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**WOODILEE  
BIODIVERSITY/  
HABITAT  
MANAGEMENT  
PLAN**

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# CALA HOMES

## WOODILEE BIODIVERSITY/HABITAT MANAGEMENT PLAN

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# **1. INTRODUCTION**

## **1.1 Purpose of this plan**

This Woodilee Biodiversity/Habitat Management Plan (BHMP) details the management and action necessary to conserve and enhance biodiversity and habitats present at Woodilee, Lenzie (NS665725) a former hospital site in East Dunbartonshire. The site has been proposed for residential development with associated community use, business units, road network and co-ordinated open space, landscaping, woodlands, walkways and infrastructure and was subject of a planning application that was determined by East Dunbartonshire Council (EDC) in June 2005 (Planning reference TP/ED/05/0040).

## **1.2 Site description and ownership**

The Woodilee site is 73 hectares in size. The Glasgow-Edinburgh railway line marks the southern boundary of the site. The current western boundary is marked by the Woodilee Road. Beyond the Woodilee Road is the settlement of Lenzie. To the north and north-east of the site lies an industrial estate, the Old Aisle cemetery, the Oxgang residential area of south-east Kirkintilloch and low grade agricultural land. To the east lies Fauldhead, a small settlement of houses formerly occupied by hospital staff. There is a network of local roads surrounding the site.

Woodilee is a site of mixed character, heavily wooded in the north and west, with scattered trees and scrub in the south and east, and forms part of the Oxgang Site of Importance for Nature Conservation (SINC). Grassland is present in the north, east and south including scattered patches across the former hospital building areas. The Bothlin Burn runs through the site from south to north where it joins the Luggie Water before flowing through Kirkintilloch. All the original built structures, except for two Category-B Listed former hospital buildings and two former corridor structures, have been demolished and a significant portion of the derelict site falls within the definition of Brownfield land.

Woodilee presents an opportunity for a substantial residential development, on Brownfield land in compliance with development plan policies, in a location which could integrate well with existing settlements. It is within easy reach of good transport facilities and yet does not represent a major encroachment of urban development into the countryside. The site is currently owned by the Greater Glasgow NHS and managed by the Woodilee Development Consortium.

## **1.3 Background process**

The planning application required an Environmental Impact Assessment (EIA) to be undertaken and an Environmental Statement (ES) was subsequently produced and submitted to accompany the application. The EIA process was the subject of an extensive scoping exercise and the consequent ES describes the design concept and Masterplan and includes an assessment of the planning issues, landscape and visual impact, impact on ecology, woodlands and noise levels. In addition to the ES submitted in January 2005, an addendum statement

was submitted in May 2005. This additional report contained a further refinement of the analysis carried out in the original report and addressed supplementary issues which were raised by interested parties. Specifically these issues concerned:

- The proposed Greenfield development on the northern edge of the application area;
- The impacts on the Oxbang SINC;
- Updated surveys;
- Treatment of buildings;
- Specially protected species; and
- Access/landscape plans.

Additional supporting documents were produced including a revised Masterplan, a Tree Survey, and Mitigation Strategies for Bats, Otters and Water voles.

Following the submission of the ES and its Addendum for the proposed housing development at the Woodilee, EDC was disposed to grant planning permission subject to a Section 75 agreement, conditions and referral to Scottish Ministers. EDC imposed the following three planning conditions, with respect to the ecological interest on the Woodilee site:

2a) *"Prior to any work commencing on the site the following matters shall be submitted to and agreed by the Planning Authority: a habitat management plan for native woodland, the Bothlin Burn (including the use of specialist River Restoration techniques), acid grassland and urban green-spaces, trees and ponds."*

2b) *"Prior to any work commencing on the site the following matters shall be submitted to and agreed by the Planning Authority; a biodiversity mitigation plan for any adverse impacts particularly on Otters (including an aquatic pollution plan as part of the 'Otter safe' works), Water voles, Bats and Kingfishers and arrangements for its implementation."*

2h) *"Prior to any work commencing on the site the following matters shall be submitted to and agreed by the Planning Authority: agreement to incorporate the detailed design and operational changes as well as legal obligations, advised in the SNH letter dated 14 June 2005, into procedures and adopted during the development process."*

Finally, to compensate for a loss of grassland to development at Woodilee, a condition was set for off-site compensation which had to be acceptable to EDC and SNH. This Woodilee Biodiversity/Habitat Management Plan has been drawn together to address all these planning conditions within one document. A first draft of this plan was circulated to SNH and EDC in early December 2005 for comment. SNH replied and subsequently a meeting was held in December 2005 between the Woodilee Development Consortium, SNH and EDC to discuss and resolve outstanding issues.

## 1.4 SNH advice and guidance

SNH have regularly provided advice and planning guidance in relation to the ecological features of importance at Woodilee and the measures necessary for the conservation management of the Woodilee site (Appendix 1). In Appendix 1 each ecological recommendation made by SNH

is listed alongside a reference to where measures have been dealt with within this plan or other associated plans in other sections of this report and in the Recreation Access Plan.

## 1.5 Structure/content of the plan

The structure of this plan is based around the important natural biodiversity/habitat features at Woodilee. It does not aim to repeat the EIA, but:

- To identify the management and actions necessary to conserve and enhance important biodiversity and habitats present at Woodilee; and
- Define responsibility for implementing these actions and the timescales under which delivery will take place.

This plan should be seen along side and not separate from the remainder of the Masterplan for the redevelopment of the site.

Since all habitats are part of general biodiversity (defined by the Scottish Biodiversity Strategy as "*the variety of all living things*") the habitat management plan and the biodiversity mitigation plan identified in the planning conditions have been combined and simplified into this one document: the **Woodilee Biodiversity/Habitat Management Plan** (BHMP). Biodiversity can be categorised along habitat lines and so the chapters of this plan are based around the broad habitats present at the Woodilee site, namely i) Woodland, ii) Rivers, Burns and Wetlands, iii) Open Areas and Grassland, and iv) Built-Up and Residential Areas.

The document contains 20 key biodiversity/habitat management objectives for Woodilee and highlights the main factors affecting the achievement of each of the objectives.

The off-site grassland compensation work is considered a separate item as it takes place away from Woodilee, so it is included as a separate item at the end of this plan (Appendix 2).

## 1.6 Timescale/duration of the plan

This plan is set to cover the period from when the first development work begins to the completion of all construction work on the site. It is envisaged that the duration of the construction period will last approximately eight years, although this timescale may vary as circumstances develop. Plans written at only one moment in time have the potential to become quickly out of date and inflexible, leading to management for the sake of it. The Woodilee environment is a dynamic system and consequently, this plan should be periodically reviewed, revised and adapted to suit new circumstances. As the new Woodilee residents community moves in and develops its own sets of priorities, the plan should be flexible enough to allow for their aspirations and emerging priorities to be considered, alongside those determined by the statutory authorities in 2005.

Therefore, although this plan covers an eight year timeframe, it should undergo periodic reviews after two, four and six years to ensure that it remains fit-for-purpose and appropriate to changing and evolving circumstances at Woodilee. To aid this developmental process and ensure continuity, a suitably qualified Ecologist will be employed from the commencement of

works on site until the completion of the final house, expected to take up to 8 years through different phases of the development (see Woodilee Ecologist - Section 8). Amongst the Ecologist's main tasks will be to ensure the delivery of the actions outlined in the Woodilee BHMP and to ensure the appropriate periodic review of the plan with the help and participation of the emerging Woodilee local community and other interested parties.

## 2. WOODLAND

Broadleaved woodland occurs throughout Woodilee at varying densities, with the largest and most important stands concentrated in the north and west of the site along and parallel to the Bothlin Burn. The woodland is connected throughout the site, providing a functioning habitat network for a range of associated woodland species (Landscape Masterplan dwg ref. 4735 L(90)0001 RevC). The woodland at Woodilee is not currently subject to any habitat or species management and therefore offers many opportunities for active conservation management.

The riparian area of the woodland is designated as part of the Oxgang SINC (Site of Importance for Nature Conservation) and consequently is of local conservation value. The Oxgang SINC is an ancient tract of woodland, having been present at the site since medieval times. SINC's are considered important not just because of their antiquity, but because they usually support natural and semi-natural plant communities and tend to contain uncommon and important flora and fauna. The SINC also extends to the northern area of the site, incorporating a small isolated area of recently established acid grassland (see the Grassland and Open Areas – Section 4). Within the SINC area there is also long-established plantation woodland (present for at least 130 years) which may also be of ancient origin and some value to biodiversity.

As no housing development will take place within the SINC woodland, few trees will need to be felled at the site, and a 2-for-1 planting verses removal strategy has already been adopted as mitigation for any trees lost during the construction work. A specialist Tree Survey was commissioned by The Farningham McCreadie Partnership, detailing tree numbers and locations and suggested actions for specific trees. This detailed work has been used to develop the Woodilee Woodland Management Plan (Section 3).

The Woodilee Woodland Management Plan has five main objectives (1) Protect and enhance important woodland habitats and individual trees on the site through active management; (2) Replace any trees lost during the construction work through a 2 for 1 planting programme and thereby increase woodland cover across the site as a whole; (3) Maintain and enhance the wooded landscape character of the site by avoiding woodland fragmentation across the site; (4) Ensure that Health and Safety issues associated with trees at Woodilee are dealt with appropriately; and (5) Encourage active local community involvement in the management of the woodlands using written and on-site guidance. These five main objectives will be achieved through a series of targeted woodland management techniques, agreed with SNH and the FC, that are designed to retain as many existing trees as possible throughout the site. For further details, refer to the Woodilee Woodland Management Plan (WMP).

### 2.1 Habitat management

The vast majority of woodland in the Oxgang SINC will not be detrimentally impinged upon by the development; quite the reverse, with many opportunities to bring the neglected woodland habitat and its associated species under long-term favourable conservation management. Management of the Woodilee component of the Oxgang SINC as detailed in this plan would satisfy the Scottish Forestry Strategy which is currently being followed by EDC and also

contribute towards the Scottish Biodiversity Strategy and the East Dunbartonshire Local Biodiversity Action Plan (LBAP) through its management of woodland for biodiversity.

The six main woodland management techniques used at Woodilee will include:

**Control/removal of invasive non-native species from the site**

Many non-native species do not become problematical invasives, but provide considerable benefits to society, particularly in relation to agriculture, horticulture and forestry. Therefore, management of non-native species requires sensitive handling and consideration of the threats/benefits on native biodiversity and habitats. When non-native species become invasive they can transform ecosystems and threaten native and endangered species.

The impacts of invasive species on Scottish woodland biodiversity are widely known e.g. competition and disease transfer between non-native Grey and native Red squirrels, and hybridisation between non-native sika deer and native red deer. The vectors and pathways by which woodland non-native species become established are numerous and operate over a range of scales. Therefore, it is important to understand what non-native species are present at Woodilee, the ecology of the species and evaluate any threats they may pose. From work undertaken elsewhere it is then relatively straightforward to develop targeted and effective control/removal plans for particular invasive species.

At Woodilee, three invasive woodland plant species and one animal are known to be present from work carried out for the ES. Rhododendron, Japanese knotweed, Snowberry and Grey squirrel are all found within the woodland SINC. The control/removal of these three plant species will allow for further management and regeneration of native understorey species. The Woodilee Woodland Management Plan intends to remove all Rhododendron from the site. Mature non-native trees that are an important characteristic landscape/amenity feature of Woodilee to be retained as they are not considered invasive and therefore problematical. For example, many of the older exotics may provide niches for lower plants and standing dead wood, which could provide holes for birds to nest in and bats to roost in.

The presence of Grey squirrels at Woodilee poses no significant threat to existing biodiversity at the site (as Red squirrels are not present). Nevertheless, the Woodilee site holds relatively high populations of Roe deer, Rabbits and Grey squirrels, all of which could potentially significantly impact on tree regeneration and the success of any new plantings.

<p><b>Objective 1. Control/remove invasive non-native woodland species at Woodilee</b></p>
<p>Main factors affecting the achievement of objective:</p> <ul style="list-style-type: none"><li>• A thorough understanding of the location of invasive species present at Woodilee in 2005-6;</li><li>• A understanding of the vectors and pathways by which invasive species could become established at Woodilee;</li><li>• An assessment of the benefits/threats each species pose; and</li><li>• Evaluation and implementation of effective targeted control/removal methods.</li></ul>



### Planting of native species

The south/south-west area of the Woodilee site suffers from a very poor quality shrub and field layer and is largely without significant woodland resources. Introduction of appropriate native berry and seed producing shrubs and trees will add to the quality and structure of the woodland in this area whilst providing shelter and foraging opportunities for bird species. Details of the tree/shrub planting locations are provided in the Woodilee WMP and illustrated in the Landscape Masterplan dwg ref 4735 L(90)0001 RevC and Planting Proposals dwg ref 4735 L(92)0001-15. Local provenance native trees will be sourced through Flora locale, BTCV or EDC's local tree nursery at Bishopbriggs and may include, depending upon availability:

Trees for drier sites	Trees for wetter sites	Shrubs
<p><i>Quercus robur</i> <i>Fraxinus excelsior</i> <i>Prunus avium</i> <i>Populus tremula</i> <i>Betula pendula</i> <i>Prunus padus</i> <i>Sorbus aucuparia</i> <i>Malus sylvestris</i> <i>Pinus sylvestris</i> <i>Carpinus betulus</i> <i>Ulmus glabra</i></p>	<p><i>Betula pubescens</i> <i>Alnus glutinosa</i> <i>Salix fragilis</i> <i>Salix alba</i> <i>Salix pentandra</i> <i>Quercus petraea</i> <i>Fraxinus excelsior</i> <i>Salix caprea</i> <i>Salix cinerea</i></p>	<p><i>Prunus spinosa</i> <i>Crataegus monogyna</i> <i>Cytisus scoparius</i> <i>Ulex europaeus</i> <i>Viburnum opulus</i> <i>Corylus avellana</i> <i>Ilex aquifolium</i> <i>Rosa canina</i></p>

Other species not native to the area but which could be included on a limited basis for added diversity include:

*Tilia cordata*, *Acer campestre*, *Taxus bacatta* and *Cotoneaster spp.*

### Objective 2. Ensure that woodland planting at Woodilee is dominated by appropriate native species

Main factors affecting the achievement of objective:

- An agreed list of native species appropriate for site conditions;
- The Woodilee development consortium to work with the agreed list throughout all planting at Woodilee; and
- Identification of suitable nurseries with capabilities to provide local provenance native stock for Woodilee.

### Change even-aged woodland structure

At present, the age-structure of the main riparian woodland habitat is rather uniform, and this will be altered by scalloped edging (imaginative landscaping) and new plantings, enhancing the biodiversity value of the woodland by creating new niches for biodiversity. Pollarding will also help to enhance and vary the age structure of the woodland. Limited areas currently exist where the canopy is open, thus coppicing and removing (mainly non-native) trees to create glades and openings is necessary to help the understorey develop. All work on trees will be carried out with close reference to the Woodilee WMP and the Bat Mitigation Plan.

**Objective 3. Ensure a diverse woodland structure develops at Woodilee**

Main factors affecting the achievement of objective:

- Development and implementation of a thorough and detailed WMP identifying necessary management actions at both the habitat and individual tree level;
- Creation of openings and glades; and
- Graded edges with native shrubs to enhance biodiversity at woodland edges

**Maintain rich native understorey of woodland plants and shrubs within the SINC**

Much of the woodland area is rich and valued because of its current flora and fauna and this should be maintained and enhanced wherever possible. The woodland provides a variety of habitats for many species of birds, animals and plants. The woodland has mature native species such as Hornbeam *Carpinus betulus* and notable understorey plant species such as Woodruff *Galium odoratum* and Broad-leaved helleborine *Epipactis helleborine*. Where non-native species are removed, native species will be encouraged to colonise or targeted planting of shrubs will be carried out e.g. Dogs mercury, brambles, bracken, ferns and *Allium spp.* The above mentioned species are illustrated on the Planting Schedule dwg ref 4735 L(92)0016. Locations are highlighted in the Landscape Masterplan and in more detail in the Planting Proposals drawings.

**Objective 4. Maintain the rich understorey vegetation within the SINC woodland at Woodilee**

Main factors affecting the achievement of objective:

- An understanding of the understorey vegetation present at Woodilee in 2005-6;
- Development and implementation of a detailed WMP that ensures the protection and enhancement of important understorey vegetation;
- Creation of openings and glades; and
- Development/Management of appropriate access/recreation routes to avoid sensitive vegetation communities.

The current Woodilee woodland structure suppresses the growth of ground flora and so coppicing and removing (mainly non-native) trees to create glades and openings is necessary to help the understorey develop. Targeted understorey plantings will be used influence human decision making. Brambles, stinger/spiky species can all be used to dissuade humans from entering sensitive areas as well as providing a valuable wildlife habitat.

**Dead wood provision**

There are many standing dead elms at Woodilee. Dead wood will be retained in situ if possible. Standing dead wood offers a productive habitat for invertebrates and fungi, however if this is unacceptable in the interests of public safety, felled trees will be moved and left elsewhere in the woodland to degrade naturally. In particular, informal footpaths and tracks leading into the sensitive Bothlin Burn area will be targeted with dead wood, making it awkward to climb over, thereby encouraging access along established and appropriate access routes as highlighted in the Recreational Access Plan. Dead wood will be kept in large pieces

as it takes longer to breakdown and fully decompose, extending the time of its value for biodiversity and as a access management tool.

**Objective 5. Maintain current high levels of dead wood as an important component of woodland at Woodilee**

Main factors affecting the achievement of objective:

- Development and implementation of a detailed WMP that ensures the retention of deadwood throughout Woodilee;
- Health and Safety considerations adequately addressed; and
- Imaginative use of deadwood that has to be felled to control access to sensitive areas.

**Managing access to sensitive areas**

An additional approach to managing access to sensitive sites will be to follow the above steps with dead wood, but to ensure that planting at the woodland edges dissuaded recreational use of the more sensitive areas of the SINC. Targeted understorey plantings will be used influence human decision making. Brambles, stinger/spiky species can all be used to dissuade humans from entering sensitive areas as well as providing a valuable wildlife habitat.

**Objective 6. Ensure sensitive areas are protected through appropriate access/recreational management**

Main factors affecting the achievement of objective:

- An understanding of the biodiversity sensitivities at Woodilee;
- Development and implementation of a detailed WMP that considers biodiversity; and
- Development of appropriate access/recreation routes to avoid sensitive vegetation communities/species.

The Woodilee Recreational Access Plan has a clear set of guiding principles and these will be taken forward with both formal and informal access routes across the site. New path networks will not be introduced to the core woodland SINC so as to reduce disturbance from Woodilee residents and existing paths have been modified and redirected away from the most sensitive areas (mainly along the Bothlin Burn). Most parts of the Woodilee site are not especially sensitive, so access, for example along the wooded edge on the southern boundary, is directed by the Access Strategy to these more suitable areas. The Access Strategy is graphically illustrated in 'Strategic Access Paths Strategy' dwg ref 4735 L(--)-0008.

## 2.2 Species management

### Bats

Survey work carried out at Woodilee has confirmed that two species of Pipistrelle bats are present. The woodland, particularly the areas along the Bothlin Burn, currently provides suitable habitat for these bat species. Survey work was carried out by Nocturne consultants and demonstrated that although no bat hotspots were present within the Woodilee

development, much habitat was suitable for commuting and foraging.

As part of the proposed works, it will be possible to encourage and conserve bat use at the site. To aid this, measures identified in the Bat Mitigation Strategy will be put in place. Several bat friendly management options have been identified for action such as the erection of bat boxes, the retention of dead trees at the site and habitat management to ensure a rich source of invertebrates for foraging through the introduction of ponds (wet SuDS attenuation ponds are planned) and by leaving dead wood from fallen trees in the woodland.

**Objective 7. Manage woodland at Woodilee to conserve and enhance its suitability for bats**

Main factors affecting the achievement of objective:

- An understanding of the use of Woodilee by bats;
- Development and implementation of a detailed WMP that considers bats; and
- Implementation of the Bat Mitigation Strategy for the site.

Although bat boxes would not necessarily encourage additional bats to the site, they would provide alternative homes for bats using Woodilee. Standing dead wood will also be retained as it decays slower than felled wood, providing a better habitat for invertebrates and fungi, as well as providing holes for roosting and hibernating bats.

Other actions identified in the Bat Mitigation Strategy will also be followed. This mitigation includes avoidance of sensitive felling periods and the presence of a licensed bat worker during arboricultural work on mature trees.

Other important mammalian species associated with the Oxbang SINC include Otters and Water voles which are discussed in detail in Section 3. Two surveys since 1996 have failed to find evidence of Badgers at Woodilee.

**Birds**

A wide range of breeding and non-breeding birds have been identified at Woodilee during surveys previously undertaken. The woodland already currently provides suitable foraging and nesting habitat for several species and the habitat management options offer potential benefits to these species.

The six main woodland management techniques used at Woodilee will support and benefit a wider diversity of bird species than is currently present. Non-native species removal and replacement with native species will favour greater invertebrate populations and native seed production, which will directly benefit birds. Changing the even-aged structure of woodland at Woodilee and maintaining a rich vegetation understorey will create new diverse niches, not only directly benefiting birds, but their prey populations too. In particular, species that favour the younger stages of vegetation succession should increase directly as a result of the planned woodland management.

The impact of development work on adjacent woodland areas will be reduced through the sensitive timing of building/construction work; especially by avoiding disturbance during the breeding season – a legal requirement (March – June). The retention of dead wood and the provision of additional nest sites through a variety of bird nest box types should reduce competition for those hole-nesting birds whose nest sites are at a premium. Loss of nest sites when removing mature exotics will be compensated for by boxes. Boxes types will include designs for small birds such as tits and starlings, as well as for larger birds such as Jackdaws and owls.

**Objective 8. Manage woodland at Woodilee to conserve and enhance its suitability for birds**

Main factors affecting the achievement of objective:

- An understanding of the use of Woodilee by birds;
- Development and implementation of a bird friendly WMP for the site; and
- Provision of additional nesting sites through the creation of suitable habitat and bird boxes.

In areas of Woodilee that have little or poor woodland cover, such as the south and east, foraging opportunities for birds will be addressed through the planting of suitable berry and seed producing plants, shrubs and trees e.g. Cotoneaster, Blackthorn, Cherry, Crab apple, Rowan, Hawthorn and Rosehip. In addition, these plants and shrubs will also be positioned so as to provide a buffer edge between the woodland and the new infrastructure through the related landscape strategy, grading the woodland edges with native species of trees and shrubs. Details provided in the Landscape Masterplan and the Planting Proposals.

**Invertebrates**

Improving the woodland habitat through restructuring, new planting, removal of non-native species and promotion of native species will benefit a large range of invertebrate species. The best way of increasing invertebrate populations will be to open up the canopy through the creation of glades and coppicing. Invertebrates form the largest component of biodiversity in most habitats and so are an important biodiversity consideration in woodland management. Although not specifically identified in the planning conditions, the proposed habitat management changes will favour invertebrate populations that form the base of the woodland food chain. In the long-term this should benefit many of the more well-known charismatic species at Woodilee such as birds and bats.

Deadwood is especially important for a specialist community called Saproxylic invertebrates, which are important in themselves and because they provide a rich source of food for a variety of woodland species e.g. woodpeckers. These invertebrates are associated with ancient woodlands and many lack the physical ability for long-distance dispersal. Consequently, the connectivity of woodland stands is important and the fragmentation of suitable woodland habitat will be avoided (Landscape Masterplan dwg ref 4735 L(90)0001 RevC).

**Objective 9. Manage woodland at Woodilee to conserve and enhance its suitability for invertebrates**

Main factors affecting the achievement of objective:

- An understanding of the use of Woodilee by invertebrates;
- Development and implementation of an invertebrate friendly WMP for the site; and
- Provision of additional sites through the creation of suitable habitats.

The decaying cores of living trees and standing deadwood also provide potential roosting and hibernating sites for bats and nesting sites for birds as well as an ideal habitat for fungi and lower plants such as mosses, lichens and liverworts. Since the Woodilee site holds significant amounts of deadwood, it is of considerable conservation value for invertebrates and those other species dependent upon them, hence retention is probably the single most important action for dead wood and Woodilee.

### 3. RIVERS, BURNS AND WETLANDS

A single water course, the Bothlin Burn, separates the north western sector from the majority of the site and then mainly runs along the northern periphery of the Woodilee site. There are no natural permanent standing still waters at the site, although there are wet-flush areas adjacent to the Bothlin Burn in the north-west part of the site along the flood plain.

The Bothlin Burn is a small burn that flows into the Luggie Water at Kirkintilloch. The Bothlin Burn which flows into the Luggie Water is a tributary of the River Kelvin. The overall water quality (biology, chemistry, aesthetics and toxicity) of the Bothlin Burn is currently classified as *seriously polluted* (river water classification D) in the upper reaches and *poor* (river water classification C) in the mid and lower reaches ([www.sepa.org.uk](http://www.sepa.org.uk)). Under the Water Framework Directive, all partners should be working towards maintaining and improving good ecological quality of water bodies such as the Bothlin Burn.

In the past, the Bothlin Burn was heavily polluted by Gartcosh Steelworks and more recently by discharges of effluent from the Scottish Water Auchengeich Sewage Treatment Works. In 2003 Scottish Water were prosecuted for discharging raw sewage into the Bothlin Burn via an overflow from the works. As a result the sewage site closed in March 2003. Recently it has been reported that water quality has improved significantly since the upstream works closed. The pollution is now believed to mainly come from the Cult Burn, at Lenzie, where there are cross connections with the waste water network.

In 1996 (prior to water quality improving) a fish (electrofishing) survey was carried out on the River Kelvin and its main tributaries. The results of this survey found:

- Brown trout in the lower reaches;
- Minnows in the lower reaches;
- Sticklebacks throughout the burn;
- No Atlantic salmon;
- No Eels;
- No Stone loach; and
- No Brook lampreys.

#### 3.1 Habitat

The Bothlin Burn corridor is of high local ecological importance on account that it is recognised as functioning as an important wildlife corridor in the ED LBAP, linking the Bothlin Burn with the Luggie Water and the River Kelvin Catchment, as well as acting as a substantial green wedge between the Woodilee development and Kirkintilloch to the north.

The Bothlin Burn provides a variety of aquatic habitats, including various pools, riffles, glides and a few meanders. The burn has good vegetation cover along both banks. The burn is culverted and canalised (armoured) in places, with various pipes draining into it. Many important species use the burn and its associated riparian habitat corridor.

The Bothlin Burn provides suitable connected foraging habitat for bats that also use the main

Woodilee woodland habitats. Several water bird species use the burn including Kingfisher *Alcedo atthis*, Grey wagtail *Motacilla cinerea*, Dipper *Cinclus cinclus*, Teal *Anas crecca* and Grey heron *Ardea cinera*. Two important mammals species, Otter *Lutra lutra* and Water vole *Arvicola terrestris*, also use the Bothlin Burn.

The corridor also offers wet woodland by the Gatehouse, unwooded areas with wetland habitats, including a wet area dominated by sedge in an old quarry and various marshy riparian areas. As with the woodland habitat, the Bothlin Burn corridor has not been under active management for decades and so offers many opportunities for active conservation management.

The four main water/wetland management techniques used at Woodilee will include:

### **Improve water quality**

As detailed above, the Bothlin Burn is showing signs of recovery from years of pollution upstream. Most of the proposed management options outlined in this section rely upon the water quality of the Bothlin Burn improving continually so that progress can be made at Woodilee. The role of local partners, especially SEPA and Scottish Water, in improving water quality in the upper catchment will be very important and underpins downstream efforts at Woodilee at improving the Bothlin Burn as a wildlife habitat.

<b>Objective 10. Improve water quality in the Bothlin Burn to increase its value as a wildlife habitat</b>
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Main factors affecting the achievement of objective:
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| <ul style="list-style-type: none"><li>• Engage with relevant partners e.g. Scottish Water and SEPA, to improve upstream water quality entering the Woodilee site (largely outwith the control of this plan);</li><li>• Presence of polluting debris (plastic storage containers, plastic bags, shopping trolleys, metal frames etc.) in the burn at Woodilee;</li><li>• Ensure on-site pollution control compliance; and</li><li>• Regular monitoring of water quality and fish populations in the Bothlin Burn before, during and after improvement work is undertaken.</li></ul> |
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Site development operations at Woodilee should not impact on water quality in any significant way. Measures will be taken to ensure that runoff from soil/mud etc from construction work does not enter the Bothlin Burn. Hazardous materials such as fuel oil, will be stored in a safe and appropriate manner on site (following SEPA guidance), so that potential leakages and pollution are avoided.

### **Diversify river habitats for wildlife through River Restoration techniques**

Most of the Bothlin Burn at Woodilee is semi-natural in terms of its channel form, providing many niches for riparian species. However, the western most section of the Bothlin Burn is culverted and canalised (armoured) at Woodilee. There are no plans to develop the burn for the housing and there are several sensitive and legally protected species e.g. Otter and Water vole that use the Bothlin burn. There is little habitat variety both within and along the edge of the canalised section of burn and it offers opportunities to use established specialist River



Restoration techniques (e.g. boulders, gravels, natural weirs, pools, riffles, meanders and backwaters) to improve the channel for sensitive wildlife and flood prevention.

If the River Restoration techniques used to increase habitat diversity coincide with an improvement of water quality then many more aquatic species may use the burn, for example, Atlantic salmon could potentially recolonise the Bothlin Burn if water quality continues to improve and measures are taken to diversify within river habitats.

**Objective 11. Diversify canalised section of the Bothlin Burn at Woodilee**

Main factors affecting the achievement of objective:

- Long-term improvement of water quality entering the burn is crucial to allowing wildlife to utilise the newly diversified section of Bothlin Burn;
- Develop and implement an appropriate River Restoration plan (boulders, gravels, natural weirs, pools, riffles, deadwood, meanders and backwaters) for the canalised section of burn with appropriate partners (i.e. SEPA);
- Link wetland creation and SuDS to river restoration;
- Regular monitoring of water quality and fish populations in the Bothlin Burn before, during and after improvement work is undertaken; and
- Provision of artificial holts to encourage Otters to breed at Woodilee.

The exact design and features of the River Restoration techniques used at Woodilee will need to be agreed between the main partners (especially SEPA) if the goal of reinstatement of natural river habitats is to be achieved.

**Maintain diverse riparian habitat corridor**

Away from the canalised western section of the Bothlin Burn, the riparian habitat is diverse and rich and is home to rare and sensitive species (e.g. Otters, Water voles and Kingfishers). As a consequence, these areas should be left alone with little human disturbance. Occasional non-intensive management will be necessary to maintain the open nature of some riparian grassland habitats in the north of the Woodilee site.

**Objective 12. Maintain diverse character of the riparian habitats of the Bothlin Burn at Woodilee**

Main factors affecting the achievement of objective:

- An understanding of the important riparian vegetation present at Woodilee in 2005-6;
- Identify and implement long-term management necessary to ensure the protection and enhancement of important riparian habitats and associated (often sensitive) species (e.g. mowing/cutting and grazing);
- Ensure quiet zones for sensitive wildlife especially Otters, Kingfishers and Water voles are identified in the Access Plan; and
- Restore / protect / improve the riparian zone (including bank sides) through fencing, planting trees and shrubs, and the removal and control non-native species.

### **Create new wetland habitats**

Wetlands provide one of the richest habitats for biodiversity (especially invertebrates) and there are opportunities to create new wetland sites, particularly along the canalised western section of the Bothlin Burn. The development will also need to consider drainage and the development of SuDS across the site, offers opportunities for temporary or permanently wetted ponds. Details are provided in the Landscape Masterplan and Planting Proposals.

#### **Objective 13. Create new wetland habitats at Woodilee**

Main factors affecting the achievement of objective:

- Creation of wet SuDS ponds and associated wetlands (to prevent water pollution/control water quality as well as benefit biodiversity);
- The design and management of the SuDS ponds will determine the range and type of wetland species and habitats to develop; and
- Create new wetland habitats through the use of specialised River Restoration techniques along the canalised section of the Bothlin Burn.

## **3.2 Species**

### **Mammals**

Survey work carried out at Woodilee has confirmed that two species of Pipistrelle bats are present and the Bothlin Burn currently provides suitable habitat for these species. Survey work carried out by Nocturne demonstrated that although no bat “hotspots” were present within the Woodilee development, much riparian habitat was suitable for bat commuting and foraging.

Survey work (by JDC Ecology and EnviroCentre) along the Bothlin Burn has confirmed the presence of Otters and Water voles on the Bothlin Burn. Otters are present throughout the Bothlin Burn at Woodilee where potential holt and couch sites were identified. However, there is no direct evidence of these sites being used at such. This could be linked to food supply, which would increase with water quality improvements, so Otters may be expected to use the site more in the future once water quality and habitat improvements have been made.

#### **Objective 14. Manage river and riparian habitats at Woodilee to conserve and enhance its suitability for Otters**

Main factors affecting the achievement of objective:

- An understanding of the use of Woodilee by Otters;
- Implementation of a Otter friendly development plan;
- Improvement of water quality and resultant impacts on fish populations;
- Bank side planting to ensure continuous cover for Otters (e.g. trees, macrophytes & reeds as food/cover/couch features);
- Removal of in-stream artificial obstacles, but leave natural organic debris;
- Creation of suitable in-stream features to improve fish habitat;
- Ensure quiet zones for Otters are identified in the Recreational Access Plan (Landscape Masterplan dwg ref 4735 L(90)0001 RevC), especially centred around the Bothlin Burn and Luggie Water; and
- Creation of artificial Otter holt sites.

Evidence of Water voles was found to be present (latrines) by the end of the western canalised section, near the more open grassland riparian vegetation. However, there was no direct evidence of burrow systems (breeding sites) being present. The evidence from survey work suggests that either Water voles ranging from adjacent colonises (e.g. on the Cult Burn) have used the Woodilee area, or that a small remnant undiscovered population exists at Woodilee.

**Objective 15. Manage river and riparian habitats at Woodilee to conserve and enhance its suitability for Water voles**

Main factors affecting the achievement of objective:

- An understanding of the use of Woodilee by Water voles;
- Development and implementation of a Water vole friendly mitigation plan;
- Improvement of water quality;
- Invasive non-native American mink arriving and killing all Water voles;
- Sensitive bank engineering to produce suitable areas for burrowing;
- Ensure bridges and footpaths do not result in artificial barriers, causing population isolation; and
- Maintenance and creation of suitable riparian habitats.

A detailed Otter and Water vole Mitigation Strategy has been produced by JDC and addresses the issues associated with the development and its potential impacts on these sensitive species. Consequently, a detailed mitigation plan for Otters and Water voles has been produced for use during the construction phase. This plan includes buffer zones along the Bothlin Burn, suggested habitat improvements and awareness inductions for site staff, contractors and visitors, as well as safe working practices.

The implementation of some of the habitat improvement strategies outlined in the mitigation strategy may cause some temporary disturbance to the populations already present and hence must be carefully planned in terms of timing and extent to reduce such disturbance. A key feature in this management strategy is the presence of an Ecologist on site during the construction phase to ensure compliance of Otter and Water vole Mitigation Plan and the realisation of additional management opportunities identified.

Some issues cannot be dealt with in isolation at Woodilee, such as Mink control. It is suggested that a strategic Mink control plan is considered across the wider Luggie Water area, as there is little point in controlling Mink at Woodilee if adjacent Mink continually re-colonise the area and wipe out Water vole populations. It is possible to protect Water voles from mink to a degree, by providing off-line wetland habitats (away from linear features favoured by mink).

### **Birds**

Amongst the several bird species that use the Bothlin Burn, Kingfisher is perhaps the rarest and of most conservation interest. Kingfishers have been recorded at Woodilee despite poor water quality. Areas along the banks are already available for Kingfisher nesting, and this may be encouraged by providing nesting burrows/holes in these areas – however Kingfishers are notoriously fussy and prefer to excavate their own holes. In stream features such as boulders and rocks will allow suitable places from which Kingfishers can forage, as well as increasing the populations of fish present, as water quality hopefully improves. Any improvement in water quality should be beneficial to all water birds known to use the site.

<b>Objective 16. Manage river and riparian habitats at Woodilee to conserve and enhance its suitability for Kingfishers</b>
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Main factors affecting the achievement of objective:
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| <ul style="list-style-type: none"><li>• Improvement of Bothlin Burn water quality and resultant impacts on fish populations;</li><li>• Removal of in-stream polluting obstacles and debris;</li><li>• Creation of suitable in-stream features to improve fish habitat;</li><li>• Ensure that all potentially suitable nesting and foraging areas are retained; and</li><li>• Cold winter temperatures.</li></ul> |
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A key ecological determinant for Kingfisher populations is winter temperature (frozen waters exclude feeding). Efforts at conserving and enhancing Kingfishers at Woodilee will be directed at habitat improvements, but it should be noted that these efforts can be negated by harsh winter conditions or pollution from upstream of the site.

### **Invertebrates**

Improving the burn habitat and the creation of wetlands and wet SuDS ponds should benefit a large range of invertebrate species, including some still-water species not currently present. Although not specifically identified in the planning conditions, the proposed riparian habitat management changes will favour invertebrate populations that form the base of the wetland/water food chain. The species typically planted in wet SuDS to improve water quality, are also the species favoured by aquatic invertebrates. Therefore, in the long-term this should benefit many of the higher wetland/water animal species of conservation concern at Woodilee.

<b>Objective 17. Manage river and riparian habitats at Woodilee to conserve and enhance its suitability for invertebrates</b>
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Main factors affecting the achievement of objective:

- An understanding of the use of Woodilee by invertebrates;
- Improvement of water quality in the Bothlin Burn;
- Create wet SuDS ponds and associated wetlands;
- The design and management of the SuDS ponds will determine the range and type of wetland species and habitats to develop; and
- Create new wetland habitats through the use of specialised River Restoration techniques along the canalised section of the Bothlin Burn.

## 4. OPEN AREAS AND GRASSLAND

Grassland and open areas occur in the north, east and south of the Woodilee site. The majority of the grassland is so called 'improved' (reseeded) species-poor grassland probably associated with the original planting in the Woodilee hospital grounds. The grounds of the old hospital are of low ecological value and are the focus of the Woodilee housing development.

An exception is a small isolated area of acid grassland with regenerating trees in the north of the site, which forms part of the Oxgang SINC. The acid grassland has been identified as an important area in the SINC, but its importance has been questioned for several reasons, namely:

1. The Woodilee acid grassland site is very small, isolated and does not form part of any grassland habitat network;
2. The acid grassland formed on top of building rubble from the old hospital and is therefore a relatively recent, transient habitat to the site;
3. The acid grassland will be lost through tree regeneration in the near future as the grassland disappears through natural succession;
4. Housing development above the acid grassland will alter the northern hydrology of the site, to the detriment of the acid grassland;
5. When originally highlighted by the EDC Officer, the acid grassland was quoted as being quite rare locally, with nothing made of the UK Biodiversity Action Plan which states it is one of the most common/widespread habitats in the UK (>1.2 million ha in the uplands and in excess of 30,000 ha in the lowlands); and
6. The UK Biodiversity Action Plan for acid grassland recommends efforts be targeted at large areas where active management, grazing or burning, can be maintained – not on small isolated sites.

The planning authority (EDC) granted permission for houses and primary infrastructure to build upon the acid grassland site as well as the remainder of the redundant hospital grounds. However, appropriate off-site compensation must be agreed with EDC and SNH.

### 4.1 Habitat management

Open area/grassland habitat management efforts should be directed towards generic biodiversity friendly management at communal and open areas in the development. Communal areas can be managed for wildlife that prefer open spaces and grassland. Such an approach would include native planting and allowing "untidy" areas of long grass and scrub to provide habitat for invertebrates, particularly butterflies, small mammals and birds as well as more conventional communal grassland planting. Establishment and maintenance of existing and proposed grasslands and grassland planting is discussed in detail in the Landscape Management Plan, Section 2.

The low ecological value of the main hospital grounds means that there are no known specialist species or species of conservation interest on which to direct targeted management. However, the provision of bird and bat boxes in the trees surrounding these open areas would not only compensate against the loss of any trees for these species, but could potentially offer scope for

additional community involvement in managing the site in the future.

**Objective 18. Manage open areas and grassland at Woodilee to enhance its suitability for biodiversity**

Main factors affecting the achievement of objective:

- Source appropriate grassland species mix for communal areas;
- The use of herbicides, pesticides and fungicides used in the management of communal areas;
- Regularity of mowing regimes in residential and roadside verge areas. A variety of mowing regimes will create different grassland habitats and niches;
- Provide targeted information for the new Woodilee residents on the management of communal open spaces;
- Provide bird and bat boxes on the edges of open spaces;
- Targeted expansion of hedgerows for shelter and linkages to other woodland habitats;
- Protect grassland remnants in north of site from development and tree regeneration; and
- Manage quarry as wild area.

Further bordering of the open areas with native hedgerows would allow shelter and foraging opportunities for animal species which would normally forage within these areas, and would compensate for the loss of any present hedgerows/scrub. It should also help to maintain a woodland habitat network around the site. In the former quarry, which falls into the category of open areas and grassland, the opportunity exists to manage it as a wild area, with minimal intervention.

Verge plantings should be designed and structured to reduce/minimize wildlife road casualties. For example, targeted shrub planting can raise the height at which birds fly across an area, so as to avoid bird traffic casualties.

## 5. BUILT-UP AND RESIDENTIAL AREAS

The Woodilee development will result in a large number of new buildings (ca. 800 properties) and residential areas being created on the former built sites within Woodilee, along with two older buildings being retained and reconditioned. There are a tremendous number of opportunities in which to consider biodiversity in the construction and operational phase of the building development.

### 5.1 Construction and development opportunities

Ensuring that building/construction methods incorporate biodiversity options from the outset, means that most houses and gardens will be wildlife friendly. Where appropriate, any green areas such as road verges etc. should be planted with a range of native species, especially berry or nectar producing plants and managed in such a way that benefits a broad range of species, as well as targeting shrub planting to raise the height at which birds fly across an area, so as to avoid bird traffic casualties.

<b>Objective 19. Ensure that opportunities for biodiversity are included in the construction and development of residential properties at Woodilee</b>
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Main factors affecting the achievement of objective:

- Use native species or berry rich shrubs in plantings to support birds using gardens and residential areas throughout the year;
- Ensure all work is in compliance with relevant environmental/biodiversity/wildlife legislation;
- Training of site development staff in biodiversity awareness and legal issues surrounding compliance of wildlife legislation;
- Provide targeted information for the new Woodilee residents on the management of communal open spaces and residential areas; and
- Targeted expansion of hedgerows for shelter.

Compliance with relevant environmental/biodiversity/wildlife legislation and best practice guidance should mean that all activities associated with the construction phase of the development should be benign or beneficial for biodiversity at Woodilee. This will be best achieved by the Ecologist working closely with site development staff to raise their awareness of the sensitive areas and legally protected species at Woodilee.

### 5.2 Engaging and involving the new Woodilee local community

By making houses and gardens wildlife friendly, it is likely to increase the opportunities for the new residents to come into contact with wildlife. It is widely accepted that people are willing to engage in practical conservation work if they have regular contact with wildlife because it enriches their lives. Thus, targeting practical action around people's living space and encouraging them to participate should lead to a wider appreciation of the sensitive elements of Woodilee biodiversity e.g. the Oxgang woodland SINC area.



Acceptance of ponds and wetlands by local communities is better if they are already installed and established before people arrive. The creation of wet SuDS ponds prior to the community moving in should make sure of this, as well as ensure water quality performance is ready for the development.

**Objective 20. Highlight and raise awareness of the importance of Woodilee for biodiversity with the new residents and local community at Woodilee**

Main factors affecting the achievement of objective:

- Local engagement with the management of Woodilee through close links with the site management company;
- Provision of a glossy and informative Woodilee biodiversity guidance note for all householders;
- Provision of bird boxes/bat boxes for houses and gardens;
- Provide targeted information for the new Woodilee residents on the management of communal open spaces and residential areas; and
- Ongoing role of Ecologist in ensuring that residents are aware of the importance of the Woodilee, the existing Woodilee BHMP and their role in shaping the appropriate periodic review of the BHMP so that it reflects their values.

By identifying and implementing the opportunities for wildlife afforded by the Woodilee development, the Woodilee Consortium and the new local resident community will help to contribute to the delivery of the East Dunbartonshire LBAP and the Scottish Biodiversity Action Plan.

There are several opportunities to provide all the residents with facilities to contribute on a day to day basis, such as composting bins, guidance on appropriate garden species etc. In the longer time scale (i.e. post construction), the Woodilee community themselves will pay for the upkeep and management of the site and this could easily be directed/guided by the final review of this BHMP involving the local community.

## 6. ACTION PLAN

The following timetable identifies the specific work required to meet Woodilee habitat and biodiversity objectives.

Objective	Management prescription	Specific actions	Timescale for action	Main responsibility
<b>1. Control/remove invasive non-native woodland species at Woodilee</b>	Develop Woodilee non-native species strategy	<ul style="list-style-type: none"> <li>a) Carry out targeted non-natives survey, focusing on Japanese Knotweed, Snowberry &amp; Rhododendron;</li> <li>b) Assess the threat/benefit posed by non-native species currently present at Woodilee; &amp;</li> <li>c) Based on the surveys findings &amp; best practice advice develop &amp; implement an effective control programme (e.g. complete Rhododendron removal is planned in the WMP)</li> </ul>	Carryout survey - 2006 Develop & implement control programme – 2007 onwards	Ecological Clerk of Works
<b>2. Woodland planting at Woodilee to be dominated by appropriate native species</b>	Native tree species to dominate Woodilee planting	<ul style="list-style-type: none"> <li>a) Produce appropriate species list;</li> <li>b) Ensure prescription is included in WMP;</li> <li>c) Source trees from BTCV or local EDC tree nursery; &amp;</li> <li>d) 2 for 1 planting verses removal prescription in Woodilee Woodland Management Plan</li> </ul>	Include in WMP – 2006 Implement action – as identified in WMP for next 8 years	Woodilee site management company
<b>3. Ensure a diverse woodland structure develops at Woodilee</b>	Maintain & develop diverse Woodilee woodland structure through active management	<ul style="list-style-type: none"> <li>a) Ensure prescription is included in WMP;</li> <li>b) Create glades; &amp;</li> <li>c) Grade edges with native shrubs to enhance biodiversity at woodland edges (including dense edges to discourage recreational use of sensitive sites)</li> </ul>	Include in WMP – 2006 Implement action – as identified in WMP for next 8 years	Woodilee site management company
<b>4. Maintain the rich understorey vegetation within the SINC woodland at Woodilee</b>	Maintain & develop rich understorey at Woodilee SINC through active management	<ul style="list-style-type: none"> <li>a) Ensure prescription is included in WMP;</li> <li>b) Open up structure by coppicing and the creation of glades; &amp;</li> <li>c) Ensure sensitive understorey areas are avoided in the Woodilee Recreation &amp; Access Plan</li> </ul>	Include in WMP – 2006 Implement action – as identified in WMP for next 8 years	Woodilee site management company

Objective	Management prescription	Specific actions	Timescale for action	Main responsibility
<b>5. Maintain current high levels of deadwood as an important component of woodland at Woodilee</b>	Retain deadwood through active management	<ul style="list-style-type: none"> <li>a) Ensure prescription is included in WMP; &amp;</li> <li>b) Utilise deadwood that has to be felled for Health &amp; Safety purposes to help manage access to sensitive areas in the Woodland SINC &amp; along the Bothlin Burn</li> </ul>	Include in WMP & Access Plan – 2006 Implement action – as identified in WMP for next 8 years	Woodilee site management company
<b>6. Ensure sensitive areas are protected through appropriate access/recreational management</b>	Protect sensitive areas from access/recreational disturbance by directing to re-routing access routes away from known sensitive areas	<ul style="list-style-type: none"> <li>a) Ensure prescription is included in Woodilee Recreation &amp; Access Plan for sensitive areas in the Woodland SINC &amp; along the Bothlin Burn</li> </ul>	Include in Access Plan – 2006 Implement action – as identified in plan for next 8 years	Woodilee site management company
<b>7. Manage woodland at Woodilee to conserve &amp; enhance its suitability for bats</b>	Implement targeted bat friendly woodland management	<ul style="list-style-type: none"> <li>a) Ensure measures identified in the Bat Mitigation Strategy are included in WMP &amp; implemented, in particular:</li> <li>b) Ensure a licensed bat person is present if &amp; when any mature trees are felled;</li> <li>c) Create ponds &amp; leave dead wood to encourage invertebrates;</li> <li>d) Stop work if bats are discovered roosting in trees to be felled &amp; seek advice;</li> <li>e) Erect bat (roosting, summer &amp; hibernation) boxes on mature trees; &amp;</li> <li>f) Maintain wooded character of the site</li> </ul>	Include in WMP – 2006 Implement action – as identified in plan for next 8 years	Woodilee site management company & Ecologist
<b>8. Manage woodland at Woodilee to conserve &amp; enhance its suitability for birds</b>	Implement bird friendly woodland management	<ul style="list-style-type: none"> <li>a) Ensure bird friendly measures are included in the WMP &amp; implemented, in particular:</li> <li>b) Ensure no tree felling occurs during the bird breeding season;</li> <li>c) Use the six main woodland management techniques to maintain &amp; improve Woodilee woodland habitat &amp; structure for birds;</li> <li>d) Protect sensitive areas from disturbance &amp; Erect bird boxes on mature trees</li> </ul>	Include in WMP – 2006 Implement action – as identified in plan for next 8 years	Woodilee site management company & Ecologist

Objective	Management prescription	Specific actions	Timescale for action	Main responsibility
<b>9. Manage woodland at Woodilee to conserve &amp; enhance its suitability for invertebrates</b>	Implement targeted invertebrate friendly woodland management	<ul style="list-style-type: none"> <li>a) Ensure invertebrate friendly measures are included in the WMP &amp; implemented, in particular;</li> <li>b) Use the six main woodland management techniques to maintain &amp; improve Woodilee woodland habitats for invertebrate</li> </ul>	Include in WMP – 2006 Implement action – as identified in plan for next 8 years	Woodilee site management company & Ecologist
<b>10. Improve water quality in the Bothlin Burn to increase its value as a wildlife habitat</b>	Implement targeted actions to improve water quality of the Bothlin Burn	<ul style="list-style-type: none"> <li>a) Identify main pollution sources of Bothlin Burn (e.g. Cult Burn);</li> <li>b) Work with partners (esp. SW and SEPA) stop pollution &amp; improve water quality entering the Woodilee site;</li> <li>c) Develop Bothlin Burn clean-up work to remove polluting debris e.g. shopping trolleys &amp; rubbish;</li> <li>d) Ensure compliance with development site pollution prevention plan; &amp;</li> <li>e) Monitor water quality &amp; fish populations prior to during &amp; after work has been completed.</li> </ul>	Liaise with partners to improve water quality – 2006 onwards; Annual Bothlin Burn clean-up programme; Annual site development compliance; Monitor fish populations in 2006/2009 & 2012	Woodilee site management company, local partners (inc. SNH & SEPA) & Ecologist
<b>11. Diversify canalised section of the Bothlin Burn at Woodilee</b>	Agree, develop & implement River Restoration Plan to re-naturalise canalised section of Bothlin Burn at Woodilee	<ul style="list-style-type: none"> <li>a) Improve water quality (biological &amp; chemical);</li> <li>b) Do not exacerbate flooding upstream or downstream construct as part of the local flood management plan (consult with SEPA);</li> <li>c) Create habitat for flora and fauna; &amp;</li> <li>d) Comply with the Water Framework Directive to achieve good ecological status</li> </ul>	2006-2008	Ecologist
<b>12. Maintain diverse character of the riparian habitats of the Bothlin Burn at Woodilee</b>	Implement targeted management to improve existing riparian habitats	<ul style="list-style-type: none"> <li>a) Develop and implement annual mowing/grazing plan to protect important open habitats;</li> <li>b) Identify and implement improvements necessary to protect riparian zone e.g. fencing, planting etc; &amp;</li> <li>c) Leave quiet zones for sensitive species</li> </ul>	Develop annual riparian work plan – 2006 Implement annual riparian plan 2006-2013	Woodilee site management company & Ecologist

Objective	Management prescription	Specific actions	Timescale for action	Main responsibility
<b>13. Create new wetland habitats at Woodilee</b>	Implement targeted management to create new wetland habitats	a) As part of River Restoration work, wet SuDS work and annual riparian management plans, identify, design and implement opportunities to create wetland habitats within the Bothlin Burn corridor	Develop options 2006 (inc SuDS); Implement actions 207-2013	Ecologist
<b>14. Manage river &amp; riparian habitats at Woodilee to conserve &amp; enhance its suitability for Otters</b>	Implement Otter friendly work in the Bothlin Burn riparian corridor	<ul style="list-style-type: none"> <li>a) Ensure measures identified in the Otter Mitigation Strategy are implemented, in particular:</li> <li>b) Re-survey Otter use of the site prior work;</li> <li>c) Remove debris from burn and add natural in-stream features;</li> <li>d) Re-naturalise canalised section of Bothlin Burn at Woodilee;</li> <li>e) Repair any damage caused to banksides or in-channel work as soon as possible after re-naturalisation work is completed;</li> <li>f) Use native species for planting to improve riparian cover;</li> <li>g) Create artificial Otter holts in a quiet zone (as part of re-naturalisation of Bothlin Burn);</li> <li>h) Ensure all bridge crossings include appropriate Otter mitigation in terms of underpasses etc;</li> <li>i) Work to ensure improved water quality &amp; fish stocks; &amp;</li> <li>j) Prevent/reduce human and dog disturbance through careful access/recreational planning</li> </ul>	Re-survey for Otters – 2006; Annual Bothlin Burn clean-up programme; River Restoration improvements include Otter friendly annual actions; Native species included in WMP – 2006; Otter friendly bridge crossings & footpath routes included in Recreation & Access Plan – 2006 Implement action – as identified in Recreation & Access Plan for next 8 years	Woodilee site management company & Ecologist
<b>15. Manage river &amp; riparian habitats at Woodilee to conserve &amp; enhance its suitability for Water voles</b>	Implement Water vole friendly work in the Bothlin Burn riparian corridor	<ul style="list-style-type: none"> <li>a) Ensure measures identified in the Water vole Mitigation Strategy are implemented, in particular:</li> <li>b) Re-survey Water vole use of the site prior work;</li> <li>c) Remove debris from burn and add natural in-</li> </ul>	Re-survey for Water voles – 2006; Annual Bothlin Burn clean-up programme; River Restoration	Woodilee site management company & Ecologist

Objective	Management prescription	Specific actions	Timescale for action	Main responsibility
		<p>stream features;</p> <p>d) Re-naturalise canalised section of Bothlin Burn at Woodilee</p> <p>e) Repair any damage caused to banksides or in-channel work as soon as possible after re-naturalisation work is completed;</p> <p>f) Maintain suitable habitat linkages;</p> <p>g) Consider creating suitable bank side areas for burrowing;</p> <p>h) Protect sensitive areas from development work;</p> <p>i) Work to ensure improved water quality;</p> <p>j) Assess feasibility of strategic mink control programme in wider catchment with partners &amp;</p> <p>k) Prevent/reduce human and dog disturbance through careful access/recreational planning</p>	<p>improvements include</p> <p>Water vole friendly annual actions;</p> <p>Native species included in WMP – 2006;</p> <p>Annual riparian management to maintain open habitats;</p> <p>Footpath routes included in Recreation &amp; Access Plan – 2006</p> <p>Implement action – as identified in Recreation &amp; Access Plan for next 8 years</p>	
<p><b>16. Manage river &amp; riparian habitats at Woodilee to conserve &amp; enhance its suitability for Kingfishers</b></p>	<p>Implement Kingfisher friendly work in the Bothlin Burn riparian corridor</p>	<p>a) Remove debris from burn and add natural in-stream features;</p> <p>b) Work with partners (esp. SEPA) to improve water quality (and therefore fish stocks) entering the Woodilee site;</p> <p>c) Ensure compliance with development site pollution prevention plan; &amp;</p> <p>d) Retain open faced banks as potential nest sites</p>	<p>Liaise with partners to improve water quality – 2006 onwards;</p> <p>Monitor fish populations in 2006/2010 &amp; 2018;</p> <p>Annual Bothlin Burn clean-up programme;</p> <p>Annual site development compliance;</p>	<p>Woodilee site management company &amp; Ecologist</p>
<p><b>17. Manage river &amp; riparian habitats at Woodilee to conserve &amp; enhance its suitability for invertebrates</b></p>	<p>Implement invertebrate friendly work in the Bothlin Burn riparian corridor</p>	<p>a) Remove non-organic debris from burn;</p> <p>b) Work with partners (esp. SEPA) to improve water quality entering the Woodilee site;</p> <p>c) Develop Bothlin Burn clean-up work to remove polluting debris e.g. shopping trolleys &amp; rubbish;</p> <p>d) Ensure compliance with development site</p>	<p>Liaise with partners to improve water quality – 2006 onwards;</p> <p>Monitor fish and macro-invertebrate populations in 2006/2010 &amp; 2018;</p> <p>Annual Bothlin Burn</p>	<p>Woodilee site management company &amp; Ecologist</p>

Objective	Management prescription	Specific actions	Timescale for action	Main responsibility
		pollution prevention plan; & e) Maintain suitable habitat linkages	clean-up programme; Annual site development compliance; Annual riparian work plan to maintain habitats	
<b>18. Manage open areas &amp; grassland at Woodilee to enhance its suitability for biodiversity</b>	Implement biodiversity friendly grassland management regimes at Woodilee	a) Produce appropriate grass species list; b) Ensure grass species prescription is included in all grassland management at Woodilee; c) Develop different mowing regimes for different grassland areas (leave some areas “untidy”); d) Minimise the use of herbicides, pesticides and fungicides at Woodilee; e) Provide targeted information for new residents on the management of communal areas (ensuring garden invasives do not invade surrounding habitats); f) Erect bird/bat boxes on the edges of open/woodland areas; g) Repair & expand hedgerows in open areas; h) Protect some grassland remnants in north of site; & i) Manage disused quarry	Agreed species list & prescription appear in Landscape Plan - 2006; Annual grassland maintenance & mowing plan compliance; Produce glossy Woodilee biodiversity Guidance note for all new residents 2007-2018; Include bird boxes in WMP – 2006 Implement bird box action – as identified in WMP for next 8 years	Woodilee site management company & Ecologist
<b>19. Ensure that opportunities for biodiversity are included in the construction &amp; development of residential areas at Woodilee</b>	Implement biodiversity friendly construction methods and materials when construction work begins	a) Use native or berry rich shrubs to dominate garden plantings and hedgerows; b) Ensure compliance with pollution and wildlife legislation; & c) Biodiversity awareness raising training for site development staff working at Woodilee	Include in construction plans for residential developments; Agreed shrub species list & prescription appear in Landscape Plan – 2006; Biodiversity Awareness raising programme for next 8 years	Woodilee site management company & Ecologist

Objective	Management prescription	Specific actions	Timescale for action	Main responsibility
<p><b>20. Highlight &amp; raise awareness of the importance of Woodilee for biodiversity with the new residents &amp; local community at Woodilee</b></p>	<p>Raise local community awareness of biodiversity &amp; use to help conserve important habitats and species at Woodilee</p>	<ul style="list-style-type: none"> <li>a) Ensure Woodilee site management company develop close links with new residents and local community;</li> <li>b) Produce glossy, informative leaflets on biodiversity at Woodilee and provide copies to all new residents;</li> <li>c) Provide free bird/bat box options for residents; &amp;</li> <li>d) Ensure new residents/local community contributes to the periodic review of this Woodilee BHMP</li> </ul>	<p>Stakeholder involvement conditional on site management company and Ecologist 2007-2016; Produce Woodilee biodiversity leaflets for when first residents move in – 2008; Revise BHMP with community in 2008, 2010 &amp; 2012</p>	<p>Woodilee site management company &amp; Ecologist</p>



## 7. ECOLOGICAL MILESTONES/OUTPUTS

The following timetable identifies the main ecological milestone/outputs planned (2006-2013).

Year	Main ecological milestones/outputs
2006	<p>Develop:</p> <ul style="list-style-type: none"> <li>• <i>Biodiversity friendly</i> Woodilee Woodland Management Plan;</li> <li>• <i>Biodiversity friendly</i> Woodilee Access &amp; Recreation Plan;</li> <li>• <i>Biodiversity friendly</i> Woodilee Landscape Plan;</li> <li>• <i>Biodiversity friendly</i> open areas &amp; grassland management</li> <li>• River Restoration Plan for canalised section of Bothlin Burn;</li> <li>• Bothlin Burn riparian habitat management for listed species;</li> <li>• Options to create new wetland habitats (inc SuDS);</li> <li>• Develop and implement on-site pollution control/prevention plan;</li> <li>• Biodiversity awareness raising training for site development staff;</li> <li>• Liaise with partners to improve water quality in the Bothlin Burn;</li> </ul> <p>Carry-out:</p> <ul style="list-style-type: none"> <li>• Fish survey prior to improvements work implementation (also in 2009 &amp; 2012);</li> <li>• Non-native species survey &amp; draft non-native species strategy;</li> <li>• Additional Otter &amp; Water vole survey;</li> </ul> <p>Deliver/implement:</p> <ul style="list-style-type: none"> <li>• Otter Mitigation Strategy actions;</li> <li>• Water vole Mitigation Strategy actions;</li> <li>• Bothlin Burn clean up work;</li> <li>• Biodiversity friendly construction methods &amp; materials during construction;</li> </ul>
2007-2013	<p>Deliver/implement:</p> <ul style="list-style-type: none"> <li>• <i>Biodiversity friendly</i> Woodilee Woodland Management Plan;</li> <li>• <i>Biodiversity friendly</i> Woodilee Access &amp; Recreation Plan;</li> <li>• <i>Biodiversity friendly</i> Woodilee Landscape Plan;</li> <li>• <i>Biodiversity friendly</i> open areas &amp; grassland management</li> <li>• Non-native species strategy</li> <li>• River Restoration Plan for canalised section of Bothlin Burn;</li> <li>• Bothlin Burn riparian habitat management for listed species;</li> <li>• Options to create new wetland habitats (inc SuDS);</li> <li>• On-site pollution control/prevention plan;</li> <li>• Otter Mitigation Strategy actions;</li> <li>• Water vole Mitigation Strategy actions;</li> <li>• Bothlin Burn clean up work;</li> <li>• Biodiversity awareness raising training for site development staff;</li> <li>• Biodiversity friendly construction methods &amp; materials during construction</li> </ul> <p>Develop:</p> <ul style="list-style-type: none"> <li>• Develop &amp; produce glossy informative Woodilee biodiversity leaflet for new residents;</li> <li>• Stakeholder involvement through Woodilee site management company, Ecologist &amp; periodic revisions to BHMP (in 2008, 2010 &amp; 2012)</li> </ul>

## 8. WOODILEE ECOLOGIST

### *Terms of reference*

The ecological issues highlighted in the report to the EDC Planning Committee (28 June 2005) and associated SNH correspondence (Appendix 1) need to be addressed in an appropriate professional, competent and transparent manner. To ensure this happens, the Section 75 agreement, Condition 13 states "*From the commencement of works on the site until the completion of the final house, the developer shall retain the services of a suitably qualified ecologist*".

### *Primary role*

- To be responsible for ensuring that measures identified in the Woodilee BHMP are adhered to and delivered effectively.
- To be available to train, advise and support the development team when habitat/biodiversity issues arise during the construction phase.

The important ecological issues identified have been pulled together to form the basis of the Woodilee BHMP. The main purpose of the Ecologist is to ensure Section 75 compliance with the finalised Woodilee BHMP. This work includes:

- Development and implementation of a non-native species strategy for Woodilee;
- Delivering biodiversity components of the Woodilee WMP;
- Provision of management advice and help to protect bats, birds and invertebrates across the site;
- Advice and liaison with stakeholders to improve the water quality of the Bothlin Burn ;
- Provision of management advice to help protect Water vole/Otters/Kingfishers on the Bothlin Burn;
- Develop, design and implement River Restoration Plan to re-naturalise canalised section of the Bothlin Burn;
- Provision of management advice to help manage important riparian habitats;
- Ensure the most sensitive Woodilee sites remain undisturbed by the development & public access;
- Surveying for particular defined species as and when necessary;
- Provision of management advice to enhance management of open areas and grassland;
- Provision of advice, training and support to site development staff;
- Develop close links with the emerging new local community, raise awareness of biodiversity and involve the community in shaping the priorities and managing Woodilee in the future; and
- Annually report progress in achieving the aims of the Woodilee BHMP.

It is envisaged that an Ecologist would be present at the outset of all major phases of work on the development. However, the Ecologist would not need to be present all the time, but would be present at least once a week during construction and be available "on-call" if situations arose requiring their attention.

## 9. GLOSSARY OF TERMS

**Acid grassland** – species poor grasslands occurring on acidic rocks and superficial deposits

**Arboriculture** – tree cultivation

**BHMP** – the Woodilee Biodiversity/Habitat Management Plan

**Biodiversity** – the variety of all living things

**Ecology** – the study of the relationships between organisms and their environment/surroundings

**EDC** – East Dunbartonshire Council

**FC** – Forestry Commission

**Habitat network** – a series of inter-connected habitats that act as one unit because they are joined together

**'Improved' grassland** – a grassland replanted with a commercial seed mix, fertilized and drained usually with very limited species variety

**JDC ecology** – ecological consultancy commissioned to develop Mitigation Strategy for Otters and Water voles

**Local Biodiversity Action Plan (LBAP)** – a local plan for biodiversity, usually based around a local authority boundary (e.g. East Dunbartonshire LBAP)

**LMP** – the Woodilee Landscape MasterPlan

**Monoculture** – a planted habitat of one or two particular species (e.g. woodland or grassland monoculture)

**Natural succession** – the natural process whereby one habitat develops and changes into a different one

**Niche** – the habitat or home where an animal or plant lives

**Nocturne** – ecological consultancy commissioned to develop Bat Mitigation Strategy

**Non-native species** – a species not normally naturally present in UK

**Pollarding** – the cutting back of large tree branches and limbs

**RAP** – the Woodilee Recreational Access Plan

**Riparian** – river, stream or burn side

**Saproxyllic species** – specialist deadwood species

**SEPA** – Scottish Environment Protection Agency

**SINC** – Site of Importance for Nature Conservation

**SNH** – Scottish Natural Heritage

**SuDS** – Sustainable urban Drainage Systems (wet SuDS – ponds with some permanent water storage capacity)

**UK Biodiversity Action Plan** – the Government's agreed plan for biodiversity in the UK

**Understorey** – the lower tier of shrubs and plants underneath the main canopy of woodland trees

**Vector** – a mode of transport or transmission whereby a species arrives at a location (the term is usually associated with non-native species)

**WMP** – the Woodilee Woodland Management Plan

## Appendix 1. SNH advice and guidance

### SNH correspondence – ecological advice/guidance (Letter - 14 June 2005) – reference to actions:

- Protect the SINC and small area of river valley adjacent – *dealt with throughout entire BHMP & Masterplan;*
- Submit a Habitat Management Plan that is acceptable to the planning authority, SNH and the FC covering the management of the existing Ancient Woodland, the Bothlin Burn, the acid grassland and the proposed urban greenspaces, trees and ponds – *dealt with in this BHMP;*
- Develop and implementation of an agreed Mitigation Plan for Otters and Water voles with the planning authority and SNH – *separate plan produced and accepted by SNH, summary of actions included in BHMP;*
- Develop and implementation of an agreed Mitigation Plan for Bats with the planning authority and SNH – *separate plan produced and accepted by SNH, summary of actions included in BHMP;*
- SNH recommends the following conditions in relation to site ecology:
  - No felling or lopping of trees should take place during the bird breeding season (March-July inclusive) – *dealt with in WMP & BHMP;*
  - Prior to construction, details, locations and designs of the attenuation ponds should be submitted to the planning authority. Ecological solutions should be used, following SEPA guidance - *separate plan produced;*
  - A Landscape Management Plan (LMP) should be submitted to the planning authority in consultation with SNH – *dealt with in separate LMP;* and
  - Prior to construction a detailed Recreational Access Plan (RAP) should be submitted to the planning authority in consultation with SNH - *dealt with in separate RAP.*
- Should the planning authority grant consent (*it subsequently has*), SNH recommends the following issues are included as conditions:
  - The removal of the proposed lowest northern sector road – *removed from revised Masterplan;*
  - Split level housing design is used to fit the landscape form consider – *removed from revised Masterplan;* and
  - Compensation is provided for the loss of grassland which is acceptable to the council and SNH – *off-site compensation work to be presented to ED LBAP partnership (see Appendix 2).*

### SNH correspondence – ecological advice/guidance (Letter - 22 December 2005) – reference to actions:

Following submission of the Preliminary Landscape Masterplan and draft Woodilee Biodiversity/Habitat Management Plan and a meeting on 15/12/05, SNH responded and highlighted the following issues:

- Loss of nature conservation. SNH agreed that regardless of the development, if the acid grassland/heath was not positively managed the habitat would revert to woodland. SNH supported the proposal that the SINC could be managed, but that on-site mitigation for the loss of acid grassland would be inappropriate due to the difficulty of recreating grassland – *off-site compensation work to be presented to ED LBAP partnership as satisfactory alternative (see Appendix 2).*
- SNH made detailed comments on the Preliminary Landscape Masterplan and looked forward to receiving a revised landscape plan in line with their comments made in writing and at the December 15 2005 meeting – *dealt with in the LMP.*
- SNH wanted the draft Access Plan submitted alongside the draft Habitat/Biodiversity Management Plan and in particular highlighted that access routes needed to be located away from sensitive natural heritage areas - *dealt with in the RAP.*

- SNH require the Woodland Management Plan to – *all dealt with in WMP*:
  - Identify a vehicle for achieving the aims of the Management Plan, which is legally binding;
  - Ensure that woodland is managed for landscape and nature conservation;
  - Create semi-natural habitats which are composed of native species appropriate to the conditions;
  - Ensure planting design and density fit with local landscape character, and link to the existing landscape features, and merge naturally with adjoining fields and woodlands;
  - Establish a monitoring programme reporting on an annual basis detailing progress towards the aims of the management plan and any alterations necessary to achieve nature conservation targets. – *the Woodilee Ecologist will provide an annual report to partners on progress and compliance of all ecological works*

SNH pleased that the draft HBMP detailed how the woodland would be managed. Furthermore, SNH agreed with the six overall management techniques: *All proposed techniques retained in WMP and BHMP*.

- (i) removal of invasive species from the site;
- (ii) planting of appropriate native species from local tree nurseries;
- (iii) change even-aged woodland structure;
- (iv) maintain rich native understorey;
- (v) dead wood provision; and
- (vi) managing access to sensitive areas

SNH now looking for more details on these proposals and their management prescriptions, in particular:

- SNH agreed with the Nocturne Bat Mitigation Strategy and all associated works e.g. erection of bat boxes, retention of dead trees etc - *summary actions included in BHMP*.
- SNH pleased that a condition has been placed on the consent to prevent trees being felled in the bird breeding season and that planting of shrubs will provide additional food for birds. SNH believe that the improvements to habitats outlined will help support an increase of bird diversity on the site- *actions included in BHMP*.
- The methods to improve the burn are in line with River Restoration Centre preferred methods – *further detail in separate plan to be agreed with SEPA*
- SNH approved of the measures identified for Otters and Water voles and highlighted three areas for additional consideration:
  - (i) riparian planting and balancing the needs of Otters and Water voles;
  - (ii) the location of new bridges/bridge repairs (safe Otter crossings); and
  - (iii) the need for regular management to prevent scrub encroachment impacting on Water voles*All dealt with in BHMP, bridge issues dealt with in RAP*.
- SNH pleased that grassland fields north of the Bothlin Burn have been entered into long-term management to retain their open nature (predominantly for landscape reasons). Additional “Off-site” compensation is necessary, with an aim to see an increase of acid grassland in East Dunbartonshire if possible to help meet LBAP targets. It was proposed that the applicant identify and draw up a set of “off-site compensation” options and put these forward to the East Dunbartonshire LBAP partnership for consideration – *off-site compensation work to be presented to ED LBAP partnership (Appendix 2.)*.
- Finally, SNH want to see more detail e.g. costings, delivery mechanisms, role of new community etc in the revised Woodilee Habitat and Biodiversity Management Plan – *detail provided in BHMP*.

## **Appendix 2. Off-site compensation**

Details of off-site compensation work to be incorporated once feed-back has been received from EDC LBAP group (presentation on 26/04/06).