

# CRANBROOK

Landscape,  
Biodiversity and  
Drainage Strategy  
November 2006

Final Issue

**COOPER**  
PARTNERSHIP



**Brookbanks**  
Consulting

Forbes-  
Laird  
Arboricultural  
Consultancy Ltd



# CRANBROOK

## Landscape, Biodiversity and Drainage Strategy

Status:	Final Issue
Issue Date:	November 2006
Revision:	B
Author:	NJ
Checked:	NJ
Approved:	JC



# Contents

Section 1.0 Introduction	1
Section 2.0 The Strategy	4
Section 3.0 LBDS Advanced Works	32
Section 4.0 Draft Strategies for Principal Open Spaces	34
Section 5.0 LBDS Management Strategy	39

## Plans

<b>LBDS 1:</b>	Site Constraints Plan (1 of 2)
<b>LBDS 2:</b>	Site Constraints Plan (2 of 2)
<b>LBDS 3:</b>	Strategic Tree and Hedgerow Retention Plan;
<b>LBDS 4:</b>	LBDS Framework Plan;
<b>LBDS 5:</b>	LBDS Advanced Landscape and Ecology works ( <i>subject to clients agreement</i> );
<b>LBDS 6:</b>	Draft Principles – Country Park
<b>LBDS 7:</b>	Draft Principles – Ecology Park

## Appendices (*separately bound*)

### **Appendix A: References and Bibliography**

#### **Appendix B: Landscape**

- B1** Technical Report: Landscape
- B2** Planting and Services
- B3** Plant Species – Draft Palette
- B4** Landscape and Management Specification – Draft Principles

#### **Appendix C: Trees and Hedgerows**

- C1** Technical Report: Trees and Hedgerows
- C2** Tree Survey by FLAC
- C3** Landscape Assessment of Trees and Hedgerows
- C4** Hedgerow Assessment Matrix and Analysis
- C5** Hedgerows qualifying as 'Important' under the Hedgerow Regulations
- C6** Example Site Log

#### **Appendix D: Biodiversity**

- D1** Technical Report: Biodiversity
- D2** Biodiversity Assessment of Veteran Trees by Ecology Solutions

#### **Appendix E: Drainage**

- E1** Flooding and Drainage Technical Report by Brookbanks Consulting

## Section 1.0 Introduction

- 1.1.1 This is the Landscape, Biodiversity and Drainage Strategy (LBDS) for Cranbrook, East Devon. It has been compiled by Cooper Partnership, and is the result of collaborative work undertaken by Cooper Partnership, Ecology Solutions, Brookbanks Consulting and Forbes-Laird Arboricultural Consultancy. Each discipline has set out its own strategy, which has been incorporated into the combined LBDS.
- 1.1.2 The primary objective of the LBDS is to set out strategic commitments which will be undertaken as part of the Cranbrook development. The secondary objective is to provide technical detail to supplement the outline planning application, which might otherwise be sought via condition. Thus both applicant (Consortium) and Local Planning Authority (LPA) have a tool with which to assess reserved matters.
- 1.1.3 To achieve these objectives the strategy will:
- i provide a strongly defined green framework for the site, which incorporates and integrates landscape, biodiversity, conservation and sustainable drainage, illustrated by the LBDS Framework Plan;
  - ii conform to landscape character, biodiversity and sustainable drainage guidance;
  - iii provide the framework for the detail design process, the aim of which is to create a sense of place for the new community;
  - iv provide principles of advanced works for LBDS management and implementation; and
  - v provide the strategic principles of how open space areas are to be managed.
- 1.2 The design process
- 1.2.1 The landscape, biodiversity and drainage survey work has informed the DFP and is being further utilised to inform the masterplan and detail design processes. The LBDS does not set out detailed design proposals. Instead, these will be provided at the time of subsequent detailed planning applications.
- 1.2.2 Design principles are illustrated by the Cranbrook Strategic Design Guide and how those principles may be achieved will be set out in the Design Codes for each phase of development. Sketch design principles are included in this LBDS for the Country Park and Ecology Park. This enables the normal process of design, planning and development to be accommodated and allows for further consultation with the LPA as necessary.
- 1.2.3 The design process has been carefully undertaken using a proactive approach between disciplines, and will be required to continue as such throughout the master planning and detail design processes for Cranbrook. This LBDS reflects the spirit of this proactive approach, and brings together landscape, arboricultural, biodiversity and drainage aspects in order to create a positive benefit to the community.
- 1.3 How to use this document
- 1.3.1 Section 2 sets out an overview of the strategic commitments of the LBDS. The strategy of each discipline is then explained, together with further detail on their aims and objectives. Section 3.0 sets out the advance works strategy. Section 4.0 contains the LBDS management aims and objectives. Section 5.0 sets out the draft design principles for the Country Park and Ecology Park. Each section ends with an Action List, to clearly set out the commitments relevant to each section. A full summary of commitments is contained in the final section of the LBDS, to be referred to during the detail design and planning process.
- 1.3.2 The order of the strategies as they are presented in this document bears no relation

- to perceived importance.
- 1.3.3 Technical reports, including relevant background data and plans requested by the LPA or other statutory consultees, are included as Appendices.
- 1.3.4 For ease of reference, the LBDS plans within this document are reproduced at A3. A1 drawings are also located at the end of this document together with a CD of digital versions.
- 1.3.5 All LBDS plans are based upon, and to be read in conjunction with, the Cranbrook DFP. Should the DFP be revised for any reason in the future, the LBDS plans will require updating as appropriate.
- 1.3.6 The naming of spaces or places in this document, such as 'Country Park' or 'Ecology Park' is to provide the reader with a simple means of identification. The final naming of these spaces will be determined in the future as appropriate.
- 1.4 Approval and future additions to the LBDS
- 1.4.1 It is intended that the LBDS can be added to as Cranbrook develops beyond 2900 dwellings and expands in the future. Amendments will not be made to the approved LBDS. Any necessary and justified changes or deviation from the approved LBDS will require written approval from the LPA.
- 1.4.2 Further detailed strategies may be added as detail planning applications for development are approved.
- 1.5 Cross-references to other strategies
- 1.5.1 This strategy is to be read with the following strategies, documents and plans for Cranbrook:
- i The Cranbrook Development Framework Plan (DFP);
  - ii Strategic Design Guide;
  - iii Detail Design Codes;
  - iv Phasing Strategy;
  - v Sustainability Strategy; and
  - vi S106 Agreement;
- 1.6 Contributors and references
- 1.6.1 This strategy has been developed in conjunction with:
- the Cranbrook Consortium;
  - the Cranbrook Consultant Team;
  - the provisions of relevant local plans, government guidance and legislation;
  - officers of East Devon District Council, as the LPA;
  - relevant officers of other statutory consultees, including Devon County Council, English Nature, the Environment Agency and the Highways Agency;
  - the Cranbrook DFP; and
  - best professional practice, drawn from relevant publications (see Appendix

3: Bibliography) and project experience.

1.6.2 References used in the production of the LBDS are set out in Appendix A, including the relevant statutory legislation and guidance. These references will also be utilised during the detail design process.

## Section 2.0 The Strategy

### 2.1 Strategic Commitments

2.1.1 The strategic commitments of the LBDS are set out below, in no order of importance.

#### 2.1.2 General

- a *Incorporate biodiversity, conservation and sustainable drainage proposals into the open space and landscape networks.*
- b *Make use of the floodplain for open space, leisure and biodiversity uses, by creating a high quality Country Park for use by residents and visitors.*

#### 2.1.3 Landscape

- a *Provide a strongly defined and clearly understood landscape structure for the site.*
- b *Conform to local landscape character guidance, and utilise local landscape materials.*
- c *Provide a defined hierarchy for open space and public areas, in accordance with Local Plan requirements and S106 Agreement.*
- d *Provide adequate and appropriate open space for both formal and informal use.*
- e *Provide access to, and circulation between, recreational open spaces.*
- f *Retain good quality hedgerows, hedgebanks, tree groups and individual trees where agreed, thereby retaining and enhancing landscape character and providing a memory of the land's former use.*
- g *Minimise the loss of hedgebanks and trees, instead utilising them as key features of the layout and as habitat corridors. Where losses are unavoidable, the position of former hedgebanks will be recognised by building lines, walls or street pattern.*
- h *Enhance the presence and condition of mature and veteran trees.*
- i *Retain green lanes and provide appropriate space adjacent to green lanes for the purpose of setting, root protection and buffer zones, as indicated on the DFP.*
- j *Frame and enhance views and vistas, and create visual entrances by means of gateways and a clear hierarchy of space.*
- k *Create high quality town squares, urban areas and open spaces which respect the landscape vernacular, whilst utilising modern principles and design.*
- l *Utilise the hard and soft landscape elements of the town as unifying and distinctive features for the new settlement, co-ordinating with buildings to form a cohesive whole.*

#### 2.1.4 Arboriculture

- a *Retention of A and B grade trees.*
- b *Retention of the best quality veteran and borderline veteran trees.*
- c *Hedgerows identified for strategic retention are set out on the DFP.*

### 2.1.5 Biodiversity

- a Secure the long term nature conservation value of the site.*
- b Maintain the favourable conservation status of those species which are important in a national and regional context.*
- c Ensure, where possible, that the site continues to support similar species assemblages as those currently present.*
- d Enhance the level of biodiversity and to promote habitat connectivity within the site and with adjacent habitats.*

### 2.1.6 Drainage

- a Replicate the natural means of surface water discharge from the site*
- b Utilise the existing watercourses to continue to convey water from the site.*
- c Create an appropriate Sustainable Urban Drainage Scheme (SUDS).*
- d Ensure that peak surface water flows from the site do not exceed the pre-development conditions.*
- e Ensure that the downstream flooding situation will be status quo, or better.*
- f Improve water quality by removing suspended solids and dissolved materials associated with urban drainage.*
- g Where possible detain water at source, or infiltrate into the ground rather than utilise site sewers.*
- h Use ponds, swales, and basins across the site to provide a system for extended surface water retention times within the wider River Clyst catchment, to alleviate downstream flood risk.*
- i No building development, except for essential infrastructure, to be located within the 1 in 1000 year floodplain. Approved landscape and biodiversity proposals will be incorporated within the floodplain, in order to enhance and protect the existing site features and to achieve the aims set out in the LBDS strategy.*

## 2.2 Landscape Strategy

### Introduction

- 2.2.1 This section has been prepared by Cooper Partnership. It sets out the landscape strategy for Cranbrook, and includes commitments which will be undertaken during the detail design and implementation process.
- 2.2.2 Key features of the site include the strong field boundaries defined by traditional Devon hedgebanks, the streams and associated riparian vegetation, which together define the local landscape character. Further information about the landscape and landscape character of the site is contained in Appendix B1: Technical report, Landscape.
- 2.2.3 The Consortium and Consultant Team decided that the existing hedgerow structure of the site should directly inform the master planning process, deliberately reflecting the nature of how traditional settlements would have developed over time. This concept is in accordance with landscape character guidance and is carried forward into the DFP.
- 2.2.4 The Trees and Hedgerow Strategy is set out at 2.3. Further tree and hedgerow information is available at Appendix C, which includes Appendix C3: Landscape

## Assessment of Hedgerows.

- 2.2.5 The strategy for advanced landscape and ecology works is set out in Section 3. Landscape management is included within the LBDS Management Strategy, Section 4.0.
- 2.2.6 Important landscape features are shown on Plan LBDS 1 and 2: Site Constraints Plan in Section 1 of this document.
- 2.2.7 The landscape strategy is illustrated on the LBDS Framework Plan, at the end of this section.

## Aims

- 2.2.8 The aims of the Landscape Strategy are to:
- i respect the surrounding landscape and landscape character;
  - ii retain and enhance the site's landscape character, and use local landscape character guidance to inform detail design;
  - iii provide a memory of the site's former landscape pattern, where development occurs;
  - iv use the landscape elements of the site as unifying and distinctive features, including protection, retention and enhancement of:
    - good quality trees and hedgerows, minimising their loss and incorporating them as key features of the development layout;
    - open space surrounding mature and veteran trees;
    - open water features and surrounding open space; and
    - the floodplain;
  - v incorporate and integrate biodiversity, conservation and sustainable drainage proposals into the open space and landscape networks;
  - vi provide a strongly defined and clearly understood landscape structure for the site; and
  - vii utilise natural features and combine with imaginative design to create a sense of identity, to create high quality open spaces, town squares and urban spaces, which reflect the landscape vernacular whilst employing modern principles and design.
- 2.2.9 Public access will be linked through the Cranbrook open space network, by means of a cohesive footpath and cycleway network.

## Objectives

### *Retention, Protection and Enhancement of Landscape Features*

- 2.2.10 Landscape features are identified on approved plans LBDS 1 and 2: Site Constraints Plan (also refer to Appendix B1: Technical report, Landscape for further general background information about the landscape features). These include:
- i trees, tree groups, copses and veteran trees;
  - ii hedgerows and hedgebanks;
  - iii green lanes;

- iv ditches;
  - v watercourses and ponds, and associated riparian vegetation; and
  - vi the listed footbridge, close to the C30.
- 2.2.11 Landscape features within the site which will be retained are illustrated on the LBDS Framework Plan. Please also refer to Plan LBDS 3: Strategic Trees and Hedgerows Retention and the Trees and Hedgerows Strategy for details of retained vegetation. Good quality trees, hedgerows, hedgebanks, and tree groups will be retained as agreed and as shown on the strategic plans.
- 2.2.12 Any necessary and justified changes or deviation from the agreed features to be retained will require written approval from the LPA.
- 2.2.13 The 1 in 1000 year floodplain on the site will be treated as open space for the creation of a Country Park for Cranbrook, available for use in part by residents and visitors. Landscape and ecological planting will be implemented within this floodplain, which will be agreed with the Environment Agency, approved by the LPA and be in accordance with the Drainage and Ecology Strategies. The Country Park provides leisure and biodiversity opportunities, which will be balanced to create its detail design.
- 2.2.14 Landscape features and character which are off-site, but which will also be respected during the detail design process include:
- i former parkland at Blue Hayes, (which possesses a distinctive local historic landscape character);
  - ii land at the Killerton Estate, owned and managed by the National Trust; and
  - iii the knolls at Whimple (distinctive landform which physically and visually separates Cranbrook from the village of Whimple).
- Open space network*
- 2.2.15 A network of open spaces is to be provided throughout Cranbrook, as shown on the DFP and the LBDS Framework Plan and the Outline Planning Application. These open spaces will be in accordance with the requirements of the Local Plan and S106 Agreements.
- 2.2.16 A defined hierarchy for open spaces and public areas is to be set out and incorporated within the Design Codes as detail design progresses and in accordance with the development phasing programme. The open space network will include both informal and formal open space.
- 2.2.17 Informal open space will include:
- i the Country Park, which is central to the layout of Cranbrook and extends south of the C30;
  - ii the extended Country Park area adjacent to the proposed Railway Station;
  - iii the Ecology Park, a pond complex forming part of the Country Park and located in the eastern side of Cranbrook;
  - iv areas which provide buffer zones or setting for retained landscape features; and
  - v other landscape planting, attenuation features, and public footpaths adjacent and within the site.
- 2.2.18 Formal open space will include:

- i sports provision, located adjacent to the schools, at the eastern edge of Cranbrook and at the Cricket Circus, in accordance with established guidance, or as agreed with the LPA;
- ii provision of play areas, LEAPS and NEAPS, in accordance with established guidance, or as agreed with the LPA;
- iii the Town Park, a display garden and central features, located at the eastern end of the High Street; and
- iv Town squares, either as hard urban spaces with formal trees, or as softer landscape spaces.

*Legibility, movement and circulation*

- 2.2.19 The details of legibility, movement and circulation are to be set out in the Design Codes, and will be expanded as detail design progresses. This will include a hierarchy of streetscapes, footpaths and cycleways.
- 2.2.20 Permeability for pedestrians will be achieved by a cohesive cycleway and footpath system throughout the public open space network and built environment, which will also link to existing rights of way in the adjacent countryside. This circulation system will be designed to link to new rights of way (footpaths, bridleways, cycleways) that may be created in the future, for example new off-site rights of way created by the LPA.
- 2.2.21 Existing green lanes will be retained in their current form, lined by hedgebanks, and utilised as new pedestrian and cycleway routes crossing the site, as agreed and as shown on the DFP and LBDS Framework Plan.
- 2.2.22 Formal and informal footpaths will be created within the Country Park where public access is to be provided. The formal footpaths will be created from compacted hoggins or another suitable surface to be agreed with the LPA and Environment Agency (where footpaths lie within the floodplain), and be suitable for wheelchair and pushchair use. Informal routes will be identified as mown footpaths, for example through wildflower areas.
- 2.2.23 Cranbrook waymarkers, incorporating a unique Cranbrook logo, will be used to define the footpath network throughout Cranbrook. The waymarker posts within open space areas will be timber and may be created from felled timber from the site, if it is suitable. This will be further progressed during the detailed design process.
- 2.2.24 The detail designs for the Country Park and the Ecology Park will set out the locations for footpaths and boardwalks where agreed, and will include appropriate safety and edge treatments in accordance with current standards.
- 2.2.25 Interpretation boards will be used throughout Cranbrook to inform and educate residents and visitors about aspects of the landscape, biodiversity and cultural heritage in key areas.
- 2.2.26 The form, design, content and materials of Cranbrook signs, waymarkers and interpretation boards is to be agreed between the LPA, Environment Agency (for floodplain areas) and the Consortium as detail design occurs, and will be in accordance with the development phasing programme.

*Landscape Design, Character, Identity and Sense of Place*

- 2.2.27 Landscape design will be used to create identity and sense of place.
- 2.2.28 Where removal of hedgerows or hedgebanks is unavoidable, their position will be recognized by building lines, walls or the street pattern, where this is practical.
- 2.2.29 Detail design of open space surrounding veteran or mature trees will be carefully undertaken in order to ensure their longevity and survival within the development, to

secure their presence and define the character of that open space.

- 2.2.30 The historic parish boundary hedgerow along the C30 is to be retained where possible, and as agreed with the LPA and Highways Authority. This will respect the historic landscape feature and an important wildlife habitat. It will form a Cranbrook frontage to the C30 which has a distinctive and strong character. The Design Codes will set out the detail design principles for this feature. As with other retained vegetation, this hedgerow will be in the public realm to ensure its longevity and maintenance. The hedgerow will be managed so as to benefit wildlife and ensure its continued presence.
- 2.2.31 New street tree planting will be appropriate to the scale and density of the development. The detail design will incorporate the technical capacity for appropriate new street tree planting to be provided. New tree planting will have due consideration to foundations, following relevant guidelines.
- 2.2.32 New trees will be carefully located to avoid undue shading of buildings, footpaths and open spaces (please also refer to the Trees and Hedgerows Strategy at section 2.3 for more information on new tree planting). Where excessive solar gain of structures needs to be reduced, new tree planting will be considered for shading.
- 2.2.33 Where space provides, main streets (including the Main Local Route – MLR) will be planted with avenue species trees. These will be to one side of the MLR, to define key spaces and town squares, or on both sides of the street.
- 2.2.34 Secondary streets will include specimen trees at carefully selected locations to provide character and a sense of place. Courtyards, car parks and squares will utilise upright tree species (refer to para 2.2.39 below).
- 2.2.35 A draft palette of plant species suitable for Cranbrook is included at Appendix B3. A table setting out the constraints for new planting adjacent to different types of services and utilities is included at Appendix B2.
- 2.2.36 Subject to agreement on technical issues, visually sympathetic wall mounted lights will be used in preference to columns, thereby avoiding conflict between tree planting and columns. Within key squares and public open space, columns will be carefully located within with the overall tree and hard landscape pattern. Minimisation of clutter in the streetscape will be sought. The SDG and Design Codes will set out the design principles and appropriate locations for these.
- 2.2.37 The transition from built environment to adjacent countryside will be softened by new copses and small woodland groups, along with casting up and gapping up of existing field boundary hedgerows and hedgebanks. This will be set out at the detail design stage and be in accordance with the advanced management and implementation works (refer to Section 3), or, where not part of the advanced landscape planting, in accordance with individual development phases.
- 2.2.38 New Devon hedgebanks will be created at the threshold of built environment and Country Park, as set out on Plan LBDS4. These are to be constructed using traditional methods, or as agreed with the LPA. These new hedgebanks will incorporate breaks at appropriate locations to provide visual and physical links between the development and Country Park, and in association with the attenuation swales of the Country Park, as set out on the LBDS Framework Plan. The precise locations, construction details and management of these new hedgebanks will be agreed with the LPA during the detail design of the Country Park.
- 2.2.39 The detail design of open spaces, including the Country Park and Ecology Park, will be in accordance with current guidelines for providing access for everyone, such as:
- i BT Countryside Access for All – a Good Practice Guide to Disabled People's Access in the Countryside;
  - ii Inclusive Mobility, a Guide to Best Practice on Access to Pedestrian and Transport Infrastructure;

- iii By All Reasonable Means: Inclusive Access to the Outdoors for Disabled People, Countryside Agency; and
  - iv Building Regulations 2000 Access To and Use Of Buildings: Approved Document M.
- 2.2.40 The detailed landscape design principles of Cranbrook will be set out in the SDG and Design Codes. These include:
- i visual integration with features beyond the site;
  - ii a palette of hard and soft landscape materials, utilising vernacular where appropriate, employed to develop a unique identity, including a hierarchy of materials, for each character area;
  - iii a palette of public realm furniture and colour treatments, which will be utilised to reinforce the different character areas;
  - iv a schedule of street trees, including size and species, which will assist in the definition of the street hierarchy and various development character areas; and
  - v conceptual sketches and other illustrative material, to describe the design principles.
- 2.2.41 Draft principles for the landscape specification, including landscape management, is set out at Appendix B4. These will be further discussed with the LPA as detail design progresses.

*Views and Vistas*

- 2.2.42 An analysis of views and vistas are set out in Appendix B1: Technical Report: Landscape. The LBDS Framework Plan identifies strategic views and vistas which are to be carried forward into the detail design and master planning process.
- 2.2.43 Visual entrances into Cranbrook will be created by the use of landscape gateways. These are to be agreed with the LPA and Highways Authority and will be set out in the relevant Design Codes during the detail design process.
- 2.2.44 Landmarks, framed views and vistas will be used to inform the orientation of buildings and open space, and will also be set out in the relevant Design Codes. These include:
- i a landscape focus to terminate the long, tree lined avenue which runs along the route of the gas pipeline;
  - ii a landscape focus in the Country Park south of the C30 to create a visual link from the built environment of Cranbrook; and
  - iii views out from selected Cranbrook locations, including to Ashclyst forest, Pinhoe hillsides, Rockbeare Church and Broadclyst Church.
- 2.2.45 New specimen trees are set out indicatively in the SDG. These will occupy key positions in the detail masterplan, and be referred to in the Design Codes. The exact locations of new trees will be agreed with the LPA during the detail design process. Specimen trees will:
- i create focal points within a space or development character area; and
  - ii define axis and the termination of vistas; and
  - iii soften hard material based urban areas.

## 2.3 Tree and Hedgerow Strategy

### Introduction

- 2.3.1 This section sets out in detail the strategy for the Cranbrook trees and hedgerows, and includes commitments for future work with particular regard to detail design and construction work on site.
- 2.3.2 For information regarding the various surveys undertaken, please refer to Appendix C1: Technical Report - Trees and Hedgerows.
- 2.3.3 The tree and hedgerow strategy, together with the work undertaken as described in Appendix C1, has informed the Cranbrook Development Framework Plan (DFP), which is submitted as part of the Outline Planning application.
- 2.3.4 This chapter has been compiled from input provided by Cooper Partnership (CP), Forbes-Laird Arboricultural Consultancy (FLAC), Ecology Solutions (ES), David Lock Associates (DLA) and East Devon District Council's Tree Officer.
- 2.3.5 For the purpose of clarity, and to simplify the text, the phrase 'hedgerows' will be used to represent both hedgerows and Devon hedgebanks.
- 2.3.6 All tree and hedgerow numbers referred to are as set out in the tree and hedgerow survey drawings by FLAC, as included at Appendix C2, and, for trees, the numbers also accord with tree tags on site, which were implemented to provide ease of recognition for the future.
- 2.3.7 Veteran tree assessments are included at Appendix C2 (arboricultural assessment) and Appendix D2 (biodiversity assessment).
- 2.3.8 At the outset of the Cranbrook project, Cooper Partnership undertook a landscape assessment of the site and surrounding area. This identified the tree and hedgerow pattern as being a key characteristic of the site and its local surroundings. As a result, the Consortium and Consultant Team decided that the existing hedgerow structure of the site should directly inform the master planning process, deliberately reflecting the nature of how traditional settlements would have developed over time. This concept is in accordance with landscape character guidance.

### Aims

- 2.3.9 Where shown on Plan LBDS3, the high value trees and hedgerows are to be incorporated into the streetscape or landscape of the new settlement, subject only to detailed design. Retaining these features within the public realm not only promotes good design and creates sense of place, but also helps to ensure their long term maintenance and survival.
- 2.3.10 The Cranbrook DFP delivers the key design aim of retaining the tree and hedgerow structure where possible.
- 2.3.11 The strategy is to be taken into account as master planning, detail design, construction works and the pre-occupation of Cranbrook phases progress.
- 2.3.12 The Tree and Hedgerow Strategy is to be implemented with proper regard to appropriate statutory and best practice guidance including, but not withstanding, the following:
- BS5837: 2005 Trees in Relation to Construction - Recommendations;
  - The Hedgerow Regulations 1997 including the Consultation Document 'The Hedgerow (Amendment) Regulations 2002' and accompanying 'Good Practice and Impact Assessment' documents;
  - Government Guidance PPS9;

- local plans, including Development Framework Plans;
- EDDC Trees and Development SPG;
- best practice documents regarding hedgerows by DCC and EDDC; and
- other best practice publications.

## Objectives and Commitments

### *Existing Trees*

- 2.3.13 The retention of A and B grade trees is a design objective, the achievement of which will be assessed and agreed with the LPA at the detailed design stage. These retained trees will be integrated within the public realm of the development.
- 2.3.14 Grade C trees are generally regarded as sacrificial, with resources to be directed instead towards the establishment of new planting. However, all tree removal will be agreed with the LPA during the detail planning process.
- 2.3.15 The best quality veteran trees will be retained.
- 2.3.16 Trees, tree groups, veteran and borderline veteran trees to be retained are illustrated on LBDS3: Strategic Tree and Hedgerow Retention Plan.
- 2.3.17 Advice is to be sought from the Arboriculturists or Landscape Architects at the appropriate times to explore all viable means of ensuring that this is achieved.
- 2.3.18 Plan LBDS3 also identifies:
- i vegetation categorised as 'R' grade by the tree survey which is to be removed or stabilised for sound arboricultural reasons; and
  - ii vegetation to be removed for the strategic purpose of development.
- 2.3.19 Plan LBDS3 relates to the current DFP and will be further refined, as the detail design layout of each phase progresses. Detailed retention and removal plans (per phase) will be produced by the Project Landscape Architects. These will be submitted to the LPA along with tree protection plans (see below).
- 2.3.20 Where any A or B grade tree/tree group or veteran/borderline veteran tree is not to be retained, this decision will have followed consultation with the Project Arboriculturists to exhaust alternative solutions, such that the loss of those particular trees can properly said to be unavoidable. This will be given special attention in relation to strategic infrastructure (access, drainage and attenuation, services and utilities). Veteran trees will include, where necessary, further on-site detailed checking of tree data at identified pinch points.
- 2.3.21 As the detail design of Cranbrook progresses, the Project Designers and Master Planners will be mindful of, and take into account, Root Protection Areas (RPAs) associated with all retained trees. There will be a general presumption against development within RPAs for retained trees. This includes those RPAs which have been identified by FLAC's work already undertaken and as set out in Appendix C2, and any relevant future RPA advice.
- 2.3.22 For all trees identified for retention, all aspects of the emerging layout design around or adjacent to them will be referred to the Project Arboriculturists for review, so that any unintended adverse effects of the design can be identified and mitigated wherever possible.

### *Tree Protection*

- 2.3.23 Once detailed design proposals have been agreed by the Consortium and Consultant Teams, detailed tree protection plans will be prepared to ensure that retention trees

are properly safeguarded during the construction process (including during preliminary works such as vegetation clearance). The full range of protection measures will be employed as required. These will include protective barriers to Figure 2 of BS5837:2005, where trees stand adjacent to intensive construction works, and other types of tree protection as deemed fit for purpose. Temporary ground protection and special engineering methods will be employed for any works which are unavoidable within designated RPAs. There will be a presumption against development within identified RPAs for retained trees.

- 2.3.24 The tree protection plans and measures will be produced in accordance with the phasing scheme for Cranbrook and BS5837:2005 and, along with any relevant applications, will be submitted to the LPA for written approval, prior to any construction works commencing for that relevant phase.
- 2.3.25 Construction works for each phase of development will only commence once necessary access facilitation pruning has been implemented, and relevant tree protection measures have been confirmed as functional and fit for purpose. Where access facilitation pruning work is necessary, it will be specified by the Project Arboriculturists. A.A.A.C
- 2.3.26 During construction of each phase, the efficacy of the tree protection regime will be monitored. A record of the site inspections will be kept in the form of an arboricultural monitoring site log (see Appendix C6 – Example Site Log). Rectifying any deficiencies in the protection measures will be made a priority. If necessary, temporary cessation of development operations will be used as a safeguard for any areas where trees for retention are found to be unprotected, until this is remedied.

#### *Trees at Pre-handover*

- 2.3.27 Prior to handover of each completed phase of the development, an updated tree condition survey will be undertaken by the Project Arboriculturists, who will specify and implement any necessary tree management works. Such works will be tailored to the context of the trees concerned, be in accordance with the LBDS and will be mindful of and take into account public safety, sound arboricultural management and biodiversity. This updated condition survey will be submitted to the LPA. All tree works will be undertaken by professional arborists (A.A.A.C) and in accordance with current industry best practice guidelines.

#### *Tree Preservation Orders*

- 2.3.28 Tree Preservation Orders (TPOs) do not exist within the site at this stage. Existing trees are afforded protection from removal by the Forestry Act 1967.
- 2.3.29 Any TPOs will be issued by the LPA at the appropriate time. The normal planning process will apply to TPO trees.

#### *Existing Hedgerows*

- 2.3.30 Hedgerows to be retained are shown on Plan LBDS3.
- 2.3.31 Appendix C1 provides information about how hedgerows have been assessed for retention or removal.
- 2.3.32 Should any hedgerows be identified for removal be found to not be included in the Detailed Planning Application, the relevant applications for hedgerow removal for the applicable phase, will be made to the Local Authority under the Hedgerow Regulations, in the normal way.
- 2.3.33 Hedgerows identified to be strategically retained within landscape areas on the DFP and as shown on Plan LBDS3 are to be retained in some form. The form the hedgerows will take within the development will be decided during the detail design process for each phase and agreed with the LPA. Where retained, hedgerows will be either:

- i in their existing form, renovated, enhanced and managed, some with hard edging, some forming boundaries and edges; or
- ii as selected trees which have been allowed to mature as a line of vegetation providing a memory of the former landscape character.

2.3.34 Where hedgerows cannot be retained for reasons of good design, the former hedgerow line is to be reflected in the layout of development parcels, the street pattern, materials or building frontages. Where hedgerows are removed from areas designed to be town squares, or other urban public realm areas, an imprint of the removed hedgerow section will be reflected or mirrored by hard landscape detailing or other features. This will be set out during the detail design process.

2.3.35 The table below sets out potential treatments for the retained hedgerows. Alternative treatments may be identified during the detail design process, for example should new best practice advice be forthcoming, or should the detail design proposals provide new opportunities for creative design solutions.

Table C1: Potential Hedgerow Treatments		
Hedgerow Treatment	Design Issues	Potential Use
<b>Full Retention</b>	<p>Requires management to retain and enhance biodiversity and form.</p> <p>Existing ditches to be retained also, and to be utilised as part of the Drainage Strategy.</p> <p>Services and drainage will be located within roads.</p> <p>Limit the effects of proposed lighting in the vicinity of hedgerows, with particular reference to wildlife corridors.</p> <p>Breaks through hedgerows must ensure they do not put integrity, form and character at risk. Visibility splays must ensure they do not cause further loss.</p> <p>Where breaks occur for roads or access, a record is to be made of the hedgerow, prior to removal (LPA archaeology requirement).</p>	<p>Green Lanes - retain existing hedgerows both sides of lane, retaining character, to be used for pedestrian and cycleway access.</p> <p>At boundary of built development to demarcate different land use (e.g. Country Park, Ecology Park), including creation of new hedgerows aligned adjacent to drainage swales;</p> <p>Between neighbourhoods and housing areas.</p>
<b>Partial removal, partial retention</b>	<p>Retention of large parts of hedgebanks, located in public open space.</p> <p>Record to be made of the hedgerow prior to removal of any sections (LPA archaeology requirement).</p> <p>The integrity and character of the former historic field pattern must be clearly defined for this to work.</p> <p>Limit the effects of removing hedgerow sections, with particular reference to wildlife corridors.</p> <p>Limit the effects of proposed lighting in the vicinity of hedgerows, with particular reference to wildlife corridors.</p>	<p>Incorporate partial hedgebanks or tree lines within public open space, create focal points, use of angled openings through retained section of hedgerow, potential for sculptural metalwork gates if additional security required, entrance to play areas.</p> <p>Definition of street edges as a boundary between public street and private realm, breaks through hedgerow for private drives.</p> <p>Demarcation of pedestrian street, use of paved and battered hedgerow base to define and separate pedestrian areas.</p> <p>Demarcation of traffic, hedgerow to separate directional traffic.</p>

Table C1: Potential Hedgerow Treatments		
Hedgerow Treatment	Design Issues	Potential Use
	<p>Consider visual mitigation requirements.</p> <p>Services, utilities and drainage to be limited, ensuring they do not put integrity, form and character at risk.</p> <p>Consider how existing field ditches could be utilised and retained in the new urban form.</p>	<p>Hedgerow used as outer wall of private front entrance or garden boundary.</p> <p>Seating built into hedgerow wall.</p> <p>Hedgebank transform into hedgerow along slope, to take up level changes.</p> <p>Hedgerow conversion into tree line, manage existing hedgerow to create lines of trees.</p>
<b>Complete Removal</b>	<p>Not appropriate where this would create loss of biodiversity or visual importance</p> <p>Not appropriate where visual mitigation is required.</p> <p>Record to be made of the hedgerow prior to removal (LPA archaeology requirement)</p> <p>Consider implications of loss of existing field ditches upon Drainage Strategy.</p>	<p>Imprint of former hedgerow to be created within building or other design, following existing hedgerow alignment, in order to maintain historic land pattern through streets, key buildings or as a landscape or urban design feature, where this is practical and appropriate.</p> <p>Pattern created by use of contrasting paving materials, lighting feature, within surface paving or on new low retaining walls to light footpath, linear tree or shrub planting.</p>

2.3.36 As detail design of each Cranbrook phase progresses, the Project Designers will be mindful of Root Protection Areas (RPAs) associated with hedgerows.

#### *Hedgerow Protection*

2.3.37 Hedgerow protection plans will be prepared to ensure that retention hedgerows are properly safeguarded during the construction process (including during preliminary works such as vegetation clearance). The range of protection measures will be agreed with the local authority. Temporary ground protection and other methods will be employed for any works which are unavoidable within designated RPAs. There will be a general presumption against development within identified RPAs for retained hedgerows.

2.3.38 Construction works for each phase of development will only commence once necessary and relevant hedgerow protection measures have been confirmed as functional and fit for purpose. Where access facilitation pruning work is necessary, it will be specified by the Project Arboriculturists, agreed with the Project Ecologists, and undertaken by professional arborists (A.A.A.C).

2.3.39 Prior to construction works commencing for each phase, all site personnel will receive a short briefing sheet on hedgerow protection, as part of their site induction process.

2.3.40 During construction of each phase, the efficacy of the hedgerow protection regime will be monitored. Rectifying any deficiencies in these measures will be made a priority. If necessary, temporary cessation of development operations will be used as a safeguard for any areas where hedgerows for retention are found to be unprotected, until this is remedied.

2.3.41 Prior to handover of each completed phase of the development to end-users, an updated hedgerow condition survey will be undertaken by the Project Arboriculturists and Project Ecologists, who will specify any necessary management

works. Such works will be tailored to the context of the hedgerows concerned, be in accordance with the LBDS and be mindful of and take into account the needs of public safety, sound landscape management and biodiversity.

#### *Proposed Trees and Hedgerows*

- 2.3.42 The LBDS Framework Plan sets out the landscape, biodiversity and drainage framework proposals, including strategic new and retained planting, trees and hedgerows. This plan applies to and is in accordance with the Cranbrook DFP and will be further refined, as detail design layouts of each phase progresses.
- 2.3.43 New tree species will be set out in the Strategic Design Guide and Design Codes for each phase. Locally indigenous species will be utilized in landscape areas, and semi-ornamental species restricted to town squares and other urban areas.
- 2.3.44 Refer to the Landscape Strategy for principles regarding new specimen trees.
- 2.3.45 New trees will be considered during the detail design process in terms of shade and proximity of tree roots to foundations and utilities. Due consideration will be given to relevant guidelines, for example NHBC guidelines with regards to any clay soils present. Also refer to the Landscape Strategy.
- 2.3.46 Trees for main streets are described at 2.2.33. Where appropriate, main streets (including the Main Local Route – MLR) will be planted with avenue species trees where space allows, or at agreed locations to define key spaces and town squares.
- 2.3.47 Trees for secondary streets are described at 2.2.34.
- 2.3.48 A draft schedule of plant species is included at Appendix B3. A table setting out the constraints for new planting adjacent to different types of services and utilities is included at Appendix B2.
- 2.3.49 Services, utilities, lighting and CCTV provision will be designed to avoid proposed and existing trees. Their root systems will be given due consideration with regard to adjacent services and utilities. Protection for roots and services will be installed if necessary, for example, root barriers to tree pits / trenches. Reference will be made to current best practice guidance, such as 'Reducing Infrastructure Damage by Tree Roots', during the design process.
- 2.3.50 New Devon hedgebanks will be constructed to a method agreed with the local authority, utilizing traditional construction methods where possible and practicable. They will include new trees.

## 2.4 Biodiversity Strategy

### Introduction

- 2.4.1 This section has been prepared by Ecology Solutions. It sets out the framework for ecological mitigation and biodiversity enhancement. It provides guidance for dealing with ecological issues at the detail design stage, as well as during the construction and operational phases of the development.
- 2.4.2 The majority of the site supports habitats of limited ecological value, being dominated by intensively managed arable and improved grassland. There is little semi-natural habitat within the site, although there are a number of wetland features, including stream corridors and ponds.
- 2.4.3 The site also supports hedgerows, some of which are species-rich and qualify as 'important' under the Hedgerows Regulations 1997. This is set out in more detail in the Trees and Hedgerow Strategy at 2.3, and Appendix C4: Hedgerow Assessment Matrix and Analysis. LBDS 3: Strategic Trees and Hedgerows Retention Plan identifies those hedgerows which are to be retained in accordance with the Cranbrook DFP.
- 2.4.4 Information regarding the biodiversity surveys undertaken (habitat and species) and

the current status of the site is included with the Outline Planning Application and summarised in Appendix D1: Technical report: Biodiversity. An additional technical report, with regard to a biodiversity assessment of veteran trees has been produced since the Outline Application was lodged, and is included at Appendix D2. Surveys undertaken include:

- i Habitat Survey based on extended Phase 1 survey methodology (spring 2003);
- ii Hedgerow survey (2004); and
- iii Veteran Tree Survey - ecology (October 2005 and February 2006).

2.4.5 Protected/notable species identified either within the site or using the site include:

- i Badgers;
- ii Bats;
- iii Kingfisher; and
- iv Reptiles (Slow Worm).

2.4.6 Important existing ecological features identified through the surveys are shown on LBDS 1 and 2: Site Constraints Plan.

#### Aims

2.4.7 The aims of this strategy are:

- i to secure the long term nature conservation value of the site;
- ii to maintain the favourable conservation status of those species which are important in a national and regional context;
- iii to ensure, where possible, that the site continues to support similar species assemblages as those currently present; and
- iv to enhance the level of biodiversity and to promote habitat connectivity within the site and with adjacent habitats.

#### Objectives and Commitments

##### *Habitat Protection*

2.4.8 Protection measures will be implemented during construction with the aim of avoiding damage to important species, retained habitat or newly created ecological features during the construction phase of development. Particular regard will be had for areas considered vulnerable to construction traffic, storage of materials, excavation operations, trampling, fires or vandalism.

2.4.9 Protective fencing will be applied to trees and hedgerows as set out in the Trees and Hedgerow Strategy.

2.4.10 Regard will be afforded to the protection of the veteran tree group and the detail design of the area in the vicinity of that group, which borders the pond in the east of the site (Trees 1854, 1855 and 1856 on Plan ECO2 at Appendix D2: Biodiversity Assessment of Veteran Trees), to ensure that any potential adverse impacts on this ecosystem is minimised.

2.4.11 Re-direction of the stream will be avoided. Unavoidable modifications to watercourses will be undertaken such that there will be no significant detrimental impact on flow dynamics. Where crossings of the streams are necessary, clear-span bridges, culverts with ledges or other solutions which will enable unrestricted wildlife

movement through the streams will be utilised.

- 2.4.12 The banks of any wetland features will be protected during construction with the use of shuttering where necessary, subject to hydrological restrictions within the floodplain.
- 2.4.13 Fuel, oil and any other potentially polluting materials will be stored within impervious bunded compounds of a capacity greater than the total volumes material and away from wetland features, the details of which are to be agreed with the EA and LPA. These will be kept secure when unattended during construction. Additional safeguards are to be agreed and implemented, for example:
- i the suitable disposal of sewage and other waste water;
  - ii the appropriate storage and composting of mowings away from watercourses; and
  - iii the strengthening of the existing vegetation buffer strip along the watercourses to reduce the amount of nutrients potentially entering watercourses, where necessary, subject to hydrological restrictions within the floodplain.
- 2.4.14 Habitats identified as being ecologically sensitive (veteran trees, hedgerows, woodlands, ponds and stream corridors) will be subject to an appropriate and agreed buffer zone (ranging from 5 – 10m depending on the specific feature to be protected) from construction areas, or, where this is not practical, an alternative means of protection will be agreed with the LPA. It is anticipated that buffer zones will be within the RPAs previously identified.
- 2.4.15 Ecology buffer zones will be maintained throughout the operational phase of development and will comprise native scrub or grass species of local provenance or, in some circumstances, a gradation of scrub and grasses will be provided, subject to hydrological constraints. Indicative buffer zones are shown on LBDS 1 and 2: Site Constraints Plan and LBDS 4: LBDS Framework Plan.

#### *Species Protection*

- 2.4.16 The following protection measures will be undertaken prior to construction works for each phase:

##### *Badgers*

- i a check survey will be undertaken to identify any new setts within the site to ensure Badgers have not recolonised the area in the period since the initial ecological assessment was undertaken; in addition, the check survey will incorporate all known setts to ensure their status has not changed;
- ii during construction the implementation of DEFRA licence method statements will be undertaken, as necessary, to ensure protection for this species;

##### Bats

- iii a check survey will be undertaken of all mature trees previously evaluated as possessing features that could potentially support roosting bats (classed as trees of medium to high potential). Bat roosts in buildings will be retained as part of the development proposals; any ancillary buildings of these properties, that are to be demolished, will be subject to check surveys to confirm that bats are not in residence; any new roosts discovered during the check surveys will be fully safeguarded through DEFRA licensing procedures; and

##### Reptiles

- iv a reptile rescue exercise will be undertaken in areas identified as 'reptile hot spots; reptiles rescued will be translocated to suitable receptor sites as

necessary, which would be selected on the basis of recommendations within the Herpetofauna Groups of Britain and Ireland's advisory note for mitigation/translocation programmes.

#### *Habitat Enhancement*

- 2.4.17 Gains in the biodiversity of the site and species-specific benefits will be made through the creation of new habitats, using indigenous species of native and local provenance.
- 2.4.18 Where agreed, seed collections and propagation will be started as far in advance of the proposed planting and seeding operations.
- 2.4.19 Plant stock will be native and of local provenance.
- 2.4.20 Wetland planting stocks will be carefully sourced to prevent the introduction of highly invasive non-native species. Wetland plant material from suitable donor sites will be sought. In any instances where aquatic plants must be purchased, care will be taken to source from nurseries specialising in native species and who will verify the origin of the plants.
- 2.4.21 Indicative locations for the habitat enhancement proposals set out below are illustrated on the LBDS Framework Plan. The exact locations will be set out during the detail design process.
- 2.4.22 Enhancement measures outlined below will be implemented according to an agreed phasing plan. Details are provided below (for example, incorporation of measures within buildings for bats and birds). Advanced works are set out in Section 3. The LBDS management strategy is set out in Section 5, and a summary of ecological management principles for each of the habitats is included in Appendix D1.
- 2.4.23 Habitat enhancements proposed are set out below. Please also refer to Section 4.

#### **Country Park**

- 2.4.24 The strategic zoning of the Country Park is set out in Section 4 and illustrated on the LBDS Framework Plan. Proposed planting and habitat creation within the Country Park is constrained on account of flooding and hydrology issues.
- 2.4.25 Zones within the Country Park will include:
- floodplain tree planting;
  - parkland;
  - ecology zone;
  - stream corridor;
  - woodland; and
  - ponds.
- 2.4.26 Please refer to the Trees and Hedgerow Strategy for information about retained vegetation. Further information regarding enhancements in the Country Park is set out below.

#### **Grasslands**

- 2.4.27 The Country Park will include different types of grassland, to be agreed with the EA and LPA during the detail design process.
- 2.4.28 A mosaic of grassland habitats will be created, including wildflower grassland in open

space, rank grassland along woodland edges and hydrophilic grasses in areas adjacent to ponds or watercourses.

- 2.4.29 A varied cutting regime for the various grasslands will take place to include maintenance of mown pathways and different areas of grassland cut annually in rotation, particularly for those within the newly created country park. This will create grassland of varying heights, which will be of benefit to insects, birds and mammals.
- 2.4.30 The use of herbicides and fertilisers will be avoided for wild-flower, neutral and species-rich grassland areas and all cuttings will be removed in order to promote species diversity.

### **Ecology Zones**

- 2.4.31 The Ecology Zones are within the Country Park as shown on Plan LBDS6.
- 2.4.32 The emphasis will be for wildlife with minimal recreational usage, with informal paths leading the public through this area, and restrictions on dog-walking (signs to be provided outside of the flood plain).
- 2.4.33 A series of linear wetlands are to be created within the C(i) wetland strips (see Plan LBDS6), which will be linked with the drainage detention basins in order to provide a base flow (see Appendix E1), the detail of which is to be agreed with the EA and LPA during the detail design process. These features will be constructed to ensure a practically impervious base to the infiltration of water and hence ensure the formation of permanent water features subject to extreme drought conditions. The technical details of the construction of these features will be provided during the detail design process. The detail design will continue to progress ensuring that there will be no increase in risk of bird strike at Exeter Airport, and the designs will be agreed with the CAA.
- 2.4.34 A conceptual illustration of these linear features is set out on LBDS 6: Draft Principles – Country Park, included at Section 4. Plant species are set out in Appendix B3. Restrictions on public access will be imposed initially to allow the area to establish, however these restrictions will be lifted in agreed locations for limited public access in time for occupation of residential development. Locations of footpaths and where public access will be permitted will be agreed with the LPA during the detail design process.
- 2.4.35 An appropriate management regime for this zone will be introduced based on annual cutting of the grasslands on a rotational basis and annual vegetation maintenance within the wetland strips, with scrub control as necessary. De-silting operations of the wetlands will occur, if necessary, every 5-10 years on a rotational basis (not all waterbodies subject to management operations at the same time). The management principles are to be agreed with the EA and LPA, and are subject to hydrological conditions.

### **Area to South of C30**

- 2.4.36 Subject to the appropriate environmental conditions being present it is proposed to establish with a neutral grassland wildflower meadow, necessitating the stripping of the top soil layer to expose the less fertile subsoil prior to seeding.
- 2.4.37 The northern section of this area, above the floodplain, will be planted with small native woodland copses with understorey woodland scrub and ground flora.
- 2.4.38 Consideration will be given to the creation of marsh/damp grassland area in the western section, by digging out scrapes and seeding/planting. Typical species to be established in such a habitat may include marsh foxtail *Alopecurus geniculatus*, rushes *Juncus* spp., and meadowsweet *Filipendula ulmaria*.
- 2.4.39 A wildlife corridor of habitat enhancements will be established through the Country Park between land to the south of the C30, and the watercourse towards Southbrook House at the eastern end of the site. Specific enhancements within this corridor are

set out below and shown on the LBDS Framework Plan, and on Plan LBDS6.

### **Ecology Park**

- 2.4.40 The emphasis for the Ecology Park will be to establish a diverse pond complex interspersed with grassland (including damp grassland/marsh) scrub and trees, with a view to furthering botanical, amphibian and invertebrate interest within the site. The complex will include both permanent and ephemeral small ponds with shallow wavy margins.
- 2.4.41 A major benefit of this feature will be education, with a series of interpretation boards provided (see Public Information and Education below). The area will be available to the public and for use by local schools. It will be accessed via footpaths for pedestrian use only (the detail design process will identify appropriate materials). A conceptual design and the draft design principles for this area are included at Section 4. The detail design for this feature will be agreed with the LPA.
- 2.4.42 The management regime of the Ecology Park will be similar to that implemented for the linear wetlands. However, as the pond complex is not functional for floodplain purposes, some areas will be allowed to become silted in order to diversify the wetland habitats present and encourage invertebrate interest that thrives in such environments.

### **Hedgerows and Green Lanes**

- 2.4.43 Please refer to the Trees and Hedgerows Strategy.
- 2.4.44 Selected hedgerows will be subject to traditional management techniques, including laying of hedgerows and casting up hedgebanks. For wildlife corridor hedgerows, management will be tailored to maximise biodiversity. Management of retained hedgerows will be appropriate to use and location, for example those in more natural areas will have less management than those within the built environment.

### **Existing Wetland Features**

- 2.4.45 The existing watercourses, stream corridors and ponds will be retained and subject to enhancements as necessary.
- 2.4.46 The Rockbeare Stream and Cranny Brook will be subject to little direct management. The Environment Agency is in favour of avoiding de-silting operations, limiting management to removal of fallen trees where they become a flood risk and strengthening of the existing river corridor vegetation. Management will be tailored to maximise biodiversity whilst maintaining agreed levels of flood protection.
- 2.4.47 Existing ponds will be retained and subject to dredging and replanting as necessary, based on a case by case assessment prior to construction of each phase of development and in agreement with the LPA; the aim of which is to promote biodiversity.
- 2.4.48 LBDS 4: LBDS Framework Plan includes the provision of a number of retention basins, swales and ditches, including permanent waterbodies. Some of these will serve as ecological resources in their own right. The drainage strategy and detail design of drainage features will set out measures to ensure that polluting run-off does not enter wetland areas proposed to serve an ecological function.

### ***Species Enhancement***

- 2.4.49 Indicative locations for the species enhancement proposals set out below are illustrated on the LBDS Framework Plan. The exact locations will be agreed with the LPA during the detail design process. Please also refer to LBDS5: LBDS Advanced Landscape and Ecology works.
- 2.4.50 The majority of the enhancement measures outlined below will be implemented during the first phase of development. A summary of the proposed management and

monitoring regime for each of the species is included in the LBDS Management Strategy at Section 5.

2.4.51 Species enhancements proposed are:

Badgers

- i badgers will be accommodated within the development, where agreed with the LPA, for example by enhanced foraging grounds and access to adjoining open countryside;

Bats

- ii existing Bat roosts will be fully retained and additional roosting opportunities will be provided; in addition, the retention and enhancement of existing navigational features and foraging areas, combined with the provision of landscape structure planting (refer to the Landscape Strategy, Tree and Hedgerow Strategy and the LBDS Framework Plan) and other newly created habitats will compensate for any minor loss of existing foraging habitat;
- iii two hundred bat boxes will be provided in areas which back onto open space, especially in those areas close to the Country Park with its associated stream corridor. These will be provided as each phase of development comes forward, with a preference that the majority of these will be placed on trees and structures;

Reptiles

- iv provision of deadwood log piles and hibernacula around some of the ponds and at suitable locations within the grassland areas of the Country Park and Ecology Park (outside the 1 in 1000 year floodplain); these will be provided as each feature is created or enhanced;

Birds

- v the proposals for the Country Park and Ecology Park, together with the landscape proposals and planting (see the Landscape Strategy) will benefit a variety of bird species, including Kingfishers and Barn Owls;
- vi two hundred bird nesting boxes will be installed either within the fabric of buildings or trees throughout the Country Park and other suitable open spaces. The bird boxes will be provided as enhancement works to each area in accordance with the development phasing and Country Park phasing. Three Barn Owl nesting boxes will be positioned in suitable locations in the west of the site and adjacent to the Country Park, which will provide suitable hunting opportunities within the open grassland. A minimum of 50 Swallow nesting cups will also be provided;
- vii where possible, bird nesting ledges will be erected on the sides of 5% of new buildings; and

Water Vole

- viii growth of bankside, emergent and aquatic vegetation will be encouraged along all watercourses to provide potential habitat for Water Vole; where this is possible it will be achieved without degrading the existing adjacent habitats, such as hedgerows, that are associated with the watercourses.

*Public Information and Education*

- 2.4.52 Interpretation boards will be provided within the wider Country Park and the Ecology Park to help residents and visitors to understand and appreciate biodiversity, landscape and other relevant issues. In addition, other methods to inform the public about the site's biodiversity and landscape will be utilised, including nature trails,

signage where agreed with the EA and LPA (also refer to the Landscape Strategy).

- 2.4.53 The detailed proposals of such initiatives will be set out and agreed with the local authority, relevant statutory consultees (such as English Nature and the Environment Agency) and other stakeholders as appropriate, during the detailed design process. This may take the form of workshops or public participation events, as agreed between the Consortium and EDDC.
- 2.4.54 In addition, a range of initiatives to promote public awareness of biodiversity issues will be instigated throughout the local community, e.g. in the form of leaflets for new residents. The proposals for these measures will be considered during the detailed design process.

#### *Management and Monitoring*

- 2.4.55 The biodiversity management strategy is incorporated into the wider LBDS Management Strategy, see Section 5.
- 2.4.56 A five year post-construction monitoring programme will be set up to test whether the mitigation and enhancement measures set out above are achieving the aims of the biodiversity strategy. Monitoring will include proposed mitigation actions and will feed back into a post-development management regime to enhance the value of the biodiversity mitigation and enhancements.
- 2.4.57 At the end of this initial five year monitoring period, the results will be used in further monitoring exercises if necessary and are to inform long-term management operations.

#### *Timing Constraints*

##### Birds

- 2.4.58 The bird nesting season will be avoided for vegetation clearance, unless a prior bird survey has confirmed that there are no nesting birds present in a given area that would be disturbed.

##### Badgers

- 2.4.59 Any licensable works (i.e. generally within 30 metres of an active sett) can only be undertaken between July and November inclusive (licences not granted outside this time period due to potential impacts on badger breeding). There is no restriction on works outside the licensable distance or to inactive setts. English Nature licences can take a minimum of a month to be granted following submission of an application.

##### Reptiles

- 2.4.60 Surveys/translocation can only be undertaken between mid March/April and mid-September/October inclusive depending upon prevailing climatic conditions. Outside this time period they are in hibernation and no survey/translocation is possible. In the height of summer June/July, translocations can be hindered by very hot weather as this reduces the need for reptiles to utilise the survey refugia that are used to capture them. Protected grassland areas which are suitable receptor sites for the reptiles will be identified and established prior to commencement of construction works.

##### Bats

- 2.4.61 Internal check surveys can be undertaken at any time of year, but any emergence/activity surveys rely on the same sort of timing constraints as for reptiles and prevailing conditions are equally applicable (optimum survey period is June to August). Timing of works may be restricted depending on roost type:
- i significant roosts (for example the . maternity roost as at Till House Farm) will be more constrained requiring renovation or construction works outside breeding and hibernation periods, leaving only limited timeframe for works in

spring (April) and autumn (October); and

- ii minor roosts (for example . roost at Young Hayes Farm) likely to be subject to minimal timing constraints.

2.4.62 Note that timing restrictions for tree works will be dependent upon findings of check survey work at detailed stage.

2.4.63 All works affecting roosts would also need to be carried out under DEFRA licence. This can take 2-3 months to apply and receive approval.

## 2.5 Drainage Strategy

### Introduction

2.5.1 This element of the LBDS has been prepared by Brookbanks Consulting and outlines proposals in respect of Flooding and Drainage. The following is a brief summary of the drainage proposals supported by more detailed proposals and technical background information contained in Appendix E1 – Flooding and Drainage Technical Report. Refer to the Biodiversity Strategy for information regarding biodiversity wetland features.

2.5.2 Prior to submission of the Cranbrook Outline Planning Application, engineering advice on the application was provided by WSP Development for the Consortium. Work completed by WSP is outlined in the various reports that support that Application. The post-planning assessments undertaken since then, by Brookbanks Consulting for the Consortium have developed from the pre-Application work to progress the design development process and to provide information requested by the LPA and other statutory consultees.

2.5.3 Basic topographical and ground investigation material used at the pre-Application stage has since been augmented with detailed surveys and investigations. This has enabled more detailed and robust assessments to be completed and presented in this strategy.

2.5.4 The DFP, landscape and biodiversity proposals have been developed during the course of this further work. Development of the drainage proposals has been an iterative and interactive process to ensure that the various professional and regulatory interests can be achieved. Minor amendments to the original intent of the scheme are set out in this strategy, which aims to provide the most beneficial solution in terms of drainage and flooding.

### Aims

2.5.5 The aims of the strategy are to:

- i replicate the natural means of surface water discharge from the site;
- ii utilise the existing principal watercourses to convey water from the site;
- iii create an appropriate Sustainable Urban Drainage Scheme (SUDS);
- iv ensure that peak surface water flows from the site do not exceed the predevelopment conditions;
- v incorporate measures to improve landscape character, amenity and biodiversity;
- vi improve water quality by removing suspended solids and dissolved materials associated with urban drainage;
- vii where possible detain water at source, or infiltrate into the ground rather than utilise site sewers;

- viii use a series of ponds, swales, channels and basins across the site to provide a system for extended surface water retention times within the wider River Clyst catchment, to alleviate downstream flood risk;
- ix no building development, except for essential infrastructure, to be located within the 1 in 1000 year floodplain; landscape and biodiversity proposals within the floodplain will be taken into account in the final calculations and compensated for, in order to enhance and protect the drainage regime. The landscape and biodiversity proposals within the floodplain will be submitted during the detail design process to the EA for approval and will be agreed with the LPA.

## Objectives and Commitments

### *Flooding*

- 2.5.6 Please refer to Appendix E1 – Flooding and Drainage Technical Report, for full details of the surveys undertaken, assessments and background information produced, regarding flooding, hydrology, geometric data and channel roughness.
- 2.5.7 The updated floodplain assessment outputs are shown on drawing 1264/FL/01, contained in Appendix E1, and take into account the landscape and ecological proposals required to enhance the existing floodplain area.
- 2.5.8 Landscape and biodiversity enhancements within the floodplain will be designed and implemented within the parameters of the revised flood modelling.
- 2.5.9 The management strategy for the floodplain, including the landscape and ecological aspects, is set out in Section 4: LBDS Management Strategy, which ensures no conflict with the flooding assessment parameters that this strategy is based upon.
- 2.5.10 Suitable measures are to be proposed and agreed with the LPA and relevant statutory consultees to ensure that ecological wetland features located within the floodplain, as set out in the biodiversity strategy and on the LBDS Framework Plan, are maintained as normally wet water bodies. This will take place during the detail design process for these features. The management strategy will set out principles so that the extent of vegetation growth remains within acceptable parameters for perpetuity.
- 2.5.11 No built development (with the exception of essential infrastructure, to be agreed with the EA and LPA) will occupy the 1 in 1000 year floodplain. Hence, built development at Cranbrook will be provided with robust level of flood protection. In addition, a freeboard, to be agreed, is to be provided to floor levels for those properties adjacent to the floodplain.
- 2.5.12 Areas of floodplain lost to essential infrastructure will be mitigated as close as possible to that lost on the Cranny Brook. Level for level compensation will provide 120% of lost storage.

### *Drainage*

- 2.5.13 Please refer to Appendix E1 for full details of the surveys undertaken, assessments and background information produced, regarding methodology, source control, detention and discharge.
- 2.5.14 Drawing 1264/DR/01, Appendix E1, illustrates the drainage strategy, and is also represented on LBDS4: LBDS Framework Plan.
- 2.5.15 The drainage strategy is integrated with the landscape and ecological proposals to provide additional enhancements to the site in the form of linear channels, basins and swales. These features will be managed as part of the ongoing management operations for the site.
- 2.5.16 Areas of development to the west of the site, which are appropriate for the

infiltration of surface waters will have source control features implemented at development parcel level by way of soakaways, infiltration trenches and other similar systems. These will be designed to service either single plots or a group of buildings with a feature located in common land, such as a shared parking area.

- 2.5.17 Properties occupying land which is inappropriate for the infiltration of surface water will also employ source control techniques where appropriate to the nature of the development. These will generally be implemented in public areas, where management and maintenance of the system can be guaranteed. As infiltration cannot be achieved in all these areas, an attenuated outlet from the device will be made to the spine drainage system that drains to the attenuation basins.
- 2.5.18 In the permeable formations, 100% of the impermeable area will be infiltrated to ground. The provision of source control techniques in the impermeable formations is predicted to reduce the extent of hard cover contributing to the storm water drainage network by no less than 5%.
- 2.5.19 In areas where source control by way of infiltration, local detention, retention or the like is not viable, water will be attenuated in strategic detention facilities across the site prior to discharge to Rockbeare Stream or Cranny Brook.
- 2.5.20 Detention proposals have been developed for each sub-catchment in the form of a series of swales, channels and basins, which generally follow the format of the pre-Application drainage work. These above-ground features will provide enhanced passive treatment to the quality of water discharged from the development, by removing suspended solids and other contaminants associated with urban run-off.
- 2.5.21 All swales, channels and basins will be implemented as unlined features and as such will provide for an element of infiltration while detaining water. Similarly, the features will also provide valuable retention of flow during low event storms.
- 2.5.22 The Source Control systems will be retained within private ownership, and be maintained under covenant by property owners. When private owners are responsible for soakaways, a clear information package, will be provided, outlining the operation and maintenance requirements of their drainage system. The EA will be consulted and the relevant approvals will be sought.
- 2.5.23 The strategic swales, channels and basins will be adopted by the local authority or a private management company. Machine access will be provided around the drainage features, for ease of ongoing maintenance. Shallow side slopes will also be incorporated to allow access for equipment into basins for future work. Where new hedgebanks are proposed at one side of attenuation swales, the other side will be kept clear for maintenance access.
- 2.5.24 Detailed design of the drainage scheme will follow the normal good practice design recommendations, to incorporate pre-treatment basins to any strategic features. These basins will encourage settlement of suspended solids in waters discharged from the drainage network and hence provide further passive treatment to water quality and concentration of the needs for non-routine maintenance in a confined area.
- 2.5.25 The strategic drainage proposals are carefully designed to limit the extent of open water bodies and hence limit the potential for bird strike occurrence at Exeter Airport, and the detailed design process will continue to do so. This constraint has been turned into an opportunity to provide permanently wet channels within the floodplain, to provide biodiversity enhancement. Further information about this proposal is set out in the landscape and biodiversity strategies.
- 2.5.26 Existing field ditches which align the hedgerows and hedgebanks within Cranbrook are to be preserved within the built environment, where agreed with the LPA, to maintain the structure of the natural flow paths.
- 2.5.27 The strategic drainage layout has been developed having regard to the presence of root systems of retained trees, tree groups and hedgerows. This principle will be continued through the detail design process, so that the detail drainage systems are

designed to avoid the need to excavate with the defined protection zone of retained vegetation.

- 2.5.28 Above ground drainage features, including the use of existing ditches, will be designed with public safety being a paramount consideration.
- 2.5.29 Discharges from the storm water drainage system are to be attenuated to the baseline site run-off conditions, which has been established as 8 l/s/ha in a 1 in 1 year storm event. No increase in flows discharged from the site will result in the 1 in 1, 5, 10, 25, 50 & 100 year event storms. The net result of the tiered train of storm water treatment will, in practice, provide enhanced attenuation of flows from the site and provide a more consistent baseflow to Rockbeare Stream and Cranny Brook.
- 2.5.30 Discharge from the strategic drainage system will act as a valuable recharge to the ecological wetland features.
- 2.5.31 Source control is the preferred means of drainage. Source control and infiltration drainage will be implemented where practical and means for adoption and maintenance can satisfactorily be provided, as set out in paragraph 2.5.22 above.
- 2.5.32 Existing ditches and watercourse channels will be retained within the site. Culverting of watercourses will be restricted to the need for essential infrastructure, as agreed.
- 2.5.33 Strategic drainage systems will be implemented in advance of the associated phase of building construction to ensure that flood protection is inherent from the start of construction.

## 2.6 Action Lists

2.6.1 The following action lists are a summary of the actions set out in the above strategies.

### 2.6.2 General

- i The LBDS and technical information contained therein has informed the DFP, and will continue to inform the masterplan and the detail design processes;*
- ii Any necessary and justified changes, or deviation, from the approved LBDS will require written approval from the LPA;*
- iii Further detailed strategies may be added as detail planning applications for development are approved;*
- iv The LBDS will be read in accordance with the other documents listed in Section 1; and*
- v Detailed design proposals will be provided at the time of Detailed Planning Applications being made, in accordance with the Phasing Programme.*

### 2.6.3 Landscape

- i Retention of agreed landscape features, will be as set out on approved Plans LBDS 1, 2 and 3;*
- ii A defined hierarchy of open spaces and public areas will be set out, in the Detail Design Codes, as detail design progresses and in accordance with the relevant phasing programme. This will include formal and informal open space;*
- iii Details of legibility, movement and circulation will be set out in the Detail Design Codes, and will be further developed as detail design progresses;*
- iv The circulation system within Cranbrook will be designed so as to enable to links to future off-site rights of way which may be created by the LPA;*

- v *Existing Green Lanes will be retained in their current form and utilised as pedestrian and cycleway routes;*
- vi *Detail design of open space around veteran and mature trees will be carefully undertaken to ensure their longevity and survival within the development;*
- vii *New trees will be planted to provide amenity and will be located where they will not unduly shade buildings, footpaths and open spaces. Where excessive solar gain exists, tree planting is to be considered as a potential solution;*
- viii *New tree planting will have due consideration to foundations, following relevant guidelines where appropriate;*
- ix *New street tree planting will be appropriate to the scale and density of the development. The detail design will incorporate the technical capacity for appropriate new street tree planting to be provided;*
- x *Services, utilities, lighting and CCTV will be designed to avoid existing and proposed trees. Techniques for the protection of roots and services will be incorporated within the detailed design process and in accordance with best practice guidance;*
- xi *Where new Devon hedgebanks are to be created, these will be constructed and managed using traditional methods or as agreed with the LPA;*
- xii *The detail design of open spaces and the public realm will be in accordance with current guidelines and best practice for provision of access for everyone, as set out in the Landscape Strategy.*

#### 2.6.4 Existing Trees and Hedgerows

- i *All proposals, protection and works to trees will be in accordance with BS5837:2005;*
- ii *Retained vegetation will be situated within the public realm, to ensure long-term survival and maintenance;*
- iii *Management of existing vegetation, including veteran trees will be set out and agreed with LPA during detail design process;*
- iv *Any TPOs will be issued by the LPA at the appropriate time. The normal planning process will apply to TPO trees and hedgerows falling within the Hedgerow Regulations;*
- v *An Arboriculturalist will review emerging detail design proposals relating to trees;*
- vi *Root Protection Areas (RPAs) associated with retained trees and hedgerows are to be taken into account during the detail design process. There will be a general presumption against development within RPAs for all retained trees;*
- vii *Detailed tree and hedgerow retention / removal plans and tree protection plans and measures will be prepared in accordance with BS5837:2005, the detail design process and phasing programme. These will be submitted to the LPA for approval, together with relevant applications, where necessary, for removal of, or works to, trees and hedgerows;*
- viii *All tree works will be undertaken by professional arborists (A.A.C.) and in accordance with current industry best practice guidelines;*
- ix *Prior to the handover of each completed phase of development an updated tree condition survey will be undertaken and submitted to the LPA;*

- x *Hedgerows identified for strategic retention, as shown on the DFP, will be considered during the detail design process with regards to their most appropriate form within the development.*

#### 2.6.5 Biodiversity

- i *Retention of agreed ecological features will be as set out on approved Plans LBDS 1, 2 and 3;*
- ii *Protection measures for important species, retained habitats or newly created ecological features will be agreed with the LPA and implemented during construction. These will have due regard to vulnerabilities arising from construction traffic, storage of materials, excavation operations, trampling, fires or vandalism;*
- iii *bridges, culverts with ledges, or other solutions which will enable unrestricted wildlife movement through streams will be utilised;*
- iv *Banks of wetland features will be protected during construction;*
- v *Existing ponds will be retained where practicable, appropriately managed and replanted following assessment and agreement with the LPA at each phase of development;*
- vi *Appropriate safeguards for the protection of wetland features and streams are to be agreed with the LPA and implemented, as set out in Section 2.4;*
- vii *Areas agreed to be ecologically sensitive will be protected from construction areas by an appropriate and approved buffer zone. Where a buffer zone is not practical an alternative method of protection will be agreed. Buffer zones will remain in place through to the operational phase of development;*
- viii *Badgers – a check survey will be undertaken prior to construction works. DEFRA licence method statements will be undertaken as necessary;*
- ix *Bats – check surveys will be undertaken prior to construction works. Bat roosts in existing buildings will be retained. Any new roosts discovered during the check surveys will be fully safeguarded through DEFRA licensing procedures;*
- x *Reptiles – reptile rescue exercises will be undertaken in identified areas. Rescued reptiles will be translocated to suitable receptor sites in accordance with the Herpetofauna Groups of Britain and Ireland Advisory Note for Mitigation / Translocation Programmes;*
- xi *Newly created habitats will contain indigenous species of native and local provenance only. Wetland plant stock will be sourced so as to not introduce non-native species;*
- xii *Detailed proposals and locations of habitat enhancements will be set out during the detailed design process. Habitat enhancements will be implemented in accordance with the approved phasing and advanced works strategies and agreed with the LPA;*
- xiii *Detailed proposals and locations of species enhancements will be set out during the detailed design process. Species enhancements will be implemented in accordance with the approved phasing and advanced works strategies and will include enhancements for Badgers, Bats, reptiles, birds, and Water Voles, agreed with the LPA;*
- xiv *Interpretation boards and other initiatives to raise public awareness of biodiversity will be agreed with the LPA during the detail design process;*

- xv *A 5-year post-construction monitoring programme will be approved by the LPA and implemented, and will include proposed mitigation actions. This programme will inform the long-term management operations;*
- xvi *Vegetation clearance will be timed so as to avoid the bird nesting season, unless a prior survey has confirmed there are no nesting birds in a given area which would be disturbed;*
- xvii *Badgers - any licensable works (i.e. works within 30 metres of an active Badger sett) will only take place in the period between July – November inclusive;*
- xviii *Reptiles – surveys and translocation can only take place between mid-March / April and mid-September / October inclusive and will be subject to prevailing climatic conditions;*
- xix *Bats – check surveys and emergence / activity surveys will take place as agreed with the LPA. Where there are significant roosts, renovation or construction works, or works to trees will only take place outside of breeding and hibernation seasons. Minor roosts will be subject to minimal timing constraints. All works affecting roosts will be carried out under DEFRA licence.*

#### 2.6.6 Drainage

- i *Landscape and biodiversity proposals will be agreed with the Environment Agency and LPA during the detail design process and in accordance with the phasing strategy, and will be taken into account in the final drainage calculations. These proposals will be appropriately compensated for, in order to enhance and protect the drainage regime, whilst also providing landscape and biodiversity benefits;*
- ii *No built development, other than essential infrastructure works agreed with the LPA, will occupy the 1 in 1000 year floodplain;*
- iii *A freeboard, to be agreed with the LPA, will be provided to floor levels for those properties adjacent to the floodplain;*
- iv *Any replacement floodplain which is to mitigate for agreed essential infrastructure will be located as closely as possible to that which is lost. This mitigation will equate to a level for level compensation scheme providing 120% of lost storage;*
- v *Appropriate source control systems will be utilised, as set out in Section 2.5 of the LBDS. Where source control by infiltration, local detention, retention or the like is not viable, water will be attenuated by strategic detention facilities across the site prior to discharge to Rockbeare Stream or Cranny Brook;*
- vi *Detention proposals for swales, channels and basins will provide enhanced passive treatment to the quality of water discharged from the development, by removing suspended solids and other contaminants associated with urban run-off. These features will be unlined and will provide for an element of infiltration while detaining water and also provide retention of flow during low event storms;*
- vii *Detailed design of the drainage scheme will take place during the detail design process and in accordance with the phasing strategy, and will follow current good practice design recommendations;*
- viii *The drainage proposals will limit the extent of open water bodies and be designed so as to avoid potential bird strike occurrence at Exeter Airport;*
- ix *Existing field ditches which align the retained hedgerows and hedgebanks are to be preserved to maintain the structure of natural flow paths. This will be*

*agreed with the LPA during the detail design process;*

- x The drainage layout will avoid the need for excavation within RPAs of retained trees and hedgerows;*
- xi Drainage proposals will be designed with public safety being of paramount consideration;*
- xii Strategic drainage systems will be implemented in advance of the associated phase of building construction to ensure that flood protection is inherent from the start of construction;*
- xiii Discharges from the storm water drainage system will be attenuated to the baseline site run-off conditions, which have been established as 8 l/s/ha in a 1 in 1 year storm event. No increase in flows discharged from the site will result in the 1 in 1, 5, 10, 25, 50 & 100 year event storms. The net result of the tiered train of storm water treatment will provide enhanced attenuation of flows from the site and provide a more consistent baseflow to Rockbeare Stream and Cranny Brook.*

## Section 3.0 LBDS Advanced Works

### 3.1 Introduction

3.1.1 Please refer to Plan LBDS 5: Advanced Landscape and Ecology Works.

3.1.2 This section sets out strategic works to be undertaken in advance of the phased construction of development.

3.1.3 The advanced works will comprise management to site-wide hedgerows and trees. The detailed planning application for each phase will include details such as advance planting, tree protection measures to retained trees and hedgerows, protection to ecological features. See 3.1.5 and 3.1.6 below.

3.1.4 All advance works will be agreed with the LPA, and where appropriate other statutory consultees such as the EA. Agreement will also be sought should there be a need to remove trees or hedges to facilitate development.

#### Advanced Management

3.1.5 Advance management works to take place prior to construction works commencing are:

- i maintenance and appropriate vegetation clearance of the watercourses (Cranny Brook and Rockbeare Stream) and ditches to be retained;
- ii required maintenance and clearance of existing ponds to be retained, for the purposes of hydrology, ecology, to ensure the continuation of eco-systems of veteran trees;
- iii removal or stabilisation of 'R' graded trees (refer to the Trees and Hedgerows Strategy in Section 2);
- iv required tree management (as set out in the Schedule of Tree Works, included at Appendix C2) to individual trees, trees within hedgerows, tree groups, including those trees associated with the watercourses, which are identified for retention on LBDS3: Strategic Tree and Hedgerow Retention Plan in Section 2 – for the purposes of health and safety, and to ensure longevity;
- v required check surveys, prior to each phase, as set out in the Biodiversity Strategy; and
- vi repair, cast up and gap up hedgerows and hedgebanks identified for retention on LBDS3: Strategic Tree and Hedgerow Retention Plan in Section 2.

3.1.6 The detail of advance management works will be identified during the detail design process, in accordance with the phasing programme and will be agreed with the LPA.

#### Advanced Implementation

3.1.7 The following will be implemented in advance of either construction works commencing, per phase, or of occupation of residential development of agreed phases, to be agreed with the LPA and in accordance with the approved phasing strategy, landscape strategy, trees and hedgerow strategy and biodiversity strategy:

- i tree copses planted at the edges of the site, where they can be implemented without later detriment to construction or infrastructure work;
- ii Country Park tree and shrub planting is to take place beyond a suitable construction buffer zone at the edge of development areas to enable construction works to take place without hindrance and without adversely

affecting the advance planting, to include: parkland trees, wetland planting, appropriate treatment to soils for wildflower, species-rich and neutral grasslands, woodland / orchard planting – implementation of the western area of the Country Park and the area south of the former A30;

- iii Country Park ecology zones, subject to detail design, and to take place beyond a suitable construction buffer zone at the edge of development areas to enable construction works to take place without hindrance and without adversely affecting the new features, for example: wetland strips, ponds, treatment to stream corridor, wetland scrapes;
  - iv the Ecology Park, subject to detailed design and agreement;
  - v bat and bird boxes on trees to be retained, and in accordance with the Biodiversity Strategy;
  - vi protective fencing and other tree protection measures for retained trees and hedgerows, in accordance with the tree and hedgerow strategy;
  - vii protection measures to existing and newly created habitats and important species, as set out in the Biodiversity Strategy, including the implementation and management of buffer zones and margins of proposed and retained ecological features;
  - viii hedgerow removal in accordance with detail design, development phasing and subject to bird nesting season;
  - ix planting and other landscape works of entrance areas associated with the MLR;
  - x setting out and reservation of lighting and services trenches along MLR to enable tree planting to take place; and
  - xi strategic drainage systems will be implemented in advance of the associated phase of building construction to ensure that flood protection is inherent from the start of construction.
- 3.1.8 These advanced implementation works will enable early establishment to occur, so that upon occupation of residential development the proposals are in place. Advanced planting will be implemented at the appropriate sizes which allow rapid and maximum success of establishment.
- 3.1.9 The proposed drainage system will be constructed in a phased manner and in advance of the area of development to which the relevant part of the proposed drainage system relates.
- 3.2 Action List
- 3.2.1 Advance works
- i Advance management works will be agreed with the LPA and take place prior to construction works commencing per phase of construction, as set out in Section 3;*
  - ii Advance implementation works will be agreed with the LPA and take place prior to either phased construction works commencing or prior to occupation of residential development of agreed phases.*

## Section 4.0 Draft Strategies for Principal Open Spaces

### 4.1 Introduction

4.1.1 Ongoing discussions between the Consortium, the Consultant Team, the LPA and statutory consultees have resulted in establishment of a number of criteria for principal open spaces – the Country Park and the Ecology Park.

4.1.2 These are set out below in draft, and are subject to detail design and further agreement. Design of open spaces will have due regard to current guidelines for providing access to all and inclusive mobility, as set out in the Landscape Strategy.

### 4.2 The Country Park

4.2.1 The Country Park extends along the floodplain, through the centre of the site and south of the C30. Conceptual sketches for the Country Park are shown on drawing LBDS 6: Country Park.

4.2.2 The floodplain constrains ecology and landscape proposals. The draft design principles, set out below, to achieve the required ecological and landscape enhancements will inform the drainage modelling calculations and define the detailed compensation measures required.

4.2.3 It is proposed that a formal hoggin footpath will extend throughout the Country Park, taking in all of the features within the park. Informal footpaths are proposed to be set out by means of mown grass. Some areas will not have public access in order to provide maximum benefit to biodiversity

4.2.4 Zones have been identified for the Country Park, which have ecological and / or landscape benefit. These, together with the initial design principles, are set out on the LBDS Framework Plan and in the table below. These will be further refined during the detail design process and agreed with the EA, CAA, other statutory consultees and the LPA.

COUNTRY PARK – DRAFT DESIGN PRINCIPLES					
ZONE	LOCATION	PURPOSE AND ACCESS	PROPOSALS	MANAGEMENT PRINCIPLES	COMMENTS
A: FLOODPLAIN/ TREE PLANTING ADJACENT TO STATION AND BELOW THE C30	Within train station car park, surrounding the train station car  Below the C30 and east of the stream	Landscape and visual, ecology.  Access available to all, no restrictions.	Specimen trees planted in a wide grid pattern, as shown by the station.  If ground conditions are favourable by the station this will be cricket bat willow.  The region below the C30 will contain small groups of tree planting with informal paths.  No shrubs or scrub in this zone. Meadow / wildflower grassland beneath the trees in soft landscape areas  Informal mown grass footpaths.	Subject to detail design, following ground condition analysis.  Relaxed meadow / wildflower cutting regime, based upon annual hay cut in August after flowering, with further monthly cuts until November.	Ground conditions to be confirmed in these areas to progress detailed proposals.  Consider species in detail proposals with regards to CAA requirements (e.g. ref fruiting and berrying species, planting centres etc)

COUNTRY PARK – DRAFT DESIGN PRINCIPLES

ZONE	LOCATION	PURPOSE AND ACCESS	PROPOSALS	MANAGEMENT PRINCIPLES	COMMENTS
<p>B: RURAL OPEN SPACE</p>	<p>The main body and spine of the Country Park, surrounding Zone D: Stream Corridor (see below) and including attenuation swales on threshold with development areas.</p>	<p>Landscape and visual, general amenity and leisure use, ecology, including drainage.</p> <p>Access available to all, no restrictions.</p>	<p>Parkland tree planting of single stem, specimen trees as single trees, or groups of 2 or 3 trees, spread throughout zone.</p> <p>Areas of general amenity grassland for informal recreational use, located for example at threshold with development associated with attenuation swales, within an area south of C30 adjacent to Zone E: Woodland, and the area adjacent to MLR crossing the Country Park and stream.</p> <p>Areas of wildflower, species-rich and neutral grassland to remainder of zone, containing light native scrub species.</p> <p>Formal footpath of e.g. compacted hoggins and informal footpaths marked out by mown grass. All footpaths to be marked by waymarkers.</p> <p>A trim trail will be created within this zone.</p> <p>Attenuation swales to be incorporated within this zone.</p>	<p>Trees to be maintained as single stem species.</p> <p>Amenity grassland areas to be cut regularly to maintain a short sward.</p> <p>Other types of grassland to have a relaxed cutting regime, based upon annual hay cut in August with further monthly cuts until November.</p> <p>Native scrub areas to be managed by rotational coppicing and cutting back as appropriate to the species and location.</p>	<p>Proposals to be agreed during detail design process.</p> <p>Programme of implementation to be agreed to ensure protection from flood risk arising from soil stripping to ecological grassland areas.</p>
<p>C: ECOLOGY ZONE</p>					
<p>i) Wetland Strips</p>		<p>Ecology and landscape.</p> <p>Access at periphery only and gated to restrict dog access near wetland.</p>	<p>Series of impermeable base wet ditches, to contain permanent water (subject to drought conditions). Strips are to be fed by flood waters or water via the surface water attenuation system to assist maintaining the water levels.</p> <p>Planting to be native and include aquatics, marginal species, wetland meadow grassland and scrub including a range of planting to illustrate the principle of succession planting.</p> <p>Footpath at the</p>	<p>Annual vegetation management as necessary to ensure the ditches do not become overgrown. Scrub control will be undertaken as necessary.</p> <p>De-silting operations to the ditches will occur on a rotational basis on a 5 – 10 year scheme. Not all waterbodies will be de-silted in the same year.</p>	<p>Detail design to consider: safety aspects of depth of ditches and bank slope gradients, the target depth of water within ditches and required establishment time.</p> <p>Management regime to be further defined during detail design process.</p>

COUNTRY PARK – DRAFT DESIGN PRINCIPLES					
ZONE	LOCATION	PURPOSE AND ACCESS	PROPOSALS	MANAGEMENT PRINCIPLES	COMMENTS
			<p>periphery wetland strip area to be compacted hoggin, or other agreed material to enable access. This footpath to link to main footpath network.</p> <p>Interpretation boards to be provided at appropriate location.</p>	Grassland will be cut annually.	
ii) Confluence of Rockbeare Stream and Cranny Brook	Northern Country Park at the confluence.	<p>Ecology.</p> <p>No access to the public.</p>	Wetland scrub planting and new tree planting to be implemented to prevent public access.		<p>Detail design to consider maintenance access and management requirements.</p> <p>If planting not acceptable for prevention of access, appropriate fencing will need to be considered in order to prevent public access.</p>
iii) South of C30	South of the C30, western area.	<p>Ecology.</p> <p>No access to the public</p>	<p>Subject to appropriate ground conditions, wildflower / neutral grassland with marsh scrapes (created using materials from other areas of the site, if suitable). Species for damp areas to include Marsh Foxtail, rushes and Meadowsweet.</p> <p>Informal mown grass footpaths with waymarkers.</p> <p>Interpretation boards to be provided.</p>	Light cutting regime subject to detail design proposals.	Ground conditions and floodplain modelling required to enable detail design proposals.
D: STREAM CORRIDOR	Alongside streams.	<p>Landscape and visual, ecology.</p> <p>Limited access provided to water's edge, but access available to all alongside the streams where footpaths are identified.</p>	<p>Retain existing vegetation. New tree planting to replace fallen or poor quality trees or loss of elms. Fallen trees to remain unless they pose a flood risk.. New streamside vegetation to be planted to strengthen existing. Hydrophilic plant species to be seeded adjacent to watercourses.</p> <p>Clearance of streams to be minimised to essential works.</p>	Minimal maintenance, ensuring public safety. Regular grass cutting.	Further investigation by consultants and statutory consultees regarding clay curtains.

COUNTRY PARK – DRAFT DESIGN PRINCIPLES					
ZONE	LOCATION	PURPOSE AND ACCESS	PROPOSALS	MANAGEMENT PRINCIPLES	COMMENTS
			<p>Footpaths formal and informal in accordance with and linking to those set out for Zone B: Rural Open Space.</p> <p>Interpretation boards to be provided at points of interest.</p>		
E: WOODLAND	South of the C30, eastern area beyond the floodplain.	<p>Landscape, visual and ecology.</p> <p>Unlimited access (subject to final use – see comments)</p>	<p>Native woodland trees, shrub and woodland ground flora understorey, to include fruit and berry species.</p> <p>Rank grassland to woodland edges.</p> <p>Informal footpaths through woodland, with waymarkers and few interpretation boards at points of interest.</p>	Woodland management as appropriate.	Ground conditions and floodplain modelling required for this area to enable detail design proposals
F: SMALL PONDS	North eastern area, incorporated with attenuation basin.	<p>Landscape and visual, general amenity and leisure use, ecology.</p> <p>Unlimited access to areas containing ponds, but limited access to pond edges.</p>	<p>One or two permanently wet small ponds located within the wider large drainage basin.</p> <p>Pond edges to be densely planted with marginal species. Ponds to include aquatic species.</p> <p>Banks of ponds to be seeded with wetland grasses up to the attenuation level, beyond which will be planted with grasses suitable for drier conditions.</p>	<p>Regular maintenance of water body to prevent silting up.</p> <p>Bi-monthly cutting of grass areas.</p> <p>Regular cutting back of marginal species.</p>	Detail design to set out size, water depth, bank gradients, with due consideration to public safety and protection of attenuation measures.

4.2.5 Further zones may be identified for the Country Park during the detail design process.

#### 4.3 Ecology Park

4.3.1 The Ecology Park is located in the eastern area of Cranbrook, on an area of low lying land situated between two existing hedgebanks, south of the secondary school area and north of the MLR and cricket circus. Conceptual sketches for the Ecology Park are shown on Plan LBDS7.

4.3.2 It is proposed that only pedestrian access will cross through this area, with other

access being limited to use of the existing adjacent lane.

4.3.3 The concept for this area is a diverse pond complex interspersed with damp grassland, marshland and wetland scrub.

4.3.4 The principles for this area are set out in the table below, and will be further refined and agreed with the LPA through the detail design process:

ECOLOGY PARK – DRAFT DESIGN PRINCIPLES			
PURPOSE AND ACCESS	PROPOSALS	MANAGEMENT PRINCIPLES	COMMENTS
<p>Landscape and visual, ecology including drainage.</p> <p>Access available to all, no restrictions.</p>	<p>Retain the existing watercourse as it is.</p> <p>Pond complex to be created within an overall attenuation basin. At peak runoff times, the whole area will flood and slowly drain away, refreshing the pond complex.</p> <p>Shallows, marshes and small ponds with shallow wavy margins to be created and to provide differing levels of water depth. The purpose is to provide botanical, amphibian and invertebrate interest. These will be planted with damp grassland and marsh species, some wetland scrub areas.</p> <p>Existing hedgerows / hedgebanks bordering the pond complex area to be retained, including the good quality trees, which form a natural boundary for this feature.</p> <p>Footpaths across the pond complex area and one footpath traversing along it. Footpath construction to be decided during detail design, possibly raised timber boardwalk or informal mown grass paths.</p> <p>Footpaths to also be created outside of this area, bordering the hedgerows, to provide dry routes during peak-attenuation periods. This dry margin to the ecology park will include new, native specimen tree and shrub planting.</p> <p>Entrances to the Ecology Park will include motorcycle barriers which enable wheelchair and pushchair use.</p> <p>Interpretation boards to be provided. Feature to be used as Cranbrook schools' resource as well as for public access.</p>	<p>Selected ponds and shallows to be allowed to silt up.</p> <p>Annual vegetation management to ensure the pond complex does not become overgrown. Scrub control will be undertaken as necessary.</p> <p>Grass cutting regime to be on annual basis for damp grassland areas, with bi-monthly cutting during summer for drier grass areas of attenuation basin and the amenity areas beyond the hedgebank boundaries.</p> <p>Regular litter clearance will be required.</p>	<p>Detail design to consider appropriate footpath materials, access for all and appropriate management regime.</p> <p>Filtration of run-off prior to surface water entering into pond complex.</p>

## Section 5.0 LBDS Management Strategy

### 5.1 Introduction

- 5.1.1 A Service Level User Agreement specific to Cranbrook (CSLA) will be agreed with the LPA. This will provide the basic specification standards of long term maintenance to all open spaces and the public realm. The CLSA will be the management regime going forward from day one .
- 5.1.2 This section sets out the strategic principles for landscape, arboricultural, biodiversity and sustainable drainage management which will take place during a period of 10 years post-completion of development, per phase. The aim is to integrate the requirements of each discipline and to set out commitments for the management of open spaces.
- 5.1.3 The Management Strategy aims to provide guidance and principles for the annual management operations during the establishment period (Years 1-5), the five year post-construction biodiversity monitoring programme, and long-term management operations (Year 6 onwards).
- 5.1.4 Detailed management proposals will be prepared for open space and public realm, including existing vegetation, for each development phase at the detailed planning application stage, and will include details of the annual and long-term management operations, including timing and frequency. These management plans are to be agreed and approved by the LPA.
- 5.1.5 A review of the scope of management works will be undertaken at the time of the detailed planning application for Phase 1.
- 5.1.6 Maintenance of private gardens and property will be the responsibility of the owners.
- 5.1.7 The strategic management principles set out below are to be followed during the post-completion 10 year management period and will also form the basis for the longer term maintenance set out in the CSLA.

### 5.2 Aims

- 5.2.1 The aims are to:
- i secure the long-term management of the landscape, biodiversity and sustainable drainage infrastructure, including recreational open space;
  - ii reinforce the existing vegetation framework and diversify its structural and age composition, including the hedgebank treatments;
  - iii maintain and diversify the nature conservation value of the site; and
  - iv provide an attractive setting and green environment for the site.

### 5.3 Principles of Annual Management Operations (Years 1-5)

#### Trees and other vegetation

- 5.3.1 Following the baseline pre-handover inspection (see 2.3.27), ongoing tree inspections will be undertaken as found necessary at each successive inspection, with a maximum interval between inspections of five years (only for those trees apparently defect-free at the time of inspection). The level of competence of the tree inspector will be NVQ level 4 or higher (e.g. Royal Forestry Society Professional Diploma in Arboriculture). These inspections will aim to:
- i address health and safety issues, such as removing or stabilising dangerous

- trees as appropriate;
  - ii prolong the remaining useful lifespan of retained trees; and
  - iii promote biodiversity.
- 5.3.2 Newly planted trees within amenity areas of the Country Park (refer to Section 4) will be maintained as single stem species with appropriate annual pruning regime, unless specified to the contrary.
- 5.3.3 Trees within basins and basin spill areas will require pruning every two years.
- 5.3.4 Annual management operations for all new planting will include annual tree inspection and remedial pruning as required, weeding and litter pick, fertiliser application, formative prune and hedge trimming, and watering.
- 5.3.5 Vegetation management, within the wetlands, will be required annually on a rotational basis, with scrub control as necessary. It will also include an annual weeding regime with a monthly inspection and removal of litter and vegetation debris.

#### Woodland, tree copses and tree groups

- 5.3.6 Areas of existing woodland, tree copses and tree groups will be brought under a favourable management regime. Additional consideration will be taken for the management of veteran and potential veteran trees, including the retention of deadwood surrounding these trees for the benefit of saproxylic species. Please refer to the Trees and Hedgerows Strategy.

#### Scrub and Grassland

- 5.3.7 The management regime for scrub planting will ensure that it remains outside the floodplain, for hydrological reasons. Light scrub will be limited to established areas within the floodplain, to be agreed with the Environment Agency or LPA.
- 5.3.8 A varied cutting regime for wildflower grassland is to be created to include management of mown pathways and different areas of grassland cut annually in rotation, especially those within the Country Park. This will create grassland of varying heights, which will be of benefit to insects, birds and mammals. A mosaic of grassland habitats will be created including wildflower grassland in open space, rank grassland along woodland edges and hydrophilic grasses in areas adjacent to ponds or watercourses. The use of herbicides and fertilisers will be avoided and cuttings from grassland will be removed, in order to promote species diversity.
- 5.3.9 Amenity grassland areas are to be cut regularly between the months of March and November, on an annual basis.
- 5.3.10 Grassed areas within the wetland areas of the Country Park and the Ecology Park are to be cut annually, on a rotational basis. The cutting regime is to be followed once every two months, with less rigorous operations in spring and early summer.
- 5.3.11 The Country Park area south of the C30 will be subject to light cutting regime, subject to detail design proposals.
- 5.3.12 Other grassed areas will be subject to a relaxed cutting/grazing regime based on an annual hay cut in August with aftermath grazing, if appropriate, or additional monthly cuts until November. The area to the south of the proposed causeway over Rockbears Stream will be subject to a greater intensity of management to retain a shorter sward, as the emphasis in this area will be for public recreation and dog-walking.

#### Hedgerows and Green Lanes

- 5.3.13 Management of retained and proposed hedgerows will be tailored to maximise their

value as landscape, amenity and wildlife corridors. The level of intervention for each will be based on predicted levels of usage by the public. Those likely to be utilised less by the public will be allowed to naturalise.

#### Wetland Features

- 5.3.14 The Rockbeare Stream and Cranny Brook will be subject to little direct management; the Environment Agency is in favour of avoiding de-silting operations and restricting management to replacement of fallen trees and strengthening of the existing river corridor vegetation.
- 5.3.15 The existing ponds within the site will be retained and subject to dredging and replanting as necessary, to promote floral biodiversity.
- 5.3.16 De-silting operations of the wetlands, along with all swales, channels and basins will occur, if necessary, every 5 years on a rotational basis (i.e. not all waterbodies subject to management operations at the same time). However, some of the ponds in the Ecology Park will be allowed to become heavily silted to diversify the wetland habitats present and encourage invertebrate interest that thrives in these environments. In the event of a major storm event, immediate inspection and removal of debris and blockages along the waterbodies, and at inlet and outlet points, will be required.

#### Paths

- 5.3.17 A monthly management regime of keeping paths free of litter, grass cuttings and general debris, is to be followed, with an annual wear and tear inspection.

#### Boundary Structures and Site Furniture

- 5.3.18 Boundary structures and site furniture will require an annual inspection for wear and tear, including any fences or new Devon hedgebanks.

#### 5.4 Objectives: Long-term Management Operations (Year 6 onwards).

- 5.4.1 The long term management operations, informed by the results of the 5-year post construction monitoring programme, aim to enhance the value of the mitigation and enhancements of the established landscape, biodiversity and drainage structure.

#### Trees and other vegetation

- 5.4.2 Existing trees will be subject to a condition and safety inspection to be carried out, once every 3 years, by a qualified arboriculturalist. A phased programme of replacement planting of mature trees will be prepared by the landscape architect, to be agreed with the local authority.
- 5.4.3 All areas of new tree planting will be inspected every two years to determine the appropriate management for individual trees or groups of trees. Trees of low viability or poor condition will be replaced.
- 5.4.4 Once every 5 years, other areas of planting will be subject to inspection to decide upon appropriate and agreed replacement of those plants which have exceeded their aesthetic lifespan; eg. 5-7% stock on rotational basis.
- 5.4.5 Areas of matrix planting will be managed by a regime of selective felling and coppicing to achieve the following aims:
  - i Diverse and robust canopy structure;
  - ii Avoidance of suppression of less vigorous species;
  - iii Varied light conditions at ground level;
  - iv Establishment of appropriate ground flora;

- v Enhancement of biodiversity;
- vi Promotion of individual specimens to form the upper canopy;

5.4.6 The period of cutting or coppicing to be determined at the start of the management period, and will be monitored and reviewed every 5 years with a view to making necessary changes to the regime.

#### Grassland

5.4.7 Areas of grassland will require an annual inspection and replacement of poor quality areas.

#### Hedgerows and Green Lanes

5.4.8 Hedgerows retained in their traditional form at the outset of the proposals being implemented will be subject to appropriate management to ensure that their purpose and value is maintained and enhanced. This will require laying and casting up of hedgebanks and where necessary, supplementary planting of any gaps with appropriate species.

5.4.9 Trees within hedgerows or hedgebanks will be subject to the tree management measures set out previously, to include appropriate checks, dead-wooding and where necessary and appropriate, replacement.

#### Wetland Features

5.4.10 Wetlands, along with swales, channels and basins will require varying degrees of de-silting based on their design and functional intent, along with major vegetation maintenance, once every 15-20 years, on a rotational basis.

#### Paths, Boundary Structures and Site Furniture

5.4.11 All paths, boundary structures and site furniture will be subject to an annual inspection for wear and tear, and be repaired or replaced as necessary.

### 5.5 Action List

#### 5.5.1 Management

- i Detailed management plans for the 10-year management periods will be prepared at the detailed planning application stage, per phase. These will include details of the annual and longer term management operations, including timing and frequency and are to be agreed with, and approved by, the LPA;*
- ii The management plans will incorporate the requirements of landscape, arboriculture, biodiversity and drainage;*
- iii The Cranbrook Service Level Agreement (CSLA) will take effect after the initial 10-year management periods, and will be administered and updated by the LPA providing long-term maintenance for Cranbrook;*
- iv All areas of open space and vegetation within the public realm will be covered by the management strategy and plans. Maintenance of private gardens and property will be the responsibility of the owners.*

Plans