



## SUMMARY REPORT



**A mixed-use development for Barnclose Quarry, Leigh-on-Mendip, Somerset.**

Situated just two minutes walk from the centre of Leigh-on-Mendip, Barnclose is a redundant quarry which has been dormant for decades and unusually has no remediation plan for its after-use, unlike the adjacent working Halecombe Quarry. It has low ecological and economic value and yet represents a remarkable and rare opportunity to benefit the people of the area and enhance the environment.

Barnclose provides a benign microclimate in parts because of its topography and southerly aspect. This development proposal for the quarry creates opportunities for sustainable living and working, which could complement the vitality of Leigh-on-Mendip whilst easing the demand for affordable homes. It proposes a mix of self-build plots and low-energy homes with employment and trade opportunities. It will reinforce demand for existing services and public transport, which have been under threat in recent years, and also allow safe public access within the quarry.

The proposed development is limited in scale and hidden within the interior of the quarry, posing no threat to the character of the area. A genuinely holistic approach will create a sustainable development, balancing the needs of the environment with peoples' needs for living and working. Innovative and ecological building design using a limited range of local, renewable and quarry materials will be controlled by tight environmental standards. By combining state-of-the-art techniques in water conservation and energy generation, with an integrated Green Transport Plan, the settlement could provide carbon-neutral housing and become self-sufficient in water & energy use. This would significantly reduce pollution while increasing the quality of the environment and life for the wider community.

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## I. Introduction

Our lives in the Mendip area are coloured by rolling hills, quarries, grazing cattle, villages and market towns. Underlying this apparent rural idyll is a growing awareness that global climate change is an undeniable consequence of our unsustainable consumption of natural resources.

### Needs of the earth - the global situation

World fossil fuel demand has grown exponentially by 5% every year since the end of World War II<sup>1</sup>. As a signatory to the International agreement on Climate Change, the Kyoto Protocol, the UK is committed to a reduction of carbon dioxide emissions by one fifth by 2010 with longer term reduction of emissions of between 60% and 90% required<sup>2</sup> to prevent runaway climate change. This will require a complete reappraisal of our use of energy and other natural resources, together with a commitment to sustainable development<sup>3</sup>, now embodied in LA21 & adopted by Mendip District Council as a principal Corporate Priority<sup>4</sup>.

### Needs of the people - the local situation

Our homes use around 30% of the total energy demand in Britain and produce 26% of total CO<sub>2</sub> emissions<sup>5</sup>. Although examples of low-energy and ecological building practice exist around the country, the techniques, which are now commonplace in the many parts of the EC, have yet to cross over into the UK volume housebuilders repertoire, particularly in lower density housing typically found in rural regions.

Increasing demand for housing land<sup>6</sup> and employment<sup>7</sup> initiatives in the Mendips exerts growing pressure on edge-of-town and productive agricultural land. Awareness of the environmental threats of new developments<sup>8</sup> and the opportunities presented for living more sustainably, led us to explore and identify sites capable of building an exemplary mixed use settlement without compromising the existing ecological value. A sustainable model that addresses the full implications of Local Agenda 21 needs space for water collection, food & energy production and waste treatment. If such a model is to be ecologically and economically sound, a brownfield site of low ecological and economic value could be used to demonstrate the positive impact of sustainable uses.

Disused aggregate quarries in the East Mendip area have been identified as providing possible 'brownfield land' sites for development of employment initiatives. Mendip District Council has identified Barnclose Quarry, Leigh-on-Mendip as a possible site for low-impact uses<sup>9</sup>, and is currently developing

'supplementary planning guidance' for low impact development<sup>10</sup>. Analysis of their After-Use Study suggests that the proposal was not economically viable for purely employment use, as development costs were too high to be financed by the relatively low rent levels achievable<sup>11</sup>. It would not address the key issue of minimizing car dependence which mixed use developments could offer.

## **2. Site & brief**

Barnclose Quarry is classified as previously developed land, and therefore has potential for development<sup>12</sup>. A preliminary investigation of disused quarries in the area for Mendip District Council and the East Mendips Rural Task Force suggests that Barnclose Quarry presents a viable location for sustainable uses, because of its proximity to the existing community and services in Leigh-on-Mendip.

Initial studies indicate that Barnclose has potential to fulfil the aims of the project. See page 4 for the site analysis, proposed layout principles and site capacity analysis.<sup>13</sup> Sketch proposals at page 5<sup>14</sup> suggest a phased approach with homes and workshops on the upper levels and other uses in the deeper parts of the quarry. The proposal demonstrates a balance of areas landscaped to increase biodiversity & water-retaining capacity, treat waste products, produce electricity and food, together with community buildings, homes and workspaces which will create a financially viable community with adequate facilities to enable them to 'live lightly on the land'.

Bedrock, the development proposal for Barnclose Quarry aims to create a carbon-neutral sustainable settlement with mixed uses. It would be built using sustainable adaptations of traditional construction techniques for low energy homes, such as those demonstrated by the Ecohome<sup>15</sup> at CREATE in Bristol, whilst also offering more pioneering low energy construction such as rammed earth walls using on-site quarry waste. Structures will range from low-cost affordable housing solutions of mixed tenure and carefully designed workspaces to beautifully crafted self-built homes, to suit a varied mix of local residents. The development is planned to expand gradually with careful phasing of the works to ensure the community manages the process of building and living sustainably in a controlled way, underpinned by a growing understanding of site specific issues.

Bedrock focuses on remediating and enhancing the landscape, improving safety and biodiversity, and providing innovative homes and employment uses within the quarry, based on the following;

## **3. Objectives**

### **Needs of the earth**

1. Protect, conserve and enhance ecosystems and existing habitats, increasing biodiversity where appropriate and limit pollution.
2. Reduce dependence on non-renewable resources, focussing particularly on substantial reductions in fossil fuel, mains electricity and water consumption.
3. Minimise embodied energy and waste in the construction processes, and maximise use, reuse and recycling of local resources.

### **Needs of the people**

4. Build a viable community with dwellings of mixed tenure and associated employment uses.
5. Support local community facilities and businesses, throughout construction and occupation, and provide facilities for new and existing local businesses.
6. Promote sustainable practice in the wider community and to use the experience gained to encourage developments of a similar nature.

## 4. Actions

We are seeking in-principle support for this proposal from Mendip District Council, the local community and the landowner, to enable us to work in partnership and assess the feasibility of this exemplary low impact project. An agreed and enforceable framework of legal and site management controls will ensure that the site is occupied sustainably, backed by a legal agreement with the Planning Authority.

The completed project will cost in the region of £6 million, with at least £1 million required for land remediation, site preparation and infrastructure.<sup>16</sup> In order to assess the environmental impact, financial viability, social implications and likelihood of achieving planning consent, the following work is planned or underway;

- explore precedents,
- formulate a well-informed project team,
- undertake a feasibility study,
- consult with Mendip District Council and local residents,
- assess project costs and funding opportunities,
- complete a Business Plan.



This proposal has been initiated by Richard Swann and Katy Duke of Great Elm, Frome, who are both involved in the construction industry and have experience of relevant projects<sup>17</sup>.

## 5. Site Analysis

Barnclose Quarry lies just to the north of Leigh-on-Mendip. It is composed of a series of plateaux cut into the hillside overlaid in areas with tipped loose spoil stepping down towards a large open area cut approximately 18m deep. Steep sided cliffs, loose piles of rock debris and vegetation border the open areas. Despite fencing and warning notices, a high degree of trespass occurs. Access and safety problems are compounded by the existence of public rights of way skirting the site. Safe access and public use of the site is a principal requirement of the project and existing arrangements for perimeter security of the site would need to be maintained and enhanced.

The quarry offers a relatively benign climate in parts, with open southerly aspects suitable for habitation, which will allow for both passive and active solar design and the potential for wind generation of electricity, or a wood-fuelled heating and/or generation system. Although only a small proportion of the overall site would be built upon, other areas will be required for recycling, water storage and for growing food or fuel crops.



Looking into the site from the east



Barnclose Quarry and its relationship to Leigh-on-Mendip and Holcombe Quarry

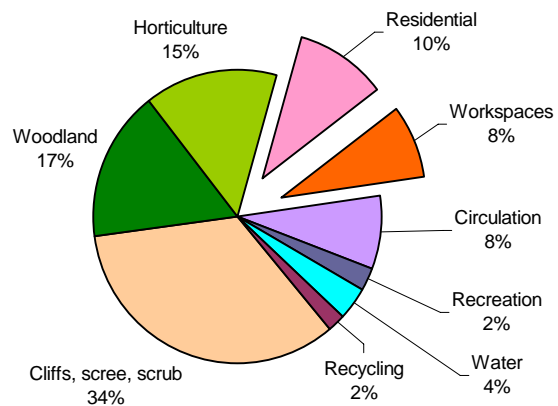
## 6. Site Capacity

The total site area is 9.8 hectares (24 acres). Of this only 49% is suitable for 'human use', the remaining 51% will be managed for the benefit of plants and animals, actively in some areas, but mainly by simple habitat protection. Of this land, around one third is currently wooded and the remaining areas are unstable scree, sloping scrub and cliffs.

Land use is proposed to be; 15% agriculture and horticulture (raised beds & polytunnels, managed organically), 8% workspaces and electricity generation, 4% for water management (reed beds, ponds and lake) and 2% for recycling & waste management, which will include community composting to produce topsoil on site. Residential areas cover 10% (around half with integral workspaces), with 8% circulation and 2% for shared recreational areas, including communal rooms, exhibition spaces, orchards and a village green. Shared land will generally be planted using permaculture principles.

The site capacity for buildings is around 40 dwellings incorporating 16 workspaces (a total of around 108 bedspaces) plus approximately 16 other separate workspaces. The sketch scheme shows how these could be laid out on site.

BARNCLOSE QUARRY - site capacity study  
TOTAL AREA 9.8 HECTARES (24 ACRES)



## 7. Outline proposal

### Phasing methodology

The project envisages an initial growing and dynamic community, learning from experience to develop and expand sustainably. A phased approach will be taken, with the heart of the scheme being constructed first, and expanded only when the time is right. Land management and infrastructure will be in place from the outset as Phase 1, and 'development projects' initiated by the community, such as orchards, recreational land and horticultural systems can be introduced when management and finance structures are agreed.

Phase 2 incorporates development of the central part of the site, with solar cottages and associated workspaces and communal facilities (mainly services), with Phase 3, some of the autonomous self-build plots coming shortly after. The site will also be made safe for settlement in other areas. If partnerships allow, the affordable homes could also be constructed in this phase.

Once these phases are completed, the workspace apartments and/or affordable homes are planned to be constructed as phases 4 & 5. Additional workspaces can commence and visitor facilities can be introduced.

At this point, after two or three years of construction, an assessment of future phases will be necessary, and a settling-in period may be useful. Further work could continue as need arises to expand the development, particularly to provide additional workspaces, but it could also stop at this point if an equilibrium has been reached. Although the scheme developed shows a mix of up to 40 homes and 16 workspaces, this can be adjusted to suit local needs as the project progresses, and the phasing is also likely to evolve.

## Phases I to 7

### Homes

#### Phase I

Land management, water, safety & remediation, horticulture & recycling areas

#### Phase 2 Solar cottages

10 -11 homes, inc. workspaces, plots 1- 9, plus flats 10 & 11, Level 2

#### Phase 3/4 Autonomous houses

7-9 self-build plots, with workspaces, plots 13 - 19, plot 12. Level 1, plus unique central 'tower'

#### Phase 4 Workspace apartments

4 flats over 4 workspaces, plots 20 – 23  
Level 2

#### Phase 5 Affordable homes

c 3 houses & 4-6 flats, plots 24 – 32  
Level 5

#### Phase 6 Earth-sheltered homes

4-5 'earthships' with sedum covered roofs, plots 33 – 36  
Level 6

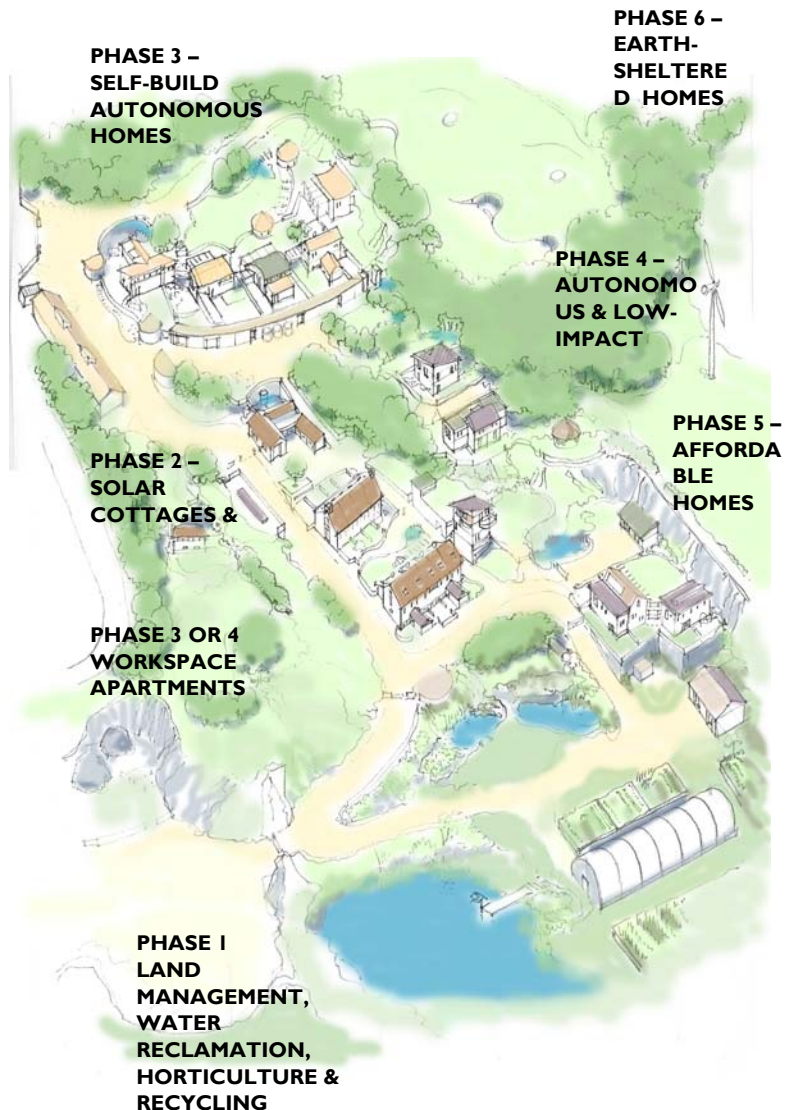
7 Low-impact shelters around 3 small 'hermitages' or self-build plots, plots 37 – 40

### Workspaces (phased according to need)

- W Entrance area – office or workshop with retail potential – around six small or three larger units
- X Central area – two units (in addition to others associated with residences)
- Y Level 4 (bottom) – Larger units, potentially related to land management use – up to 6 units
- Z Level 3 – remote area, suitable for heavier/noisier work – up to 6 units

Management & communication systems will aim to allow full participation by all residents. A management company will be formed, which may be in the form of a Trust or IPS, using the Cohousing model as a base. This company will be responsible for legal agreements, supply of services and land management. A range of tenures will be available.

**8. This report was written in 2003 and updated in 2005. See Bedrock Ecovillage 'Brief & Outline Programme' report for further details on proposed legal, management & procurement agreements.**



## Footnotes

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<sup>1</sup> J. Bookout, 'Two centuries of Fossil Fuel Energy', *Episodes: Journal of the International Union of Geological Sciences*, Dec 98.

<sup>2</sup> It has been estimated that we need to reduce our emissions by between 60% and 90% to prevent runaway climate change according to the Royal Commission for Environmental Pollution.

<sup>3</sup> Sustainable development was first defined in 1987 by the World Commission on Environment and Development as that 'which meets the needs of the present without compromising the ability of future generations to meet their own needs'.

<sup>4</sup> Mendip District Council states that one of their key objectives is to promote a sustainable environment, detailing promotion of recycling/composting and reviewing the development of eco-friendly construction and energy/waste management as two areas for work. *Executive Board report, 21<sup>st</sup> Oct 2002*

<sup>5</sup> Data from DoE, *The UK Environment* (London: Government Statistical Service, HMSO, 1992) and C.H.Pout, 'Relating CO<sub>2</sub> Emissions to End-users of Energy in the UK' in *Buildings and Environment: Proceedings of the First International Conference, 1994*.

<sup>6</sup> **Housing policy.** 'A further 4,380 houses need to be provided [in the Mendip District] for over the remainder of the Plan period [1998 – 2011], to meet the Structure Plan requirement' and 'the approach has been to maximise the contribution from previously developed land'.  
*Mendip District Local Plan, Deposit Draft 1998*

Rural Centres & Villages are expected to provide about 880 homes.

### <sup>7</sup> **Employment policy**

5.12 'Demand for premises in the District is primarily from local companies either relocating or taking up premises for the first time. The demand is principally focussed on smaller premises...'

5.13 'Demand is also focussed on what might be described as 'the modest end of the market'... The stock of such premises is limited and the poor supply in relation to demand is identified by local businesses as a constraint to their activities.'

5.3 'the Plan's employment policies and proposals have been designed to meet the following objectives; to allow sensitive, small-scale employment development to take place in Villages to help diversify the local rural economy and to sustain Mendip's rural communities.'

*Mendip District Local Plan, Deposit Draft, May 98*

### <sup>8</sup> **Environmental threats**

'Climate change is a great threat to global sustainable development. Some climate change is now inevitable, and we will have to adapt to that. But climate change must be kept within limits which global society can accommodate. Exactly what those may be needs to be defined, but action is likely to involve reducing global and UK greenhouse gas emissions, over time, to significantly below today's levels.

Achieving this as living standards rise, in the UK and globally, will require significant changes in the way energy is produced and used. It will require policies which meet the needs of people and businesses for affordable energy, warmth and mobility, and ensure secure and diverse energy supplies in environmentally-acceptable ways.'

From DEFRA's 'Sustainable Development, The Governments Approach'

<sup>9</sup> Mendip Quarries After-Use Study, Feasibility Report, May 1999, for the East Mendips Rural Task Force & Mendip District Council. This summarises the constraints of the quarry and recommends development of a sustainable business park employing around 50 people at a cost of around £1.4 million.  
*Quattro Design Architects Ltd.*

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<sup>10</sup> **Low impact development** – MDC’s ‘Planning Policy for Low Impact Dwellings’, recommended; The preparation, adoption and implementation of Supplementary Planning Guidance for low impact dwelling developments should be undertaken in such a manner that it will support the Council in achieving the following corporate objectives:

- use resources efficiently and minimise waste;
- protect and value the diversity of nature;
- limit pollution to levels at which natural systems can cope;
- meet local needs locally wherever possible;
- protect human health and amenity through safe, clean, pleasant environments and health promotion;
- ensure access to good food, water, housing and fuel at reasonable cost;
- encourage necessary access to facilities, services, goods and other people in ways which minimise the impact on the environment; and
- value, protect and develop diversity and local distinctiveness to strengthen local community and cultural identity.

Extract from MDC paper to Executive Board, 22<sup>nd</sup> Jan 2001.

<sup>11</sup> Analysis of the project costs in the Mendip Quarries After-Use Study, Feasibility Report, shows estimated development costs of £1,370,000 for 18 workspaces plus 3 houses, providing 50 jobs. Average cost per workspace is over £70,000 at a cost per sq.m of around £935.

<sup>12</sup> **Planning.** ‘Previously developed land’ (PDL), or brownfield land, is identified as having development potential in the *Deposit Draft Local Plan, May 1998 (Page ii)*. Quarry sites are classified as PDL if they have no agreed restoration plan (*Planning Policy Guidance 3*). Somerset County Council classifies Barnclose as a dormant quarry with no agreed plan in the *Minerals Local Plan 1997 – 2011 (Revised Deposit Version), Feb 2001*. It has an Interim Development Order (IDO) from 1992, which is revoked when Whatley extension is implemented (now invoked). (Sit ref. L27)

<sup>13</sup> **Site analysis** – further details are available, Duke & Swann.

<sup>14</sup> **Sketch proposals** - further details are available, Duke & Swann.

<sup>15</sup> Ecohome at CREATE, Bristol. [Eco-Home](#) by Richard Swann at Bruges Tozer Architects.

<sup>16</sup> Estimates show costs as follows;

Remediation, infrastructure, landscape & lake	£230,000
Water, sewage, electricity, services	£275,000
Community facilities	£160,000
Consultants fees & finance	£220,000
6 workspaces	£210,000
20 homes	£2,250,000

<sup>17</sup> See CV’s at [www.ecohome.org.uk](http://www.ecohome.org.uk).