



# **SUSTAINABILITY STRATEGY**

**For the New Community  
Cranbrook  
Devon**

**On behalf of  
The New Community Development Partners**

**6<sup>th</sup> November 2006**

**Final Report**



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## EXECUTIVE SUMMARY

This sustainability strategy aims to provide a clear understanding of how the proposed development of a new community at Cranbrook by the New Community Development Partners (NCDP) will be sustainable.

The strategy is guided by section 3.8 of East Devon District Council's Supplementary Planning Guidance for the New Community (SPG), which lists what the strategy should consider, and as a result of negotiations between EDNCP and the District Council through the S106 process.

The application is described as;

*"a new community comprising up to 2900 residential dwellings, a town centre and a local centre composed of retail, employment, community and leisure uses, 2 primary schools and one secondary school, sports and recreation facilities, a country park, a railway station, a cemetery / burial ground, allotments, landscaping, engineering works, associated infrastructure, public transport infrastructure and car parking for all uses".*

All homes will be designed to attain Eco Homes 2006 Very Good rating, and all non residential buildings designed to attain BREEAM Very Good rating. Achievement of these standards are envisaged to become part of the S. 106 Agreement.

Insulation standards of a minimum 10% improvement on 2006 Building Regulations will be achieved.

Energy efficient lighting and appliances will be specified.

Homes will include high-efficiency, gas condensing boilers as standard. These units will be Class 5 (low NOx) boilers with minimum NOx ratings of <70mg/kWh. Boiler efficiency levels of >90% will be achieved using these products.

Selected non residential buildings will be promoted to deliver 50% low carbon output.

All units will be initially connected to a green electricity supply.

The development will be constructed in accordance with sustainable construction principles including minimising pollution and waste.

CHP and MicroCHP will be considered for the Education Campus.

NCDP aspire to deliver 16.4% overall of total energy from on-site renewable sources based on the assumptions set out in the section on predicted energy requirements. The goal is that, of the non residential buildings, 30-50% of their energy will be sourced from renewable sources, whilst with regard to residential buildings 9.5% on average will be sourced through solar water heating panels on 1000 homes.

NCDP will assess the viability of Ground source heat pumps at the detailed design stage for some non residential buildings.

A new railway station is proposed together with new frequent bus services, which will offer a sustainable public transport service.

Cycle and pedestrian facilities and routes will be incorporated where possible to encourage this mode of transport.

Extensive outside space will be available to residents due to the development of a Country Park, Town Park, Ecology Park and LEAPs/NEAPs.

The average density will be 40-70 dph in the town centre and 30-40 dph elsewhere.

A 10% improvement on 2006 Building Regulations will be achieved for acoustics.

There is a strategy for ecological mitigation and biodiversity enhancement.

There is a strategy to minimize water use through a Sustainable urban drainage system and low use sanitary fittings.

Recycling will be encouraged through external storage and segregation facilities and composting to some units, together with education to residents.

The development will create a mixed use scheme, including 2900 homes and up to 24,200 sqm of retail and employment plus other non residential uses (e.g. community, leisure, hotel, restaurants), and, with a variety of house sizes and types and a mix of tenures.

Community development will be fostered through the distribution of a Welcome Pack on arrival, a community extranet, appointment of a youth worker, ongoing consultation and education and training facilities on site.

The scheme includes the provision of 2 primary schools and 1 secondary school and a special needs school.

The sustainability assessment shows that good or best practice is achieved for 98% of the categories and factors.

Delivery of sustainability elements will be monitored through the certification of Eco Homes and BREEAM.

## INTRODUCTION

### 1. Report aim, approach and objectives

This sustainability strategy aims to provide a clear understanding of how the proposed development of a new community at Cranbrook by the New Community Development Partners (NCDP) will be sustainable. There are 4 key objectives for the report:

- to provide a thorough evaluation of general sustainability issues for the proposed development
- to respond directly to the sustainability requirements of local policy (East Devon District Council Local Plan and Supplementary Planning Guidance for the new community)
- to provide a means for measuring sustainability through the use of a sustainability assessment framework
- to provide a framework for the delivery, monitoring and review of sustainability commitments

The strategy forms part of the outline planning approval for the proposed development.

In preparing this report we have relied upon information provided within the supporting documents produced by other consultants to NCDP. Further detail in relation to some matters discussed within our report can be found within these documents.

Our approach for devising the sustainability strategy is guided by **section 3.8 of East Devon District Council's Supplementary Planning Guidance for the New Community (SPG)**, which lists what the strategy should consider. It has also been derived as a result of negotiations between NCDP and the District Council through the S106 process.

The strategy includes a written report element and a measured assessment element. The written report responds to the specific (local) sustainability guidance and requirements for the development whilst the assessment uses a more general, though very detailed, framework, to provide a measure of sustainability. This assessment framework is used on other major development proposals across the UK, for the same purpose.

There is a third element of the strategy which examines delivery, monitoring and review of the sustainability objectives.

It is considered that by adopting this approach all aspects of sustainability are covered, and readers from different disciplines and with different motivations will be able to clearly understand the sustainability objectives for the development, and how these will be achieved.

The first task has been to review policy and guidance documentation on sustainability.

In Chapter One we provide a summary of the policies and guidance which is deemed particularly relevant for the project (together with individual document summaries at Appendix 1).

Chapter Two of our report focuses on the proposed development. The SPG (S. 3.8) identifies 10 key items which must be addressed by the sustainability strategy and these items form the structure for this chapter. Our report will respond directly to each SPG requirement for the strategy. For some of the requirements the response is fairly straightforward (usually where the requirement is very specific) but for some there are a great many factors to be considered.

Section 3 provides an evaluation of sustainability using an assessment framework devised by Richard Hodkinson Consultancy. This framework has been created following our extensive work

in the field and a full explanation of how it has evolved, its uses and limitations is provided. The actual assessment is contained within a matrix (at Appendix 4), and an explanation as to what this means for sustainability is provided in Chapter Three. This assessment is broader than the issues included in our written report and helps to give a more holistic overview to the sustainability of the project.

For the remainder of this introduction we set out briefly the background to the site selection and the master plan for the development together with an overview for the scheme.

## 2. Background to site identification/ selection

The Structure Plan identifies an area of land (which lies at the extreme western part of the District) which is for the following development;

- A new community to accommodate approximately 2,900 dwellings (scale to be regarded as part of a potentially larger community in the longer term)
- Provision of 40 hectares of land for employment purposes
- A new airport terminal and associated works at Exeter airport
- Intermodal facility for the transfer of freight and a freight distribution centre
- New infrastructure provision required to accommodate the above

The new community site has been selected on the basis of a thorough examination by East Devon District Council of all realistic and possible options and it constitutes (in the Council's view), the best fit match between the objectives and criteria laid down for a new community and the social, environmental and economic opportunities and constraints present in the East Devon part of the PUA. The site is identified within the Local Plan, and can be described as;

*"the boundary for the site is defined by an arc of a radius at a distance of 1400m from the most northerly of the existing aircraft engine testing site at Exeter International Airport. The Northern boundary is formed by the Exeter/Waterloo Railway Line, the Southern boundary is the old A30 except for an area either side of the Rockbeare Stream which is proposed as Country Park and the Eastern boundary follows field boundaries approximately parallel to the high voltage power cables closest to the hamlet of Southbrook".*

The majority of the development land is farmland of relatively low ecological value.

## 3. Background to Master plan and development overview

The proposed site consists of 176 hectares of land, situated to the east of Exeter, between Broadclyst, Whimble and Rockbeare. The application is described as;

*"a new community comprising up to 2900 residential dwellings, a town centre and a local centre composed of retail, employment, community and leisure uses, 2 primary schools and one secondary school, sports and recreation facilities, a country park, a railway station, a cemetery / burial ground, allotments, landscaping, engineering works, associated infrastructure, public transport infrastructure and car parking for all uses".*

Detailed information on each element of the proposed new community is provided within Chapter 4 of the Planning Statement (March 2005) and within the Cranbrook Strategic Design Guidance (prepared by David Lock Associates).

## CHAPTER ONE

### 1. Definitions of sustainable development

The World Commission on Environment and Development defines sustainable development as;

*“development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.*

The 4 key aims for this are:

- Social progress which meets the needs of everyone
- Effective protection of the environment
- Prudent use of natural resources
- Maintenance of high and stable levels of economic growth and employment

The Sustainable Communities: Building for the future, (The Communities Plan) 2003 states that sustainable development is not just about additional housing but *“creating places where people want to live and continue to want to live”*. It describes sustainable communities as:

- Active, inclusive and safe
- Well run
- Environmentally sensitive
- Well designed and built
- Well connected
- Thriving
- Well served
- Fair for everyone

The UK Sustainable Development Strategy (March 2005) states that achieving sustainability is about;

*“building a strong, stable and sustainable economy which provide prosperity and opportunity for all and in which environmental and social costs fall on those who impose them, and efficient resource use is incentivised”.*

The 4 priority areas identified in this guidance are;

- Sustainable consumption and production
- Climate change and energy
- Natural resource protection and environmental enhancement
- Sustainable communities

There are many more definitions of sustainability with many more key objectives and principles for its achievement. Whilst the actual words used for the definition vary, and the key strategic aims for achieving it vary, there are the following common issues;

- Sustainable development is something which we all want to achieve
- It concerns protecting resources which without protection will result in a worse place for people to live
- It concerns ensuring a strong economy
- It concerns social issues mostly to do with creating good communities in which to live
- All 3 issues (environmental, economic and social) need to be considered together
- There are many factors which affect sustainability

With these 6 statements in mind the following section examines the Government and Local policy guidance on sustainable development.

## 2. Policy review

We set out below the guidance and policy which we have thoroughly examined in devising the sustainability strategy for the proposed new community. Where relevant we provide a summary of the key themes of the guidance/policy at Appendix 1.

We have been influenced by each guidance/policy to differing extents depending upon its relevance to the specific site and proposed scale of development, as well as the status of the document.

### 2.1 DCLG (Former ODPM) PPS1- Delivering Sustainable Development (February 2005)

This Government guidance seeks to ensure that sustainable development is pursued in an integrated manner by Development Plans, in line with the principles for sustainable development set out in the UK strategy. It states that Regional planning bodies and local planning authorities should ensure that development plans promote outcomes in which environmental, economic and social objectives are achieved together over time.

There are 4 key themes to PPS1, as outlined:

- Climate change is a very important issue for sustainable development and causes and impacts must be considered through development policies.
- Planning policies must promote high quality inclusive design in the layout of new developments and individual buildings in terms of function and impact, not just for the short term but over the lifetime of the development.
- Development plans are to contain clear, comprehensive and inclusive access policies (such policies should consider people's diverse needs and aim to break down unnecessary barriers and exclusions in a manner that benefits the entire community).
- Community involvement is an essential element in delivering sustainable development and creating sustainable and safe communities. As such In developing the vision for their areas, planning authorities are to ensure that communities are able to contribute to ideas about how that vision can be achieved, have the opportunity to participate in the process of drawing up the vision, strategy and specific plan policies, and to be involved in development proposals.

There is often a tendency with exemplar projects for the focus to be entirely on environmental issues which neglects the integrated consideration of the wider range of issues associated with economic and social objectives that need to be properly considered for sustainable development.

PPS1 is a practical and realistic policy guidance which, whilst aiming to achieve much on the environmental agenda, is also aware that development mostly takes place in the commercial world where economic and social factors play an important role. The following extracts from the policy support this;

In preparing development;

- plans should not impose disproportionate costs, in terms of environmental and social impacts, or by unnecessarily constraining otherwise beneficial economic or social development. (Para 26 (iii))

- plans should have regard to the resources likely to be available for implementation and the costs likely to be incurred, and be realistic about what can be implemented over the period of the plan.

## **2.2 DCLG (Former ODPM) PPS22: Renewable Energy (August 2004)**

Increased development of renewable energy resources is important to facilitating the delivery of the Government's commitments on both climate change and renewable energy. Positive planning which facilitates renewable energy developments can contribute to all four elements of the Government's sustainable development strategy:

- social progress which recognises the needs of everyone - by contributing to the nation's energy needs, ensuring all homes are adequately and affordably heated; and providing new sources of energy in remote areas.
- effective protection of the environment - by reductions in emissions of greenhouse gases and thereby reducing the potential for the environment to be affected by climate change
- prudent use of natural resources - by reducing the nation's reliance on ever diminishing supplies of fossil fuels
- maintenance of high and stable levels of economic growth and employment - through the creation of jobs directly related to renewable energy developments, but also in the development of new technologies.

PPS22, like PPS1, is commercially minded and states that renewable energy proposals or requirements are dependant on the viability of such measures, given the particular project circumstances, and that any such policy requirement should not place an undue burden on developers. (Para 8 (i) & (ii)).

It is noted that the Good Practice Guide that accompanies PPS 22 provides examples of policies, which are principally aimed at non residential development (industrial estates, public buildings etc), where it would be practical and possibly more viable to incorporate equipment for renewable energy production. It is also questionable if renewable energy solutions within primarily housing schemes are the most efficient and effective means of energy production and could ultimately prove to be a less efficient method of achieving the wider regional targets for renewable energy.

More detail is provided in the relevant energy sections of our report.

## **2.3 Draft Regional Spatial Strategy for the South West 2006 – 2026**

This guidance for the South West Region is draft at present. Very briefly, the guidance contains sustainability principles and policies to guide the spatial strategy for the region. There are four key sustainability themes;

- Sustainable consumption and production
- Climate change
- Protecting natural resources and enhancing the environment
- Creating sustainable communities

Policy ENV8: Renewable energy and energy efficiency stresses the importance of ensuring compatibility with other environmental objectives. The paragraph also stresses the importance that individual proposals are considered in the full context of sustainable development with their environmental, social and economic benefits properly accounted.

## **2.4 Devon Structure Plan 2001 – 2016: Devon to 2016 (adopted October 2004)**

The Devon Structure Plan is the current Structure Plan for the whole of Devon, including Plymouth, Torbay and Dartmoor National Park, but excluding Exmoor National Park. It sets out strategic planning policies for development and other land uses in respect of: housing; employment; conservation; minerals; waste; transportation; shopping; tourism; leisure; and recreation, over a 15 year period. It provides a framework for detailed decisions by local authorities as well as other organisations and individuals in the preparation of their forward Plans (e.g. Local Plans, Local Development Frameworks and Community Strategies).

In addition, Devon County Council is producing a sustainable development strategy. This currently has the following themes;

- Air quality
- Climate change challenge
- Culture
- Education
- Health
- Light and noise pollution
- Tourism
- Waste
- Biodiversity
- Construction and maintenance
- Economy and regeneration
- Energy
- Housing
- Transport
- Water

Structure Plan Policy N2 concerns the proposed new community stating that it is to provide a range of community and other facilities and should be located where it can access major and local networks. The new community is to include a new railway station to access the Exeter Waterloo line in addition to the following;

- be assimilated into landscape of the area
- avoid as far as possible, use of significant areas of the best and most versatile agricultural land
- be well related to, but separate from, existing settlements
- be linked to Exeter in the first phase by effective road system
- be accessible to the high quality road network and local highway system
- be capable of accommodating further development

## **2.5 East Devon District Council Local Plan revised deposit September 2003 incorporating proposed modifications 2006.**

This Local Plan contains East Devon District Council's policies and proposals for the development and use of land in the District until 2011.

Strategically the plan sets out objectives for general development under the three key sustainability headings of Social, Environmental Protection and Economic Need.

Chapter 12 of the plan is dedicated to the proposed new community development and Exeter Area of Economic Activity, now superseded by Exeter Principal Urban Area. It states a need for 3500 homes, 2900 within the new community (between 1995-2011), with potential for expansion, and sets out the factors at work in choosing the site (see above).

Planning Obligations (in the form of S. 106) to be attached to a grant of consent for the development of a new community are identified as:

- To ensure sustainability objectives achieved
- To ensure that works and costs of infrastructure and essential community facilities are met by the developer
- To ensure compatibility of new community with Skypark, the new Exeter Airport terminal and the intermodal facility for transfer of freight and a freight distribution centre

Proposal PUA 1 (Mod 7) sets out the objectives for sustainable development of the new community as follows;

- development of 2900 dwellings
- include timely and integrated provision of the necessary community facilities and infrastructure
- embody current practice in sustainable layout, building design and energy efficiency
- first residents to have basic needs met
- facilities to be of sufficient quality to avoid them seeking them elsewhere
- staged provision with increasing numbers of residents

The infrastructure required in line with phased programme of housing delivery is listed as follows;

- new railway station (Exeter/Waterloo)
- contributions to road link construction (Old A30 and new A30 Airport junction) and others required from projected pressure of new community
- improvements to existing facilities and new facilities and infrastructure for buses, cycles and pedestrians (within and to surrounds)
- public transport to major employment sites in Exeter and Exeter Airport
- measures to encourage public transport use
- landscape buffer around community
- high standard landscaping
- appropriate levels of services, amenities and infrastructure and associate building including retail, recreations, health, social services, places of worship, community hall, library, primary and secondary education, emergency services.
- Mix of design, densities, size and types of dwellings which reflect character of ED
- Min 40% affordable housing
- Opportunities for employment inc office/workshop space and electronic facilities for working from home (min 5 ha)
- Scheme for protection, provision, enhancement and management of existing landscape features, wildlife corridors and habitats
- Noise protection for dwellings (from engine testing land to north); <65Db LAeg.(5m) at night or bedrooms having building envelope sound insulation of 30 Db (A)

## **2.6 East Devon District Council - SPG for the New Community (April 2005)**

East Devon District Council has produced supplementary planning guidance for the East Devon New Community April 2005, which draws on the Devon Structure Plan and East Devon Local Plan, and sets out the specific requirements for the new community.

The SPG adopts a broadly based definition of sustainable development and seeks to ensure that the new community promotes high standards of sustainability. This includes the achievement of a thriving local economy and good community cohesion, whilst ensuring that environmental impacts are kept within sustainable limits, both in the short and long term.

The SPG sets the key sustainability aims as:

- Maximising the retention of wealth and employment opportunities within the community
- Reducing the need to travel
- Promoting IT use in the community and options for home working
- Minimising waste production
- Achieving high levels of energy efficiency and use of renewable energy
- Minimising use of non renewable resources and maximising the use of local materials
- High environmental protection and minimal detrimental environmental impacts
- Mitigating effects of climate change
- Maximising health and well being
- Achieving social equity and community cohesion

**Objective 3B of the SPG requires the developers to produce a Sustainability Strategy for the proposed new community and it poses 10 key items which are to be included in this Strategy. It is these 10 items which form the structure for our written report element of the submitted strategy (Chapter Two).**

**The report element of our strategy is supported further using a sustainability assessment framework which uses best practice benchmarks to enable measurement.**

## **2.7 East Devon Local Strategic Partnership, East Devon Sustainable Community Plan 2006-2016 (2006)**

This document is an umbrella for a number of other documents, all community related. Together the suite of documents form the Community Plan. It focuses on aspects which need to be tackled in partnership at a local level and therefore it should influence plans made by local organisations.

There are 7 key themes and the plan identifies priorities for each topic. The themes are:

- Community safety
- Inclusion and access
- Housing
- Keeping healthy and independent
- Culture and leisure
- Protecting and enhancing the environment
- Economic development

It is not considered relevant at this stage of the new community development to detail the actual priorities as they are very specific to certain locations.

## **3 Policy summary**

The policy and guidance on sustainable development in general and for the proposed new community is considerable.

It is important to note that in both PPS1 and PPS22, there is a requirement for proposals to be subject to viability testing based on economic, social and environmental issues, not purely environmental. This brings to light the need for policies to be realistic from a cost standpoint and that policies be considered in an integrated way bringing together the wide range of sustainability issues.

What is considered to be very important, and which must be addressed first, is the very specific needs for the development as set out within the East Devon SPG for the New Community (March 2005) and the East Devon Local Plan Revised Deposit September 2003 (Incorporating Proposed Modifications 2006).

## CHAPTER TWO

Chapter two of our report responds directly to the brief for the sustainability strategy (S.3.8 SPG) and to other feedback from the Local Authority. Firstly it is important to understand the vision for the new community.

### 1. SPG for the New Community: Vision

East Devon District Council's SPG provides specific guidance on what the new community should be and how this is to be achieved. It also provides a brief for what should be addressed in the sustainability strategy.

The SPG sets the following vision for the new community;

*"The new community will be a healthy, attractive and sustainable place to live; well designed and well thought out, with the services and facilities one would expect in a small town. The town will have an urban character but will be set within a green framework of open spaces, trees and hedges, which will provide a natural backdrop. High priority will be given to the pedestrian and cyclist, and the majority of streets and public places will not be dominated by motor vehicles. The new community will be economically active, both within its boundaries and in relation to nearby major employment sites. Overall the intention is to create a modern market town. An exemplar development of which everyone can be proud. Its design and development will seek to meet the high standards set and will challenge the conventional approach, where necessary, in order to achieve this".*

We consider the key themes of this vision for the developers as follows;

- Services and facilities of a small town
- Retention of open spaces, trees and hedges to provide green feel
- Dominance of pedestrian and cyclist over car
- Retention of employment locally
- Standards to be pushed beyond the norm

### 2. The sustainability strategy

As stated the structure of this element of the report follows the brief for a sustainability strategy as stated within East Devon District Council's SPG (S. 3.8).

**Objective 3B requires the developers to produce a sustainability strategy. The sustainability strategy will;**

#### 2.1 Include proposals to enable all buildings to be designed to significantly reduce their environmental impact and in particular their energy consumption

This objective is supported in the Local Plan; *"embody current practice in sustainable layout, building design and energy efficiency"* (Local Plan PUA 1 (Mod)).

Unravelling these two statements we find the following key elements;

- It applies to all buildings, homes, employment, community, retail, even public transport buildings
- The aim is to reduce environmental impacts which includes the impact on water resources, the landscape/environment, CO2 emissions and waste production
- Environmental impact of buildings is also related to their spatial design (ie location in relation to other facilities)
- These impacts should be considered through the use of a building and in it's construction
- The impacts should be considered today and in the future

Many environmental impacts of development are assessed in Eco Homes and BREEAM assessments. The following outlines the issues assessed by each of these assessments.

### 2.1.1 Eco Homes

The Eco Homes assessment applies to residential buildings and covers the following environmentally related issues;

- CO2 emissions
- Building envelope performance
- Provision of drying space
- Eco labelled white goods
- Low energy lighting
- Provision of cycle storage facilities
- Proximity to local amenities
- Provision of home office space
- Use of non ozone depleting insulating materials
- Nox emissions
- Reduction of surface run off
- Use of renewable energy
- Flood risk
- Environmental impact rating of construction materials
- Sustainable sourcing of construction materials
- Provision of recycling facilities
- Water use internally
- Water use externally
- Use of brownfield or low ecological value land
- Enhancement of ecological features
- Protection of ecological features
- Density of development
- Provision of natural daylight
- Sustainable construction and management

NCDP are committed to achieving a Very Good rating for all residential buildings in the new community (according to 2006 Version of Eco Homes).

A Very Good rating will put the homes in the top 85% of all homes assessed using this method in the UK (2004 and 2005 data).

As the assessment method is quantitative, it is possible to score Very Good in numerous different ways. There are some credits which are fixed for all homes on a site wide basis for the whole development but others are flexible depending upon the individual buildings. The NCDP intend to secure with BRE, if practicable, the site wide EcoHomes credits at an early stage and fix these for the full duration of the development.

This scoring flexibility for the individual buildings will assist in creating a more diverse “home” product and to reduce the homogenous feeling of some new build developments. It will also enable individual developers within NCDP to play to their own strengths in terms of methods and styles.

Overall each home will, as a minimum, achieve the Very Good EcoHomes 2006 rating.

If site wide credits are not attractive (by virtue of the methodology adopted by BRE) or the system of EcoHomes ceases to operate, then NCDP may not pursue certification by BRE but, in the event, NCDP will still be required to have the dwellings assessed by suitably qualified assessor, having regard to the anticipated site wide credits, and a Very Good rating will be required.

### 2.1.2 BREEAM Assessment

BREEAM assessment applies to all non residential buildings and it covers the following environmental impact issues;

- Air conditioning
- Ventilation
- Daylighting
- Illumination
- Comfort
- Acoustics
- Energy metering
- Energy performance
- Travel Plan
- Cycle facilities
- Public transport facilities
- Water consumption
- Water metering
- Water leakage
- Asbestos
- Recyclable waste
- Materials rating
- Timber source
- Polluting refrigerants
- Boiler type
- Rainwater systems
- Renewable energy
- Insulation
- Ecology changes
- Ecology advice
- Management commissioning
- Management information
- Management building
- Site monitoring

NCDP are committed to achieving a Very Good rating for all non residential buildings in the new community (according to 2006 Version of BREEAM).

We attach at Appendix 2 a summary of suggested design and management actions which would assist in achieving the Very Good BREEAM.

## 2.1.3 Energy consumption

### 2.1.3.1 Performance

Energy performance of buildings is important because it directly affects climate change.

In order to positively address climate change and reduce CO<sub>2</sub> emissions, Cranbrook is undertaking numerous energy reduction measures. The principle of these energy reduction measures is to improve overall building performance as well as promoting positive end-user energy behaviour.

The following sets out initiatives to be undertaken by NCDP at Cranbrook;

#### a) *Insulation Standards*

Improving the performance of the building envelope beyond the requirements of existing Building Regulations Part L is a key consideration and will be addressed by improving the standard insulation standards on all residential and non-residential units. As a minimum there will be a 10% improvement in building envelope performance provided at Cranbrook. This will be achieved on all homes through setting a notional 14% improvement in U values. These factors allow for variations in glazing proportions and building orientations.

Standard methodologies (SAP and SBEM) will be used to monitor and assess building envelope improvements and the impact on total CO<sub>2</sub> emissions during the development programme.

The following table provides an example of the residential insulation standards that Cranbrook will seek to specify above existing Building Regulations Part L and the predicted improved energy performance (%) that these measures will deliver.

Element	Thermal Performance Levels	(Area-weighted dwelling average (U-value))
(% improvement above Building Regulations)		14%
Wall	0.35	0.30
Floor (determined by the thermal resistance of the construction)	0.25	0.20
Roof (subject to location of the insulation)	0.25	0.20
Windows, roof windows, roof lights, doors	2.0+	1.8

+Note: Design standards allow a U-value of 2.2

### ***b) Efficient Lights and Appliances***

The specification of energy (and water where applicable) efficient lights and appliances aims to reduce the electrical requirements. Electrical consumption within residential units is increasing as a percentage of total energy demand, and is presently estimated to be around 30-40% subject to dwelling type.

The following specifications and measures will be specified throughout the site:

- Individual energy consumption meters that can be programmed to show user's real-time data on: energy use, CO<sub>2</sub> emissions and unit costs
- A+ rated electrical appliances as per EU Energy Labelling Scheme
- A rated water usage on all electrical appliances as per EU Energy Labelling Scheme
- European Ecolabel products specified where practicable
- Energy efficient light fittings specified in all units (including PIR sensors in non-residential units)
- Energy efficient space and security lighting (including PIR and day-light sensors as standard)

The overall impact of these efficiency measures would reduce electrical consumption by an average of 10%.

### ***c) Gas Condensing Boilers***

Cranbrook homes will include high-efficiency, gas condensing boilers as standard in all units. These units will be Class 5 (low NO<sub>x</sub>) boilers with minimum NO<sub>x</sub> ratings of <70mg/kWh. Boiler efficiency levels of >90% will be achieved using these products, approximately 4% better than existing Building Regulation Part L compliance.

Individual gas boilers have a greatly reduced NO<sub>x</sub> level compared to a centralised boiler or a CHP engine, and as the boilers will operate only when required, the overall pollution levels will be lower. This is an important issue, especially when considered in the wider context of sustainability standards being delivered.

The use of individual gas boilers enables end users to retain ownership of their energy use – they are able to control the system locally and therefore manage the cost. Individual gas meters and the associated gas bills will reflect the unit's occupancy levels and system use, which is not an efficiency always captured through a centralised heating system.

## ***2.1.3.2 CO<sub>2</sub> Reductions for Non Residential Buildings***

Through energy reduction measures and implementation of renewable energy technologies (see S. 2.3 of our report) NCDP will endeavour to deliver a 50% low carbon (CO<sub>2</sub>) reduction for the non-residential buildings at Cranbrook. This goal is set against existing Building Regulations and would relate to energy and CO<sub>2</sub> reductions in use.

The impact of this would ensure the energy reduction measures will be fully maximised through the detailed design and construction processes, thereby delivering high quality, sustainable units that can meet the aspirations of users and the challenges of the 21<sup>st</sup> Century. The approach is detailed further in Paragraphs below and the Cranbrook Employment Strategy.

### ***2.1.3.3 Provision of Green Electricity Tariff***

All major providers of electricity are developing national renewable power resources and/or are purchasing power from such sources which is sold to customers under a green electricity tariff. The provision of a green tariff is shown to positively influence end-user behaviour and directly connects the user with sustainable energy generation and energy efficiency.

Subject to the viability and provision of a private wire network within the town centre area and future supply legislation Cranbrook would have town centre units connected to a green electricity supply on practical completion/handover.

Although this process does not guarantee that the end user will retain the tariff – for example existing legislation allows homeowners to change energy suppliers under the 28 day rule - the experience of Green Energy suppliers is that a high percentage of users would stay with the same provider and consequently a significant but unquantifiable amount of power could be taken from renewable sources.

Further to this the NCDP will look to explore the potential for purchasing Renewable Energy Generation Obligation certificates subject to this process developing over the forthcoming 12 months.

The principle of the REGO will enable Cranbrook to guarantee the source and supply of renewable electricity supply purchased as part of a green electricity tariff supplied to customers in Cranbrook. This process will enable optimised off-site renewable electricity projects (eg regional wind, tidal and hydro schemes) to be directly supported by the Cranbrook development and increase the sustainable energy offering to those users who may not be able to have on-site renewable energy generation.

### **2.1.4 Sustainable Construction**

The development at Cranbrook is large and will be phased over a number of years. It must provide sustained mitigation measures against construction impacts to ensure there is no blight to exiting local residents or to those moving in to the early phases.

Measures will be put in place by NCDP which have longevity and provide a coherent and proactive approach and which will be regularly reviewed to ensure continuing appropriateness and monitored to confirm continuing effectiveness.

The main sustainability impacts to be considered during construction are:

- Health and safety issues in regard to the general public and site workers
- Protection against damage of existing features
- Materials used in the development
- Efficient methods of construction
- Pollution generated by transport of materials and by construction processes
- Minimisation of construction wastes and handling of the residues
- Use of local and national resources during construction.

A key contribution to the overall performance in mitigating construction impacts will be the registration of builders in the Considerate Constructors Scheme for each phase or sub-phase.

The following examines each item listed above.

#### ***2.1.4.1 Health and safety***

Measures to protect the general public and site workers from harm are fundamental to sustainable construction and would be the over-riding consideration in all aspects of the development at Cranbrook. The requirements of the Health & Safety at Work Act and all related requirements will be covered in Safety Plans, Method Statements, Risk Assessments, Permit to Work systems and the like for all aspects of construction activities and site security.

Typical of the issues that would be covered are:

- Site security and fencing
- Site facilities and layout
- Construction methods and plant to be used
- Materials transport and handling
- Site craneage and hoisting
- Site and work access and scaffolding.

More detailed risk assessments and work procedures will be prepared for specific site operations such as foundation excavations, piling procedures and the like as work progresses.

Liaison with local organisations will be established and maintained throughout the development period to ensure continuing education of public and workers regarding site safety issues.

The main elements of the Health and Safety approach will fall under Construction Design & Management Regulations, but as these issues are over-riding, documents such as the Construction Environmental Management Plan will also contain references to them.

#### ***2.1.4.2 Protection of existing features***

The site has only a very limited number of ecological features at present but care has been taken in the design to retain such features where practicable with the aim of incorporating them into the development. Their protection during all construction activities is essential and appropriate site management practices and procedures will be developed by builders to protect and maintain them in good condition until their incorporation in the completed development or individual phase is effected.

The main details of the protection methods and the management procedures to be implemented are included in the Construction Environmental Management Plan.

#### ***2.1.4.3 Materials used in the development***

While a major consideration in materials selection is the external appearance of the buildings, from a sustainability perspective it is crucial to seek to minimise the environmental impact of the materials used over the life time of the building - from manufacture, to eventual demolition and disposal.

The use of recycled materials (such as crushed concrete from site waste used for site hardstandings) have zero embodied energy impact, other than that expended in their processing or transport. Such uses are therefore highly desirable from a sustainability standpoint and their incorporation wherever possible in the development would be promoted through the Construction Environmental Management Plan.

For building materials NCDP will where viable and practicable specify A rated materials using the BRE Green Guide to Housing and ENVEST tool. Such materials have low environmental impacts compared with B and C rated materials, and especially so when sourced locally. It is intended that, as a minimum, floors, external walls, internal walls, windows and roofs for housing will meet the A rating, with other building elements being rated B rated.

Local supplies of all materials will be sought, subject to availability, quality and consistent supply.

Timber used at Cranbrook for both building and finishing elements will be sourced from sustainable sources (PEFC and FSC), wherever possible and wherever practicable and commercially viable. All materials will be locally sourced wherever possible (subject to viability).

#### **2.1.4.4 Efficient methods of construction**

The developers recognise the Health and Safety and sustainability benefits in employing efficient methods of construction. Such methods include off-site manufacture of whole buildings, frames and building elements and these will be considered in the development at Cranbrook. The Cranbrook development is not yet at the stage where such detailed decisions on design approaches and construction methods have been concluded. However, procedures will be implemented to ensure a robust and comprehensive evaluation process.

#### **2.1.4.5 Pollution**

We attach at Appendix 3 a table which sets out the impact potential associated with the proposed development activities. It is noted that the potential impacts are considerable which requires careful management as outlined below to mitigate these effects.

As a general strategy for dealing with such issues NCDP will set appropriate standards of performance, monitor them regularly, report them appropriately and review performance and any need for changes to procedures to meet changing circumstances.

As well as those pollution aspects, the project team at Cranbrook will implement detailed procedures for the ordered collection, segregation, re-use (where possible) and final disposal of residues of site waste streams. Training will also be provided to all site workers to encourage reduction of site waste at source.

More detailed measures are incorporated in the Construction Environmental management Plan but broadly impacts will be addressed as shown in the following sections.

##### **a) Air quality and pollution**

A risk assessment will be undertaken for each item below. Following this assessment, mitigation measures will be decided upon and implemented.

- Watering of the site to avoid generation of dust
- Use of dust suppressing tools where possible
- Minimising of earth handling movements
- No burning of materials on site
- Control of exhaust and fume emissions from site plant
- Monitoring and reporting dust generation and air quality
- Inspection and cleaning of local highways

**b) Noise pollution**

Almost all site activities have the potential to cause noise pollution and are inherent to the process. To avoid major nuisance to local residents, as well as preparing detailed work procedures to limit noise, the site will also limit the hours of work to ensure respite.

The main measures that will be adopted include;

- Careful transport planning to ensure fixed routes and appropriate timings
- Provision of method statements including plant to be used for agreement
- Agreement of a programme of sound monitoring with local council
- Calculation of noise levels at sensitive buildings
- No noisy activities on Sundays or Bank holidays unless with prior approval from the Council
- Use of piling methods appropriate to the location
- Plant to be fitted with acoustic covers
- Percussive drills to be fitted with mufflers
- Particularly noisy activities such as skip delivery at specified hours only

These and other measures to mitigate noise nuisance will be implemented through the Construction Environmental Management Plan.

**c) Vibration**

The measures to mitigate vibration across the site will aim to eliminate vibration, as far as possible, by careful selection of tools and methods. Where this is not practicable careful evaluation of vibration effects will be carried out in line with British Standards. Many of the considerations regarding noise (11.5.2 above) will also have a mitigating effect on vibrations. Where site plant is found to be causing ground vibration, such activities will be limited in their duration and if possible the plant changed.

**d) Ground pollution**

There are many potential sources of ground contamination in construction from storage and use of plant and materials on site to concreting and other construction activities.

These issues will be addressed in detail in the Construction Environmental Management Plan but are likely to include;

- Appropriate storage of fuels, oils and chemicals, with bund walls where necessary
- Restrictions on the transfer of fuels etc to specific 'safe' areas
- Investigation and remediation of any hydrocarbon ground emissions
- Protection of watercourses
- Pollutant management measures and carefully designed site drainage
- Detailed transport plans to ensure fixed routes
- Stripping and storage of topsoil to avoid contamination during construction.
- Controlled disposal of any contaminated materials.
- Permits to Work systems where significant risks are identified.

***e) Light pollution***

During the winter months the site working hours will be likely to mean that work starts at the beginning of the day and ends in the evening in darkness. It is therefore important that full consideration be given to careful siting of site temporary site compounds and particular task lighting. The requirements for this will be included in the Construction Environmental Management Plan in more specific detail.

Once complete the architectural, landscape, signage and advertising lighting may be potential pollutants. As such codes will be drawn up as part of the C Construction Environmental Management Plan to help to minimize these impacts.

### ***2.1.4.6 Construction waste***

Estimates show that around 40% of all waste sent to landfill in UK is construction related. This large amount of wastage is patently unsustainable and performance must be improved. It has also been shown on a number of housing sites that as soon as the issue of waste starts to be addressed significant improvements follow quickly.

The measures that will be implemented at Cranbrook include;

- An earthworks strategy to avoid removal of excavated material from site
- Minimisation of the need to import fill to the site
- Careful and appropriate materials storage
- Selection of materials and design styles that minimise waste
- Engagement of the supply chain and site team in waste and packaging issues
- Site training and information on waste issues
- Reducing waste at source, re-using or recycling materials wherever practicable
- Segregation of waste streams on site.
- Waste monitoring and report on performance against local or national benchmarks
- Site security measures to prevent loss through vandalism or theft

### ***2.1.4.7 Resource consumption during construction***

Construction activities are generally energy intensive and consume a large amount of electrical power and water, as well as the use of materials both within buildings and in their construction. The drive for energy-efficient building designs would thus be paralleled by a drive to reduce the energy consumed in their building operations. It is appropriate that measures be included in the Construction Environmental Management Plan.

These will include monitoring and reporting of:

- site temporary electricity consumption
- site water consumption
- journeys for both materials and workers
- waste issues noted above
- re-use of materials
- selection of design styles that minimise resources needed

### 2.1.4.8 Transport

As noted in the table of potential impacts, transport of materials and workers has the potential to cause air pollution, noise and vibration nuisance and ground pollution and uses a significant amount of energy. Additionally, the safety hazards associated are obvious.

The large scale of the Cranbrook development will generate significant material deliveries, worker commuting and waste disposal journeys. Because of these wide-ranging potential effects a number of mitigation measures will be incorporated in the Construction Environmental Management Plan. These will include:

- A detailed transport plan designating transport routes, parking locations, site access, delivery timings and the like to minimise problems
- Controls on the timing and/or location of use of plant on site
- Information to local residents as to the measures proposed
- Monitoring of performance and liaison with local residents to resolve problems.

## 2.2 To seek to provide a CHP scheme serving parts of the new community and, if viable, nearby employment sites.

Over the lifetime of the development CHP may provide a secure and efficient method of generating electricity and heat at the point of use. Due to the use of heat (via a district heating network) from electricity generation and the avoidance of transmission losses because electricity is generated on site, CHP typically achieves a 35% reduction in primary energy usage compared with power stations and heat only boilers.

There are potential economic savings, as well as the associated CO<sub>2</sub> reductions, associated with CHP. These benefits are only realizable for developments where there are high densities, where the base energy requirement can be balanced with a mixed base load energy profile and there is a suitable balance between the heat and electrical loads. Both the community heating network and a private wire network infrastructure must be provided. The private wire network will allow electricity to be sold to each customer at a competitive rate and is an essential element in enabling CHP to be a viable energy source.

CHP will be considered for the main education campus where the energy usage and profile is most likely to be able to support such a system and, if successful it may be extended into adjacent properties in the Town Centre. The viability of such proposals will need to be fully evaluated.

MicroCHP engines can also deliver CO<sub>2</sub> savings at a local level - within a single building. This potential will also be assessed as part of the overall energy generation mix at Cranbrook, especially for the two primary schools and multi purpose building where higher hot water demand during the working day may result in on-site electricity generation that matches the electrical load profiles for the building types. Although CHP engines are presently commercially available for natural gas only, the inclusion of such a system is likely to future proof the specific buildings for future micro-technologies.

The addition of a CHP engine attracts a greater capital cost than both centralised and individual gas boilers and as the Development will be constructed in multiple, separate phases the centralised system would initially not be operating at maximum efficiency. As such, if at all viable, a modular boiler strategy is most likely to be appropriate.

## 2.2.1 Community Heating

A community heating (district heating) scheme enables multiple buildings to be heated from a single energy source at the present time they are not viable as detailed in paragraph 2.2.2. However, over the lifetime of the development they may become more commercially viable. Regardless of overall size they comprise three common components:

- Heat source
- Heat distribution network
- Customer connections and metering

### 2.2.1.1 Heat Source

The heat source can be provided from a number of sources (CHP, Biomass, Gas boilers). However, the scheme would typically have a designated, centralised plant room or building containing the engines/boilers, (fuel storage if applicable) thermal store and pumps.

The locating and sizing of the plant room/building will need to be taken into account and accommodated within the development. A minimum area of 100m<sup>2</sup> would be required for the centralised heat source. This space requirement would increase further if biomass boilers and the associated fuel storage were installed.

Centralised boilers have to be designed to cover peak heat load requirements which vary considerably between residential and non-residential uses. As such a centralised system covering an imbalanced heat load profile (ie a high number of individual, residential units) will be less efficient than using individual boilers which can respond to specific user's requirements, occupancy levels and unit sizes without the need for retaining a large thermal store in the plant room. Any savings in CO<sub>2</sub> emissions will be marginal as a result through using centralised boilers in such a situation.

### 2.2.1.2 Distribution Network

In community heating schemes, heat (normally as hot water) is distributed from a central boiler plant to customers via well insulated underground pipes. These pre-insulated pipes can be installed in either underground ducts or directly in the ground and are fitted with automatic leak detection equipment. Zone isolation valves and other fittings that may require access for operation/maintenance can be accommodated in small access pits as standard.

Extensive distribution networks do incur standing heat losses which will not be incurred in individual, localised boilers or heating systems. However, in appropriate, high density areas and with well engineered systems, the distribution losses should be less than the efficiency gains resulting from more efficient, centralised heat generation. Therefore community heating may provide a net efficiency benefit relative to multiple, individual boilers.

### 2.2.1.3 Customer Connections and metering

Each customer (residential) could be supplied with a heat exchanger which then provides hot water for the heating system and water use but maintains a physical separation between the two systems. This separation enables higher distribution temperatures (~85°C), and therefore smaller network pipes to be safely used and prevents network contamination or leakage via individual units.

Small community heating systems (eg block of flats), or specific non-residential units (eg stores) may use a direct connection system to offer cost and energy efficiency benefits due to avoiding the use of the heat exchanger.

In both instances heat meters would need to be installed to enable individual energy management and billing to take place. Although the meters are likely to be monitored 'remotely' they would need to be installed in suitable areas for convenient manual meter reading as per other centrally supplied services. Measures would need to be taken to ensure that the meters remained properly calibrated over the life of the development.

Operation and maintenance of the centralised system would need to be undertaken by a management company on behalf of the residents. This raises two main issues in relation to costs for residents that would be higher than operating their own individual boilers:

- The billing process would be expensive to manage and process via the use of individual heat meters for each resident recording their heat usage as well as an annual service charge covering maintenance and equipment depreciation.
- The alternative approach of a single service charge avoids the cost of monitoring and billing individuals via the heat meters but disassociates residents from energy efficient practice through the use of a 'flat fee' for the heating and hot water charged to residents as an annual service charge.

### **2.2.2 Viability**

Although CHP technology has been widely applied to commercial and industrial premises little successful experience exists for residential, mixed-use, particularly in the private sector. A crucial issue is the robust multi-customer arrangements which need to be in place for proper revenue recovery. Over the lifetime of the development technologies may advance and residential CHP may become more viable but at this juncture there are no proposals to use CHP in residential property.

### **2.2.3 Micro CHP**

Micro combined heat and power (Micro CHP) units are designed to replace standard individual gas fired boilers and supplement the mains electricity supply by providing space heating, hot water heating and electricity. It is proposed to consider the use of CHP units within individual, non-residential units at Cranbrook.

Like large scale CHP, Micro CHP is designed to generate electricity as a by-product of the waste heat from the boiler's heating process. The heating load profiles required within the unit, the electrical generation will also mirror periods of increased electrical loads and as such the majority of electricity generated will be used on site (~80%), thus offsetting electricity that would otherwise be drawn from the mains (often at peak rate) as well as the energy losses and emissions associated with the electricity grid.

The main issues around installing Micro CHP compared to a standard boiler concern operational noise levels, unit size and increased pollution (NOx) levels. Suitable plant space will be provided within the selected units, which are likely to be the retail and commercial buildings.

## 2.3 Progress toward delivering 30% of energy needs using renewable energy technology

### 2.3.1 Predicted Energy Requirements

Based on the master plan and outline design details, the following energy prediction can be made for Cranbrook based on existing Building Regulation requirements. This is based on the application proposals and assumes a non residential element of 28,000 sq metres which includes allowances for community uses, hotel, leisure, restaurants etc

Building Type	Space Heating MWh/yr	Hot Water MWh/yr	Electricity MWh/yr	Total MWh/yr	Total Tonnes CO2/yr
<b>Residential</b>	5,880	6,720	8,400	21,000	6,082
<b>Non Residential</b>	3,992	2,495	3,493	9,982	2,771
<b>Total</b>	9,872	9,215	11,893	30,982	8,853

The predicted energy requirement for Cranbrook is 30.9MWh per annum which generates over 8,853 tonnes of CO<sub>2</sub> per annum. The energy efficiency measures discussed previously have sought to minimize the overall energy requirement for the site before applying renewable energy to the energy mix.

With selected non-residential units generating 30-50% on-site renewable generation and 9.5% from the residential units, and overall figure of approximately 16.4% can be achieved as shown in the table below.

Building Type	Total Energy (MWh/yr)	Potential RE (MWh/yr)	% Contribution RE
<b>Residential</b>	21,000	2,000 (from 1000 solar water heating systems)	9.5%
<b>Non Residential</b>	9,982	3,078 (to be decided – based on selected non-residential space providing 30-50% RE technology – not green electricity tariff)	30.8%
<b>All Units</b>	30,982	5,078	16.4%

#### Residential units:

2000MWh from 1000 solar water heating systems. Additional renewable energy from green tariff if all users subscribed: 8400MWh giving a total residential contribution of 10,400MWh.

**Non-residential units:**

3,078MWh is the renewable energy available from the low carbon options selected. Specifying particular renewable technologies for the various building types has not been undertaken. This would be carried out as the building designs are agreed. If all non-residential electricity comes from a green tariff – predicted level would be 3,493MWh giving a total non-residential contribution of 6,571MWh.

**Overall scheme:**

If all homes and non-residential units used Green Tariff Electricity together with the defined renewable energy products that have been included above then the total renewable energy contribution would be 16,971MWh which represents 55% of the total site energy demand.

**2.3.2 Energy Commitment**

During the lifetime of the development, renewable energy technologies will continue to develop in terms of performance, efficiency and technical specification. However, the NCDP cannot predict how technology will advance over the years and can only make an assessment based on today's technology.

A commitment has been given by NCDP to fund the installation of solar water heating technology on 1000 residential units (homes). The net result of this commitment will be the generation of approximately 9.5% of residential energy requirements being generated from on-site renewables.

The impact of this commitment is considerable for the delivery of renewable energy at Cranbrook and particularly on the residential units. Through the improved building envelope performance directly addressing space heating requirements, energy efficient lighting and appliances and green energy tariffs directly addressing the electrical load, solar water heating technologies will directly address the on-site hot water demand which on average remains a constant overall load despite dwelling size changes.

**2.3.3 General Performance Levels**

The performance of solar technologies is primarily in response to the solar irradiance levels the array will receive in the chosen location. Solar irradiation is a measure of the solar (direct and diffuse) energy falling onto a horizontal m<sup>2</sup> area over a set period – normally a day: W/m<sup>2</sup>/day. The UK has differing solar irradiation levels which decrease in value with increasing latitude. However, the average figure used within the PV industry for SE England, and thus Cranbrook is 1000W/m<sup>2</sup>. (The average solar irradiation in the Sahara Desert is 5000W/m<sup>2</sup>)

In addition to the latitude, solar irradiation is also affected by levels of cloud cover and pollution. Pollution levels have not been addressed in this report for the Cranbrook area, however, as Cranbrook is located in reasonable proximity to Teignmouth (SW of Exeter), average MET Office weather data has been referenced for Teignmouth to identify what impact cloud cover may have on the average irradiance level.

**MET office data**

The MET office publishes climate statistics of a 30 year period on the average weather conditions for local regional and national data, including max/min temperatures, sunshine and rainfall levels.

The data for Teignmouth, SW of Exeter (at 3m asl) shows the following average data over the period 1971-2000:

Month	Max Temp (C)	Min Temp (C)	Sunshine (hours)	Rainfall (mm)	Days of Rainfall >1mm rain (days)
Jan	9.0	3.7	62.3	101.8	13.6
Feb	8.9	3.5	76.3	82.7	11.2
Mar	10.5	4.6	117.8	68.1	11.3
Apr	12.2	5.7	178.8	54.8	9.5
May	15.3	8.6	216.1	52.0	9.0
Jun	18.2	11.2	212.4	51.0	7.9
Jul	20.6	13.5	228.8	36.4	6.3
Aug	20.4	13.4	212.4	56.9	7.7
Sep	18.1	11.4	158.7	66.5	9.5
Oct	14.8	8.9	107.9	83.2	11.7
Nov	11.7	6.0	82.8	83.8	12.5
Dec	9.9	4.8	55.8	112.8	13.5
<b>Year</b>	<b>14.2</b>	<b>8.0</b>	<b>1710.0</b>	<b>850.0</b>	<b>123.7</b>

The data shows that on a yearly average Teignmouth, and potentially Cranbrook, receives a high level of sunshine with approximately 1/3<sup>rd</sup> of the year receiving >1mm of rain, thus average/below average levels of cloud cover. The average annual level of sunshine is 5-8% above the data for Yeovilton and Greenwich, London for example and 20-25% better re sunshine and rainfall days than the more north-westerly locations such as Manchester Airport and Paisley, nr Glasgow.

### 2.3.4 Solar Water Heating (SWH)

Solar water heating systems harness solar irradiation to heat water that can then be used for either hot water heating or additionally space heating. Solar water heating is one of the most cost effective and well established renewable energy technologies that can be installed on buildings available in the UK and Europe.

There are two main types of solar panels: flat plate and evacuated tube collectors (see following section). In principle a solar hot water system consists of a solar collector(s) that can be either free standing or mounted on the building. A heat transfer liquid (treated water or oil) is passed through the collectors to a heat exchanger in the hot water cylinder. The hot water cylinder will usually be a dual coil cylinder, connected to a conventional heat source, such as gas or electricity, or another renewable heat source (biomass) providing back up hot water and heating.

Both types of collector can be connected to a pressurised or unpressurised solar water heating system, and there are numerous products commercially available on the market providing different approaches and solutions<sup>1</sup>.

The solar water output from both technologies is naturally biased towards periods of higher irradiance levels (sunnier, brighter summer months) and as such is primarily suitable for providing hot water loads. Optimum orientation on average would be within 25° of south at 35-40° pitch.

<sup>1</sup> Systems that drain the heat transfer liquid when not in use back out of the collector, DC pumps powered by small PV panels.

The following generic performance figures are based on an optimised southerly, unshaded orientation:

Collector	Area (m <sup>2</sup> )	Output (kWh)	Gas Offset (kWh)
Flat Plate	3.3	1350	1588
Evacuated Tube	3	1800	2118

### **SWH Technologies**

The main SWH technology being assessed in the study relates to those using a heat transfer liquid as a means to heat the hot water cylinder/provide space heating.

There are solar air based systems now commercially available in the UK, which provide space heating and hot water in addition to air ventilation. These systems use flat plate collectors and operate in a similar principle to standard solar water heating systems. As this stage of the study no further assessment will be undertaken although the technology will be assessed as part of the detailed design stage.

#### **2.3.5 Flat Plate Collectors**

Flat plate collectors expose a broad, flat expanse of absorber to the sun, and the absorber surface is contained within a glazed<sup>2</sup>, sealed panel. The absorber material directly transfers the solar irradiation to the heat transfer liquid, while the glazed front and well insulated rear maximise the internal temperatures generated and minimising possible heat losses.

The capital cost for flat plate collectors is less than that for evacuated tubes, however they have lower efficiencies and are subject to conductive and convective heat losses.

#### **2.3.6 Evacuated Tube Collectors**

In evacuated tube collectors the absorber material is placed within a glass tube and the air is removed to eliminate conductive and convective heat losses. The system either heats water directly or uses a heat transfer liquid to transfer heat energy to the water in the hot water cylinder.

Evacuated tubes are more expensive but more efficient than flat plate collectors on average.

### **2.4 Seek to achieve compatibility of energy distribution network with proposed or future links with local suppliers of renewable energy**

South West England has one of the fastest growing renewable energy industries within England, with manufacturers and suppliers based throughout the region, with further manufacturers located just outside the region in South Wales. The industry covers technologies from solar water heating and ground source heat pumps through to wind generation, tidal systems and the production of biofuels.

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<sup>2</sup> Either toughened glass or UV stable plastic.

The provision of suitable renewable energy technologies as part of the site wide energy mix at Cranbrook will seek to support and enhance the development of the local renewable energy industry wherever practicable. This support is likely to include using local renewable energy companies to supply and install the solar water heating systems and other renewable technologies, provision of biofuels for heating and transport, and management and maintenance of the potential community CHP system.

The following technologies are provided by regionally based renewable energy companies, and have been considered for inclusion at Cranbrook.

### 2.4.1 Photovoltaics

Photovoltaic (PV) modules are capable of converting daylight into direct current (DC) electricity, thereby converting one of the most abundant energy sources – solar irradiation. PV technologies are being used in increasing situations to provide power to both grid connected and off-grid applications.

PV technologies are increasingly available in a range of different styles and formats to suit the built environment. These range from standard modules in an aluminum frame through to panels integrated into the building fabric, PV roof tiles and slates, atrium/conservatory glazing and curtain walling façades.

The amount of AC power output that is generated by a PV system relates primarily to;

- irradiance levels (amount of daylight) falling on the PV modules
- orientation and pitch of the array
- size of the array (ie number of panels),
- efficiency of the modules
- efficiency of the PV system (ie the correct sizing of the PV modules to the inverter(s))

The most important of these is the irradiance levels and the amount of daylight falling on the PV modules, in that the systems performance is directly proportional to the irradiance level.

Cranbrook receives above average levels of sunshine and therefore the orientation and pitch of the modules would have significant impact on the system performance and overall energy generation potential.

#### **Benefits and limitations of PV**

There are a number of benefits that might accrue from installing PV systems into the built environment:

- silent in operation with no moving parts
- operate throughout the year using daylight (not sunlight)
- they can be integrated onto/into the building envelope so:
- no additional land area is required
- other building material costs are offset
- Versatility of incorporation within the building envelope and the architecture.
- modular systems allowing any system size to be installed.

The main limitations with using PV as a renewable energy source are;

- High cost of the PV components
- Highly sensitive to shading/overshadowing

- Possible structural implications for the building design
- Output is limited to daylight hours only

Although in principle PV is technically viable at Cranbrook, photovoltaic systems have not been specified within the overall development for a number of reasons:

- Suitable sizing and location of PV systems will be determined at the detailed design stage of individual units and buildings and as such specifying a system size and location is not appropriate
- A commitment to 1000 solar water heating systems within the initial 2900 homes has already been undertaken and as such suitable roof orientations will need to be prioritized for optimizing these systems performance
- PV technologies are developing rapidly, including cost effective integrated roof tiles, increased cell performance and 'organic' PV. As such more viable (economically) systems may be commercially available during the development phase of the project.

In progressing the new community beyond 2,900 dwellings NCDP's will reassess whether PV technologies should play a role.

## 2.4.2 Biomass Boilers

Biomass Boilers operate using a number of different bio fuels such as bio diesel or wood pellets/chips. These systems can range from a stand alone heater situated within the main living room (using smokeless fuel) through to a centralised boiler system connected to a district heating system. The majority of the larger systems (non-residential) can run on a number of fuels – both wood and gas, however, within the residential sector they are primarily fuelled by wood pellets or wood chip.

The main issues that is often raised regarding biomass boilers is the ability to secure a guaranteed supply of fuel: wood pellets or wood chips. This situation is improving as the UK supply chain develops and matures with the SW being one of the more mature markets in the England.

They are a carbon neutral source<sup>3</sup> of energy if using recycled waste timber sources or FCS credited pellets/wood chippings.

### **Benefits and limitations of biomass boilers**

There are a number of benefits of installing biomass systems into the built environment:

- Lower capital cost than other Renewable Energy technologies
- Ability to integrate within a centralised heating system

There are a number of limitations of biomass systems;

- Local, guaranteed supply chain for biomass fuel
- Requires community heating infrastructure to deliver economies of scale and real benefits
- Locating centralised plant and provision of space for fuels storage area and access

The use of Biomass Boilers will be explored, along with the CHP possibilities, for within the secondary education campus. This location provides a suitable site and localised heating system that is likely to support the use of biomass boilers.

The local supply of either woodchip, or more preferably wood pellets, will need to be assessed nearer to the start of construction of Cranbrook.

### 2.4.3 Biodiesel Engines

Detailed assessment of bio-diesel boilers has not been undertaken at this stage and it is not recommended to specify this technology at Cranbrook due to the cost of bio-diesel being prohibitively expensive to run a static heat source from (ie boiler). Even after removing the ~27p/l UK duty on diesel, the cost of bio-diesel is still double that of heating oil (Kerosene) and considerably more expensive than gas which is presently supplying the development. In the longer term the pricing of biodiesel is most likely to be set in line with the price of other road fuels.

Although biodiesel is a rapidly growing industry in the SW, the majority of this renewable supply will be used to service the increasing demands of the transport industry.

### 2.4.4 Ground Source Heat Pumps

The use of Ground Source Heat Pumps (GSHP) winning low-grade heat from the ground, from large bodies of water or the air and transferring this into a building via the use of a compressor is becoming more prevalent in the UK. This technology may be appropriate for some of the non-residential buildings being proposed at Cranbrook, and would be specified at detailed design stage.

The process takes advantage of the fact that average ground temperature, 1-2m below the surface, remains fairly constant at around 10-13°C. GSHP predominantly use a 'loop' system to absorb the energy from the environment. These can be laid in horizontal trenches, vertical bore holes or lakes/ponds. Closed loop systems are filled with a water/antifreeze mixture and a typical trench will need to be over 40m in length and a minimum of 5m apart. During summer months the system can operate in reverse and be used to cool the house.

The heat pump, exchanger and compressors (located in a utility room/garage within a residential building or plant room within a non-residential building), and via a heat exchanger transfers the heat from the water/antifreeze loop to heat refrigerants in the heat pump which, via the compressor, increases the temperature to about 40°C. The heat pump and compressor are powered by electricity and on average have a coefficient of performance of 1:3 to 1:4.

The systems are best suited to under floor heating systems in that the GSHP will efficiently generate the required 30-35°C heating requirement, as opposed to conventional heating systems which require higher operating temperatures (60-80°C).

Installation costs will vary based on the type of trench required and overall system sizing and as such specifying GSHP is not appropriate at this early stage of development at Cranbrook.

## 2.5 Contain proposals to reduce reliance on the car and secure an efficient, viable and sustainable transport network

The Local Plan sets out the following objectives to assist in developing a sustainable transport network;

- A new railway station
- Contributions to road link construction (Old A30 and new A30 Airport junction) and others required from projected pressure of new community
- Improvements to existing facilities and new facilities and infrastructure for buses, cycles and pedestrians (within and to surrounds)
- Provision of public transport to major employment sites in Exeter and Exeter Airport
- Include measures to encourage public transport use
- Opportunities for employment inc office/workshop space and electronic facilities for working from home (min 5 ha)

Extensive work has been undertaken through the planning application process and is contained within the following reports;

- East Devon New Community Environmental Statement
- East Devon New Community Environmental Statement Further Information (David Lock Associated with Cole Jarman Associates, Cooper Partnership, CPM, Ecology Solutions and WSP March 2005).
- Access Strategy for Proposed Developments to the East of Exeter in the Exeter Area of Economic Activity (Evidence of K Little presented to the Local Plan Inquiry). This document examines the impact of the development and of the cumulative impact as a result of the other proposed surrounding developments.

For the purpose of this section of our report we provide a summary under each of the following sustainability related topics, to demonstrate how sustainability is being addressed. We have kept each section brief and intend to demonstrate merely an overview to avoid repeating what is already included in other consultant's reports.

**The Overarching aim is to create sustainable transport which follows the hierarchy of transport modes – walking, cycling, public transport and private vehicles.**

### 2.5.1 Public Transport

There are two proposed forms of public transport for the new community and surrounds; rail and bus.

In designing the new community great consideration has been given to ensuring higher densities of development closest to the public transport stops, in particular the railway station.

High quality information and marketing material about public transport will be provided in the Welcome Pack to all new residents to encourage the use of these sustainable modes from the outset.

#### 2.5.1.1 Rail

The provision of a railway station within the new community with access to the Exeter-Waterloo line is a requirement of the Devon County Council Structure Plan.

The site of the Cranbrook new community was chosen, not least in part, because of its proximity to the Exeter-Waterloo rail line.

The site chosen for the station is to the north of the Neighbourhood Centre, and this has been chosen as the most suitable based on;

- safety and the public
- convenience for the user of the new community, Skypark and the airport
- commercial and operating view on spacing of stations

The predicted additional rail patronage generated by the new community is 1600 passengers per day.

The new community has been designed to ensure maximum numbers of homes are within a 800m walking distance of the new station. 1100 homes will achieve this objective and if expansion of the community progresses to the west of the current site, as is likely, this figure will increase significantly.

In designing new bus services the “competition” issue between rail to Exeter city centre and these new services has been fully considered. Bus services aim to complement the rail service and not compete with it.

There will be an appropriate network of foot and cycle paths to the new railway station to provide a high standard of access and its use will be further encouraged through the provision of cycle storage and car parking at the station (70 cars).

### ***2.5.1.2 Bus services***

Predicted bus passenger flows have been calculated and used to ensure a comprehensive service to all surrounding amenities, both within the new community and outside. Appropriate frequency of these services will be provided - see supporting travel reports (as listed above).

The design of homes within the new community has been worked on a principle of ensuring that as many people as possible are within a 400m walking distance of a bus stop. This is achieved, and indeed is exceeded, for all homes on the main street through the new community – many are within 200m.

The shuttle service which will provide a service from the new community to Honiton Road Park and Ride (at 15 minute intervals) will be fully accessible with a low floor and will use a low emission vehicle.

On site bus stops will have high quality shelters include suitable seating, lighting, easy access kerbing and good travel information.

Existing bus services in the locality will be diverted through the new community, which will both enhance the viability of them, and ensure that existing local residents services do not change too much.

### **2.5.2 Pedestrian network**

The aim is to create high permeability for pedestrians and to link all the residential, education, commercial, retail and employment areas.

The principal pedestrian routes are identified as follows;

- Along the main street to the schools, station, Settlement Centre and Local Centre
- From the residential areas to the bus stops along the main street
- Along the former A30 to existing businesses at Jack-in-the-Green
- Along the public footpath to Rockbeare
- To the new employment areas at the Airport, SkyPark and the Freight Terminal
- Recreational route through the new Country Park

Predicted footfalls are calculated for each route.

The pedestrian routes are designed to ensure high levels of pedestrian safety so routes are signed, visible, lit and of appropriate width and surfacing (for the predicted footfall). Where they run alongside roads traffic speeds are managed to ensure pedestrian safety.

Phasing of pedestrian routes is considered in detail to ensure that appropriate pedestrian movement is possible as development of each type of land use occurs. This will help to set up sustainable pedestrian movement from the start.

### 2.5.3 Cycling

Cycling will be encouraged through the provision of comprehensive network of cycle routes between homes and facilities. Some of these routes will run along former hedgerow lines (green lanes).

The principle cycle desire lines through the new community closely mirror the pedestrian route, as set out above. Predicted cycle movements for each route are calculated.

Cycle routes will be designed to be safe and attractive, ensuring that where they run along traffic routes vehicular speeds are reduced. Formal crossing points for cyclists will be closely linked to pedestrian crossing points to benefit from the associated reduction in vehicle speeds.

Cycling will be encouraged through the provision of cycle storage both for homes and for facilities. Stores will be covered at all schools, Town Centre and train stations, local facilities and sports facilities.

The employers of businesses and facilities within the new community will be encouraged by NCDP to make provision for cycle storage.

### 2.5.4 Car reduction strategy

The strategy for the new community is to reduce the use of the private car. This does not mean to preclude the use of car but to maximise the perception of walking, cycling and public transport.

This will be achieved through the following list of items. There is considerable overlap between these items and the preceding sections however it is important to see these items together to see how sustainable transport will be dominant over the car. Greater detail to each is provided within the specialist transport reports.

- Designing a network of movement on human scale

- A true mix of land use
- The pedestrian and cyclist to have access to all areas of public realm and with relative ease
- Provision of a well connected network where routes lead to one another, thus minimising walking/cycling distances between facilities
- No need for cul de sacs or car dominated distributor roads which are unwelcoming to pedestrians
- Provision of a traffic calmed environment
- Highway design principle is to achieve highly attractive public realm where pedestrian and cyclist needs are paramount
- Public transport connects all key locations
- Public transport will be convenient, frequent and easily accessed by foot

### **2.5.5 Construction traffic**

An assessment of the anticipated construction traffic has been undertaken and proposals to deal with this are set out in the Construction Environmental Management Plan.

## **2.6 Contain proposals to secure an attractive, healthy and ecologically rich environment**

Our response to this statement is considered in two parts; proposals to secure attractive and healthy and proposal to secure ecologically rich.

### **2.6.1 Attractive and healthy**

This statement is very broad and includes a wide range of issues. "Attractive" is a subjective term. In creating a place where people wish to live it is important to consider what elements of that place will attract them to it.

Through our extensive work in sustainability attractive and healthy also covers issues such as;

- reducing traffic
- reducing pollution
- offering opportunities for walking and cycling
- outside space provision
- good levels of natural daylight
- well insulated home so as to reduce the need to use heating
- access to medical services
- appropriate density for the locality
- appropriate acoustic design

We respond to our list of attractive and healthy related issues above.

#### ***2.6.1.1 Transport***

The transport, walking and cycling issues listed above are explored in more detail in S. 2.5 above.

#### ***2.6.1.2 Outside space***

The outside space provision is assessed in Eco Homes. Full credits are awarded.

Outside space will be provided to all residents and users of the new community. For each home there will be either a private garden, terrace/balcony or a shared communal garden (predominantly for the town centre apartments). In addition to this there are 6 LEAPS and 2 NEAPS in the development, a Country Park (including an Ecology Park), sports provision, a Town Park and Town squares. More detail is provided in section 2.6.2 below.

### ***2.6.1.3 Natural daylight***

The provision of natural daylight is assessed in Eco Homes. It is predicted that full credits will be awarded for adequate daylighting to the kitchen and for a view of the sky in all rooms.

Greater natural daylight reduces the need for electric lighting which in turn reduces energy requirements. It also creates a healthier, and generally preferred, environment in which to live. Natural daylight is affected by window size, window location, glazing type and orientation. In designing buildings it is important to consider these issues for each room, designing those rooms which offer greater natural light as kitchens and living rooms and those with less as bedrooms and bathrooms.

### ***2.6.1.4 Insulation***

Building envelope performance will be improved for all construction elements, except glazing, by a minimum of 10% above building regulations, with some elements as high as 14% improvement.

Such improvements in insulation are considerable in the context of other new build schemes, and will significantly impact on the cost of heating bills for the residents, as well as reducing significantly CO2 emissions.

### ***2.6.1.5 Medical services***

Medical services are anticipated within the new community before the completion of 50% of the total units, it is expected that the multiuse building, to be provided by the developers at 151 occupations, will allow for the same.

In addition a public health promotion campaign will be organised jointly by NCDP and the medical centre which will include information on healthcare, nutrition, education, healthy living environments and fitness. The promotion will be aimed at the new community population.

### ***2.6.1.6 Density***

Development density is also an important factor in creating an attractive place to live. Current sustainable development guidance is generally calling for development at higher densities so that undeveloped land can be protected.

The proposed design includes densities of between 40 - 75 dph in the town centre and 65 dph in the other focal points. In the rest of the community the majority of development will be between 30 - 40 dph.

This diversity of densities respects the East Devon locality whilst also responding to current higher density guidance. It will enable great variety within the community thus helping to ensure homes are provided for all people.

### **2.6.1.7 Acoustics**

Sound insulation is assessed within Eco Homes, the aim being to ensure the provision of adequate sound insulation and to reduce the likelihood of noise complaints. In order to achieve the Very Good rating NCDP will;

- Commit to carrying out a programme of pre completion testing based on guidance provided within Eco Homes (this specified the appropriate number of tests for different size groups of units, both for separating walls and floors.
- Commit to achieving airborne sound insulation values at least 3db higher and sound insulation values at least 3db lower than performance standards as specified in Building Regulations approved Document E (2003 Ed).

The standard reached will allow for a 10% improvement over current Building Regulations (2002).

These commitments will help to create homes in which people will wish to live in the long term. It is particularly important in the higher density areas of the community (town centre) where noise from neighbours and surrounding activities is more likely.

### **2.6.2 Ecology**

The current site is of limited ecological value.

A comprehensive Landscape, Biodiversity and Drainage strategy has been prepared for the new community.

This strategy includes a Landscape Strategy, a Tree and Hedgerow Strategy and a Biodiversity Strategy.

The Landscape Strategy identifies strong field boundaries and a comprehensive existing hedgerow structure as important to the local landscape character. These features therefore have directly informed the master planning process for the new community.

The strategy sets out objectives and commitments for the retention, protection and enhancement of landscape features, and for the provision of open space. Considerable open space will be provided for the new community as follows;

- Country Park including an ecology park
- Other landscaping planting
- Sports provision located adjacent to the schools
- 6 LEAPS and 2 NEAPS (in accordance with established guidance or as agreed with LPA)
- Town Park, display garden and central features
- Town squares (hard and soft spaces)

These spaces not only provide actual places for activity to take place but they help to create an identity for the community, including views.

The tree and hedgerow strategy provides a framework for the development which respects the existing ecology features, identifying the most important features for retention and a way forward for future work. Some of the hedgerows qualify as important under the Hedgerows Regulations 1997 as species rich, and will therefore be appropriately protected.

Similarly the biodiversity strategy provides a framework for ecological mitigation and biodiversity enhancement. The majority of the site supports habitats of limited ecological value (dominated by intensively managed arable and improved grassland), although there are a number of wetland features. Protected/notable species include badger, and bats.

Considerable habitat enhancement will be undertaken and phased into the development appropriately. Details are provided within the Landscape and Biodiversity Strategy.

In addition to these protection and enhancement measures to be undertaken, NCDP will implement a programme of public information and education on the topic to try and raise awareness and interest. This will include provision of interpretation boards in the Country Park, provision of nature trails, signage, wildlife hides and lookout points. In addition a range of initiatives such as leaflets distributed to the residents, will be undertaken.

## **2.7 Seek to minimise water use, especially potable water by incorporating water saving devices and systems whenever possible, including the use of rainwater harvesting systems**

There are many different elements in the reduction of water consumption, including:

- Reduction in the use of water within homes
- Facilities for rainwater harvesting
- Integrated approach to water demand and rainwater disposal
- Promotion of sustainable drainage systems
- Reduction of water leakage from pipes
- Sustainable sewerage systems
- Reduction of water use in construction

With respect to water use within all buildings of the proposed development, water efficient devices will be fully evaluated, and installed, wherever possible. The specification of such devices would be considered at detailed design stage and each will be subject to an evaluation based on technical performance, cost and market appeal, together with compliance with the water use regulations.

The following devices will be considered for incorporation within each building:

- Water efficient taps
- Water efficient flushing toilets
- Water efficient appliances
- Low flow output showers
- Flow restrictors to manage water pressures to achieve optimum levels
- Water fuses to prevent significant water leakage
- Water meters to all premises with guidance on water consumption and savings
- Leak detection systems to area/plant vulnerable to leakage

It is anticipated that water consumption might be reduced by up to 20% through these means.

It is also proposed to provide rainwater harvesting for all buildings for use in landscaped areas / garden watering. For residential buildings, this would generally take the form of rainwater butts for each dwelling. Rainwater harvesting will be fully evaluated for the schools.

Water used in construction is covered in the Construction Impacts section of our report (S. 2.1). Site water consumption will be monitored and reviewed.

## **2.8 Dispose of surface water through a SUD scheme**

NCDP have set the following objectives concerning sustainable drainage for the new community;

- ensure that run off does not increase above greenfield rates
- explore the viability of permeation of the ground as part of a Sustainable Urban Drainage System (SUDS).

Sustainable drainage has found a central plan in the preparation of the Landscape Biodiversity Drainage strategy. The conclusions are that some areas of the development can accommodate a sustainable drainage system, while others will require attenuation ditches and other small balancing features. These are recognised as vital by NCDP and will be incorporated appropriately, and effectively, to achieve run-off rates no higher than those from the existing green fields. The drainage strategy also includes measures to attenuate and store run off at source.

These sustainable drainage measures add significantly to the cost of the development, however they are deemed critical by the NCDP to ensure the new community development is sustainable.

Similarly, a review has been made by NCDP of measures by which to avoid pollution (e.g. from roads etc). Trapped gullies will be used, and where run off is directed to an attenuation ditch before discharge to a watercourse, benefit will also be gained from settlement of pollutant sediments. In detailed design stages, guidance on the need for any oil separators would be followed.

These measures proposed by NCDP, as set out in the Environmental Statement. They provide a broad range of initiatives to mitigate any risk of flooding as a direct result of the development and to avoid pollution of watercourses. The principles are supported by the Environment Agency.

## **2.9 Provide the infrastructure and systems to achieve a high level of re use, recycling and reduction of household waste both in and outside dwellings and within community as a whole**

The East Devon District Council waste-recycling target for 2005/6 is 27% (Local Plan 2006) and this target is likely to rise in subsequent years. EDDC has assessed that 42% of waste, excluding organic wastes, is potentially recoverable.

NCDP are committed to working towards these recycling targets and aspire to achieve up to EDDC's recycling targets for non-organic waste over the term of the development. Achievement of this will be dependent on the active encouragement and support of the District Council and the participation of voluntary recycling bodies.

NCDP also recognize the importance of waste segregation for domestic and non-domestic waste and will implement design and management protocols to facilitate improvements, as follows;

- External segregated waste storage bins located conveniently for dwellings

- Bin storage areas for the commercial buildings
- Advisory and educational information on waste issues would be identified in consultation with EDDC and disseminated to all occupiers
- The New Community web site would also be used to provide advice and information on community achievements
- Individual composting bins for residential units, where practicable
- A “bring” site for recycling clothes, glass, cardboard and paper would be provided within the community

NCDP recognize the need to arrange and agree all waste management proposals with EDDC and are willing to consider other waste recycling initiatives that the Local Authority may wish to propose.

In addition, through the S106 Legal Agreement a contribution would be made by NCDP towards funding a new domestic return/recycling centre on the eastern side of the city, using appropriate evaluation procedures to assess viability, based on performance and cost.

## 2.10 Promote sustainability amongst the new community residents

Much of the current sustainability guidance concerns developing a sustainable community – one in which people wish to continue living. The themes often read about are;

- An inclusive community
- Prosperity for all
- A balanced community
- A healthy place to live and work
- Provision of comprehensive community and recreation facilities

There is a Community Plan for East Devon District Council which lists the following 7 topics as important;

- Community safety
- Inclusion and access
- Housing
- Keeping healthy and independent
- Culture and leisure
- Protecting and enhancing the environment
- Economic development

There are two key ways of achieving these objectives; through creating a physical product (the new community) and through community initiatives. These are examined below.

## 2.11 Through physical product

By this we mean the actual building(s) being developed.

### 2.11.1 Mix of use and provision of local amenities

The Local Plan calls for a development with;

*“appropriate levels of services, amenities and infrastructure and associate building including retail, recreations, health, social services, places of worship, community hall, library, primary and secondary education, emergency services”.*

**Objective 6B** of the SPG for the new community sets out the following land use related objectives;

**Objective 4A** - employment generating land use

**Objective 4C** - retail and commercial facilities suitable for an area centre to serve local and wider needs

**Objective 5A** - leisure and recreational facilities, local employment sites and schools and colleges

**Chapter 7**– Country Park and local nature reserve, open space with informal and formal recreation opportunities

**Objective 8A** – Community and recreation facilities including one secondary and two primary schools, meeting paces, library, places of worship, local offices, health facilities, sports and play facilities.

The new community will be a mixed use scheme in a true sense. The non residential elements of the development are not merely gestures like many other “mixed use” schemes. They comprise a significant proportion of building and include accommodation for all of the major types of non residential use, including those called for in the SPG (a list of non residential buildings is provided in S. 2.1.2).

The total floor space of non residential use is 35,450 sqm. Based on a total of 2900 homes this is a ratio of 12.2 sqm : 1 home.

Provision of amenities is assessed by Eco Homes, which examines the availability of a post office, ATM, food shop, medical, leisure, play area, places of worship, outdoor space, pharmacy and leisure, and safe access to them.

These non residential elements will be phased into the scheme to ensure a smooth progression of development and to ensure appropriate integration of homes and infrastructure. In particular phasing will seek to ensure that the first residents are able to have all of their basic needs met.

## **2.12.2 Community initiatives**

Initiatives implemented in the new community once complete, and with the existing local community, during design and construction, can help in achieving a sustainable community. The following shows how this will be done at Cranbrook.

### ***2.12.2.1 Consultation***

The new planning system (Local Development Framework) requires developers submitting plans for council approval and planning permission to submit an accompanying Community Involvement Statement. This document should set out the steps that the developer has taken to involve the local community in the development process.

The proposed development has not been required to produce this as the Local Development Framework is not yet in operation. Despite this the NCDP have been pro active and have undertaken a full consultation exercise. They have considered this consultation to be critical given

the scale of the new community development, and embrace the exercise as a way of helping to inform the design decisions.

Consultation has included the following;

- Public meetings
- Public exhibitions
- Design workshops
- Direct engagement with identified stakeholders

Going forward, East Devon District Council may set up a local panel to advise on the design codes. If established this local panel will include the Local Council NCDP representations, local stakeholders and representatives from local interest groups.

### ***2.12.2.2 Welcome packs***

Each new home resident will be issued with a Welcome Pack which will contain information on a range of topics aiming to encourage sustainable behaviour from the outset. Examples are provided below;

- Bus/railway timetable
- Guidance on using home in an energy efficient way
- Guidance on selecting A rated energy efficient white goods
- Information on the location of nearby recycling centres and compost centres
- Tips for reducing water used in the home using the specification supplied
- Internet links and helpline numbers on a range of sustainability topics

A similar pack will be provided to the tenants and landlords of the non residential buildings.

### ***2.12.2.3 Community Extranet***

A web based intranet will be set up by NCDP for the new community. This facility will be used to inform the new residents of how the development is progressing, of opening dates for proposed facilities and will offer a means by which the residents can communicate with the development team, and each other. In addition there will be information about a wide range of sustainability topics such as recycling, water use reduction and energy efficiency. Any community initiatives or promotions will be advertised here.

### ***2.12.2.4 Management***

The proposed development has wide ranging open space provision, both formal and informal, and public buildings. It is absolutely critical that such facilities are managed from the early phases and into the future. Without management even the highest quality facilities soon fall into disrepair and no longer offer what is required by the new residents and businesses.

These public facilities in the new community will be managed by the Local Authority or a management company, and will be financed, in part, by NCDP contributions. Over time (once a critical mass of X has been achieved), it is anticipated that a Parish/Town Council will be established to manage the public realm.

In addition a Country Park Development Ranger will be appointed by NCDP to manage the facility. It will be important that this Ranger is involved in the early phases.

### **2.12.2.5 Education and Training**

The provision of education and training facilities within the new community will encourage sustainability by providing opportunities for residents which will make the place a desirable and prosperous place to live. In addition it will help to retain skills (and income) in the community.

Some of the developers in the NCDP have construction apprentice schemes which will provide training opportunities on site during the construction period. These schemes will be offered to local people including new community residents if appropriate. Once these skills are learnt by locals they will hopefully remain in the locality. In addition, training in health and safety will be provided to all construction workers.

The recruitment process for both construction jobs and other employment within the new community will be closely linked to a local Job Centre to ensure that local people have the opportunity to apply for positions.

The new community will include two primary schools and one secondary school. Within the secondary school campus there will be provision for a special needs school. It is anticipated that the secondary school will provide adult education services and the opportunity for adult education provision. If appropriate, this would be provided through the Local Education Authority.

Additional education facilities will also be provided through a library in the town centre.

For a new community of 2900 homes this is considered to be a high provision of on site education and training. The facilities will be available also to the wider population of the area.

### **2.12.2.6 Youth worker**

It is intended that the new community population will include people aged between 16-24. In order to guide this group about education, training, employment and healthy living a youth worker will be appointed by NCDP for the community. The appointment of this person will take place within Phase 1 of development.

### **2.12.2.7 Safety / crime**

Consideration of safety and crime in a development is important in creating a place in which people want to live.

The layout of the development has been designed to ensure a safe and welcoming community. The following issues are considered in order to achieve this;

- Strong public surveillance
- Lighting to public places
- Appropriate permeability to allow people to move safely within the community
- Visual policing
- Heat and carbon monoxide detectors within buildings

Consultants to the NCDP have had regard to Secured by Design standards (UK Police flagship initiative supporting the principles of "*designing out crime*" by use of effective crime prevention and security standards for a range of applications) at all stages of design and will continue to do so through the development.

## CHAPTER THREE

### The Sustainability Assessment Framework

#### 3.1 Aims/Purpose

The sustainability assessment framework was created using some 10 years of experience in the sustainability field by Richard Hodkinson Consultancy, in response to a specific instruction from English Partnerships. The requirement, in brief, was to prepare a tool kit which could be used to assess the sustainability of various development schemes using a variety of existing standards combined within a single, detailed, analytical framework. This framework has been co-ordinated at government agency level with emerging sustainability toolkits for use by Regional Development Agencies.

Assessment in this way enables;

- Comparison between the sustainability of developments in different parts of the country
- A measurement of sustainability at different stages of a development
- A single glance at a complex topic – a holistic overview

As sustainability is affected by so many different factors an assessment framework enables all of these factors to be considered in a single document. Whilst some of the factors may not be of particular importance to a particular project (many are general rather than site specific), the framework does ensure that all factors are at least considered (even if they are disregarded or given little emphasis for that project).

#### 3.2 Sustainability categories

The assessment framework comprises 8 principle categories (or criteria) for sustainability which are drawn from various current standards. These are;

- Inclusive communities
- Future proofing
- Enterprise and education
- Placemaking
- Transport and movement
- Building performance
- Site infrastructure
- Construction impacts

These categories are broken down into sub categories which are themselves broken down into Factors.

Each sub category or Factor is derived from a clause in the existing standards or best practice guidance.

#### 3.3 Application

The assessment can be applied to all development projects at any stage of development. It can be used as a web based tool and / or as a paper based tool.

The success and usefulness of the assessment is however related to the stage of the project at which it is introduced. At an early stage the results from an assessment will be brief however

applying it does help to raise questions and issues for the development which otherwise might be overlooked. The earlier these issues are raised, the easier they are to address in a positive and cost effective way.

For each Factor listed it is important to consider first what is considered to be good practice. For many Factors, for consultants working in the sustainability field, a “norm” will be known. This “norm” may be stipulated in statutory legislation, in regulations or by policy guidance. For other factors establishing a “norm” is not so straight forward, and in doing so the assessor will rely heavily on their own experience. It is then important for the assessor to consider what would be “best practice” i.e. beyond the “norm” or what issues we would look for to say that the “norm” has been exceeded. Conversely then the assessor must consider what would be considered below “norm”.

Using this approach the assessor considers each factor in the context of the development, and in the framework notes down issues which are relevant, and issues which do not appear to have been fully considered. Against this a mark is awarded of good practice, best practice or below good practice.

### 3.4 Limitations

As with all quantitative models/assessments there are limitations to use. Providing that these limitations are known, and considered with relevance to the development, they do not pose a problem. We list below some of the limitations of the RHC assessment framework;

Each factor used to assess will have a different level of importance for each project, yet in the assessment they are not weighted

For some factors there is a quantitative good/best practice benchmark against which to measure. For others measurement is qualitative and therefore subject to operator subjectiveness, interpretation and skill.

### 3.5 The Assessment

We set out at Appendix 4 the Sustainability Assessment.

This comprises the framework of assessment Categories, Sub categories and Factors, annotated with comments applicable to the new community proposal, together with a score of good practice, best practice and below good practice.

### 3.6 Explanation and Summary

From the assessment we note the following points;

- The majority of scores are at good or best practice.
- The true mixed use nature of the development contributes toward creating an inclusive community by bringing a feeling of identity and providing means by which the community can be knitted together.
- This mix of uses also contributes to the health and well being category which measures access to medical care services, recreation space and design to reduce fuel poverty, and to mix of uses and range of amenities categories.

- The provision of outside space scores best practice both due to the quantum, it's proximity to homes and the diversity of spaces, informal and formal.
- The high proportion of employment generating development contributes well to the development of a strong local economy scoring highly in business opportunities and employment Sub categories.
- The mix of homes score highly on tenure and accommodation mix due to the wide diversity of product and its tenure blindness.
- A considerable amount is being done to reduce the effects of climate change through CO2 emission control; improved insulation, use of gas condensing boilers, energy efficient lighting and A rated appliances.
- Public transport provision scores highly due to the provision of bus stops within 400m for the majority of homes, and the provision of a new railway station, for the majority within 800m. The frequency of service, their destination and access to the stop/station are considered to be very good.
- Construction impacts sub categories score highly due to the commitment to use A rated materials where viable, FSC certified timber for 2<sup>nd</sup> fix and efficient methods of construction.

## CHAPTER FOUR

### 4. Delivery, monitoring and review

As stated in our Introduction it is important to consider at the early stages of a development how sustainability objectives and commitments will be delivered, monitored and subsequently reviewed.

Ensuring a comprehensive mechanism for this is part of achieving sustainability for a scheme.

There are two key, already identified, mechanisms for this project;

1. Through Eco Homes assessment
2. Through BREEAM assessment

We attach a Schedule of Sustainability Commitments Schedule at Appendix 5 which provides more detail on timing for these assessments.

As future planning applications come forward anticipating the growth of Cranbrook beyond 2,900 dwellings EDDC and NCDP will have an opportunity to review the renewable energy and environmental standards anticipated in this strategy.

## CONCLUSION

Through this sustainability strategy we have demonstrated that a very wide range of sustainability issues pertinent to the proposed development at Cranbrook have been considered and are being promoted. In addition the scheme is policy compliant at national, region and local levels.

The proposed scheme is rated Very Good in sustainability terms addressing all the principle environmental, economic and social issues. This is demonstrated through the Sustainability Assessment which is included with this report. Delivery of these commitments will be monitored through robust arrangements based around the Section 106.

What sets this scheme apart from the others is the considerable emphasis upon creating a new community, a place in which people will choose to live, whilst minimising its impact on the natural environment during construction and for future.

## **Appendix 1**

### **East Devon Local Plan**

### **Revised Deposit September 2003 (Incorporating proposed modifications 2006)**

#### **Local Plan Strategy**

##### *Social needs objectives*

1. To ensure that all households have the opportunity of a decent home by providing a mix of house types and densities and encouraging housing tenure diversity through the provision of affordable housing
2. To support the retention of existing facilities and services and the provision of community and leisure facilities appropriate to the needs of each settlement and which are easily accessible
3. To support communities by creating new development close to facilities with good access to public transport and by other transport modes
4. To maintain a clean and safe environment and improve public amenity
5. To seek provision of adequate infrastructure to meet existing needs and keep pace with the requirements of new development

##### *Environmental Protection Objectives*

1. To protect and enhance the countryside and areas of landscape, nature conservation or historical/archeological importance
2. To maintain and increase biodiversity
3. To protect and improve the quality and character of settlements
4. To minimise the use of Greenfield land and direct most new development to existing towns
5. To reduce the need to travel and maximise the potential of modes of transport other than the private car
6. Promote good design in development that respect and enhances local character and distinctiveness
7. To protect important open spaces in towns and villages and green wedges which preserve their separate identities
8. To conserve land, soil, water and energy resources and reduce and minimise waste

##### *Economic Need Objectives*

1. To create a stronger and more diverse local economy and contribute to the development of the regional economy, to be capable of generating self sustaining growth and which offers secure and good quality employment to local people taking account of planning and environmental consideration
2. To protect and enhance the vitality and viability of district and local centres
3. To support economic diversification in rural areas.

### Chapter 12 – New Community and Exeter

Site identified as Exeter Area of Economic Activity, now superseded by Exeter Principal Urban Area. Need for 3500 homes, 2900 within the new community (between 1995-2011), with potential for expansion.

Structure Plan Policy N2 – new community to provide a range of community and other facilities and should be located where it can access major and local networks. To include new station to access Exeter Waterloo line. Not to interfere with Airport operations. Also;

- be assimilated into landscape of the area
- avoid as far as possible, use of significant areas of the best and most versatile agricultural land
- be well related to, but separate from, existing settlements
- be linked to Exeter in the first phase by effective road system
- be accessible to the high quality road network and local highway system
- be capable of accommodating further development

### New site chosen. Important factors in choice;

- noise reduction (from existing engine testing land to north, proposed to be airport terminal in future)
- minimise development in floodplain (road only falls in floodplain)
- suitable location for new railway station – enable new community to be highly accessible

### Planning Obligations, in form of S. 106:

- ensure sustainability objectives achieved
- works and costs of infrastructure and essential community facilities met by developer
- ensure compatibility of new community with Skypark, new Exeter Airport terminal and intermodal facility for transfer of freight and a freight distribution centre

### Important Proposal for New Community (of Local Plan) – PUA 1 (Mod 7)

- development of 2900 dwellings
- include timely and integrated provision of the necessary community facilities and infrastructure
- embody current practice in sustainable layout, building design and energy efficiency
- first residents to have basic needs met
- facilities to be of sufficient quality to avoid them seeking them elsewhere
- staged provision with increasing numbers of residents

### Infrastructure required in line with phased programme of housing delivery:

- new railway station (Exeter/Waterloo), operational during first phase
- contributions to road link construction (Old A30 and new A30 Airport junction) and others required from projected pressure of new community
- improvements to existing facilities and new facilities and infrastructure for buses, cycles and pedestrians (within and to surrounds)

- public transport to major employment sites in Exeter and Exeter Airport
- measures to encourage public transport use
- landscape buffer around community
- high standard landscaping
- appropriate levels of services, amenities and infrastructure and associate building including retail, recreations, health, social services, places of worship, community hall, library, primary and secondary education, emergency services.
- Mix of design, densities, size and types of dwellings which reflect character of ED
- Min 40% affordable housing
- Opportunities for employment inc office/workshop space and electronic facilities for working from home (min 5 ha)
- Scheme for protection, provision, enhancement and management of existing landscape features, wildlife corridors and habitats
- Noise protection for dwellings (from engine testing land to north); <65Db LAeg.(5m) at night  
Or bedrooms having building envelope sound insulation of 30 Db (A)
- Construction not to start until relocation of engine testing station
- All development within identified boundary except for informal open spaces and parkland and essential supporting infrastructure

## Appendix 2

### Suggestions for design and management decisions for BREEAM Certification

Category	Area	Suggested actions	
Health & well-being	Air conditioning	Avoid the use of cooling towers	
		Take positive measures to avoid Legionellosis in domestic hot water systems	
	Ventilation	For buildings over 7m width ensure opening windows are evenly distributed and are sized to be equivalent to 5% of gross internal floor area	
		Avoid humidification systems or at worst use steam humidification	
		Position air intakes away from sources of external pollution – eg Car parking areas close to the building	
		Mechanical ventilation or air conditioning systems should provide at least 12l/sec/person	
			Where no ventilation system is used trickle vents should be at least 5% of gross internal area for buildings <15m depth. Greater provision for deeper buildings
	Daylighting	Good daylighting needs to be provided for at least 80% of the net lettable area	
		Blinds or glare control systems should be provided and be locally adjustable	
	Illumination	Luminaires should be fitted with high frequency ballasts	
		Lighting levels should be 350-400lux. Louvre types to be to the Addendum to the Lighting Guide 3	
		Lighting to be zoned to control groups of no more than 4 workplaces	
		All workplaces should have a view outside and be no more than 7m from a window	
	Comfort	Local temperature control should be maximised	
An assessment of thermal comfort levels should be undertaken			
Acoustics	Ambient internal noise levels <ul style="list-style-type: none"> <li>• 35-40dB<sub>L<sub>AeqT</sub></sub> for single occupancy cellular offices</li> <li>• 40-45dB<sub>L<sub>AeqT</sub></sub> for medium open plan multi-occupancy &lt;4 places&gt;40m<sup>2</sup></li> <li>• 45-50dB<sub>L<sub>AeqT</sub></sub> for large multi-occupancy open plan offices &gt;4 places &gt;40m<sup>2</sup></li> </ul>		
Energy	Metering	Sub-metering should cover lighting and small power plus the following where they occur <ul style="list-style-type: none"> <li>• Computer rooms</li> <li>• Humidification plant</li> <li>• Cooling plant</li> <li>• Fans (large only)</li> <li>• Catering facilities or similar</li> </ul>	

		<b>Where there is more than one tenancy sub-meters should be included for each tenancy</b>
	<b>Performance</b>	<b>Heat losses minus gains should be between -15 and +15 kWh/m<sup>2</sup>/year</b>
		<b>CO<sub>2</sub> emissions should be as low as possible and at worst &lt;45kg CO<sub>2</sub>/ m<sup>2</sup>/year</b>
<b>Transport</b>	<b>Travel</b>	<b>A travel plan should be implemented for worker journeys and materials deliveries</b>
	<b>Cycling</b>	<b>Provision of cycle stores, showers etc should be made for 10% of staff</b>
	<b>Public transport</b>	<b>Seek to get frequent bus services etc to a main transport hub (station, bus station et al)</b>
<b>Water</b>	<b>Consumption</b>	<b>Water consumption should be &lt;4m<sup>3</sup>/person/year</b>
	<b>Metering</b>	<b>Pulsed output meters should be installed on all supplies</b>
	<b>Leakage</b>	<b>Leakage detection system should be installed on all major supplies</b>
		<b>Proximity detection shut off should be provided for all urinals and WCs</b>
<b>Materials</b>	<b>Asbestos</b>	<b>Specification to require No asbestos in the structure, services, lifts etc</b>
	<b>Recyclable waste</b>	<b>Provision should be made for internal or external storage</b>
	<b>Materials ratings</b>	<b>Use only A rated materials for all upper floors, external walls, roof and windows</b>
	<b>Timber</b>	<b>Ensure that all timber comes from sustainably managed sources</b>
<b>Pollution</b>	<b>Refrigerants</b>	<b>Avoid use of refrigerants or ensure that any used have zero ODP</b>
		<b>Any refrigerants should have &lt;5 Global Warming Potential</b>
	<b>Boilers</b>	<b>Boiler NO<sub>x</sub> emissions should if possible be less than 59 mg/kWh delivered heating energy</b>
	<b>Rainwater</b>	<b>Rainwater systems and/or SUDS should attenuate at least 50% of peak run-off</b>
	<b>Renewable energy</b>	<b>If possible provide at least 10% of heat demand or electricity consumption from renewable sources</b>
	<b>Insulation</b>	<b>All insulation to have Global Warming Potential &lt;5</b>
<b>Ecology</b>	<b>Changes</b>	<b>Seek to minimise change in ecological value of the site</b>
	<b>Advice</b>	<b>Seek advice from Wildlife Trusts (AWTC) of Institute of Environmental Management &amp; assessment (IEMA) members</b>
<b>Management</b>	<b>Commissioning</b>	<b>Appoint a design team member to monitor commissioning requirements and activities</b>
		<b>For complex systems appoint a specialist commissioning agent/manager</b>
		<b>Specify seasonal commissioning for the first year of occupation</b>
		<b>Pass on pre-commissioning, commissioning and quality monitoring to the appropriate contractors and all trades as per BSRIA/CIBSE guidelines</b>
	<b>Information</b>	<b>Provide a simple system guide for non-technical building managers. This can be part of O&amp;M manuals but MUST be a separate section.</b>
	<b>Building</b>	<b>Require builders to register with the Considerate Constructors Scheme with a commitment to achieve best practice certification</b>
	<b>Site monitoring</b>	<b>Require that constructors</b>
	<b>Note that these items should also</b>	<ul style="list-style-type: none"> <li>• <b>Monitor &amp; report energy consumption or CO<sub>2</sub> emissions from site energy use</b></li> <li>• <b>monitor &amp; report fuel consumption or CO<sub>2</sub> emissions from transport to and from site</b></li> </ul>

	<p><b>appear in the Construction Environmental Management Plan</b></p>	<ul style="list-style-type: none"> <li>• <b>Monitor and report construction waste</b></li> <li>• <b>Segregate and recycle construction waste</b></li> <li>• <b>Establish best practice to minimise risk of air pollution from site operations</b></li> <li>• <b>Establish best practice to minimise risk of ground and watercourse pollution from site operations</b></li> <li>• <b>Source temporary timber used on site in construction from a sustainably managed source and/or re-use or recycle it.</b></li> </ul>
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## Appendix 3

### Sustainable construction – Construction activities and impact potential

Construction activity	Safety	Pollution					Waste	Consumption		
		Air	Noise	Vibration	Ground	Light		Materials	Energy	Water
Site layout & facilities	yes	-	-	-	yes	yes	yes	-	yes	yes
Site plant and craneage	yes	yes	yes	yes	yes	-	-	-	yes	-
Earthworks& excavation	yes	yes	yes	yes	yes	-	yes	yes	yes	-
Demolition	yes	yes	yes	yes	yes	-	yes	yes	yes	-
Piling	yes	-	yes	yes	yes	-	yes	yes	yes	yes
Materials transport	yes	yes	yes	yes	yes	-	yes	-	yes	-
Fuel storage and handling	yes	-	-	-	yes	-	-	-	-	-
Materials storage and distribution	yes	yes	yes	yes	-	-	yes	-	-	-
Concreting	yes	-	yes	yes	yes	-	yes	yes	-	yes
Building operations	yes	-	yes	-	yes	yes	yes	yes	yes	yes

## Sustainability Assessment - Cranbrook new community - Appendix 4

CATEGORY	SUB CATEGORY	CRITERIA	Response	Overall Rating		
				Below Good Practice	Meets Good Practice	Above Good Practice
<b>1 INCLUSIVE COMMUNITY</b>	1a. Stewardship	Public amenity space well designed and managed	Extensive informal and formal amenity space. Country Park bisects West and East, Ecology Park to North. LAP/NEAP requirements met. Town squares.			
		Long term management	Parish Council. Interim period Local Authority, financed by EDNCP contributions in part.			
		Community involvement	Programme of consultation to date. Proposed ongoing consultation.			
	1b. Identity/Character	Sense and feeling of identity	Hedgerow/tree pattern informed design. Study of East Devon towns informed design. Town Centre and neighbourhood centre will give identity. Railway station will help to develop it as a destination.			
		Buildings to exhibit strong architectural quality	Detail design stage. Design to be informed by local character, construction materials etc. Study of local towns to inform architecture.			
		Features in development help to knit community	True mixed use scheme; office, retail, neighbourhood centre, primary and secondary schools, medical, public house, creche, health and fitness, hotel, supermarket, workshop, convenience store. Phased infrastructure to support.			
	1c. Consultation	Community engagement in planning, design and management	Programme of consultation to date. Proposed ongoing consultation and community initiatives.			
	1d. Safety/Crime	Secure by design	Regard had to standard but not certification. Future police consultation.			
		Provision of safe play areas	Provision of 6 LEAPS and 2 NEAPS as agreed with LPA or in accordance with established guidance.			
		Surveillance and lighting strategy	Regard to Secure by design requirements. Design for passive on looking. All public external places will be lit. Local police consultation proposed.			
	1e. Accessibility	Provide safe and readily available access to all facilities	Network of green lanes, pedestrian/cycle routes connecting facilities - appropriate thought to phasing to ensure earliest use. Railway and bus access to surrounding employment facilities and Exeter.			
		Access arrangements for mobility impaired	Disabled access provided			
	1f. Tenure Mix	Mix to reflect the needs of the location within the wider community	Mix including 40% affordable as required by SPG. Proportion of rent and sale.			
		Tenure blind/socially inclusive?	Tenure blind, pepper potted.			
	1g. Accommodation Mix	Mix to reflect the needs of the location within the wider community	1-4 bed, flats and houses			
Design to enable a sustainable mix?		Mix of uses, mix of houses and apartments, mix of room numbers, mix of tenures. Diverse community.				
<b>2 CLIMATE CHANGE AND FUTURE PROOFING</b>	2a. Adaptability	Designed for expansion/internal layout remodelling?	Lifetime Homes achievement enable flexibility of use.			
		Provision for retrofitting new technology etc..				
		Walls and ceilings allow for supports/lift to be added in designated properties?	For proportion achieving Lifetime Homes yes but not all.			

3	ENTERPRISE  AND  EDUCATION	2b. Climate change effects	Flood risk considered?	Yes in Landscape, Biodiversity and Drainage Strategy, Cooper Partnership June 2006.					
			Increased solar gain considered	Yes in Energy strategy.					
			Allowance for CO2 emissions control	CO2 reduction 50% for non residential buildings. Insulation 28% improvement on Part L. Gas condensing boilers 4% improvement on Part L. Efficient lighting. A rated appliances - seek to reduce electrical demand by 10%.					
		2c. Durability and robustness	NHBC/Zurich Building Guarantees etc. accreditation						
			Designed for routine inspection, repair, maintenance and renewal?						
			Parts and components easy to source and replace?						
		2d. Health and wellbeing	Proximity to medical and care services and pharmacy etc.	Doctor and dentist facility within neighbourhood centre by completion of 1100 homes. Likely to be pharmacy in town centre.					
			Formal and informal leisure and recreation facilities/space	Informal; Country Park, Ecology Park, extension to Country Park. Formal; Sports provision adjacent to schools, LEAPS/NEAPS, Town Park, Town squares.					
			Designed to reduce fuel poverty?	Energy reduction strategy - low emission gas condensing boiler, light fittings and appliances, improved insulation.					
		3	ENTERPRISE  AND  EDUCATION	3a. Business opportunities	Employment opportunities and uses	1200 permanent jobs in offices, retail, workshops, community sectors. Construction jobs. SkyPark offers further local opportunities.			
					Home office provision-space and services incorporated in design?	All homes internet and 2 BT points. No Live work units.			
				3b. Employment sites	Included within development? - size and type	28,000 sqm non residential (9.65 sqm per home). Phased in over construction period to ensure high quality tenants/uses yet first residents basic needs met. Employment in offices, retail, workshops, community, foodstore.			
					Quality/quantity of sites locally and within commuting distance	Sky Park, Exeter International Airport, Intermodal Rail Freight terminal 1km to South West. Science Park, London Electricity and Met Office 2-2.5 km to South West.			
					Opportunities on site during construction	Construction jobs including apprenticeships and health and safety training.			
				3c. Training	Enhanced employment and training prospects for local people?	Employ local people where possible. Apprenticeships available with some developers. Health and safety training for all.			
Improve skills through training opportunities	Not specified								
3d. Education for all	Provision of primary/secondary schools/FE - access to existing			Two primary and One secondary school. Special needs facility within the secondary.					
	Library and lifelong learning provision?			Library in town centre, phased in by completion.					
	Community website to be provided?	Yes through Management company/Parish Council.							
3e. Awareness of sustainability issues	Guidance on energy efficient use of home and controls to be provided?	In residents Welcome Pack and subsequently through website.							
	Provision of facilities for recycling/composting/water harvesting etc.?	Water harvesting through water butts to individual homes. Composting bins where practical. Bring site within neighbourhood centre. Segregated bins externally.							
4	PLACE MAKING	4a. Land use	Use of reclaimed/contaminated land	Greenfield site					

	Sustainable density	Town centre max 75 dhb, focal points 65 dhb. Majority 30-40 dhb, fringes as low as 20 dhb. Diversity within scheme.			
	Allowance for appropriate provision and access to green space	Green space in Country Park, LEAPs/NEAPs, Ecology Park, Town Park, playing fields attached to schools.			
4b. Urban form	Scale and concept of development integrates with surrounding area?	Surrounds greenfield. New community separated by landscaped buffer.			
	Design provides for sustainable density, layout and height of buildings?	Medium - High density. Appropriate for greenfield, isolated site.			
	Imaginative house designs and eco friendly living space?	Detailed design stage. Design informed by surrounding towns.			
	Designed to achieve a sense of place?	Town centre will create identity for Central/Eastern element. Neighbourhood Centre and school will create focus for Western. Linked by Country Park. Railway station will make it feel like a destination.			
4c. Quality of design	EcoHomes/BREEAM-buildings or spaces above minimum standards?	Very Good rating Eco Homes and BREEAM. In top 85% of units assessed for Eco Homes.			
	Buildings to be compatible with, or enhance the environment	Low impact driven design - considers CO2, water, waste etc.			
	Privacy and security-delineation of public and private space allowed for?	Yes. Each house has private space. Passive and active security - regard to Secured by Design.			
4d. Natural environment	Registered ecologist retained?	Yes Cooper Partnership			
	Designed to protect, conserve and enhance existing landscape and ecological features?	Hedgerow/tree pattern informed design. Protection and enhancement of ecological and biodiversity features with ongoing monitoring and review mechanism.			
	Landscape and planting proposals enhance the environment?	Comprehensive planting proposals and landscaping, including of buffer.			
	Management and maintenance strategy	5 year monitoring and review programme.			
4e. Mix of uses	Integrated to enable quality living, working and playing?	Connectivity between facilities and homes via green lanes and public access routes. Non residential integrated with homes.			
	Appropriate mix of dwellings in terms of size, type and affordability?	Affordable 40% specified by SPG. Type includes flats in town centre, houses outer and neighbourhood area. Sizes range 1-4 bed.			
4f. Range of amenities	Is a food shop, post office and other facilities within safe walking distance?	Local facilities include schools, retail, open space, leisure, supermarket/convenience. Post office not specified but anticipate in town centre with boxes in neighbourhood centre.			
	GP surgery, schools, places of worship etc.ditto	Medical centre, dentist and primary school in neighbourhood centre. Secondary school and 2nd primary school in North East. 2 NEAPs, 5 LEAPs.			
	Private or semi private outside space provided to all dwellings?	Yes to all homes - garden, balcony, terrace, shared communal garden.			
	Adequate provision of accessible and safe play/leisure space?	Yes - 2 NEAPs, 5 LEAPs in accordance with established guidance.			
4g. Contribution to surrounding area	Is the design and layout informed by wider character?	Devons urban form characteristics inform design and layout - continuity a strong theme. Identity from studies of the best of Devon both old and new. Local Distinctiveness - photographic survey of South Devon towns and villages. Also taken from Exeter suburbs analysis. Hedgrow pattern on site informs layout.			
	Enhancement of local economy anticipated?	C. 1200 jobs within new community. Provide homes for employees at Sky Park and Science Park.			
	Positive benefits attributable to the development	Employment, housing provision, public transport improved to area via railways station.			

5	TRANSPORT  AND  MOVEMENT	5a. Public transport	Do routes connect with surrounding area with clear hierarchy of routes?	Railway connection to Exeter Airport, SkyPark, Science Park etc including stops at school and town centre. Highway access via former A30.			
			EcoHomes-80% of development to be within 500m of 15 min service to hub	80% homes within 400m of bus stop.			
			Proximity of bus stops to dwellings	Principle of all homes within 400m to bus stop			
		5b. Reducing car use	Reduction strategy-building layout to avoid car dominance/parking etc	Hierarchy of streets; main, connector, tertiary, green lane, mews/courts. Dominance of pedestrian/cyclist over car. Car parking provision balance of convenience and reduction of visual intrusion. Fairly restricted private car parking, town centre parking and Country Park, leisure, station, education parking.			
			Encourage more sustainable modes-provision of PT/foot/cycle facilities	Provision of railway station to north of neighbourhood centre. All homes within 400m of bus stop. Green lanes for cycling/pedestrian.			
			Green Travel Plan to be introduced?	Unspecified			
			Design to include home office provision?	All homes internet and 2 BT points. No Live work units.			
		5c. Car parking	Well considered car parking strategy?	Car parking provision balance of convenience and reduction of visual intrusion. Identified different types of parking: Private (on plot, plot related, courtyard, on street), Town Centre (High St, Town Centre backlands, business and residents), Country Park, Leisure, Station, Education parking.			
			Quantum and location of car parking facilities	Car parking strategy by David Lock Associates.			
			Visual impact minimised?	Principle objective. Achieve by parking behind gates, integral, rear access, within perimeter blocks, within courtyards, use landscaping to define boundaries. Some shorter term on street parking to create visual scene.			
		5d. Movement within community	Does layout promote safe and easy access/navigation for all?	Routes lit and signed. Regard to Secured by Design standards. Disabled?			
			Satisfactory integration with existing roads, paths and surrounding area?	Link to site via former A30 to the south west and East. Junctions on former A30 with existing Crannaford Lane and with several Cranbrook connector streets. <b>Footpaths?</b>			
			Road designs and traffic calming measures to restrict speeds	Speed restrictions for each road type, influenced by road width.....			
		5e. Cycle network	Routes designed to facilitate and encourage cycling (lanes/barriers to cars)?	All streets designed to be cycleable and form a completely connected system for cycling. Separate cycle facilities at edge of main local route. No separate facility within connector streets or mews/courtyards. Within Homezone type carriageway for tertiary streets and within carriageway for Green lanes.			
			Safe and accessible network to schools and on site/local amenities?	Yes to all facilities/schools			
			Secure and weatherproof storage provided to dwellings and other locations?	Covered facilities at schools, Town Centre and railway station. Facilities at local centres and sport facilities. Employers encouraged to make provisions in their individual schemes. Provision for homes.			
		5f. Pedestrian network	Encourage walking by design/provision of a comprehensive network that links to surrounding footpaths	Green lanes for pedestrian movement - lit, signed and safe. Dominance of pedestrian over car.			

		Well lit, safe and overlooked pedestrian network	Contemporary and forward looking lighting - SON, SON SuperDeLux and Longlife LEDs. Simple and contemporary signage - classic type. Bespoke for Cranbrook for street names and general direction, colour coded.			
		Vehicle segregation if practical to assist pedestrians use safe routes	Green lanes are non vehicular.			
	5g. Proximity to amenities	Local amenities readily accessible by modes other than the car?	Accessible by cycle network, pedestrian network, bus service.			
		Safe and convenient access provided to all to public buildings and areas ?	Yes by bus, cycle, pedestrian, with car parking facilities at some including town centre shopping, backlands shopping, town centre business, country park, leisure parking, station and schools.			
6	BUILDING PERFORMANCE	6a. Water use	EcoHomes/BREEAM standards-design of buildings to conserve water	Very Good rating Eco Homes and BREEAM. In top 85% of residential units assessed.		
			Water recycling and saving measures to be adopted?	Rainwater recycling to houses via butts.		
			Increased water efficiency through initiatives and education	Sanitary specification and guidance in Welcome Pack.		
		6b. Waste management	Provision of waste management and household recycling facilities	Internal and external storage to achieve full Eco Homes credit for Very Good rating. Composting bins to those practical. "Bring" site within new community.		
			EcoHomes/BREEAM -facilities to presort/store waste for recycling?	None specified.		
			Composting facilities to be provided?	For some houses.		
		6c. Energy	CO2 emissions-% improvement in insulation/lighting/boiler spec.?	50% target improvement for all non-residential units and up to 28% improvement in residential units. Min standard of 10% improvement to be delivered. Boiler specification >90% average. 1000 solar water heating systems - offsetting 2000MWh energy per year		
			Building fabric-% improvement in thermal envelope performance?	Residential units up to 28% improvement over minimum elemental values. Minimum 10% improvement to be delivered.		
			Provision of drying space to all units?	To be specified for all residential units		
			Provision of EcoLabelled goods-'A' rated white goods?	To be specified for all residential units		
			Energy efficient external lighting to be specified?	To be specified for all residential units - min of 75% of fittings as per EcoHomes methodology		
		6d. Daylighting, noise and ventilation	Daylighting standards to BS 8206 in kitchen and other habitable rooms	To kitchen and view of sky from all rooms. Not applicable to living room and bedroom.		
			Dwelling layout designed to minimise noise transmission	Commit to achieving airbourne sound insulation values at least 3db higher and sound insulation values at least 3db lower than performance standards as specified in Building Regulations approved Document E (2003 Ed). To achieve Eco Homes Very Good.		
			Sound reduction above current Part E- validated by testing?			
	6e. Internal services	Accessible-particularly meters and circuit breakers?	To be specified for all residential units			

		Adaptable-future proofed and capable of incorporating new technology?	Subject to detailed design considerations for individual units re ducting and cable management. District heating network is being provided within the town centre for non-residential units and limited residential units				
		Renewable-with minimum of disturbance to building fabric/decoration?	Yes				
	6f. Local pollution	Insulating materials with no ODP and GWP of less than 5	To be specified in all residential units				
		Specify low NOx emitting burners to boilers	To be specified in all residential units. Subject to impact of community CHP engine for non-residential units				
		Designed to reduce peak surface runoff to hard surfaces and roofs?	Drainage design to reduce run-off				
		Design/specify for the control of light spill	As per standard light regulations for external lighting. Individual space/security lighting will have additional controls/sensors to reduce light pollution.				
		Air, noise and water pollution from surrounding industry and roads?	Fairly isolated site.				
<b>7</b>	<b>SITE</b>	7a. Contamination	Preparation of site investigation report and findings?	Yes greenfield site, low ecological value, intensive arable and grassland.			
			Site constraints and mitigation measures to be adopted				
			Reuse of existing materials?	Not applicable			
	<b>INFRASTRUCTURE</b>	7b. Surface run-off	Flood risk and water table level-mitigation measures	Yes - Cooper Partnership report.			
			Natural drainage and extent of intervention	See Cooper Partnership report.			
			Sustainable drainage strategy/SUDS?	Yes - Cooper Partnership report.			
			Reduction of surface runoff-attenuation measures	Yes - Cooper Partnership report.			
	7c. IT infrastructure	Provision for future IT infrastructure requirements (ducts)	Unspecified				
		Incorporate easily accessible IT data points in living room and bedrooms	Unspecified				
		Community website provision?	Extranet				
	7d. Energy infrastructure	Preparation of development wide energy strategy	Energy strategy is being produced to ensure a coherent energy approach is adopted site wide in order to meet the improved standards				
		Provision of energy from CHP or on site renewables?	1000 residential units will have solar water collectors installed. Centralised CHP scheme within the town centre for non-residential units and limited residential units				
		Street and security lighting	Street lighting - minimise light pollution, use renewable options for town centre lighting if applicable, Security lighting to use PIR, timers and or daylight cut-offs to minimise light pollution.				
	7e. Utilities infrastructure	Capacity of existing utilities infrastructure determined?	Yes				
		Design of new utilities infrastructure	Yes				
Provision for future utilities infrastructure requirements		Yes					

	7f. Metering	Billing arrangements for communal energy / water	Where applicable this will be managed through an energy services company			
		Individual or collective metering arrangements?	To be specified within the detailed design stage			
		Design to allow for accessible meter reading	To be specified within the detailed design stage			
<b>8 CONSTRUCTION IMPACTS</b>	8a. Materials use	Reuse of existing/reclaimed materials	Not applicable			
		Use of sustainable materials-BRE 'A' rated in roofs, floors, walls, windows	Subject to evaluation of cost, environmental impact and performance.			
		% certified timber in basic and finishing building elements	To achieve Very Good Eco Homes rating.			
		Use of locally sourced materials, where practical	CEMP contains a commitment to seek local supplies where practicable and commercially viable.			
	8b. Efficient methods of construction	Use of advances in construction/technology to reduce defects and waste	As in MMC below			
		MMC, prefabrication and standardisation to enhance efficiency	CEMP recognises the health and safety and efficiency advantages in the off-site manufacture of whole buildings,			
		Contractor selection process	NO statement yet seen on this			
		Construction method statement	For all major tasks with local impacts the CEMP requires method statements to be prepared and agreed before the			
	8c. Impact on surroundings (noise, traffic, air quality)	Community consultation/liaison procedures	CEMP sets requirements for local consultation and engagement to minimise local impacts			
		Construction method statement and minimisation strategy	CEMP sets requirements for local consultation and engagement to minimise local impacts			
		Haulage routes agreed and properly maintained	CEMP includes requirement for identification of designated transport routes and delivery hours and a travel plan for			
		Hours of working agreed and adhered to	CEMP sets site working hours such that there will be no work on Sundays or Bank Holidays. Any variation needs to be			
	8d. Protection of existing ecology	Protection and management plan for existing ecology?	Protection of hedgerows, trees, biodiversity and landscape - see Cooper Partnership report. Monitoring over 5 years to			
		Agreed mitigation measures/procedures?	Yes			
	8e. Construction waste	Strategy to reduce construction waste	CEMP sets a strategy to measure, monitor and report waste volumes; to seek to re-use materials such as waste bricks			
		Segregation of waste and maximum use of 'take back' schemes	CEMP sets strategy for waste segregation			
		Waste minimisation culture and reinforced at induction talks	CEMP sets a strategy and includes requirement for engagement of all workers, sub-contractors and supply chain			
	8f. Health and safety	Drive to improve on the national average injury rate by 50%	NO improvement target has yet been specified			
		Promote safety culture and monitor accident records	As health & safety is the over-riding element of sustainable construction the CEMP sets requirements for safety for both			
		Considerate Constructors Scheme and subcontractor selection	CEMP sets a strategy and seeks for all builders to register with the CCS			

**Appendix 5****SCHEDULE OF SUSTAINABILITY COMMITMENTS**

<b>REF</b>	<b>Topic</b>	<b>Details</b>	<b>Delivery mechanism</b>
1	BRE Eco Homes assessment (2006 Version)	Very Good rating	Post completion assessment
2	BREEAM assessment (2006 Version)	Very Good rating	Post completion assessment