

Nature Networks in The Leven River Park

What is a Nature Network?

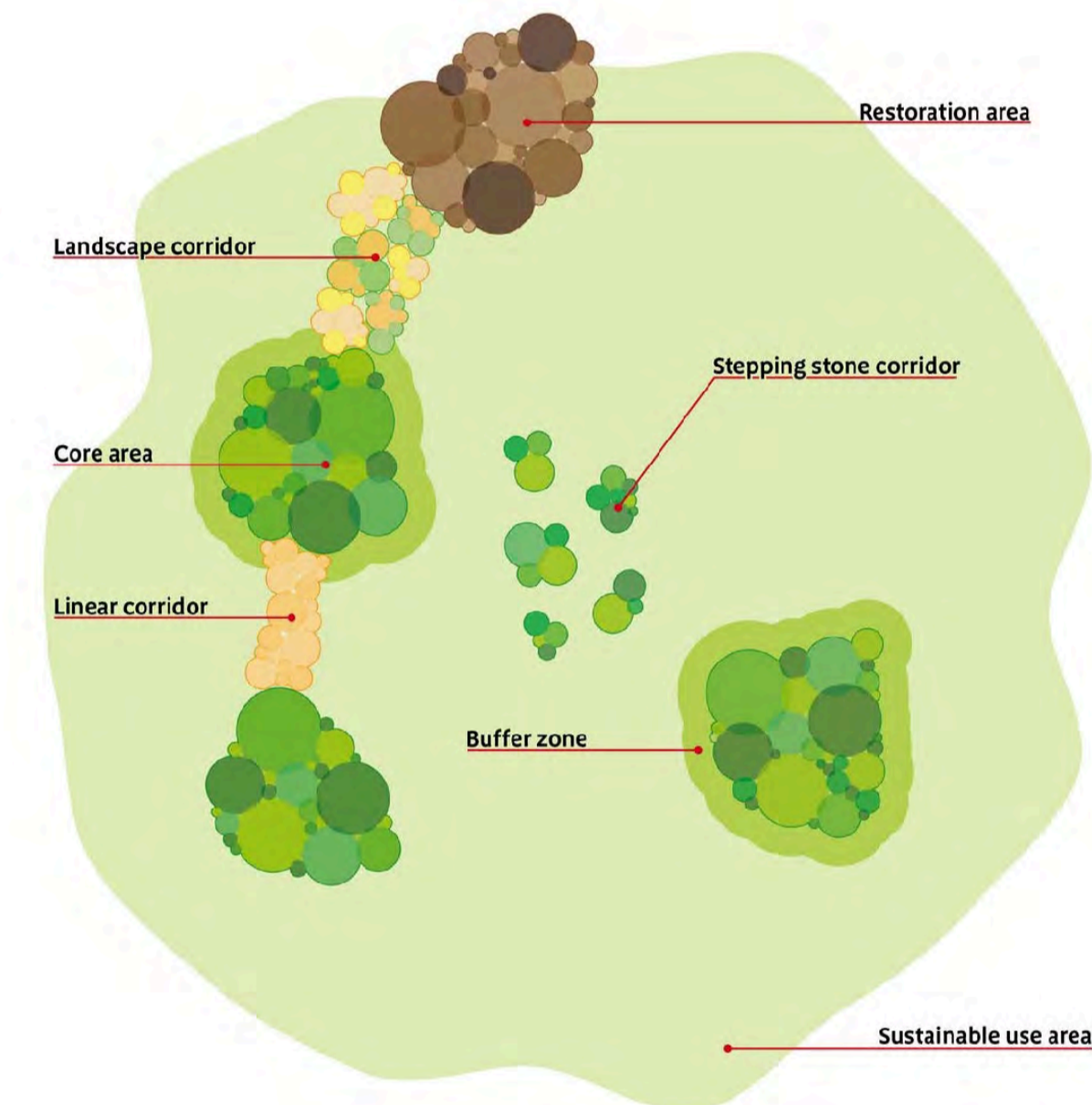
A Nature Network is effectively just a network that connects nature-rich sites, restoration areas, and other environmental projects through a series of areas of suitable habitat, habitat corridors and stepping-stones. As well as supporting regional and national approaches to protect and restore nature, they provide local benefits to wildlife and people.

Connectivity is an essential part of nature. It is necessary for functioning and healthy ecosystems, key for the survival of animal and plant species, and is crucial to ensuring genetic diversity and adaptation to pressures such as climate change.

To ensure Scotland's nature can thrive, nature-rich areas must be connected through a series of networks linking them all together



Wet woodland in the Leven River Park



Source : Making Space for Nature: A review of England's Wildlife Sites and Ecological Network, S. John, Lawton Cbe Frs, 2010

Current state

Scotland is one of the most nature-depleted countries in the world. One of the key drivers for biodiversity loss is land-use change where, over time, habitats have been lost and increasingly fragmented.

This fragmentation means that the remaining habitats are often isolated and unconnected and as a result they are less resilient, often in poor health, struggling to support healthy populations of the species that normally rely on them.

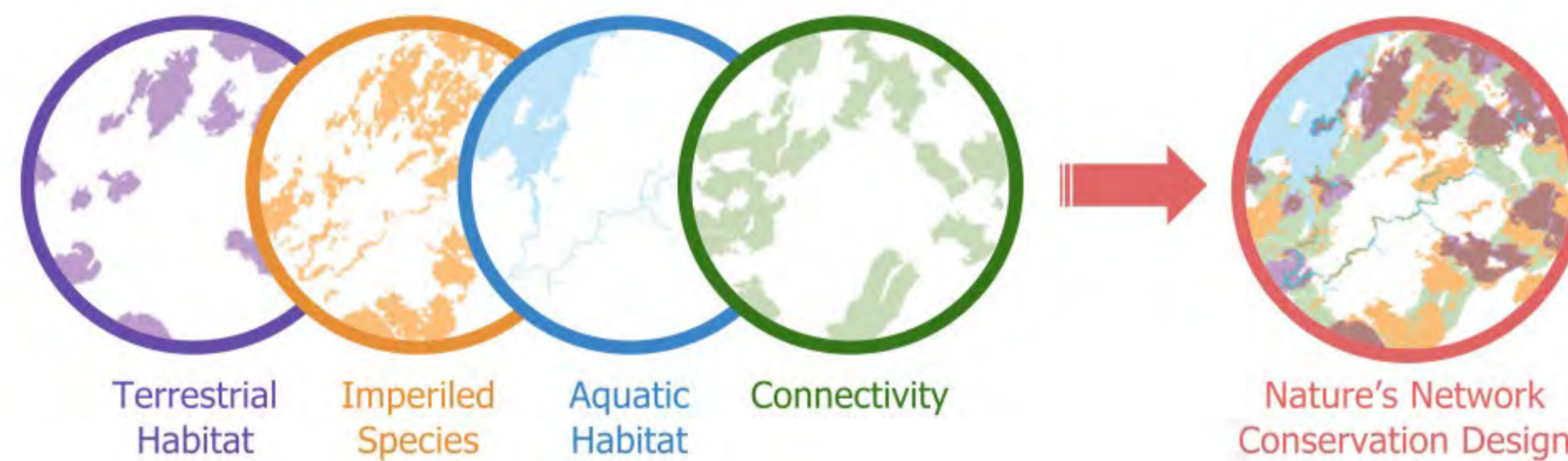
The challenge

If we are to reverse declines in biodiversity, it is vital to address this by developing a robust network for nature.

Nature Networks were a commitment of the 2021 Programme for Government, noted as a key component in increasing ecological connectivity and restoration of nature across Scotland.

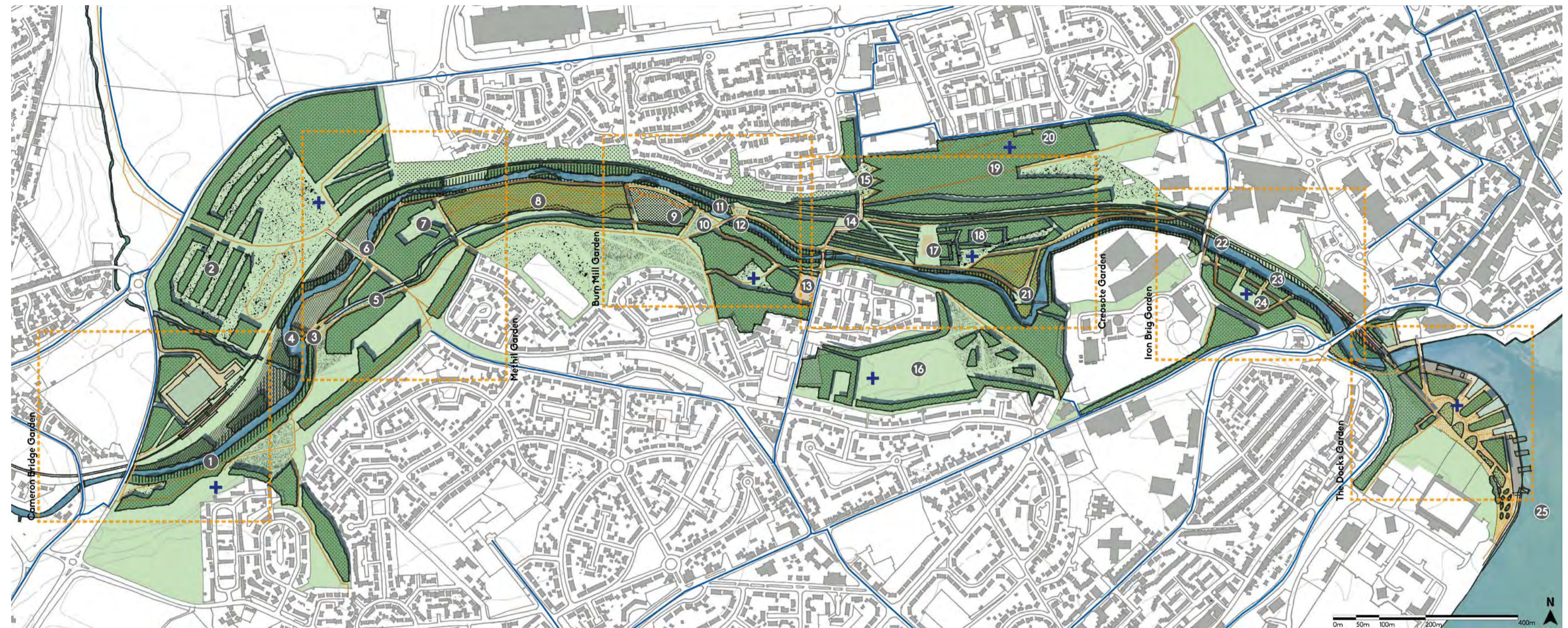
This ambition aligns with the EU Biodiversity Strategy, which proposes to integrate ecological corridors, as part of a Trans-European Nature Network.

Effective delivery of this framework will significantly contribute towards tackling the nature and climate emergency.



Recommended Practices for Landscape Conservation Design, Version 1.0, September 2018

Concept Masterplan



Levenmouth Active Travel And River Park Concept Design Masterplan Report (2021)

Leven Parks Nature Networks Ambitions

The Leven Nature Networks project will develop, design and detail a series of nature-based solutions along the route of the Levenmouth Active Travel and River Park corridor, within the Leven Programme Connectivity Project area.

The Nature Network project is nested within the overall Leven Masterplan (2021) shown above. There are a number of projects of a similarly large scale, which will fulfil the aims of the masterplan, each with their own timescales.

To create such significant change over such a large geographical area will take time, investment and collective input from all those who want to improve the River Leven and its surrounding communities.

Other projects in The Leven River Parks

It is anticipated that the programme of change around The Leven will take 10 years to deliver, which means that most projects will be complete by 2030. The projects will be delivered in a series of phases:

- River Leven Connectivity Project: New active travel links through the park.
- Leven River Park: A series of six themed gardens along the river's length.
- River Restoration: Improvements to the banks and areas adjacent to the river.
- The River Leven's History: incorporation of heritage and interpretation.
- Health and Wellbeing: using The Leven to physical activity and improved connection to the natural environment along the River Leven.

The Nature Network project will link areas of semi-natural habitat, support surface water management of new grey infrastructure, and contribute to creating an attractive blue-green active travel network.

The project aims to enhance habitat connectivity through creating native flower-rich grasslands, swales, ponds and wetlands, as well as trees and hedges along the active travel network.

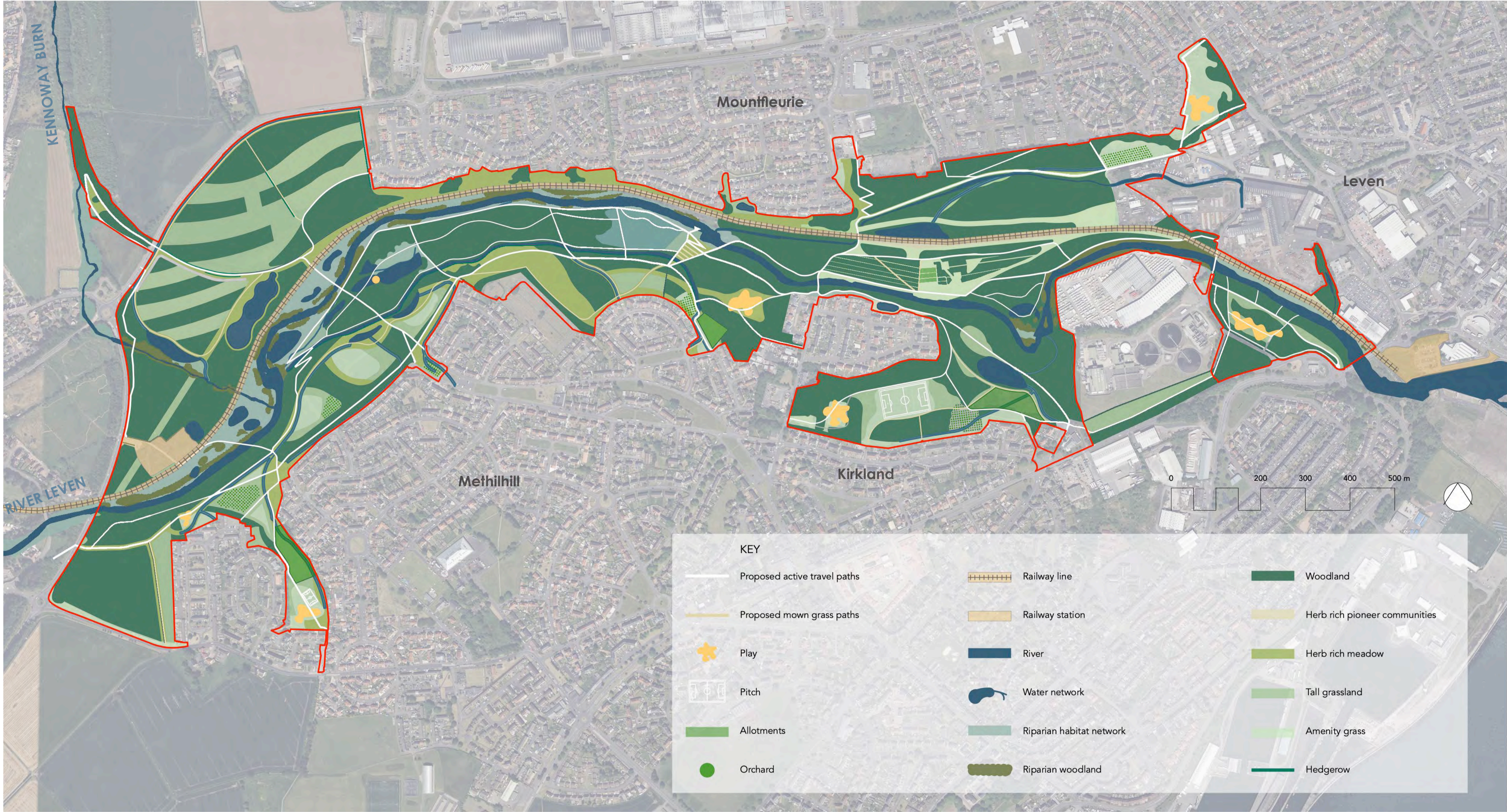
Legend

- Proposed river valley path network - Smooth surface to Sustrans specifications
- Proposed priority active travel network - Smooth surface to Sustrans specifications
- Woodland - Existing woodland to be retained and reinforced with new native planting
- Wet Woodland - Existing woodland thinned, managed and enhanced to establish flood tolerant area
- River margin and embankment reinforcement - Including slope stabilising solutions
- Floodplain - Existing wetland and low-lying river margins to be protected and managed to accommodate flooding
- Gardens. Detailed Design Areas - Areas of focus where communities can meet, play, relax and socialise
- Grassland / low meadow - Existing grassland to be maintained regularly
- Grassland / high meadow - Existing grassland to be allowed to grow and renaturalise (good for biodiversity)
- Wildflower - Existing grassland planted with wildflowers
- Pollinator space - Existing south-facing slope planted for nectarivorous insects
- Proposed play spaces - Including natural play elements such as mounding and tunnels. Potential for other play equipment.

Features

- Woodland walk extended with viewing platforms through trees
- Proposed agroforestry trial landscape
- New viewing platform at Kirkland Dam
- Weir/dam upgraded to allow fish migration
- Former lade re-opened and exploration route
- Existing river bridge crossing upgraded to new active travel bridges across river and new rail-line
- Proposed Heritage trail focal point of former Methil Mill
- Re-connected lade and raised boardwalk through wet woodland
- Green roof shelter and observation hides above wetland
- Central gathering space with seating, wildflowers and interpretation boards
- New fishing platform at Burn Mill Dam, upgraded to allow fish migration
- New active travel bridge over pipe
- New housing units (16 no.) for Kingdom Housing Association, currently under construction
- New active travel bridges to cross rail line and the river
- Switchback pathway to address steep gradient down to river
- Community pitches and play facilities
- Potential community hub location with WC facilities
- Experimental community gardens and growing spaces
- Potential new pathways and community spaces within woodland
- Proposed lookout platform at top of slope
- Wet-woodland and river facilities - Canoeing? Screening of existing pipeline with vegetation?
- New active travel bridge / crossing to Iron Brig
- Viewing platforms cantilevered over river through woodland, from Iron Brig Garden
- New co-designed community play space and car park
- Potential for seeding coastal fringe with seagrass

Concept Nature Networks Masterplan



Building a strong green network

The Nature Networks project will capitalise on the existing extensive and diverse habitats along the River Leven valley through Methil and Leven, further increasing the diversity, connectivity and robustness of the habitats. The park provides an opportunity for multi-functional green infrastructure – green spaces that soak up rainwater to reduce flooding, and help local people live healthier lives, enjoy nature and eat locally grown food.

The River Leven Park contains significant areas of riparian habitat that are uncommon in Fife and are distinctive in character. These diagnostic habitats should form the focus of the nature networks plan for the park.

The aims of the nature networks masterplan are:

- To expand the extents of riparian swamp, wet woodland and marshy grassland habitats so that they are characteristic of the natural river floodplain.
- To improve the robustness of these wetland habitats through the integration of SUDS to increase their water supply.
- To form a network of connected habitats extending from riverbank to doorstep.
- The network will include native woodland, meadow grassland, scrub, hedgerow and tall herb vegetation, in addition to the riparian areas.
- The network will be enhanced with fruiting and playful planting including: orchards, fruiting hedges, fruiting scrub, fruit thickets, willow tunnels and mazes that together will help local people enjoy and gain sustenance from the park.



Much greater biodiversity in grassland habitats can be developed through further change to grass-cutting regimes, creating wildflower strips by soil scraping and seeding, forming wet meadow swales and allowing tall grass to grow along woodland edges. Mown grass routes and activity areas provide for people to move and play within this enriched setting.



The nature network should be a playful landscape full of incidents and features that invite enjoyment and adventure, for children and adults.



New wetland habitats help absorb rainfall, helping to prevent flooding. The Nature Networks offer the chance to disconnect surface water flows from the combined sewer network, instead routing it through the park as a network of attractive wetland habitats. This will also help sustain the valuable riparian floodplain swamp and woodlands.



There is abundant scope for an edible landscape. Planting and management proposals will encourage fruit foraging, establish local orchards and provide allotments that are close by each of the neighbourhoods surrounding the river park.



The park was once mainly farmland, and some parts of it remain so. The potential for livestock, cropping and productive forestry to contribute to biodiversity and also to sustainable domestic food and materials production is an opportunity. This could extend to agroforestry and energy generation, through solar or ground source heating.

Diverse woodland types and tree species will respond to the different character, soil and drainage in each part of the park. From individual willows on the riverbank, fen woodland and osier beds on the floodplain, native deciduous woodland and coppice framing the surrounding streets.

The River Park is a key corridor for the movement and residency of many species, especially invertebrates, birds, fish and mammals. Connectivity of different habitat types throughout the river park is the aim, in order to maximise the scope and resilience for each species.

Existing Habitats



A valuable resource

A Phase 1 habitat survey and a woodland survey and assessment have already been undertaken over the project area, providing a wealth of knowledge and proposals for habitat and species enhancements through interventions and management.

Vegetation cover relates strongly to land-use, which divides into the following broad categories :

- Arable farmland
- Municipal grassland with planted trees
- Riparian marshy grassland and swamp, with planted woodland, in the floodplain
- Spontaneous open and woodland mosaic vegetation on derelict land
- Woodland, scrub and open mosaic growing on steep or inaccessible ground

The Nature networks will expand the native habitats and increase their diversity through management and the use of planting and seeding where appropriate. There will be a particular focus on habitats that feature in the Fife Local Biodiversity Action Plan:

- Lowland fen
- Ponds
- Reedbed
- Species-rich grassland
- Field margins and boundaries
- Traditional orchards
- Lowland deciduous woodland



Open scrub mosaic below Kirkland Cemetery



Wet woodland in the valley floor



Japanese Knotweed is present in several locations, requiring active eradication



Reed swamp is home to waterfowl

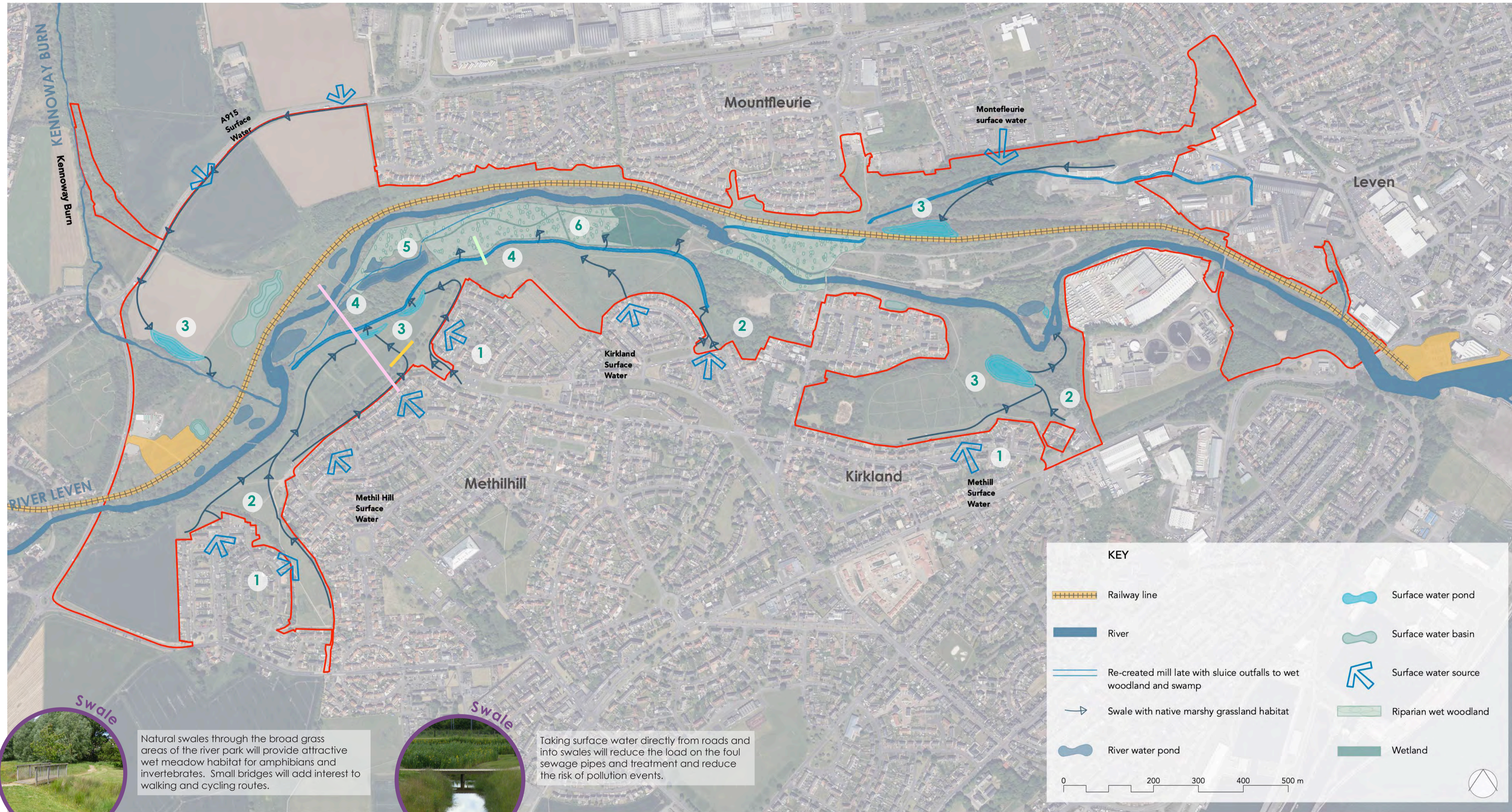


Municipal grassland has been diversified through relaxing of mowing



Planted broadleaved woodland lacks canopy diversity

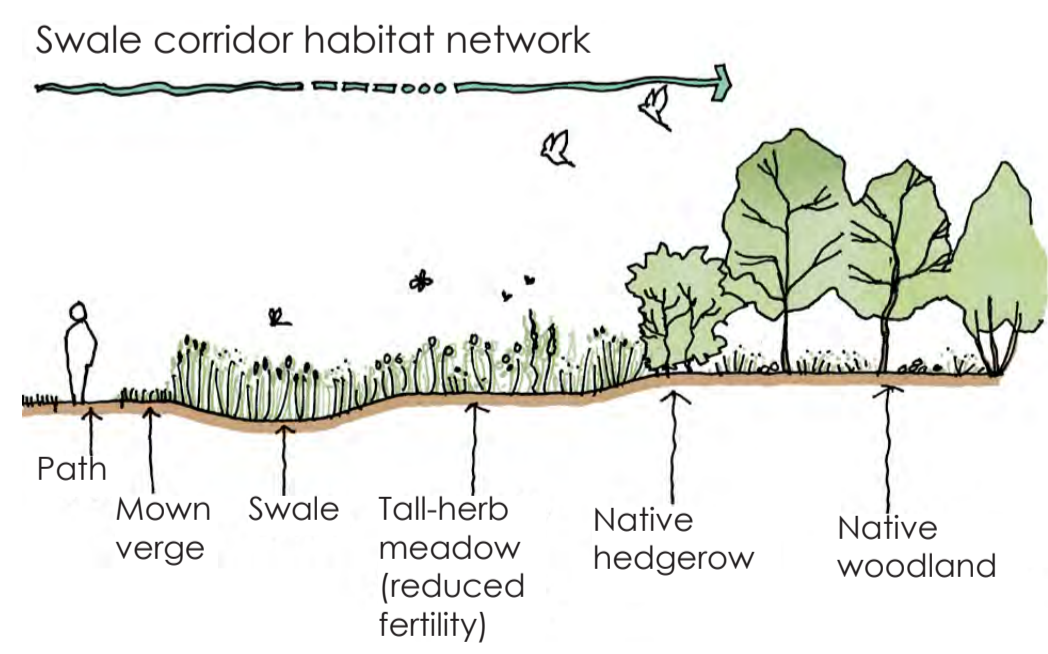
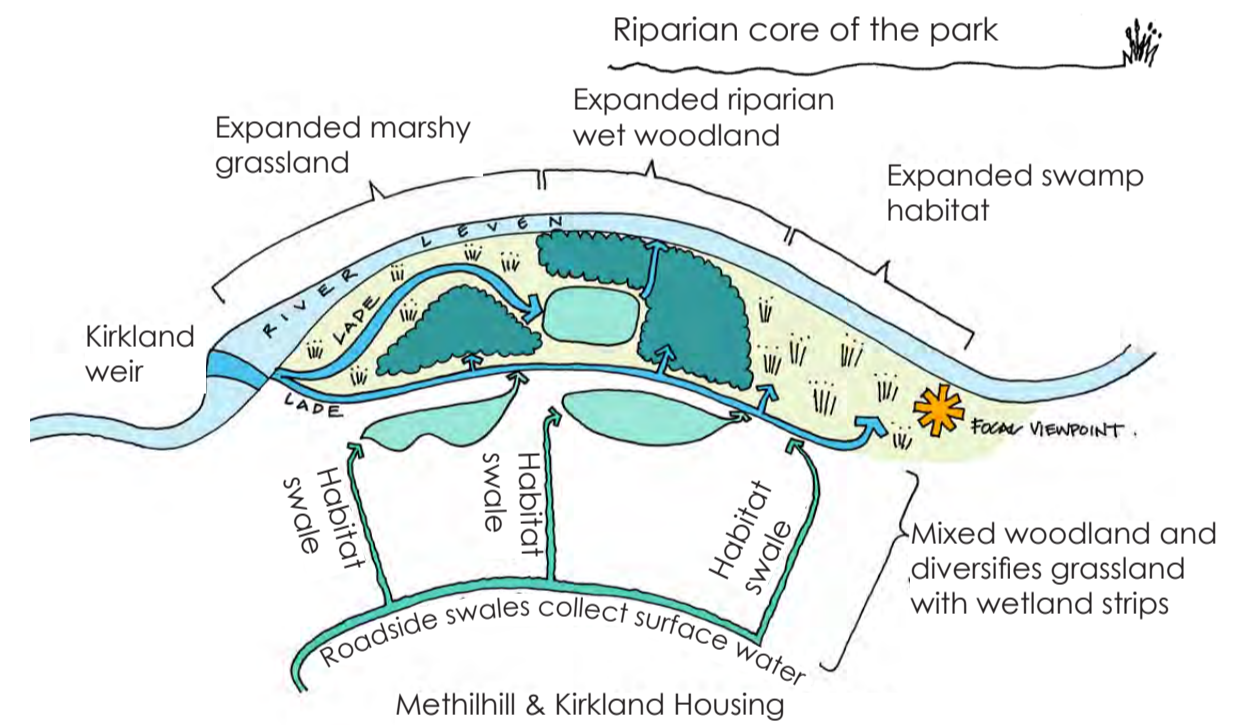
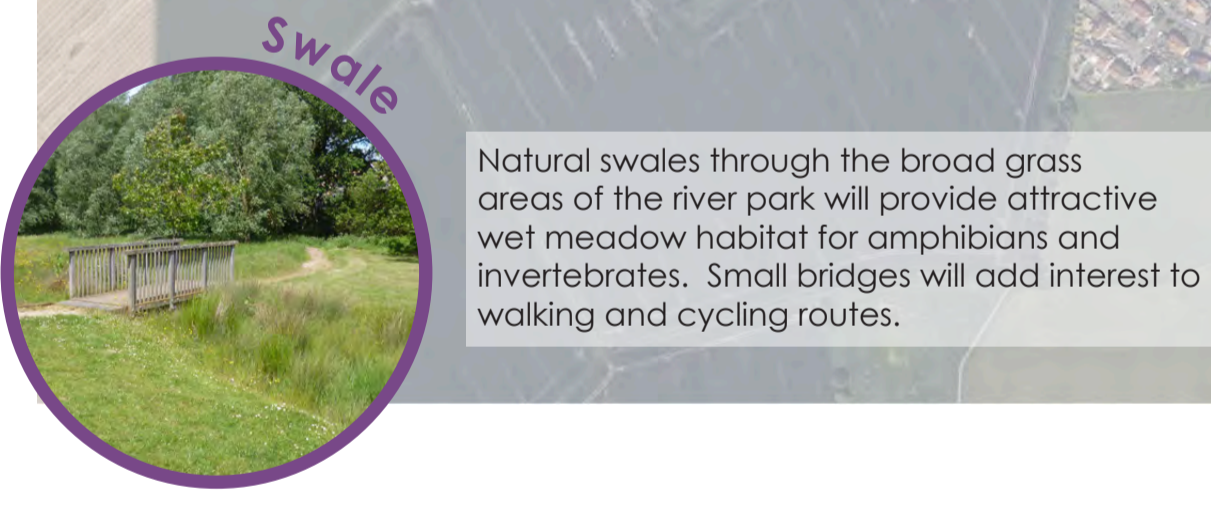
Wetland Enhancements



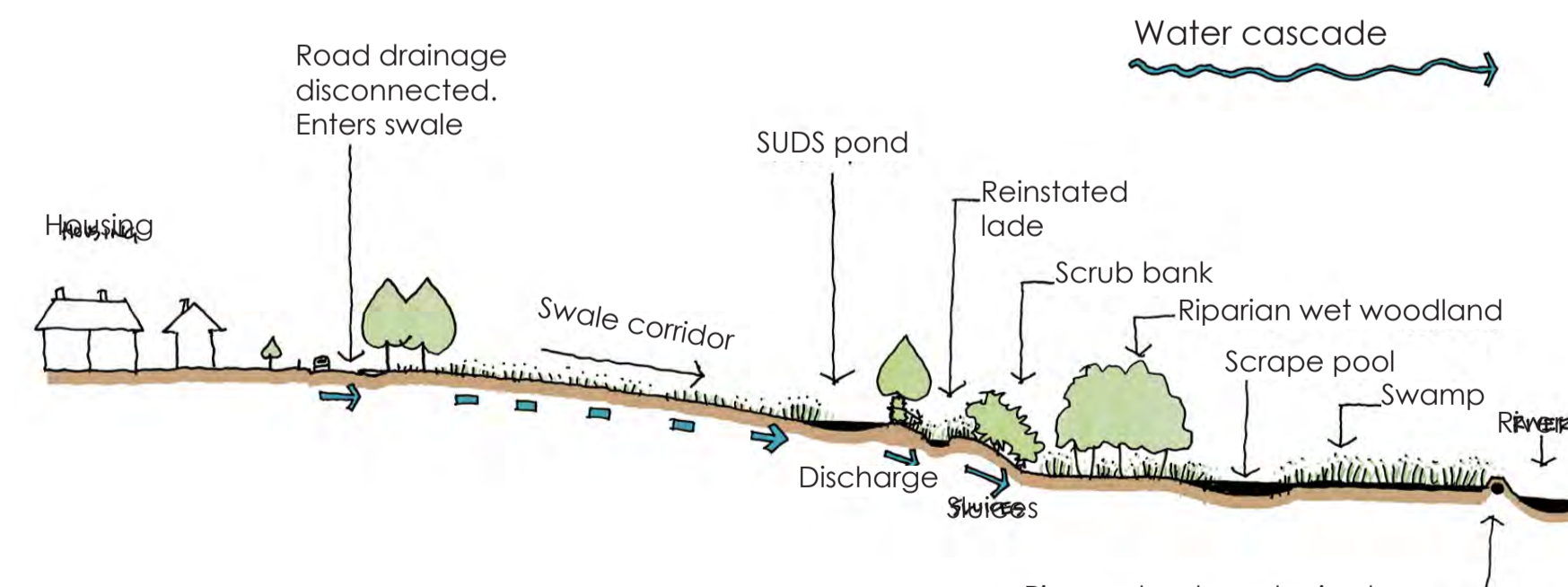
A connected water network

Underlying the Nature Networks is the water network, defined by the sources of water, topography and flow routes. The River Leven has a riparian floodplain of distinctive character, into which the River Park drains. The River Restoration Project is progressing a range of river channel and floodplain habitat enhancements that perfectly complement the Nature Networks objectives. There are also great opportunities to integrate the surface water from surrounding housing areas into the park, sustaining the riparian vegetation and creating threads of wetland ecosystem through the landscape.

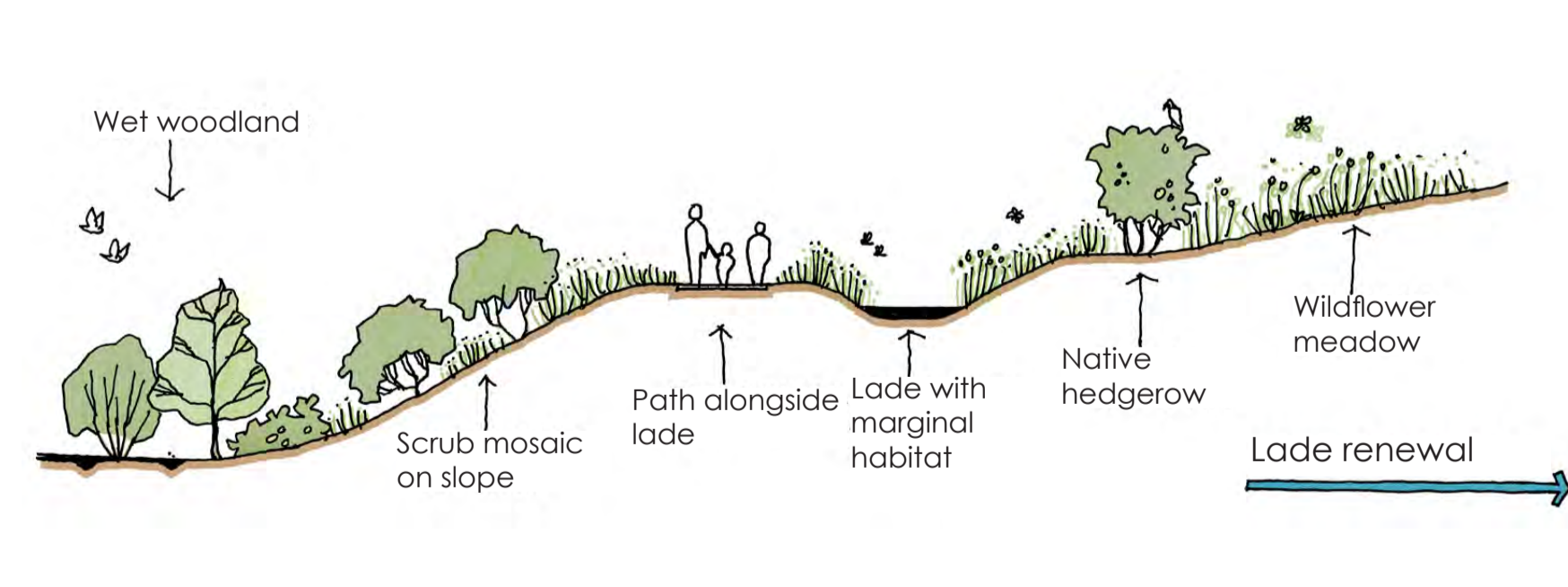
1. Create a linked network of surface water swales to capture road drainage and reduce load on the existing combined sewer network.
2. Swales are planted with wet meadow to contribute to the wetland grass habitat network.
3. New basins which store water and provide wetland habitat away from the Leven floodplain.
4. Re-use of historic lades to maintain water levels in wetland areas; acting as a collector at the base of slopes from Methil and Mounfleurie.
5. Opportunity for dipping pond at the site of Methil Mill.
6. Increase area of wetland to the west of Burn Mill Dam; improve diversity of wetland planting.



Typical Section 1
Swale corridor habitat network.



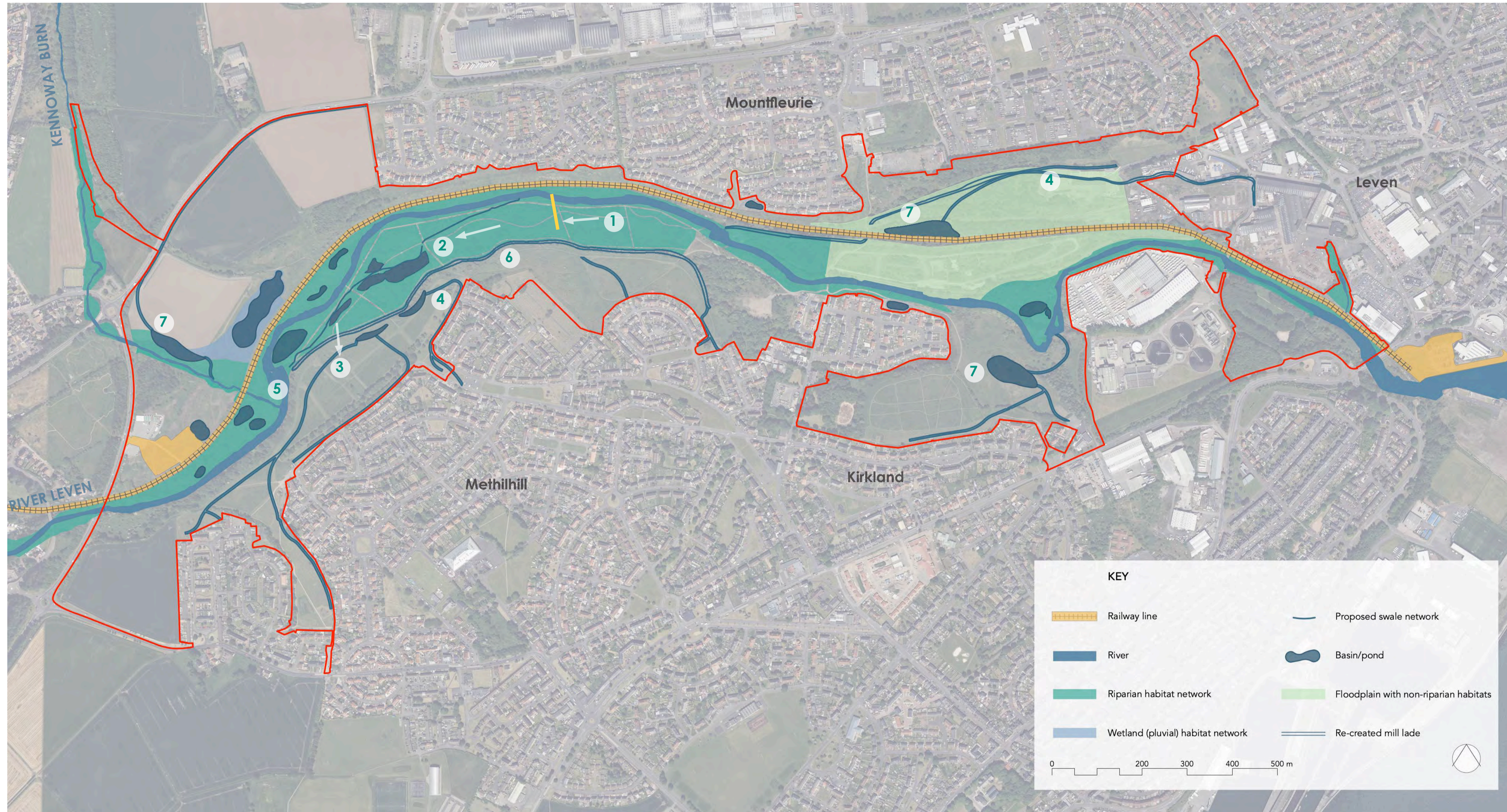
Typical Section 2
Flow of water through the park - from doorstep to river.



Typical Section 3
Restoration of the lade as a linear pool habitat.



Riparian Habitat

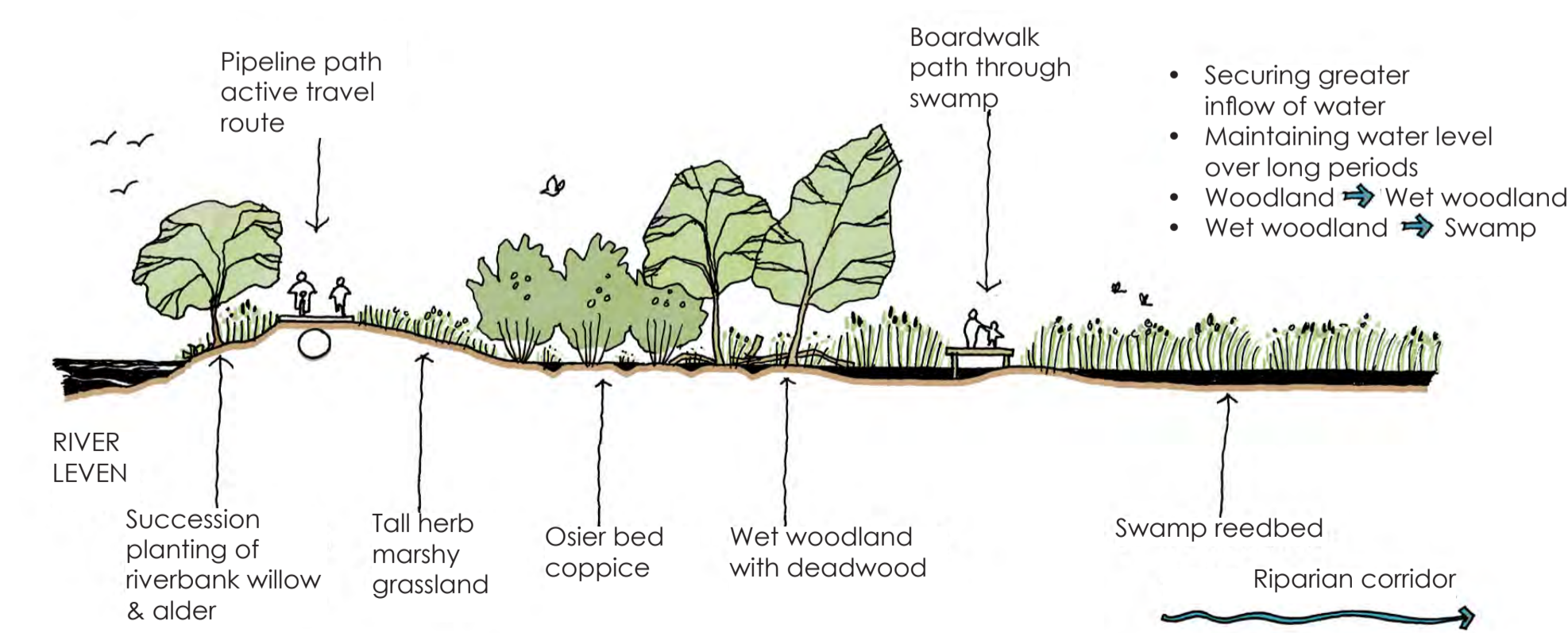


The River Leven Riparian Habitat Corridor

The floodplain area of the River Leven provides important storage of floodwater, which the Nature Networks project and River Restoration Project will both retain and enhance through the creation of wetland scrapes.

Habitat creation and management in the riparian zone will be targeted on those distinctive vegetation types of damp and periodically flooded ground – swamp, aquatic marginals, marshy grassland and wet woodland. The intention is to expand these habitat types where possible, in place of the more common deciduous plantation woodland in some areas. There is an opportunity to introduce coppiced osier willow beds that can provide small wood and weaving materials for landscape management activities elsewhere in the park.

1. Swamp areas expanded by raising water level.
2. Wet woodland extended, include osier beds and bank side willow trees.
3. "Dry" woodland type displaced to neighbouring open parkland slopes.
4. Consistency of water supply increased through SUDS.
5. Option to include late reconnection at weir sluices.
6. Lade restored as linear wetland and supply of water to the floodplain.
7. New ponds and basin wetland habitats.



Typical Section 4 Riparian habitat network.



The floodplain
SEPA mapping shows the natural extent of flooding for an extreme event (200 year return period plus climate change). We must not do anything within the floodplain that reduces flood storage.

Wet woodland
Wet woodland is a rare habitat in the lowlands of Scotland, with distinctive wild character.

Wet woodland
Riverbank trees and their rooty crevices are vital to the health of the river habitat.

Wetland
Lowland fen, a Fife LBAP habitat found in the River Park, can be expanded through careful changes to surface water flow and woodland management.

Woodland Habitats



The woodland structure

Woodlands will provide the spatial structure of the River Park, defining and subdividing open spaces. The woodland assessment and enhancement proposals produced for the Forth Rivers Trust have detailed how these different types of woodland can be improved and managed to realise their potential. There are also locations well-suited to new woodland creation by planting, and some specific areas where a reduction in woodland would benefit other valuable and scarce swamp and marshy grassland habitats.

Much of the existing woodland was planted in recent decades and as a consequence lacks canopy diversity and the trees grow in plough rows. Selective thinning to favour long-lived native species, coppicing to develop dense understorey, inter-planting of native shrub species, and the introduction of woodland field layer plants where conditions are shaded, will all form important tasks detailed in the landscape and biodiversity management plan for the Nature Networks.

Native woodland planting will be focussed on the valley side slopes to form woodland habitat connections along and across the valley, in place of grassland. An edge mix of denser tree and shrub species will be planted, in some places supplemented with a hedge to provide a strong and tidy boundary. Open tree groups, lines and avenues will be planted alongside residential streets and paths where a more open character is desirable. Orchards are an important final part of the woodland jigsaw, forming a characteristic wood-pasture habitat type of great value to invertebrate and bird life.

- To enhance existing woodland with understorey planting and selective thinning.
- To expand the woodland network, arable land is to be planted with swathes of native broadleaf woodland.
- To develop diverse habitats, woodland is bordered by scrub and meadow to create transitional zones and improve edge ecology.
- Along river banks, fragmented woodland is connected with tree planting.
- Creation of "dead hedges" to enrich habitats for insects and small mammals and make use of deadwood.
- To encourage engagement with woodland habitats, routes through are improved and there are opportunities for nature play.
- Educational and community involvement throughout the process.
- Construct hibernacula within woodland and open areas.
- Support woodland thinning and understorey with diverse woodland glades.



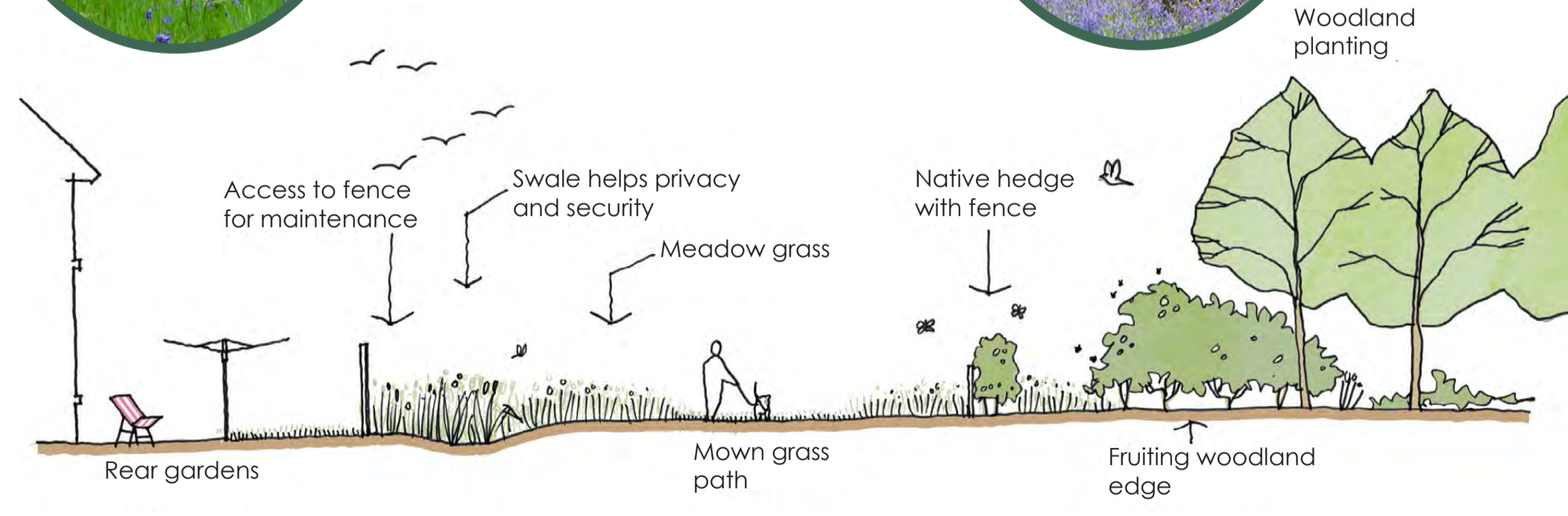
Native woodland
Native woodland wildflowers can be introduced where conditions are shaded, to diversify the habitat.



Coppicing
Coppicing creates variety in the canopy structure and diversity on the woodland floor.



Broadleaf woodland
Selective thinning helps long-term woodland health.



Typical Section 5
Rear garden boundary with meadow strip and woodland.



Woodland play
Woodlands are a natural place for play, especially large mature trees. Woodland management will aim to keep trees of unusual character.



Wet woodland
Wet fen woodland is a distinctive woodland type of the floodplain, valuable for invertebrates.



Dead hedge
Dead-hedges can be used to limit access to some area for the benefit of sensitive wildlife.

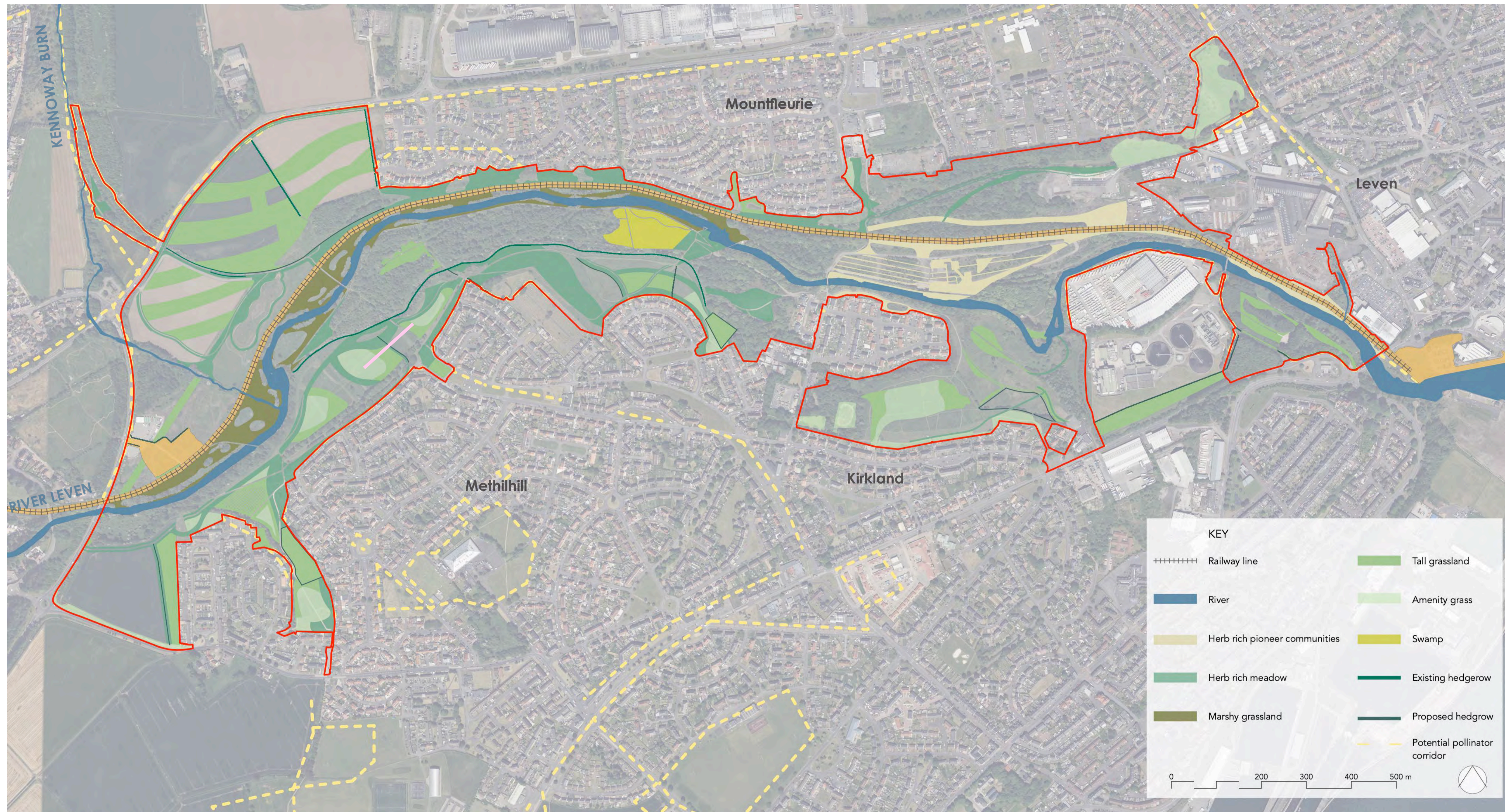


Riverbank trees
Riverbank trees proposed in the river restoration project provide shade, organic matter and rooty hollows for the river habitat.



Agro-forestry
Agro-forestry combines productive trees with grazing or cropping, providing biodiversity and economic return.

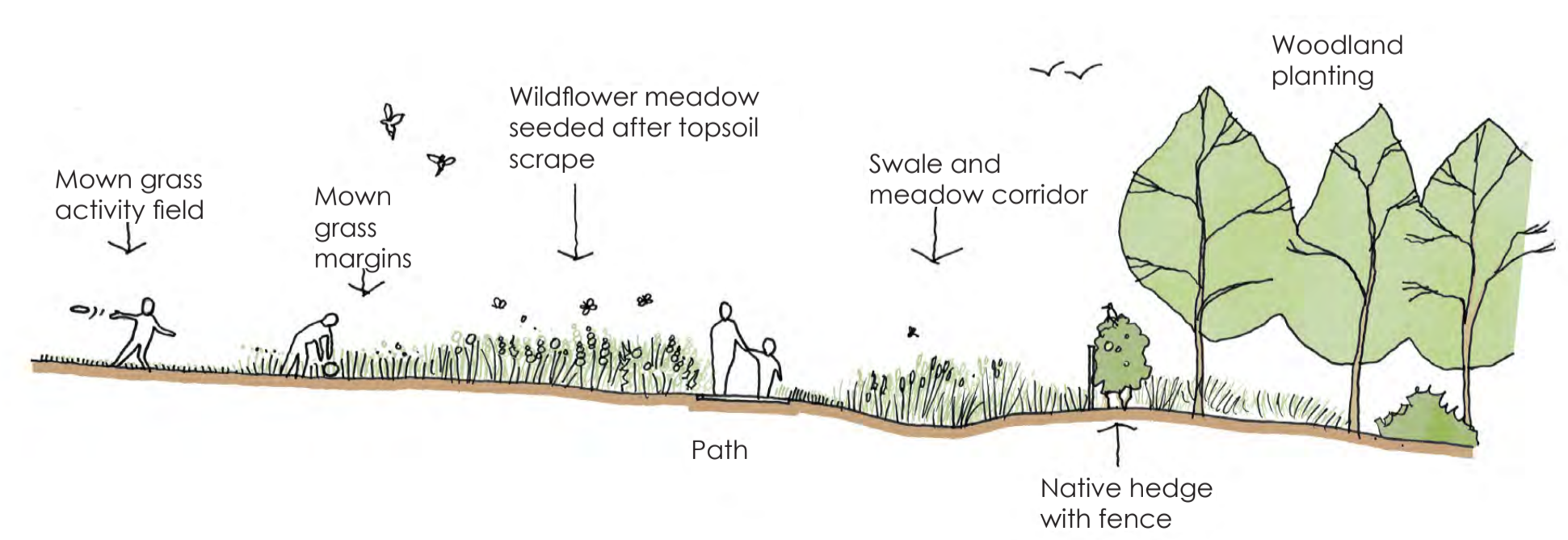
Meadows and Hedges



Diversifying the grassland

Grassland is currently the most extensive habitat type in the River Park area and actions to diversify grassland will be a key part of the Nature Network proposals and biodiversity management plan. There is considerable ecological value in the marshy grassland / wet meadow of the floodplain, less diversity in the extensive neutral semi-improved grasslands growing on untended areas of the valley side, and very low ecological value in the extensive areas of mown amenity grass that bound Methilhill and Kirkland.

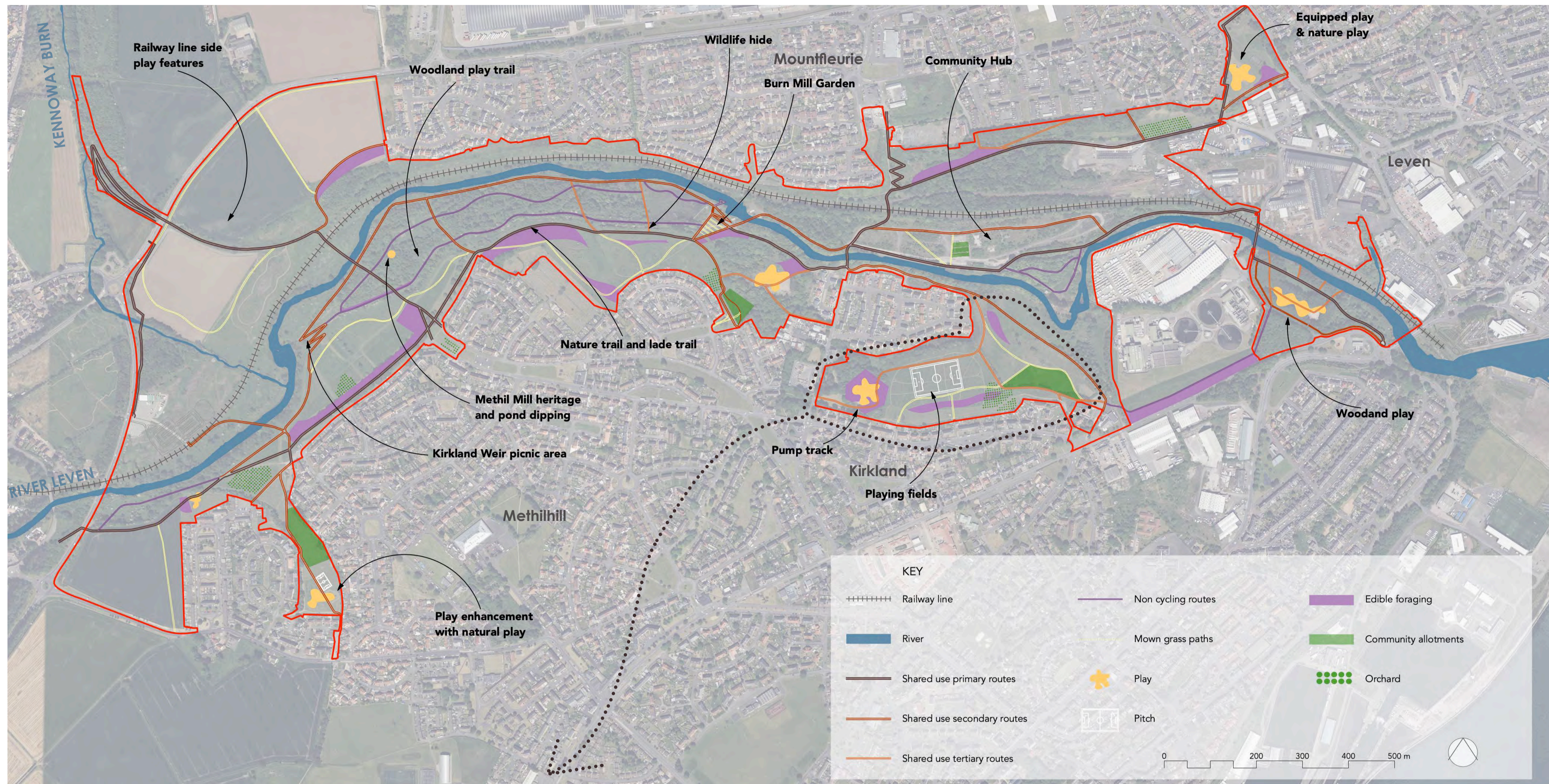
- Protect nutrient-poor crushed material associated with demolition sites, which is good wildflower habitat.
- Create a network of species-rich grasslands to provide linked pollinator habitat across the site.
- Improve wetland meadow networks associated with floodable / damp areas beside the River Leven, and adjacent to new SUDS features.
- Create new meadow habitat.
- Create "tidy edges" to the proposed path network in order to make the park look cared-for.
- Diversify wetland areas; increase species diversity.
- Include basking areas for butterflies and insects, specifically on south-facing slopes.
- Forms a park of the wider Pollinator Network proposed by Buglife in the Green Network Biodiversity and Habitats Phase 2 Report.
- Improve rough grassland for small mammal habitat.



Typical Section 6
Section through meadow network.



A Nature Network for People



A Path Network for all

The River Leven Connectivity Project will create a strong network of main paths along and across the river park, and there will also be unsurfaced paths through woodlands and mown through grassland areas. These paths will generally be aligned to run alongside other landscape features such as swales, wildflower-rich verges, hedgerows and orchards, so that people can easily enjoy the variety of habitats. In the swamp and wet woodland areas of the floodplain, new paths may be along raised boardwalks that can be submerged during times of flood.

The paths will have attractive and durable waymarking so that a number of circuits of varied route length can be created for people to explore and to set as challenges for walking or running. An interpretation plan will highlight wildlife and heritage features seen from the routes.

Edible Landscape

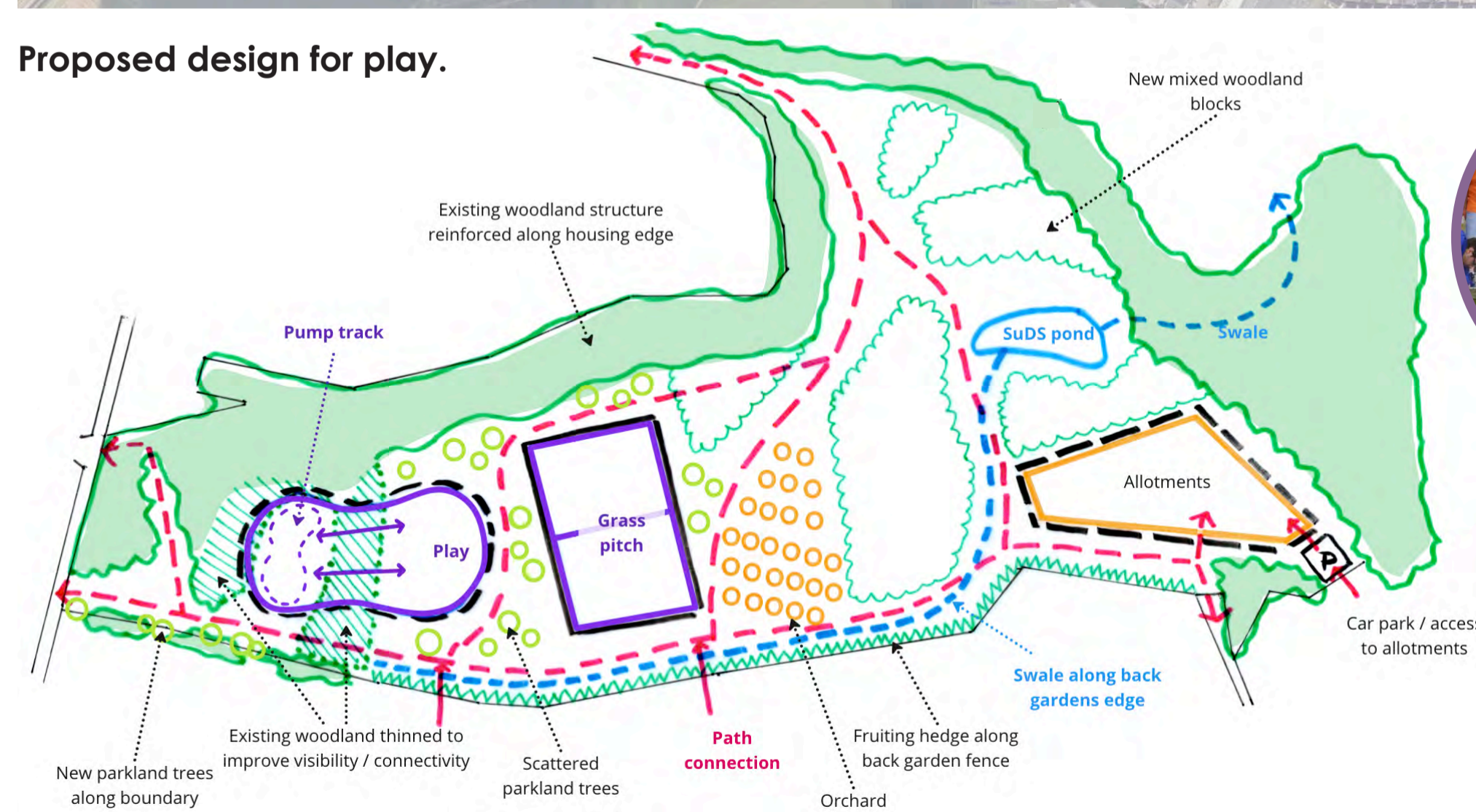
The Nature Network will provide diverse opportunities for people (and birds) to find and grow produce.

- Foraging – wild fruiting plants incorporated into the native woodland, hedgerow and scrub habitats. e.g. Raspberry and blackberry thickets, sloe and damson scrub, blackcurrant and blackberry understorey to woodland glades.
- Orchards – Local community orchards to expand upon the successful work already done in Methil and Buckhaven by CLEAR, creating attractive groups of fruit trees within wildflower meadow.
- Allotments – Formal growing spaces to help local people grow their own healthy fruit and vegetables as part of a supportive allotment group with shared tools and resources.
- Community Garden – As part of the Community Hub project in the creosote site, some raised beds will support gardening as one strand of this initiative.

Playful Nature

People of all ages and stages in their life should feel welcome to enjoy the Nature Network, and it will be woven with playful features that encourage interaction with nature.

Proposed design for play.



Pond dipping

Pond dipping platform



Edible planting

Community management of greenspace such as orchards.



Woodland play

Winding paths through the park allow us to get lost in nature.



Outdoor Classroom

Community free planting can involve everyone in creating a rich environment.



Woodland play

Woven willow features that evolve over time through management by the community.



Bug hotels

Bug hotels, bird and bat boxes, offer holls and log piles can all be made with people's help.



Natural play

Natural play features created from materials found on the site or nearby.

- Pond dipping platform in the wetland zone
- Coppicing of woodland to provide smallwood for den building
- Felled logs as habitat and for natural building play
- Robust carved features such as wild animals, as touchstones, play features and perch seats
- Woven willow arches, tunnels, mazes and chambers
- Balance features, stepping stones across swales
- Low-tech rope swings and slacklines on mature trees
- Cycling circuit path on old blaes pitch

The programme of works to create and sustain the Nature Networks will include a range of activities suited to community involvement so that local people can shape and feel invested in their park. This will include tree planting, wildflower seeding, orchard management and community growing.

Integrated Nature Networks

