated with the building's operational energy on an annual basis is zero or negative. A net zero carbon building is highly energy efficient and powered from on-site and/or off-site renewable energy sources, with any remaining carbon balance offset."*

2.6 College Farm would contain built development but also a significant amount of blue, green and connectivity infrastructure. The trajectory to net zero has been considered for all of these elements, not just buildings.

2.7 With net zero carbon in mind, Committee on Climate Change guidance has been consulted to determine the design principles that will facilitate zero carbon living at College Farm.

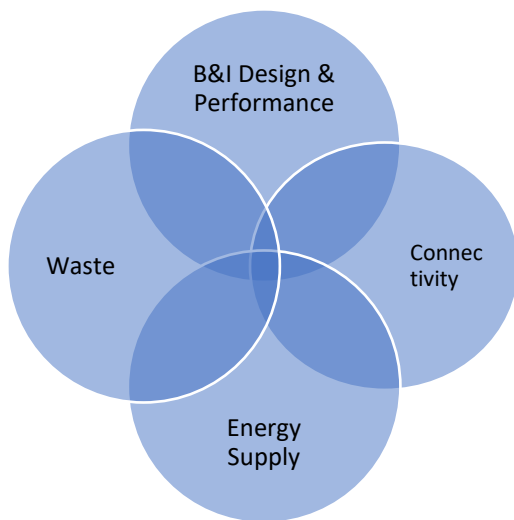
Objectives, KPIs and Review

2.8 The Climate Change Strategy is integral to the Strategic Vision and flows through and influences all aspects of design. The Strategy has been developed alongside the Vision and interfaces with all aspects of day-to-day life. Importantly, the climate change mitigation and adaptation measures are deliverable and can be reviewed and adapted over time to suit the future circumstances and priorities.

2.9 The KPIs are measurable to track the efficacy of the design principles embedded in the project and the commitment made by the Promoter. The intention is that the Strategy

will be reviewed and updated at outline planning application stage, again at Reserved Matters stage, during the construction and operational phases.

- 2.10 The objectives against each of the four themes for College Farm are set out below. Each theme is then considered in detail with KPIs proposed.



Building & Infrastructure Design & Performance

– framework masterplan to enable passive design, high levels of energy efficiency, the potential to accommodate inbuilt renewable energy generation, a district heating network, flexibility of layout for home working/EV vehicles. To meet Future Homes Standard (New homes would have CO2 emissions 75-80% lower than current Part L from 2025).

Connectivity – optimised for active travel with sustainable transport second and the private car last. Inbuilt corridors for high-speed data links and future technology, including a provision of a mobility hub that will make provision for electric forms of movement including an e-bike scheme.

Energy Supply – Framework masterplan with safeguarded corridors for future energy infrastructure, potential to accommodate on site renewable energy generation, storage and facility to sell back to the grid.

Waste – minimal construction waste, materials to minimise embodied carbon. Masterplan designed for maximised reuse, recycling, composting, with waste disposal as last resort. Community driven programmes to minimise waste.

3.0 STRATEGY

3.1 The proposed development at College Farm allows some innovative and ambitious proposals to be considered. These include:

- High levels of internalisation – trips internalised through the provision of key local services including primary school, and local centre (that may provide homeworking support facilities);
- The provision of active and sustainable travel options including pedestrian and cycle links into Bedford via Bumpy Lane.
- Provision of a new and dedicated extension to the Forest of Marston Vale comprising 30% of the development area set aside to forest planting and recreational uses, linking the site with Shocott Springs to the south.
- Greater than 10% Biodiversity Net Gain through green and blue infrastructure design proven to DEFRA Metric 3.
- Provision of a mobility hub to give faster non car mode access to the current and proposed train stations and employment destinations in Bedford and Wixams;
- District heating strategy allowing the proposed development to be served by air source heat enabled district heating network.
- Solar PV, EV Charging points for every home.
- Achieve latest Part L and F building Regs and Future Homes Standards for insulation and heat generation.

KPIs for College Farm

3.2 KPIs for each climate change mitigation theme and climate change adaptation have been set as follows:

Building & Infrastructure Design and Performance

- Incorporate a proportion of modular build where feasible
- New Homes Standard met for all homes
- Homes enabled for home working, EV and bicycle charging and storage
- Homes enabled for PV/heat pump installation
- All development zones to be protected from extreme rainfall events and flooding through the use of SuDs
- Buildings and infrastructure to be resilient to the higher average temperatures predicted

- Trees to be retained where possible. Any unavoidable tree loss to be matched and increased by native planted trees to act as carbon sink and provide natural shading and cooling.

Connectivity

- Modal shift from private car to active/sustainable modes
- Centres to be car free to maximise walking and cycling
- All development plots enabled for high speed internet
- Communication corridors to be resilient to, and protected from, flooding and heat stress
- All buildings to be smart and include sensors for sharing information, maximising energy efficiency and alerting users to environmental changes
- Corridors safeguarded to all development zones for potential future technological upgrades
- Provision of dedicated area comprising 30% forest cover to Forest of Marston Vale standards, including opportunity for 5km walking/running routes provided for recreation
- All homes to access convenience shop and primary school via convenient cycle and pedestrian links.

Energy Supply

- A proportion of energy demand provided by onsite low/zero carbon generation such as solar PV
- Potential for reinforcing electricity infrastructure for decarbonised grid and/or future hydrogen pipes
- Electric car charging points to all homes
- District heat network providing hot water to homes from air source heat pumps with an insulated network interfacing with residents.

Waste

- Net cut and fill balance across the site
- Site Waste Management Plan for construction phase
- Opportunity for modular build
- Just in time delivery
- "Take back" scheme with suppliers
- Maximise use of recycled/second-hand construction materials where feasible
- Seek to source a proportion of materials locally (within 20km radius)

- All buildings to provide appropriate storage for sorting different types of recyclables and waste, including food waste for composting.

Climate Change Adaptation

3.3 In addition to the KPIs above, the follow measures have been included within the design of the proposals to ensure resilience and adaptation to climate change in the future:

- Provision of 30% coverage of new woodland planting to Forest of Maston Vale standards in dedicated area linked to Shocott Springs
- Sustainable drainage systems to provide surface water attenuation allowing for climate change
- Tree planting in all streets, where feasible
- Permeable surfaces where feasible
- Use of timber and other natural materials prioritised within buildings.

3.4 Through the above, we have demonstrated that Biodiversity Net Gain of 10% can be achieved as a minimum in line with DEFRA's new Metric 3 calculator and the recently passed 'Environment Act'.

District Heat Network

3.5 A modular energy centre system has been designed into the scheme through individual single storey unit(s) that could serve 500 homes (195sqm) or 1,000 homes (366sqm) per unit. The illustrative masterplan has made provision for this level of infrastructure i.e. up to 390sqm for the district heating infrastructure.

3.6 Within the energy centre there will be an air source heat pump for the base load of heating provision providing 90% of annual heat, an electric boiler to top the heating up during very cold periods (10% of annual heat), and thermal storage.

3.7 The energy centre feeds a site wide plastic heat network which has similar installation techniques to gas networks.

3.8 Heating and hot water is delivered directly to homes through a heat interface.

4.0 SUMMARY

4.1 This report sets out the design principles and best available technology and that would be adopted within the scheme to achieve net zero carbon.

4.2 It also provides a detailed set of aims and objectives for the proposals to achieve net zero carbon alongside the decarbonisation of the national electricity grid.

4.3 The key measures included in the design vision are:

- High levels of internalisation through provision of a new primary school and community services;
- The provision of active and sustainable travel options including pedestrian and cycle links into Bedford;
- Provision of a new and dedicated extension to the Forest of Marston Vale;
- A minimum of 10% Biodiversity Net Gain;
- A mobility hub;
- Carbon free district heating strategy;
- Solar PV, EV Charging points for every home;
- Achieve latest Part L and F building Regs and Future Homes Standards for insulation and heat generation;
- Climate resilience through design.

4.4 This Strategy would be reviewed, revised and updated at the following key milestones:

- Submission of outline planning application;
- Submission of Reserved Matters;
- Once operational.

- 4.5 KPIs would be quantified once an Energy Strategy has been prepared to reflect the current and emerging legislation at the time, with regard to how decarbonised the grid is and energy generation technologies available.

REFERENCES

ⁱ <https://www.ukgbc.org/wp-content/uploads/2019/04/Net-Zero-Carbon-Buildings-A-framework-definition.pdf>