Little France Park Management Framework

Client – Edinburgh & Lothians Greenspace Trust

Author – Hebe Carus

Delivered – March 2019

Contents

Summary of Proposed Management with Indicative Costs

Objective		Targeted action	Option	Indicative total cost estimate (NB. This may vary significantly depending on implementation)
1	**To maintain diversity of habitats**	Invasive species control		As required
2	**To enhance the quality of existing habitats**	Woodland	Plantation thinning	As required
			Scrub creation	Per patch (2 recommended) £533
		Grassland	Option 1 – cut only	Area 1 = £171 / year Area 2 = £125 / year + arising removal
			Option 2 – yellow rattle	£265 per area (unlikely to required for Area 2)
			Option 3 – spot treatment	As required
			Option 4 – plug addition	£600 per area (for planting across 0.5% area)
			Option 5 – topsoil strip / re-seed	Significant cost, but unlikely to be required
		Wetland		Pending further information
3	**To reinstate degraded habitats**	Hedge restoration	3 row hedge	For 3 rows £1808
4	**To create new targeted high value habitats**	Solitary bee nest site creation	Bee bank	Approx £415 (varies widely depending on method / materials used)

I Purpose of Management Framework

This report has been produced by Hebe Carus in response to the brief issued by the Edinburgh & Lothians Greenspace Trust (ELGT) on 12 November 2018 and subsequent amendments agreed on 7 December 2018.

Drawing on existing studies, surveys and expert opinion, this report is a management framework for Little France Park (LFP). It identifies the main habitat types and proposed actions to improve their condition and long-term sustainability. These actions will enhance the biodiversity of the park and provide a key connection to nature for the local community.

The options are numerous so those presented aim to be the most appropriate to balance the following –

- costs of on-going management need to be kept to a minimum (some of the proposed enhancements are relatively achievable with minimal extra funds, whilst others are aspirational and could be delivered as priorities and resources allow)
- benefits to the surrounding communities
- the value of Little France Park lies in large part in it's value as part of the local nature network to boost resilience, including against climate change
- target habitat for key species already present or nearby especially on EBAP or Scottish Biodiversity List where these will have broader benefit than for a specific species

Little France Park presents an excellent opportunity to deliver multiple benefits with biodiversity enhancement at it's the heart.

Limitations

This report was based primarily on information already available, supplemented by two site visits (autumn 2018 and mid-winter 2019). The report was prepared with input from consultees recommended by ELGT and Scottish Wildlife Trust. These and information sources consulted are listed in Appendix 1. Available survey data is basic, and in the case of the wetland area of the flood alleviation basin is lacking. It is recommended that a full baseline survey is not necessary to meet the indicated aims of providing a quality greenspace for people and nature rather than to develop a nature reserve type refuge for rare of threatened species.

There are many potential options and those presented have attempted to balance the multiple benefits that LFP can offer with the costs of enhancement and management. Some options cannot be prescribed in detail as the lack of current data constrains knowledge of the outcomes of some potential management actions. In these cases a series of options from lower to higher cost interventions are outlined. Where there is insufficient information available, this has been highlighted. Cost estimates are approximate, where available, based on averages provided by the City of Edinburgh Council.

II Little France Park Site Description

Ownership

The majority of Little France Park (previously referred to as South-east Wedge Parkland) is owned by The City of Edinburgh Council (CEC).

Size

Little France Park (as mapped in Figure 1) is approximately 45 ha in total.

Location

The site lies to the north and south of Little France Drive and is centred on grid reference NT296706. This is on the south-east boundary of CEC area adjacent to Midlothian Council area which lies to the south. To the north-west is Hawkhill Wood. The Edinburgh Royal Infirmary, Bioquarter and Edmonstone form the south-west facing boundary and along the north-east boundary lies the new development of Greendykes and a proposed housing extension.

Figure 1 – Little France Park Boundary

Note this is a working boundary for report definition purposes and does not show all the landscape features on the site.

Edinburgh Living Landscape

Little France Park (LFP) is a flagship project for Edinburgh Living Landscape – a broad-based partnership initiative building a network for nature across the city which is crucial for the health and wellbeing of Edinburgh's people and wildlife. LFP is described as the city's newest park reclaiming unmanaged grassland for the local community and defining a green corridor from the city centre to Midlothian. It will establish an enhanced corridor for wildlife whilst offering a network of paths and cycleways. Other landscape-scale initiatives that LFP can contribute to is B-lines co-ordinated by Buglife and referred to as the John Muir Pollinator Way which runs through Edinburgh where it has been

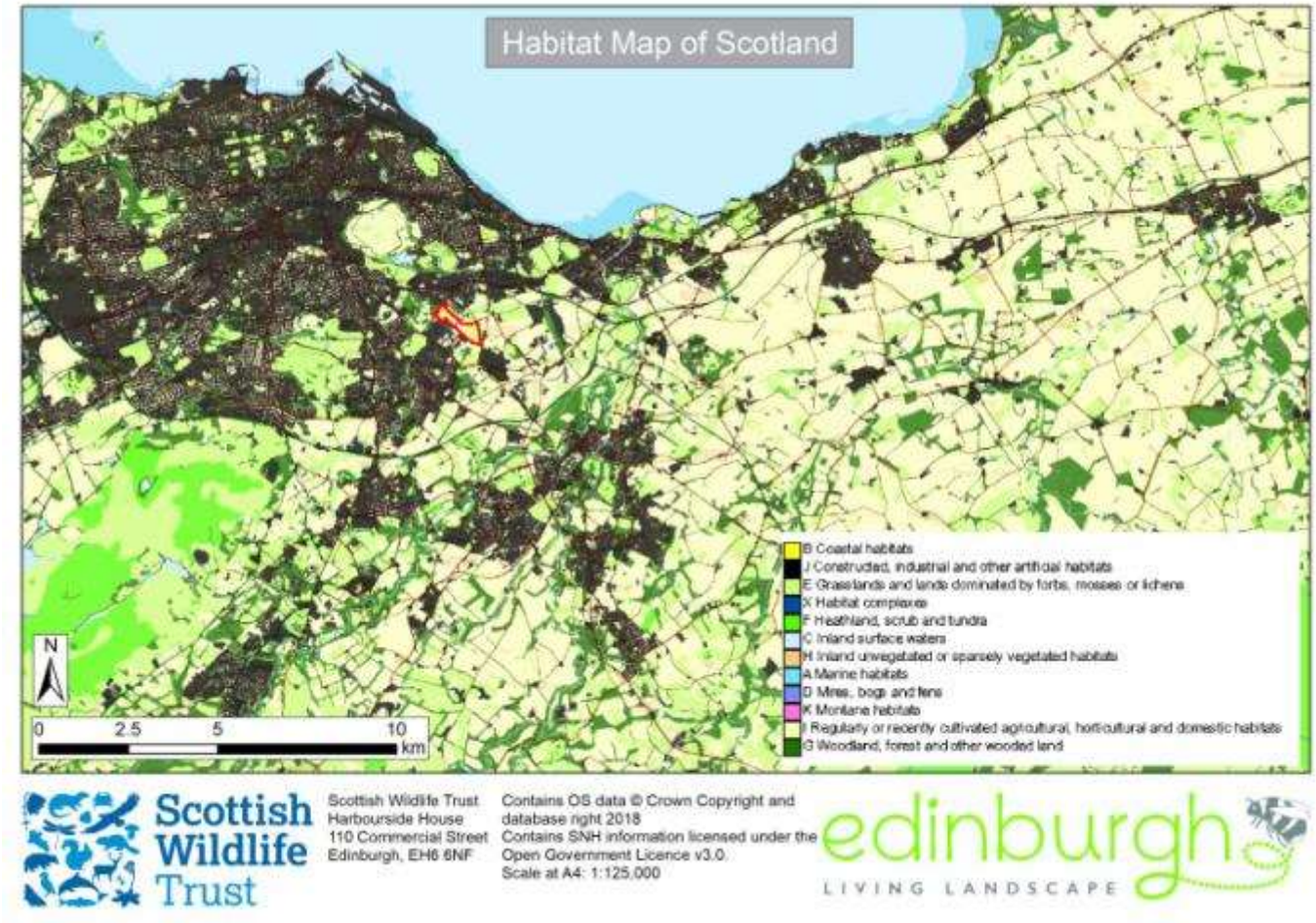
identified that there is the greatest benefit of grassland habitat creation, enhancement and management and 3 km either side. LFP is in this priority corridor.

Statement of Significance for Nature

Little France Park is a relatively large (approx. 45ha) peri-urban greenspace with a diverse range of habitats – grassland, hedges, standing water / wetland (part of a flood alleviation scheme), moving watercourses, and woodlands. This diversity and size make it ecologically valuable in the urban context even though currently the habitats on-site are not highly valuable intrinsically. There have been limited species surveys, but a range of locally and nationally notable species have been recorded recently on or adjacent to the site (see Appendix 2).

In the context of its important role in the green network, it is significant as a strategic link between the more rural / green setting in adjacent Midlothian and as a habitat node along the corridor to important sites such as Duddingston Loch SSSI (1.5km to the north-west), Bawsinch and the wider Holyrood Park. It is also well linked with 3 adjacent smaller Local Nature Conservation Sites – Edmonstone, Hawkhill Wood and the green corridor of Niddrie Burn. The principle of this site as part of a wider green space network is embedded within Development Plans for both areas, which also reflects broad non-biodiversity benefits.

Figure 2 – Habitat Map of the Surrounding Landscape



Challenges for Biodiversity Enhancement in Little France Park

LFP offers a rare opportunity to make a significant difference to the nature network due to its size and location spanning the urban – rural zone.

An unnatural community is likely to have resulted from habitat fragmentation and history of use for agriculture disruption to natural disturbances and compounded by non-native plants, some of which are of an invasive nature. At LFP, the most effective approach is likely to be to build on the existing habitat to improve diversity, quality and connectedness. The proposed management in the following sections are based on an achievable balance between these outcomes and work towards a suite of species forming a resilient and self-

managing community where possible. Introducing or allowing suitable disturbance regimes will be vital to enhance and sustain the gains.

Other constraints are the existing infrastructure. Proposals have taken into consideration that the flood alleviation facility must maintain its existing effectiveness, views of the primary landscape elements assessed in the Landscape & Visual Appraisal (April 2016) are respected, and there is a balance between the aim of low maintenance and real biodiversity gains.

Risks Associated with Inaction

- Loss of diversity within habitats - vegetation densities, micro-habitats, dominance by a few common competitive or invasive species
- Decline in variety of species seed source within viable dispersal range
- Loss of permeability of the site for a wide variety of species to travel through
- Loss of views through progression of the site to a climax community of mature trees

III Recommendations for Target Objectives and Delivery

Over-arching Objectives

The following recommendations target the most effective and efficient use of resources to achieve the maximum biodiversity benefit both within the LFP site and as an element in the local network of greenspaces within a balanced approach benefitting biodiversity and local communities while constraining costs.

It is recommended to target benefit for invertebrates and plants on-site through concentrating on providing microhabitat structure and ensuring that there is a balance of habitats, especially woodland and grassland. Proposals aim to benefit all habitats through consideration of the permeability to movement across the site as a whole and into the surrounding green network for species with larger range or dispersal abilities.

To minimise necessary on-going maintenance, the proposals are targeted towards putting in place sustainable processes rather than delivering a static end point of habitats. This also supports resilience to climate change and other challenges.

Objective		Targeted action
1	To maintain diversity of habitats	Invasive species control
2	To enhance the quality of existing habitats	Enhancement of woodland, grassland and wetland
3	To reinstate degraded habitats	Hedge restoration
4	To create new targeted high value habitats	Solitary bee nest site creation

Promoting enjoyment and appreciation by local communities is an important objective for LFP, but detailed proposals to meet this are beyond the scope of this report. Suggested actions to achieve this objective are included in Appendix 3.

Target Species

The Edinburgh Biodiversity Action Plan (EBAP) 2016-2018 listed species are targeted where possible and appropriate for the site. These are grouped in the EBAP as follows.

Birds	terns, swifts
Mammals	badgers, bats (common pipistelle, Daubenton's bat)
Invertebrates	dragonflies and damselflies, pollinators (bees, hoverflies, beetles, butterflies (small pearl-bordered fritillary, northern brown argus) and moths (wood sage plume, cotton-grass fanner)
Reptiles and Amphibians	common toad and great crested newt
Vascular Plants	juniper, sticky catchfly, maiden pink, field gentian, purple milk-vetch
Lower Plants	sieve-tooth moss
Invasive Species	invasive non-native species, invasive native species, plant and animal pathogens
Fungi	

IV Objective 1 – To Maintain the Diversity of Habitats

The guiding principle for habitat distribution across the site should be of no net reduction in habitat diversity spatial diversity and to increase diversity where possible. An essential minimal action is control of non-native invasive species.

Himalayan balsam (*Impatiens glandulifera*) was recorded across the site particularly along the existing access track in the south and along the Niddrie Burn (recorded 2015 & February 2016). Giant hogweed (*Heracleum mantegazzianum*) was recorded at NT30287039 in February 2016 & January 2018. Up to date records across the site were not available.

Invasive Species Management Proposal

- Search and record locations of non-native invasive species
- Treat these locations using recommended methods already used across the Council area
- Monitor the site for the need for subsequent treatment as these species can spread quickly from surrounding areas
- In general any management creating fertile bare ground should be avoided

V Objective 2 – To Enhance the Quality of Existing Habitats

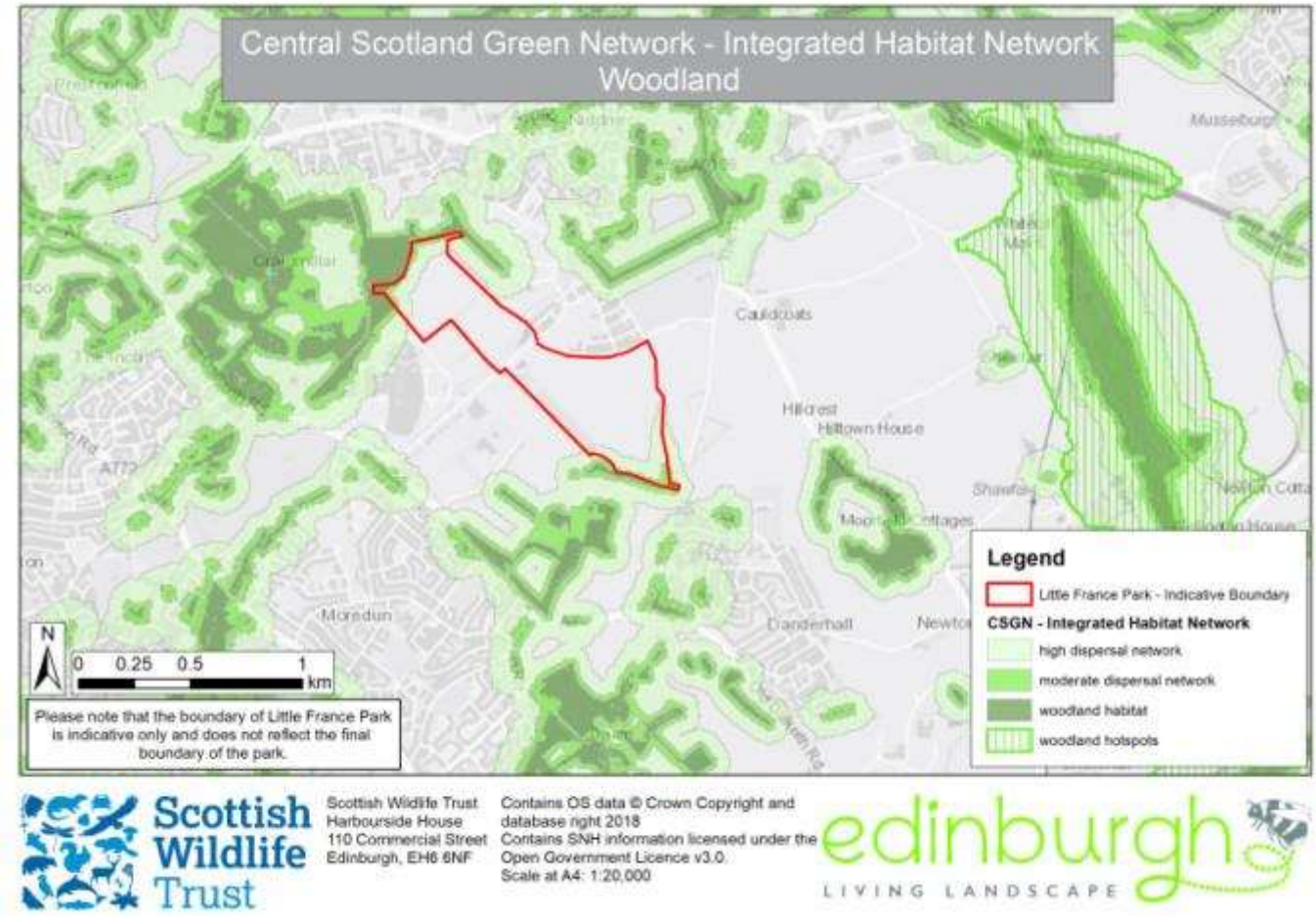
Woodland and Associated Habitats

Current Woodland and Associated Habitat Context

The existing woodland habitat comprises three areas of 2018/2019 native broadleaf planting (not on the basemaps currently available). Two blocks are in the north-west of the site (approximately NT292710) and one at the south end of the south-west boundary (approximately NT292710). Maps of these are held by ELGT. These areas were planted at a spacing of 1,600 stems per hectare so are likely to develop some natural understory over time, hence should require minimal management. A natural tree species composition and understory are lacking in the densely planted block established 10 to 15 years ago (approximately NT297705). There are also lines of trees along much of the boundary.

Although the woodland elements are likely to be of planted origin as agricultural land or policy woodland, they are of significant value in a region where woodland cover has declined markedly. The Central Scotland Green Network (CSGN) Integrated Habitat Network for woodlands (see Figure 3) shows that LFP is well placed within 1.5 km of an identified "woodland hotspot" and as a link between core woodland habitats immediately to the north-west and south. The development of quality woodland from the recently planted trees on site will form an important addition to this network, and through designing other habitats on the site to maximise the permeability to woodland species dispersal, these habitats can also contribute. The current grassland in LFP is semi-improved which has some permeability to woodland animal species. Scrub and hedges are very permeable and act as stepping stones. A balance between the quality, quantity and layout of these habitats is therefore critical. The importance to people is also reflected in LFP being within the Woodlands In and Around Towns target zone.

Figure 3 – CSGN Integrated Habitat Network - Woodlands



The semi-natural woodlands nearby are native broadleaves, and outputs from Ecological Site Classification (ESC) have been used as the basis of the following proposal. The ESC suggests the most appropriate NVC communities would be - on the south slope W11 (*Quercus petraea – Betula pubescens – Oxalis acetosella*), W15 (*Fagus sylvatica – Deschampsia flexuosa* woodland), W16 (*Quercus spp. – Betula spp. – Deschampsia flexuosa*), or W17 (*Quercus petraea – Betula pubescens – Dicranum majus*). The ESC output suggests that the north slope would be highly suitable for W11 and 15. Further, this suggests that the slope to the north of Little France Drive is more suitable for woodland than the one to the south, although neither is unsuitable.

General Principles of Management of the Woodland and Associated Habitat Areas

Management to promote habitat quality should target achieving a varied structural diversity, tree species diversity, a wide range of micro-habitats, and an adequate supply of deadwood. Trees are important for pollinators, seed and berry-eating birds, so species supplying a range of these should be encouraged. Any new planting should be native and of local provenance for biosecurity and local climate adaptation reasons.

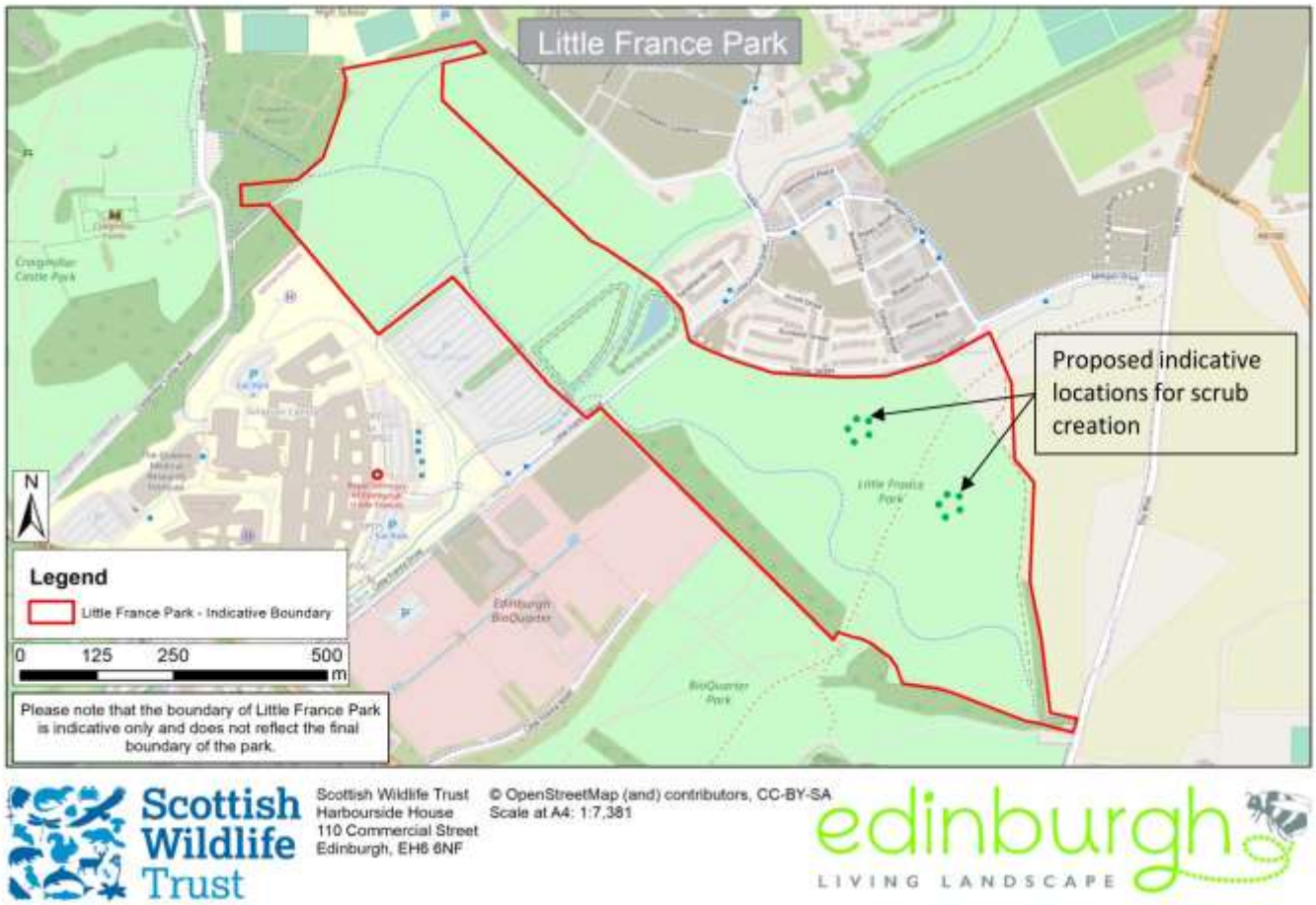
To maximise benefit for biodiversity, management of the tree layer should be kept to a minimum within the constraints of safety – retaining maximum fallen deadwood (benefitting fungi and beetles) and standing rotting and deadwood additionally for potential bat use. In the tree survey report (Rodger 3/16), the author advised some trees to be removed within 10 years and ivy management. This advice should be reviewed in the light of the benefit of both deadwood and ivy habitats, and retention favoured where possible.

Woodland and Associated Habitat Enhancement Proposals

Management of Existing Plantation

The existing block at approximately NT297705 has limited ground flora and is a barrier to views. The recommendation is to selectively thin this block – preferentially removing non-natives where these exist, or poor form or weaker trees where this is not applicable. This would be a good task for volunteer or corporate groups.

Figure 4 –Proposed Indicative Locations for Scrub Creation



Scrub Habitat Creation

There will be temporary scrub habitat as the newly planted woodlands grow, but this will mature to woodland. To maintain a presence of scrub habitat, which is ideal for thicket nesting birds, it is recommended that the area to the south of the "hedge" (see Objective 3) be supported to develop into a mosaic of grassland interspersed with scrub. This would need no long term management. As the rank grass and lack of seed source will not naturally progress the habitat in this direction in a meaningful timescale, it is proposed that a few areas of scrub-specific species are planted.

Species selection should be based on linking with the proposed species for the hedge re-establishment in Objective 3 as listed in Appendix 4. These species are selected to balance nativeness, biodiversity benefit and avoidance of the need for long term height management. The ideal locations and sizes of scrub patches are flexible, but a suggested indication is shown in Figure 4 with irregular patches of average diameter around 25 metres planted at a density of 2,500 trees / ha (2 m spacing) to ensure density.

New planting on site is reported as at risk from rabbits, voles and roe deer. Fencing and other protection are however expensive and can be counterproductive, encouraging spindly growth and being difficult to remove as well as unsightly. The compromise proposal therefore is for initial establishment within 1.2 metre stock fencing with whips protected by spiral guards. The spiral guards should be removed based on an assessment, but likely to be around 3 or 4 years dependent on growth rate. The fence could be removed after the trees and shrubs are no longer at risk of being killed by herbivores. Size or growth pattern-limiting browsing is acceptable. The species selected with a significant constituent of thorny species should be self-protecting after 5-10 years.

Grassland

Current Grassland Context

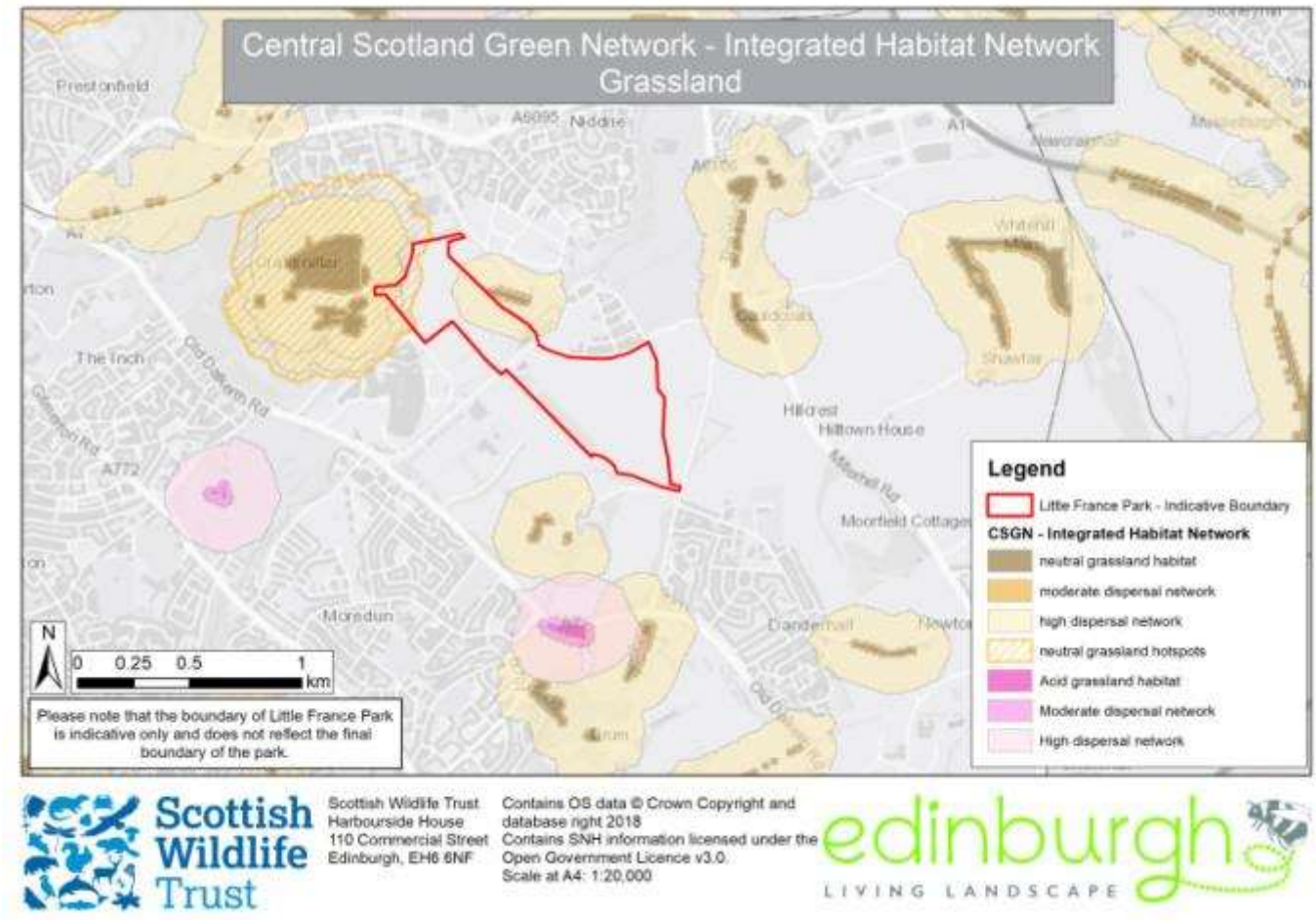
Over the last 50-60 years, three million hectares of UK wildflower-rich grassland were lost (about 97%), and so far less than 1% has been re-created. It is therefore important to include a component of grassland enhancement at LFP as currently the grassland is predominantly dominated by grass with little diversity or structure. Diversifying the current mostly rank grassland will complement the meadows across Edinburgh created through the Edinburgh Living Landscape initiative and add to the network that links through the openings in Hawkhill Wood and Craigmillar Castle woods through the rough grassland element of Prestonfield Golf Course to the grasslands of Bawsinch and Holyrood Park. Light on-going management would be required to maintain the gains.

The CSGN Integrated Habitat Network for grasslands (Figure 5) shows that immediately to the north-west there is a neutral grassland hotspot, and on the north-east edge and to the south are neutral grassland patches. Neutral grassland areas are likely to be of greater diversity or potential than other areas. It should be noted that the majority of this north-east area of interest is currently under private ownership with a view to future housing construction. There is ecological value in enhancing the quality grasslands between to promote connectedness.

Management to promote habitat quality should target achieving a varied structural and species diversity, so delivering a wide range of micro-habitats that support diverse communities of dependent species. Structural diversity can be achieved through varied management regimes across the LFP grasslands, varying from unmanaged to an annual or twice annual meadow mowing regime with removal of arisings. Species diversity may be a challenge without specific intervention outside of areas with existing diversity as the seed bank will be depleted or absent and too distant from quality seed sources.

Long vegetation over the winter provides seed heads for birds and shelter for small mammals. It is also a valuable overwintering habitat for invertebrates such as bumblebees. A particular target species could be the small skipper butterfly (*Thymelicus sylvestris*). It's caterpillars overwinter in undisturbed tussocks of Yorkshire fog (*Holcus lanata*), and both have been recorded in LFP (see Appendix 2). It is therefore useful to retain a proportion of unmanaged grassland, but this will tend to be species poor, hence the need for some areas to be managed.

Figure 5 – CSGN Integrated Habitat Network - Grassland



Proposals to enhance species richness have been targeted towards parts of the site that are likely to have lower fertility and more free-draining soils. Lower fertility of the soil is critical, and this can be achieved most economically and sustainably through removal of arisings after cuts. Removal is likely to incur a cost if this requires an external contractor to bale and remove as dog foul in grass renders the arisings a risk to cattle and therefore is categorised as waste rather than potential feed. A potential solution is proposed below. With the presence and likely adjacency of non-native invasive plant species and the remit to propose management that minimises costs, it is suggested that weedkilling and planting / seeding is not the best option. Although producing a quick result, this may result in a higher management input requirements as bare soil allows the pernicious weeds to take hold.

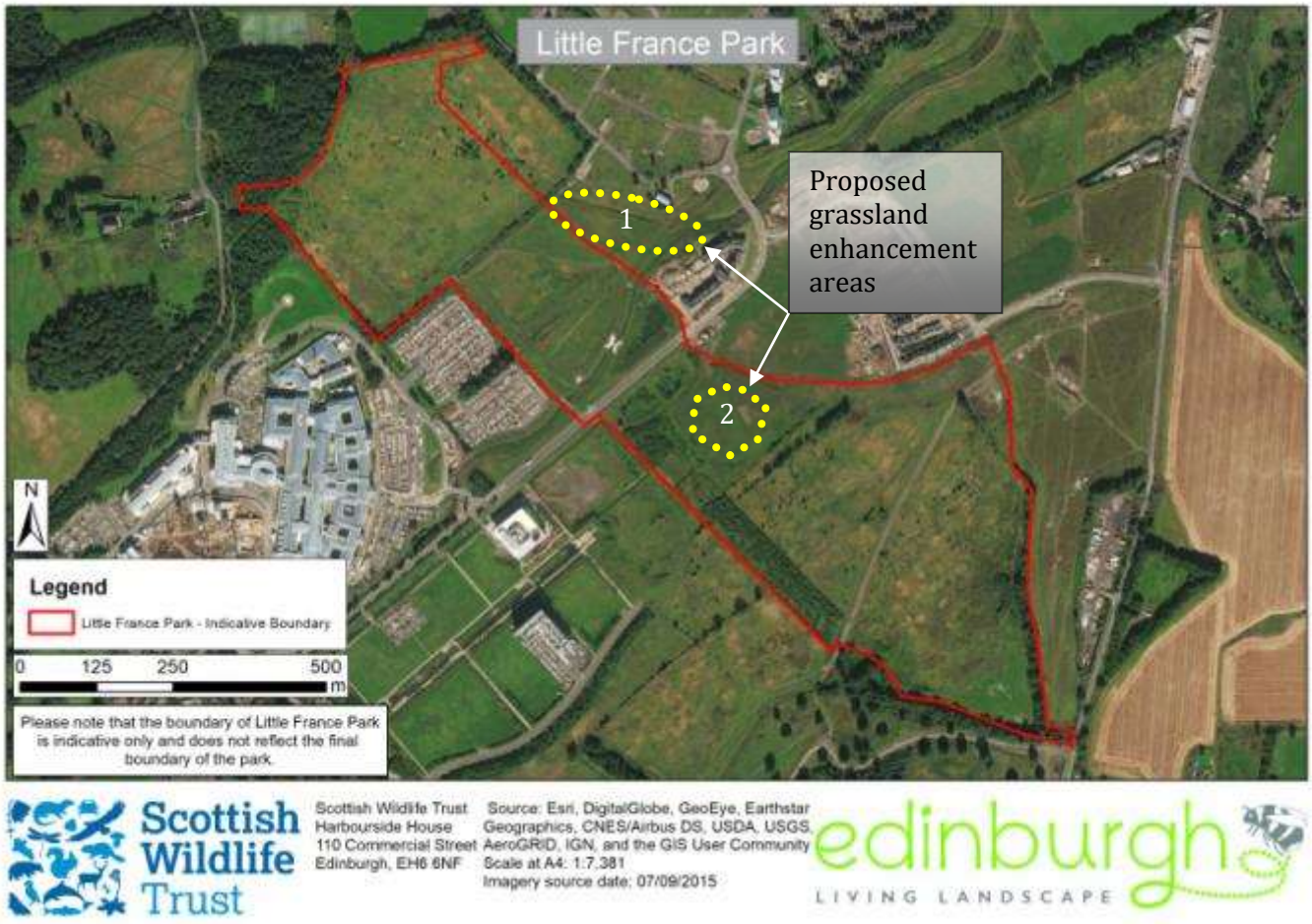
The Urban Pollinator Seed Mix (Appendix 5) developed through the Edinburgh Living Landscape initiative, and composed of locally-appropriate species seeds with local provenance, is a useful guide should re-seeding or "plugs" be necessary. Establishment across most if the site of a true wildflower meadow would likely require topsoil stripping which would incur a significant initial cost. The exceptions to this are the mapped on Figure 6.

These biodiversity-targeted management proposals will complement the access and amenity cuts as agreed by the CEC for 2019 – 1 metre maintenance strip on existing formal paths monthly during growing season, cut of 4 metre on grass paths, and three amenity use areas cut up to 3 times annually.

Grassland Enhancement Proposals

These proposals are targeted where there is likely to be greatest benefit for least management input. As explained above this applies particularly to the north-east neutral grassland area (Area 1) (although this may not be possible as it is under private ownership) and the higher species richness area (Area 2) near Tobias Street as indicated on Figure 6.

Figure 6 – Proposed Target Areas for Grassland Enhancement



The ideal option of grazing is unlikely to be practicable on this site, so it is necessary to cut the grassland at least once, or twice if necessary, in late summer (July - August). It is essential to remove the arisings. This lowers the nutrient level which is essential to establish and retain the species-richness. Any significant increase in species-richness is likely to take 3-5 years of this routine, then it may be viable to reduce cutting / removal to once a year, if relevant. To alleviate the complexity of disposal of green waste off-site, the successfully trialled approach at Craigmillar Castle Park could be used where, working with volunteers, the arisings could be scattered under denser woodland and hedge areas where there is little or no understory.

Due to the absence of data on soil and seed source availability nearby, the precise outcomes of potential establishment options are difficult to predict. The following is a proposed sequence. Each option, when carried out in sequence, may achieve the desired outcome, so negating the need for the more costly interventions later in the list. These options are not mutually exclusive.

1. Cut selected areas and remove the arisings between mid-July to August. ELGT have hay rakes which are essential if doing this by hand with volunteers. In Area 2 there is a spring, therefore low ground pressure machinery will need to be used if cutting is to be mechanised. Assessment of species-richness and the herb-grass coverage ratio after several years will indicate if fast-growing grasses are being suppressed. If grass coverage is declining but species-richness is not increasing, this is likely to indicate that there are insufficient seed sources nearby, suggesting that Option 2 is required to supplement the species diversity.

1a. Cut and seed patches with Yellow rattle (*Rhinanthus minor*) in addition to Option 1 according to the instructions in Appendix 6. This plant species is a pollen source for bumblebees and helps to suppress fast-growing grasses through its hemi-parasitic nature. This will produce similar results to Option 1 but in fewer years if grass is very dominant. This option is more indicated by the rank grass growth observed in Area 1.

1b. Where vigorous weeds continue to suppress the desired diversity, the options are to carry out chemical spot treatment or hand-pulling before flowering and /or carry out an additional cut in spring (late March – April) for several years.
2. Should flowering plant species diversity not be increasing after several years of the above treatment, planting selected local provenance species plugs is indicated. The Urban Seed Mix (Appendix 5) is a useful list of species that should be considered. The results may take several years to show in monitoring.
3. Should the above options not deliver the desired outcome, the remaining costly option is to remove areas of topsoil to reduce fertility and remove weed and vigorous grass seeds. This would require disposal of significant amounts of material. The area then should be re-seeded in late-summer/early-autumn, preferably with the Urban Seed Mix (Appendix 5).

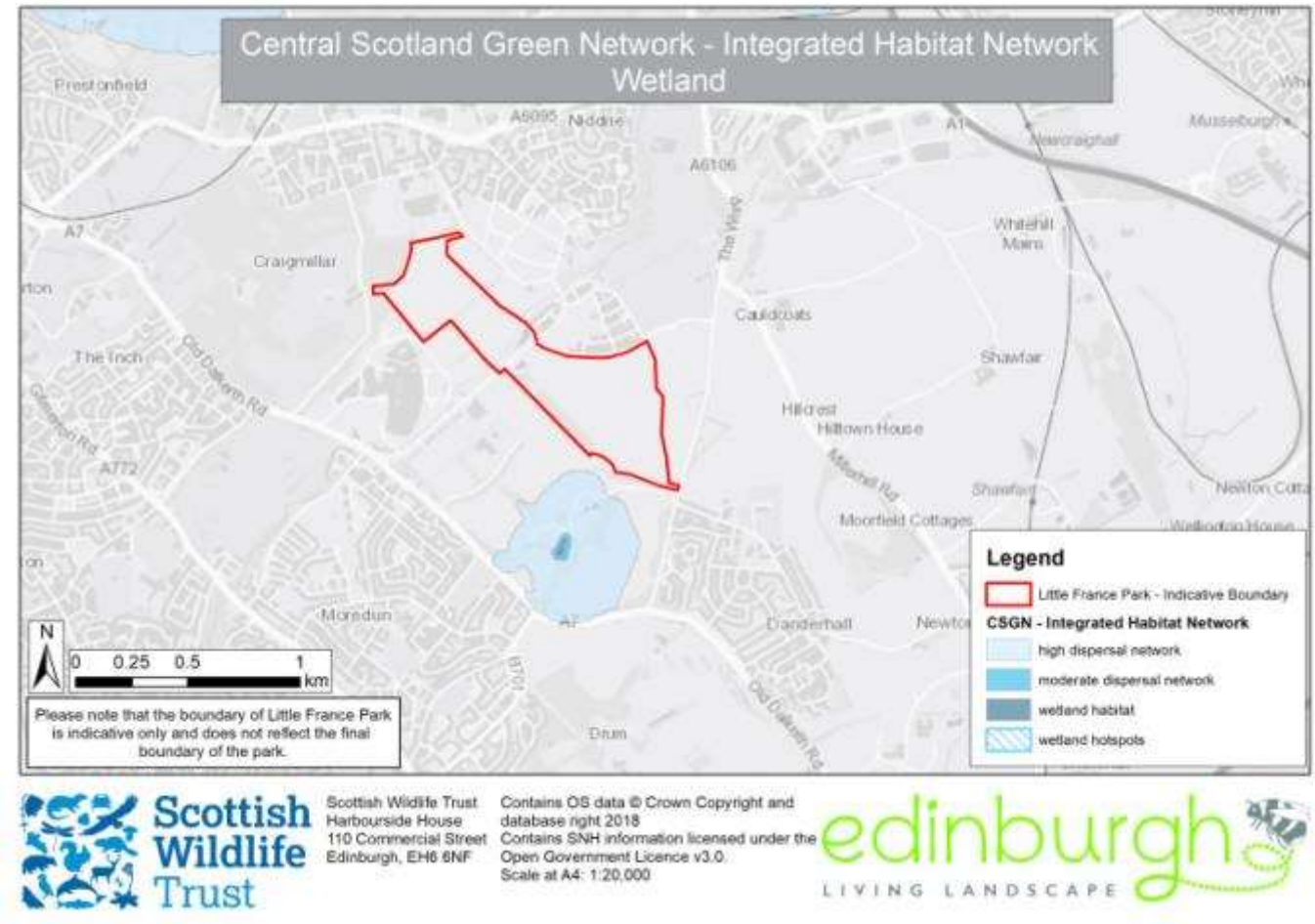
Grassland not proposed as a target area would still benefit from occasional cutting to maintain some species diversity. This could be achieved by segmenting the Park into zones for late summer alternate year cutting on a rotation of approximately 3 years. In these areas arising removal would not be required.

Wetland

Current Wetland Context

Figure 7 shows that there is no quality natural wetland on site or nearby to link with. There is value in creation of quality wetland in itself to diversify the habitats present, and the flood alleviation basin may fulfil this role.

Figure 7 – CSGN Integrated Habitat Network - Wetland



Consultation with experts in CEC confirmed no results to searches on the CEC Planning Portal for a planting or biodiversity plan for the flood alleviation basin, part of the overall SUDS scheme in and adjacent to LFP. There is no identified monitoring process or tolerance limits for substrate, vegetation cover or open water aqrea. It is unclear if this part of the SUDS requires official adoption. The re-aligned Niddrie Burn has a planting plan from when it was installed.

On walkover site visits, the basin appeared to have good vegetation structural diversity with a variety of density of marginal and emergent vegetation areas with open water interspersed. Ideally, this would be maintained. In the event of the basin becoming dominated with vegetation and loss of open water areas, the recommendation would be for emergent vegetation to be managed in the autumn. This early management in response to monitoring aims to avoid the need for the considerable disturbance should dredging for silt removal be needed.

Wetland Enhancement Proposals

Due to the limited information available for this area, the recommendation would be to clarify responsibilities for this facility, define any required tolerance levels, set up a basic monitoring scheme and ensure there is a system in place to ensure that management is conducted at the earliest stage when the need is identified.

VI Objective 3 – To Reinstate Degraded Habitats

Hedgerow

Current Hedgerow Context

Hedgerows are listed as a priority habitat in the UK Biodiversity Action Plan (BAP). Hedges are important as a linking habitats or as stepping stones and can provide pollen- and nectar-rich flowers throughout March to late-September, so can be particularly important at the beginning (eg. willows, cherry, hawthorn and blackthorn) and at the end of the season as selected species may flower earlier or later than meadows. Hedges can also provide a breeding location, and offer shelter for a wide variety of animals as well as autumn berries.

A mature hedge provides the structural elements of mature trees, and layers of bush / shrubs, and herbs. The shrub / bush layer of a hedge is the core element that provides shelter through its dense nature and food sources through composition.

Mature trees scattered along the hedge provide song and prey observation posts for birds. Climbing plants can provide a useful structural element in hedges.

A derelict hedge marks an old field boundaries that runs south-west to north-east in the centre of the south slope. The total length of this remnant hedge (including gaps) is approximately 180 metres. It comprises scattered trees amongst denser re-growth. The species are a mix of sycamore, ash and elm in early maturity, and therefore likely to be too mature to bring back into management as a hedge, but offer an existing tree layer to underplant. Increasing the species diversity would also enhance the benefits of this landscape feature. The current structure does not provide the same depth and density of understory and scrub offered by a true hedge.

Figure 8 – Derelict Field Boundary Hedge

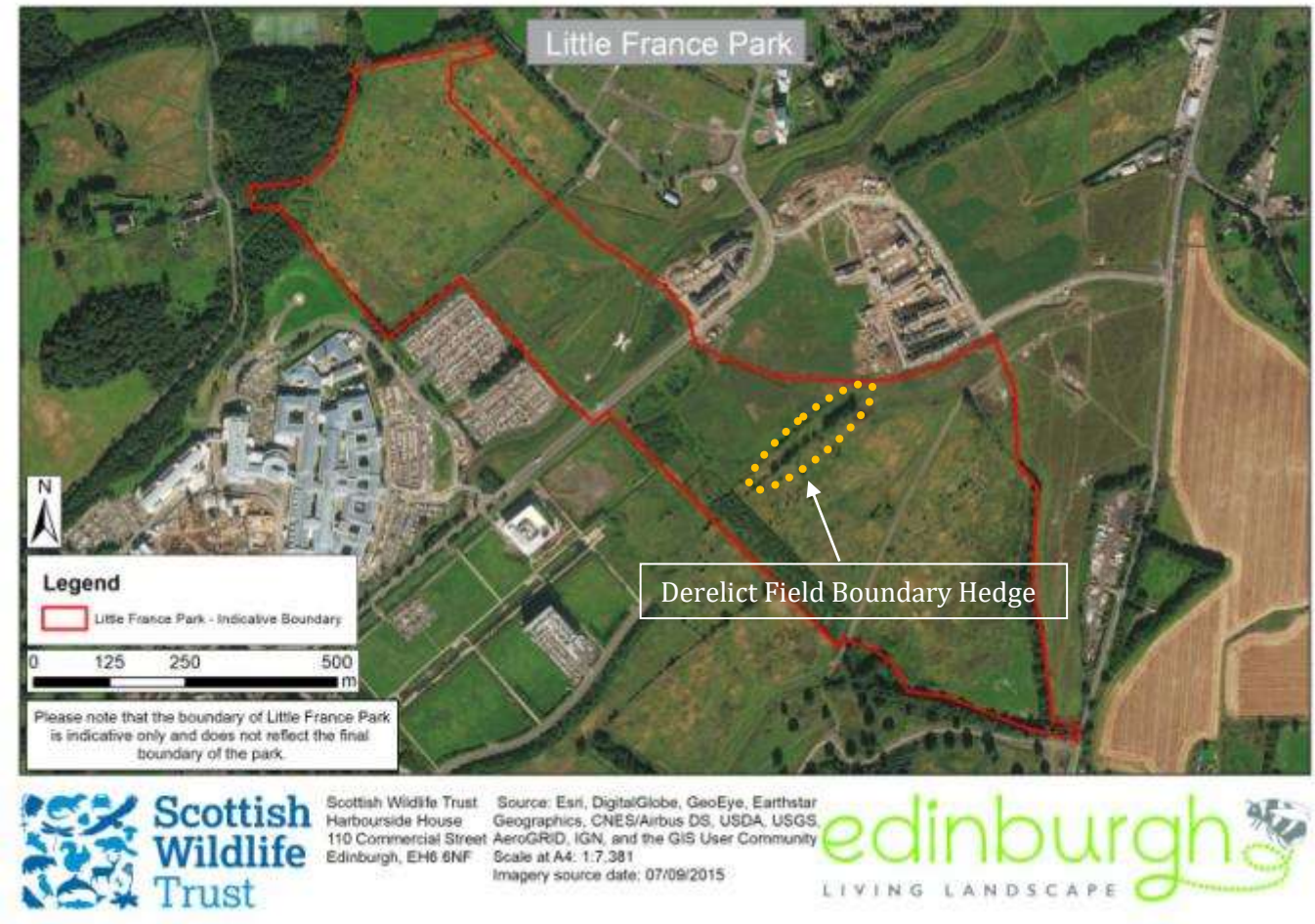


Figure 8 shows that the location of the derelict hedge is in a gap between woodland network features (shown in Figure 3), and with reinstatement would add to the woodland network along with the scrub creation under Objective 2. A wide hedge (similar to linear scrub) would function as quality habitat stepping stone, and visually could be used to delineated the more managed north-west of the site from a wilder south-east section.

Hedgerow Enhancement Proposal

It is proposed to enhance the species and structural diversity of the remnant hedge through planting and introducing a low maintenance regime. The objective is to create a well-structured hedge with a variety of habitat niches for a wide range of invertebrate species and food sources, and shelter for birds and small mammals.

Planting Plan

The most effective and efficient method of enhancing the line of trees is to coppice non-mature trees and plant in the gaps. A survey will be required to map the gaps and choose and position plants appropriately based on this according to likely shading by any planned standard trees. Coppicing and planting should occur between October and March, but avoiding periods of frozen ground. Planting should be around 50cm apart along each line of a staggered triple row with 40cm between the lines. A double row may be sufficient to produce an acceptable outcome, but three rows would be preferable should funding allow as the thicker a hedge is, the more effective it is as a distinct habitat.

Planting should focus on species that already occur in hedgerows in the area. All plants should be of native species from local provenance, as they are more likely to thrive in the local climate and soils. More shade tolerant species should be chosen for planting in the locations near mature trees. To ensure an authentic field boundary hedge, it is recommended that at least 50% of planting is hawthorn (*Crataegus monogyna*) with the remainder selected from native species appropriate for hedges listed in Appendix 4.

The cost effectiveness and likely success of protection using whole-hedge fencing versus tree tubes, spirals or quills should be assessed as newly re-established hedges may be vulnerable to damage by rabbits, voles or deer. Fencing and other protection are, however, expensive so these should only be used if the assessment shows that this is necessary. At a minimum spiral guards may prove adequate without fencing, and removed once the trees are no longer at risk of being killed by browsing. A more secure approach likely to prove sufficient would be to follow the recommendations for the scrub area planting described under Objective 2.

Post-planting Management

- Following coppicing, planting or laying most trees and shrubs re-grow quickly, so annual light trimming by removing up to one third of new growth each year for the first few years will help to stimulate a dense growth form, and would offer an opportunity for volunteers
- During the establishment phase, any plant which competes with the hedgerow plants is likely to reduce growth rates, so a weed free area around each plant for the first few growing seasons should be maintained. This can be done using a mulch. Chipped woody debris (such as from the onsite coppicing), or grassland cut arisings, could be used.
- Any plants that die in the first few years may need to be replaced to prevent gaps
- Once well established, the spirals, and if wanted, the fence can be removed

On-going Hedge Maintenance

The traditional and least resource intensive method of maintaining a hedge is to lay it. It promotes vigorous re-growth that maintains the desirable dense base. The hedge should be laid in winter (November to February) when it is at least 2.5m tall with stems approximately 5-10 cm thick at the base. Very frosty weather should be avoided. Depending on the speed of growth, laying is likely to be needed approximately every 10 years. The tall stems should be cut near the base and almost completely except leaving a strip of bark to connect the stem to the root. These stems (pleachers) should be woven between equally spaced stakes (straight cut stems can be used to recycle material onsite). If necessary, the top of the hedge can be bound with small diameter, very flexible stems. Only a proportion of the total hedgerow should be laid in a single year, to ensure that overwintering dependent species are not completely eliminated, and ensure that some shaded areas are retained. One approach is to divide the length into four quarters, and lay non-adjacent sections at least approximately three years apart.

Standard trees can be retained and their density increased up to 30% of the length of the hedge. Species re commendations are in Appendix 4. These selected trees should be identified and recorded as future mature trees. It may help to mark these without damaging them. Note that holly does not respond well to coppice or laying, and should be allowed to mature as a standard tree.

Although the Tree Survey report (Rodger 2/16) advised removal of ivy, this element should be retained where it does not pose a safety issue or is too dominant, as this species provides an important habitats for beetles which live in the dead wood of old stems, and its autumn flowers are especially important for providing food when sources are scarce for insects. The herb layer may need assessed once the hedge is re-established to ascertain if there is a need or desire to enhance this element with, for example, woundworts, dead-nettles, knapweed and foxglove.

VII Objective 4 – To Create New High Value Habitat

Solitary Bee Nesting Habitat Creation

Many solitary bees nest in the soil, but are dependent on un-compacted bare ground. As an historically agricultural site, the soil is likely to be compacted, and generally have good levels of nutrients promoting colonisation of bare ground. A simple approach to providing this habitat is to create soil conditions in raised areas that suppressed vegetation growth and remain un-compacted. Linear raised features would best be profiled to create south-facing slopes. For aesthetic reasons, the mounds could be lightly sown or plug planted with species that are adapted to this type of situation and found nearby such as wood sage (*Teucrium scorodonia*) which would benefit a range of EBAP target invertebrates, but it is primarily the substrate that would be of value.

Bee Bank Creation Proposal

The most appropriate location for creating this habitat would be where it is not overshadowed by trees, and not in the immediate vicinity of where dog walkers will enter the site e.g. near the boundary with the Bioquarter. The mound should be oriented such that the inner slopes of the raised crescent shape are south facing. A simple and cost effective method of adding this habitat across a small area is to spread mineral aggregate - a few tonnes of sand/gravel/grit in piles would be sufficient to make a difference for a suite of invertebrates. A more reliable, although more costly, method would be to –

1. Remove the turf from the selected area
2. Dig out the footprint of the bank to a depth of approximately 30 cm
3. Replace the turf upside down in the trench
4. Cover the turf with the material removed in step 2
5. Cap the bank with at least 30 cm but varying depth of builders sand (can be mixed with sub-soil) spreading this beyond the dug footprint

Further details can be found in Appendix 7. The naturally challenging conditions formed by the substrate should result in no long-term management being necessary to maintain the desired primarily bare surface.

If the site bund is to be removed, some cost of material disposal could be offset by mixing a proportion with the sand to create one or more bee nest mounds.

VIII Indicative Cost Assessment

The following estimates are based on indications provided by Bob McAllister at CEC and estimated From Alba Trees, Scotia Seeds and Timber Building Supplies.

Objective		Targeted Habitat	Targeted Proposal	Units	Indicative cost per unit	Proposed area	Indicative total cost estimate (NB. Guidance only as vary significantly depending on implementation)	Indicative Post-establishment Maintenance (averaged over 10 years)
1	**To maintain diversity of habitats**	All	Invasive species control		Dependent on results of updated survey	As needed		
2	**To enhance the quality of existing habitats**	Woodland & associated	Plantation thinning	As required to diversify shading		Woodland block approx NT297705		Should require minimal on-going maintenance
			Scrub habitat creation	Per patch - 125 each (whips + spiral guards + canes) + 79 m x 1.2m stock fencing	Mix species whips (average) = £0.45 Spiral Guards = £0.20 Canes = £0.13 Fence = £5.50 / m	0.05 ha per patch	£98 (trees + protection) + £435 (fencing) = £533 per patch as described	Should require minimal on-going maintenance
		Grassland	1. Cutting only	Area 1 Area 2	£156 / ha / year	Area 1 = 1.1 ha Area 2 = 0.8 ha	Area 1 = £171 / year Area 2 = £125 / year	Area 1 = £171 / year Area 2 = £125 / year + volunteer collection of arisings (or contractor)
			1a.Yellow Rattle	1g / m2	£265 / kg	1000m2 per area	£265 per area (unlikely to required for Area 2)	None additional to Option 1
			1b. Spot treatment		Dependent on results of inspection			
			2. Plant plugs	2 plants / m2	£600 / 1000 plugs	500m2 per area	£600 per area (for planting across 0.5% area)	None additional to Option 1

			Targeted Proposal	Units	Indicative cost per unit	Proposed area	Indicative total cost estimate (NB. Guidance only as vary significantly depending on implementation)	Indicative Post-establishment Maintenance (averaged over 10 years)
			3. Topsoil removal / re-seed	No estimate available				
		Wetland			Further assessment of actions required			
3	**To reinstate degraded habitats**	Woodland & associated	Hedge restoration	For 3 rows (fill gaps between coppice) = 1020 each (whips +spirals guards + canes) + 185m stock fence	Mix species whips = £0.45 Spiral Guards = £0.20 Canes = £0.13 Fence = £5.50 / m	3 rows (approx 170m total gap between coppice) + 2 whips / 1m + 185m fencing	£790 (trees + protection) + £1018 (fencing) = £1808	1 hedge trim per 10 years (between laying) = £128 + laying approx every 10 years with volunteers
4	**To create new high value habitats**	Bare un-compacted ground	Solitary bee nest site creation	Per feature – mixed 50:50 builders sand:soil	£35 / hour tractor (mini digger likely sufficient) with bucket + £30+VAT / 0.5m3 (approx 800kg bulk bag)	2x6m feature	£240 material + approx £175 tractor (varies widely depending on method used)	Should require minimal on-going maintenance

IX Demonstrating Success

Monitoring should be to review the site management outcomes, and where necessary, amend these to maximise delivery of the objectives. By involving volunteers, many of these can be low cost and deliver the added benefit of community engagement.

	Outcomes recommended for monitoring	Potential monitoring method
Objective 1 – To maintain diversity of habitats	Habitat diversity is increased then maintained	Updated Phase 1 map with individual habitats marked
Objective 2 – To enhance quality of existing habitats	Tree thinning introduces varied woodland densities and increases then maintains diversity a diverse understory	Record of tree thinning Bioblitz – understory and deadwood
	Scrub habitat attracts a greater range of animal species	Bioblitz – bird species use Small mammal trapping
	Grassland management increases then maintains greater flowering plant diversity in the designated zones	Record of mowing regime Bioblitz – plant species diversity and dominance
	Grassland invertebrate species diversity is maintained or increased	Promote LFP as a site for a new Beewalk (National Pollinator Monitoring Scheme in Scotland) & butterfly transect (UK Butterfly Monitoring Scheme) - ideally these would start before introduction of new management regime
	Habitat diversity is maintained across the open water and wetland	Integrated into SUDS monitoring
Objective 3 – To reinstate degraded habitats	Hedge habitat is diversified, maintained and attracts a greater range of animal species	Bioblitz – bird species use Small mammal trapping
Objective 4 – To create new targeted high value habitats	Bee nest banks have been created Bee nest banks are used by burrowing invertebrates	Promote LFP as a site for a new Beewalk (National Pollinator Monitoring Scheme in Scotland)

X Next Steps

This management framework report is intended to guide the future conservation and management of Little France Park with respect to it's quality as a greenspace for nature and for people to enjoy. It is recognised that works will have to be phased or delivered incrementally subject to funding availability.