

A photograph of Bradbourne Lakes. The water is dark and reflects the surrounding green foliage. A large tree branch with vibrant green leaves hangs over the water from the right side. In the lower right, a small, fluffy, brown animal is perched on a rock in the water. The overall scene is peaceful and natural.

Bradbourne Re-Bourne

Condition Report and Vision 2023

Photograph of Bradbourne Lakes by kind permission of Derek Medhurst - Sevenoaks Camera Club

1 - Introduction

Introduction

This report sets out the project need and initial Landscape Vision proposals for Bradbourne Lakes in Sevenoaks, on behalf of Sevenoaks District Council.

It provides an introduction to the park including its historical development, current condition, the main issues, the need for refurbishment and landscape improvements, and the main key features; a description of the current structural features, condition of basic infrastructure including paths and bridges, and ecology; key opportunities and constraints; a breakdown of the outline areas of differing character; a series of outline proposals culminating in a Vision Plan with some precedent images.

The majority of the initial survey and design work was carried out in 2019 with an update in July 2022 to coincide with the Stage I Heritage Fund Application. Further survey work will be required during the Development Phase to refine and detail the proposals.

Project description

Bradbourne Lakes is a tranquil local park of historical and local significance, comprising a series of five ornamental lakes with waterfalls, cascades and a circular walking route set in areas of amenity grass, dense overgrown vegetation and clumps of trees, and some striking specimen veteran trees.

In 2012 the Bradbourne Residents' Association (BRA) carried out a visitor survey that recorded a strong desire for restoration. In 2015 an application was made by Sevenoaks District Council to the Heritage Lottery Fund for a grant to restore the park, which unfortunately was unsuccessful at the first round pass.

In July 2017 it was agreed to employ design consultants to prepare a Vision Plan for the park. This updated report seeks to provide a cohesive set of proposals to repair and restore the park in order to provide a high quality open space that is accessible to all, educational, sustainable, and preserved for the enjoyment of future generations.

Site particulars

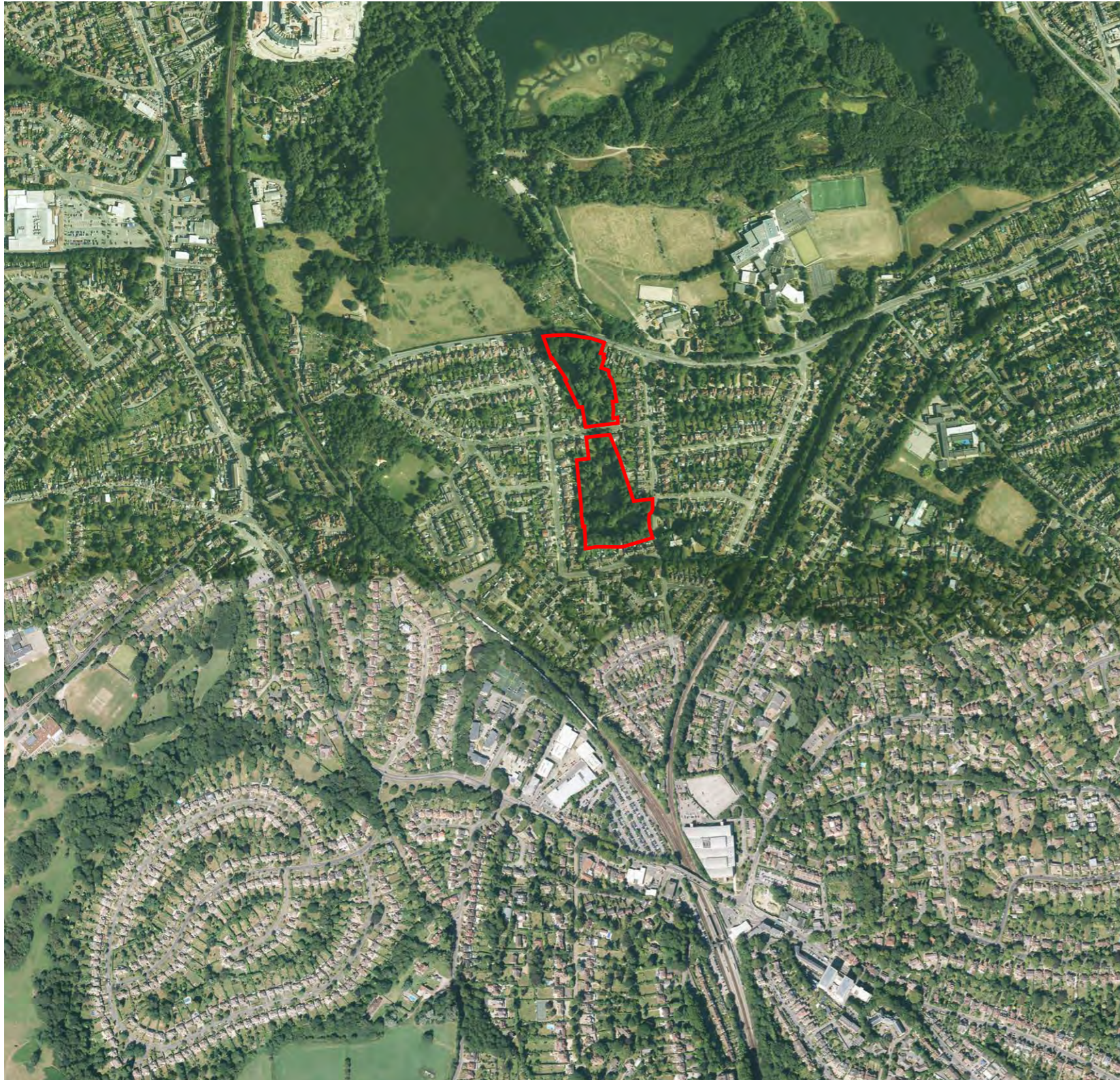
Bradbourne Lakes is identified within the Sevenoaks Local Development Framework and is in the Kent Compendium of Historic Parks and Gardens. This list includes a number of other historic parks and gardens which are both registered and non-registered, Bradbourne Lakes being the latter. However, the Local Planning Authority considers that it is an important part of the area's heritage and makes a significant contribution to the character of the area in which it is located.

The park is also categorised as Open Space, which includes both public and private spaces and covers any open space which contributes to the character of the locality and is important to the local community.

Other nearby considerations include the Sevenoaks Gravel Pits Site of Special Scientific Interest, as Bradbourne Lakes sits within its Impact Risk Zone. Also, the Clock Tower located to the south-west of the park is a Grade II Listed building and once formed part of the original Bradbourne Estate.

Lastly, the majority of the park sits within an area of High Risk Flood Potential for both flooding from rivers or the sea, and from surface water, all as determined by the Environment Agency. An area of high risk means that each year this area has a chance of flooding of greater than 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

Aerial photo - wider area



Aerial photo - local area



2 - Existing Site

Bradbourne Lakes is a tranquil local park located 2km north west of Sevenoaks town centre. It measures approximately 350m long x 100m wide, covers 3.5 hectares, and is severed nearly in half by Betenson Avenue. It comprises a series of five ornamental lakes with waterfalls, cascades and a circular walking route set in areas of amenity grass, dense overgrown vegetation and clumps of trees, and some striking specimen veteran trees.

The Bradbourne Residents' Association (BRA)

The Bradbourne Resident's Association was reformed in December 2011 to work towards the restoration and conservation of Bradbourne Lakes, as well as issues affecting local residents. The BRA now have in excess of 450 members from the boundary of the Bradbourne Estate Area of Sevenoaks Town. Exclusively from the membership, as well as other known regular contributors, they organise volunteer working parties (with the agreement of Sevenoaks District Council) to undertake small scale maintenance work within the capabilities of the participants. Such work comprises cutting and control of low planting, bushes and small trees, path edge trimming, and clearance of unswept debris. Some tasks such as removal of small fallen branches from the lakes are undertaken and where possible, with manual effort, water gullies, sumps and water falls are cleared of blocking debris.

Currently, the volunteer effort is limited to those from the membership of the BRA, although there are other organisations, clubs, schools and groups who have indicated a willingness to participate in maintenance and conservation work. However, this falls beyond the scope, resources, and capabilities of the BRA to manage large groups of volunteers, although they are encouraging of such third party involvement.

Existing site layout



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Existing site views



1. Views south over the ornamental lake



2. View north west over the ornamental lake



3. Southern park entrance from Betenson Avenue



4. View west over the central lake



5. Looking south through trees in northern open space



6. Eroded southern section of the central lake



7. View north close to entrance of northern park



8. View south across the north lake



9. View over 'island' within north lake

3 - Historical Development

Context - Historical significance

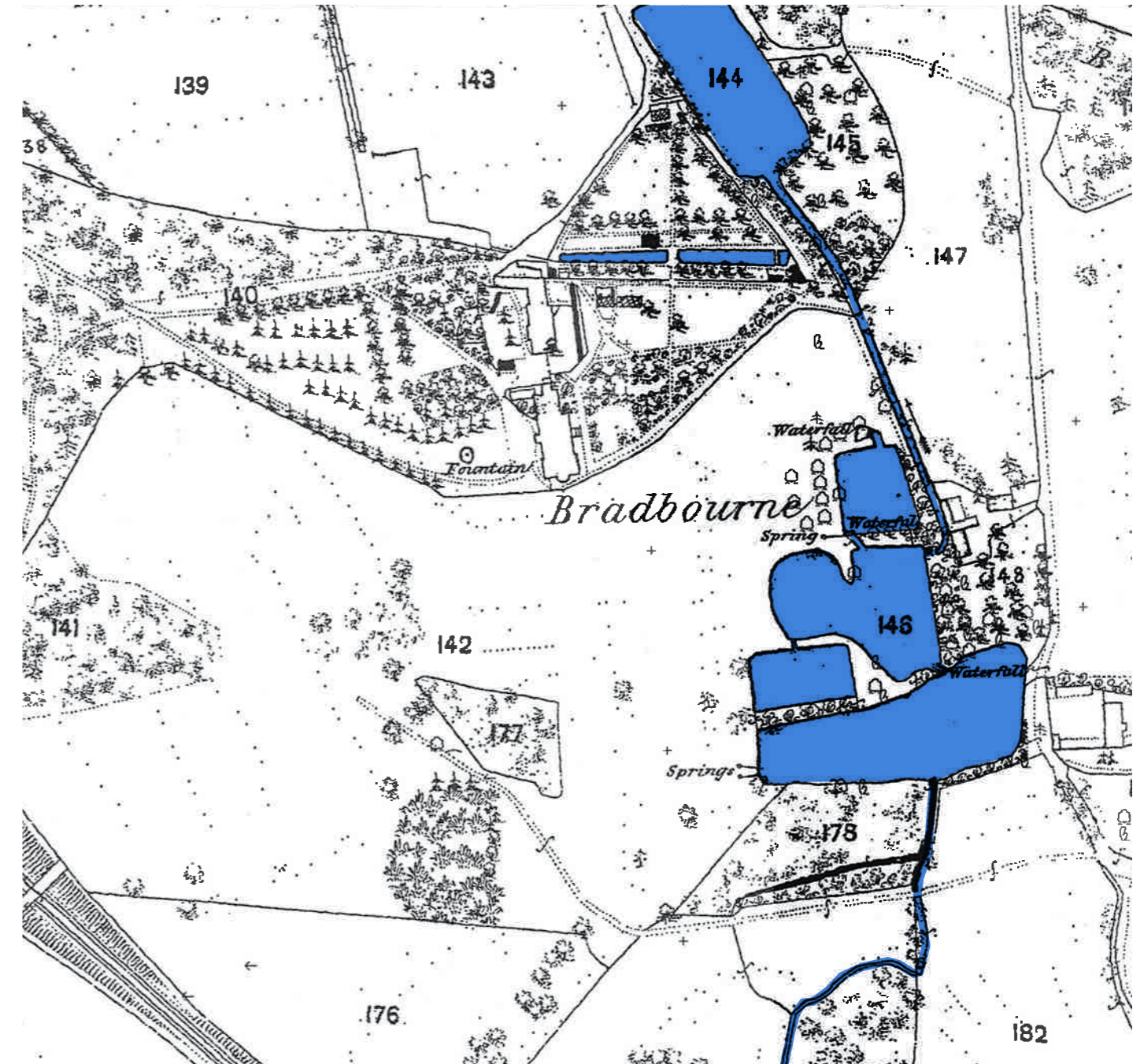
Bradbourne Lakes was formerly part of the Bradbourne Park Estate, first laid out between 1740-1761 by Henry Bosville as a picturesque landscape of lakes and waterfalls, forming the setting for the house of the same period. In 1870 Francis Crawshay purchased the estate and retired to Bradbourne Hall. He had an interest in Druids and brought to the grounds and surrounding area of Bradbourne many stone monoliths from within the British Isles. These were erected in lines and circles according to Druid practice, and still survive today mostly within the back gardens of the surrounding houses. In 1896 Major William Gore Lambard inherited the estate and by 1926 had sold off the contents followed by the house the following year. The land was eventually passed to the New Ideal Homesteads Company which laid out new streets and, over the subsequent 30 years, undertook much domestic building. In 1935, the land in the centre of this development, surrounding the chain of artificial lakes, was transferred to Sevenoaks Urban District Council with a covenant to maintain it as a public park. Finally, in 1937, the mansion was demolished.

Some of the original picturesque features such as waterfalls built of local ragstone still survive, although the lake edges have deteriorated in places, with evidence of more recent repair works involving metal shuttering and concrete. The lakes themselves are heavily silted from years of deposited leaf matter from overhanging trees, and little in the way of de-silting management. The woodland areas are overgrown and have contributed to the damage to the lake edges in places, and there are several examples of self-seeded trees that have added to the dense and wild nature of some areas of the Park. Some of the lakes are dominated by Geese, who have destroyed large swathes of grass and whose faeces has contributed to eutrophication of the lakes, resulting in their need to be managed.

Bradbourne Lakes has a local friends group in the form of the Bradbourne Residents' Association (BRA) which was reformed in December 2011 to work towards the restoration and conservation of Bradbourne Lakes as well as all issues affecting local residents. They are an active group who have recently carried out maintenance work involving the clearance of some of the overgrown vegetation areas. This is in addition to the conservation and management work carried out by the Council involving tree works and replacement of fences.



Historical Site Layout

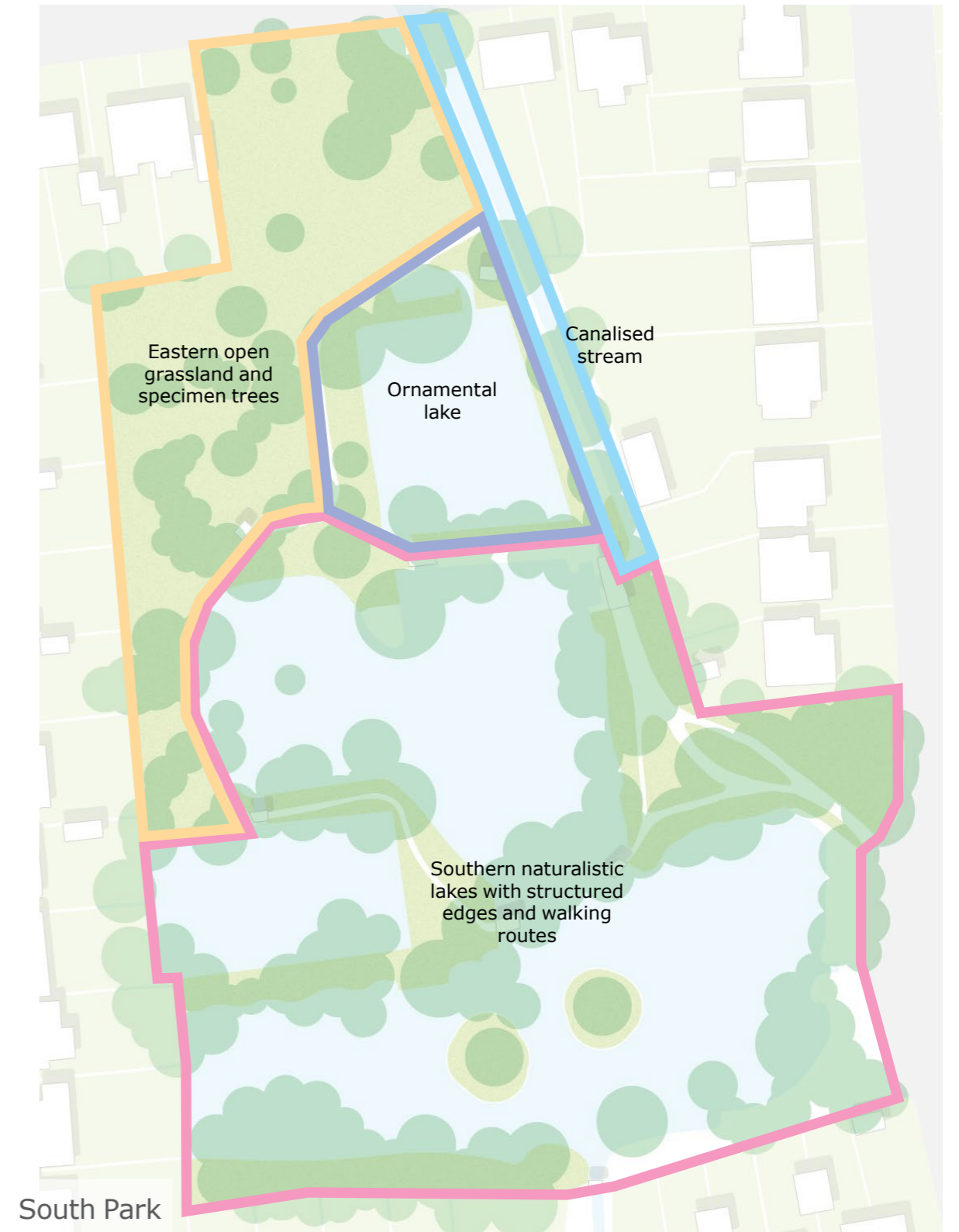
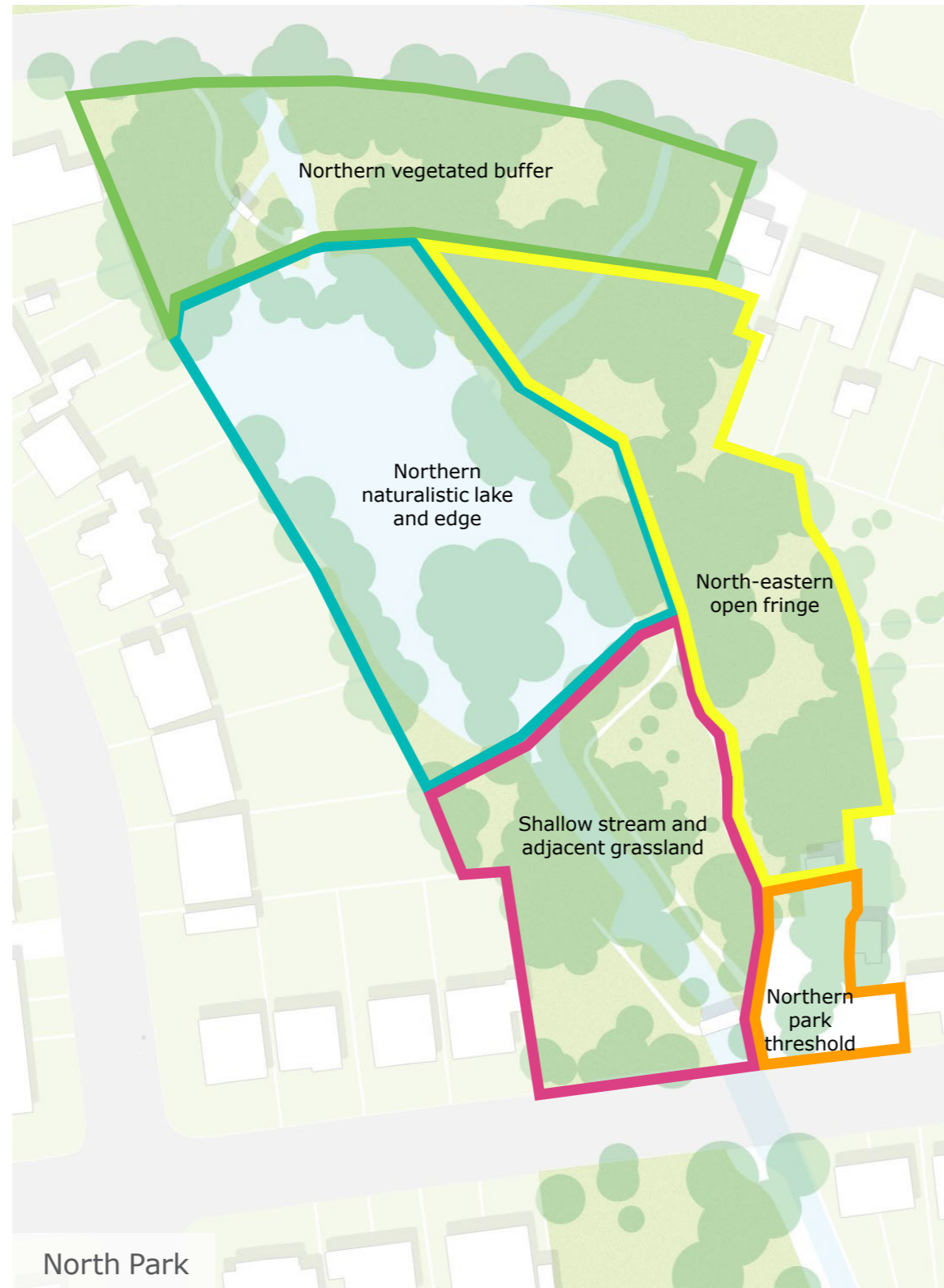


Mid 19th Century Produced using ESRI (UK)'s MapExplorer 2.0 - <http://www.esriuk.com>

4 - Character

Outline Character Areas

The park has been split into broad areas of similar character, in order to assist with any proposals that may or may not be suitable within each of those spaces.



North Park

Northern vegetated buffer:

- Dense woodland buffer bordering Bradbourne Vale Road (A25) screening vehicular traffic from view.
- Includes the northern most stream that outfalls towards Sevenoaks Wildlife Reserve further north.
- Incorporates a narrow woodland path to the northern gate.



Northern naturalistic lake and edge

- Large open lake with a more natural character than the others in the southern park.
- Naturalised lake edges fringed with mature and veteran trees.
- Back gardens face on to the lake from the western edge, making the lake publicly accessible on three sides only.



North-eastern open fringe

- Long thin strip of land along eastern boundary adjacent to back gardens.
- Open grassland interspersed with trees and clumps of hazel coppice
- Includes a small overflow from the adjacent lake, in the form of a shallow ditch.



Shallow stream and adjacent grassland

- Shallow, accessible stream and island, with stone edge of varying condition.
- Adjacent grassland with small clumps of trees.
- Pedestrian bridge on to a dead-end path. Paths are narrow and informal in nature.



Northern park threshold

- Entrance space into northern park, including entrance boards.
- Includes space previously housing toilet block and library.
- Space used for storing of recycling bins.



South Park

Eastern open grassland and specimen trees:

- Open area of amenity grass interspersed with individual specimen trees.
- Contains the monolith stone and some interpretation.
- Space used for various events and functions as more of the 'front door' and arrival space into the park.



Ornamental Lake

- Rectangular lake, ornamental in character and used for model boating.
- More formal in character with a brick upstand edge to the entire perimeter.
- Includes an ornamental cascade in and out of the main pool, with a focal point for seating around paving at the main outfall.



Canalised stream

- Outfall stream along the eastern boundary that takes the main overflow over an ornamental waterfall from the southern upper lakes.
- Stream is brick and stone lined but in varying degrees of physical condition.
- Planting lines the embankments which is quite dense in places.
- The stream continues under Betenson Avenue into the north park.



Southern naturalistic lakes with structured edges and walking routes





- Collection of three lakes to the southern most end of the park which are more naturalistic in character.
- Predominantly natural edges which, due to erosion, have been restrained and strengthened in places with brick upstands or steel shuttering.
- The South Lake and Central Lake both have a small inaccessible central islands, generally with overgrown vegetation.
- The lakes are inter-connected with a range of cascades and sluices, which eventually flow either into the ornamental lake or the overflow stream.

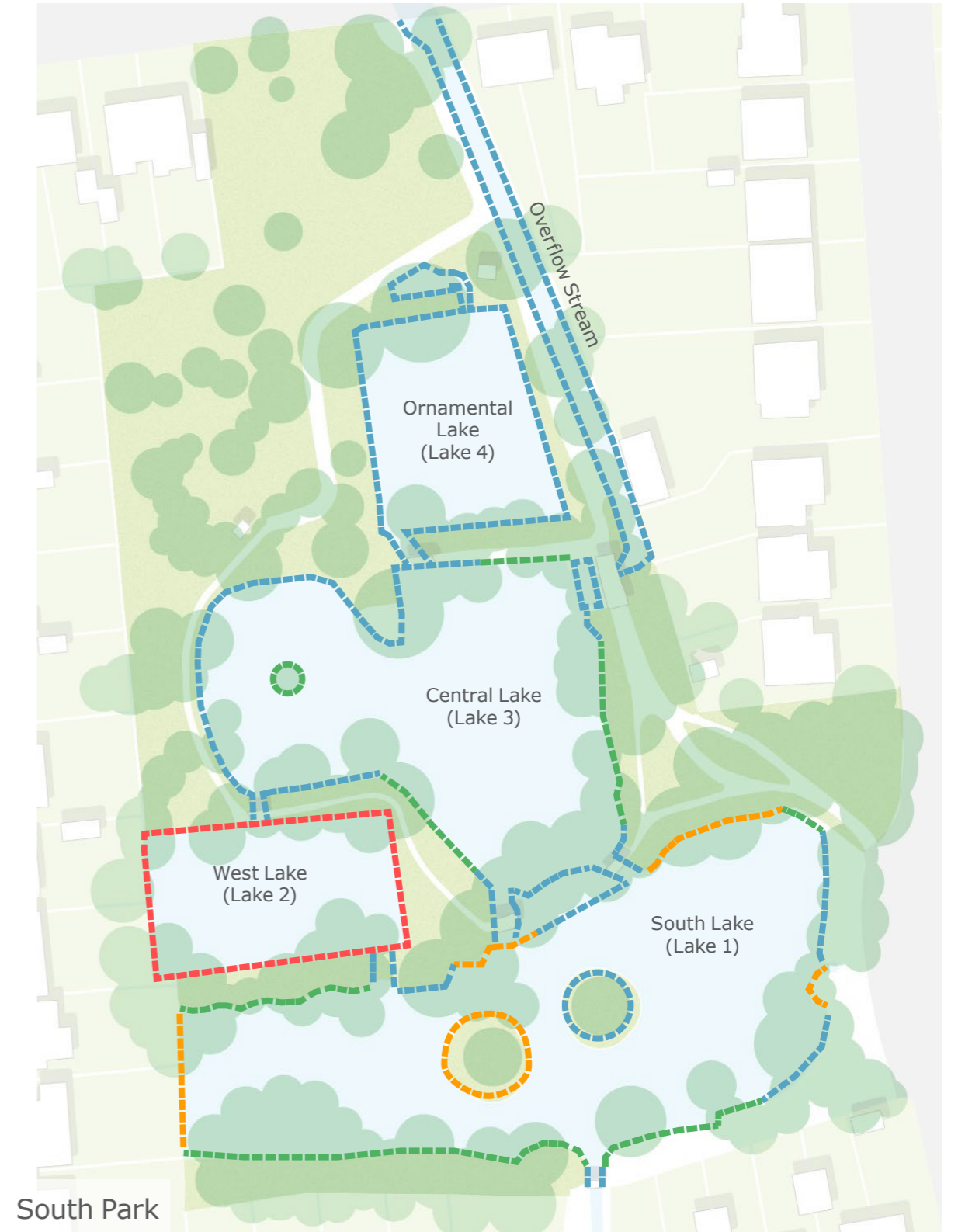


- Narrow winding paths in poor condition weave between each of the lakes - the Darent Valley footpath SU11 runs through both North and South parks..

Lake character

Each of the lakes has a different character from one another, including different edge treatments. Therefore any proposals should reflect this and be appropriate to their setting individually and collectively.

-  Ragstone/brick edge
-  Metal shuttering
-  Shuttering with brick coping
-  Natural edge



South Lake (Lake 1)

- Large lake to the southern end of the park. Most naturalistic in character with some edge areas to the south and west that are inaccessible to the public.
- Receives the main inlet from Thames Water and the tributary from the River Darent, as well as water from adjacent natural springs.
- Site of inflow from circulation pump.
- Has three main outlets in the form of waterfalls and sluices.
- Has two small inaccessible islands with overgrown vegetation.
- Seems to have received the most amount of lake edge reinforcement, with a mixture of natural earth banks in places, and some areas with concrete reinforced steel shuttering.
- Is surrounded by mature trees, many with overhanging branches over the water.

West Lake (Lake 2)

- Rectangular lake with steel shuttered edges capped with a brick on edge coping.
- Is fed from natural springs and one inlet from Lake 1 and features one outlet channel into Lake 3.
- Surrounded by dense tree cover and ground vegetation, and is the most enclosed lake feeling much darker than the others.
- Feels like the most under-used lake, only being publicly accessible on the north-east bank (approx 30% of its total perimeter).

Central Lake (Lake 3)

- Large odd shaped lake, the result of two individual lakes being joined together sometime in the past.
- The west side has a greater sense of formality to it, with a brick coping to its perimeter, a more open edge character, and a centralised circular island. The east side is less formal and features a large amount of overhanging self-seeded trees which have assisted with the erosion and destruction of the lake edge.
- The east edge features one of the more prominent

ornamental features in the form of a large waterfall into the overflow stream.

- The lake is fed from three inlets from Lakes 1 and 2, and has two outlets into Lake 4 or the overflow stream.
- There is a footpath to the entire perimeter, and all edges (except for a few areas of overgrown vegetation) are accessible.

Ornamental Lake (Lake 4)

- The most ornamental lake is rectangular and has a more formal setting than the others, with ragstone and brick edging.
- It is fed via one inlet from Lake 3 only, and has one outlet over an ornamental water cascade which then enters a below ground pipe that leads to the overflow stream and another under the footpath.
- Has some tree canopy coverage from surrounding trees, but is fairly open in character.
- A small gargoyle is located in the south-eastern corner.
- Has a footpath to the entire perimeter, and all edges are accessible.

North Lake (Lake 5)

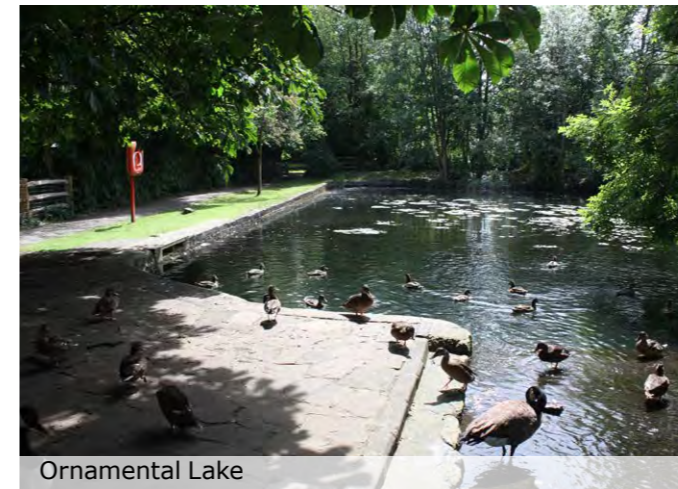
- More naturalistic in nature than the other lakes, but a fairly rectangular shape.
- Only fed from the main overflow stream from the southern park.
- Has three overflow points via sluices and weirs, which drain towards Bradbourne Vale Road to the north of the park, and towards Sevenoaks Wildlife Reserve further north.
- Predominantly restrained with a brick/ragstone edging, although most edges are fairly inconspicuous from overgrown vegetation.
- There is a large inaccessible vegetated island towards the southern end.



North Lake



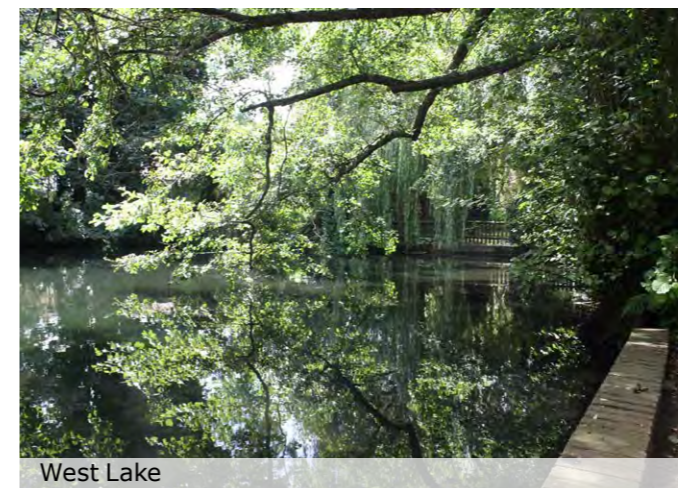
North Lake



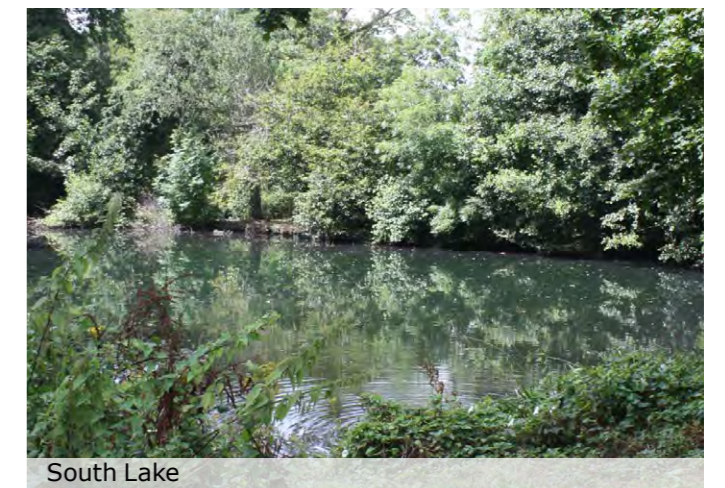
Ornamental Lake



Central Lake



West Lake



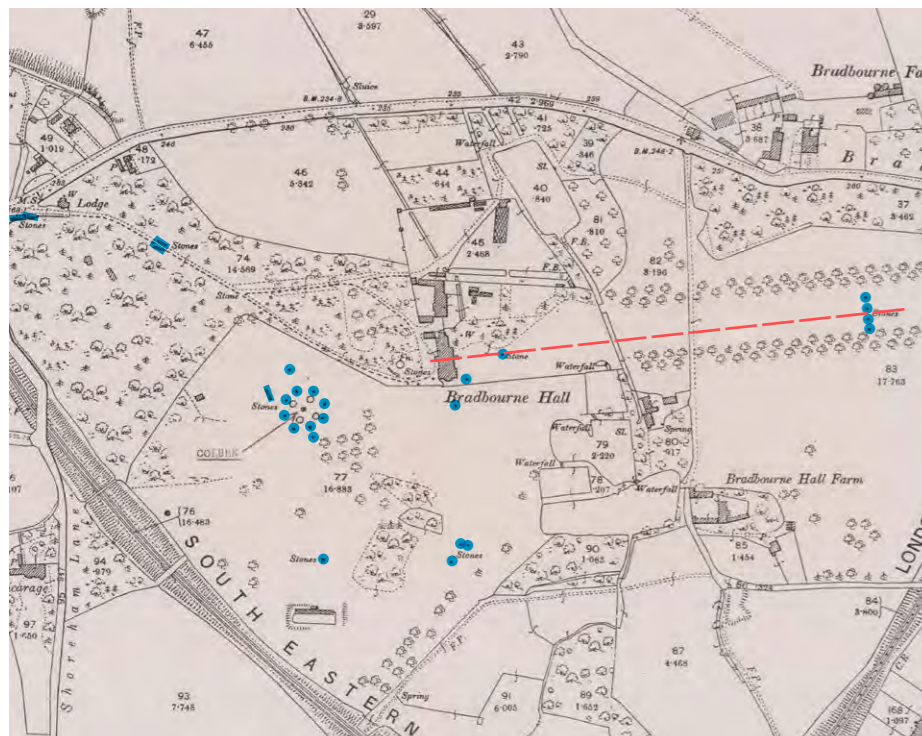
South Lake

5 - Key Features

Historic Value

- Good example of a picturesque landscape
- Francis Crawshay's druid legacy survives - seen in the presence of a stone monolith in the garden of 5 Pontoise Close, which is described by English Heritage as a "tall Doric column of red Cornish granite", as well as other standing stones dotted around the back gardens of nearby residents and the impressive monolith in the south park itself, moved from its original setting in the garden of 22 Robyns Way a decade ago.
- Interesting historic estate with a large Hall, now lost below the surrounding streets and houses.

The park and the immediate local area has a rich and diverse history which is currently under-exploited and generally unknown. But there are many surviving remnants of the previous estate including the lakes themselves, standing stones, various ornamental water features, and several veteran trees.



Late 19th Century - Location of druid stones within the Bradbourne Estate



Picturesque landscape



Stone monolith within the south park

Ecological Value

- Standing water
- Broad-leaved woodland
- Grassland
- Hazel coppice
- Bare earth
- Flowing water - waterfalls
- Specimen and veteran trees - several remaining from the historic estate

The park currently offers a reasonable ecological value, from a variety of water fowl to invertebrates, but this could be significantly enhanced through a number of simple interventions. Generally increasing the biodiversity of the park through development of a range of habitats may attract a mixture of new species that could help improve the water quality through oxygenation. If oxygen is present throughout the water at all times, beneficial aerobic microorganisms and insects feed on the organic sediment which will ultimately result in a cleaner lake bottom.



Historic hazel coppice



Areas of bare earth suitable for nesting birds and invertebrates



London plane tree, listed on the Kent Heritage Trees list - 5890



Flowing water and marginal plants



Standing water with overhanging tree canopy

Cultural Value

- Ornamental lake previously used by model boating enthusiasts but now has too much silt
- A space for social events, such as Easter egg hunts, picnics and music concerts
- A unique park with an identity and character of its own
- Volunteer working parties organised by the BRA
- A strong and passionate local community who care about the future of the park

The park is a much loved local resource for a wide variety of community members. The Bradbourne Residents' Association (BRA) organise bi-monthly working parties to help maintain the park. They also organise social events such as Easter egg hunts, picnics and music concerts.

There are other numerous historic events and activities that are either no longer popular or are becoming increasingly difficult to sustain, such as the affect the lake silting has on the use of the ornamental lake for model boating.



Members of a BRA working party



Sevenoaks Scale Model Boat Club



Santa visits the lakes



Christmas market stalls



Easter egg hunt

6 - Main Issues - existing condition

Site wide issues

Bradbourne Lakes faces a number of challenges, with several areas and park features that require repair or restoration. Below and the following pages highlights some of the main issues faced:

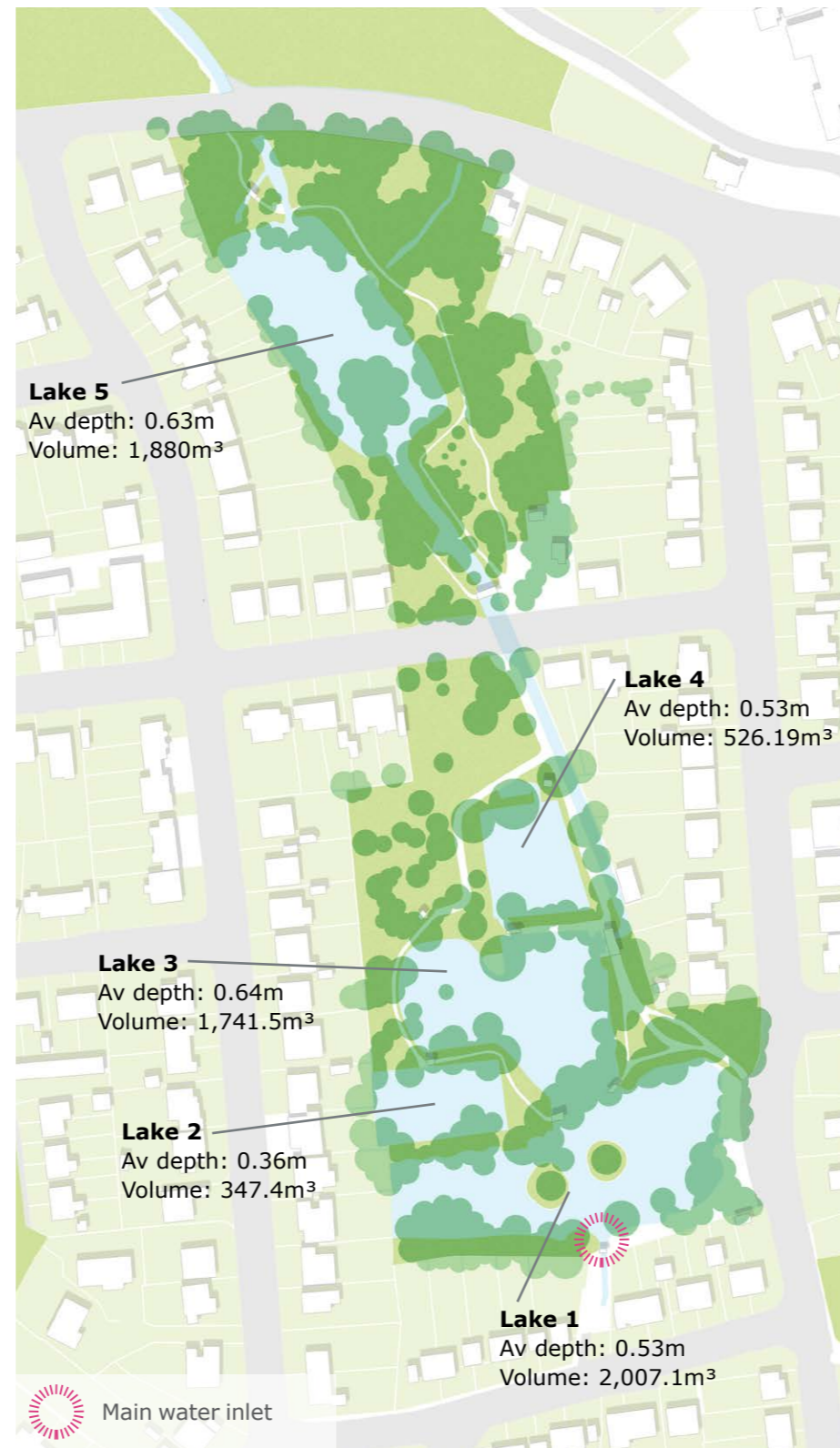
Lake Silt

The lakes are heavily silted up due to leaf drop from overhanging trees. This has implications on the local ecology and recreational use such as paddling in the shallower sections, and the sailing of model boats which has traditionally been a popular pastime. Currently, the required capital works to get the lakes back into good condition are far beyond existing maintenance budgets. Silt samples were taken in 2014 by Sevenoaks Environmental Consultancy Ltd, in order to help with future dredging proposals. The samples and laboratory analysis recorded potentially elevated concentrations of sulphates, sulphur, ammonia, speciated PAHs (Polycyclic Aromatic Hydrocarbons) and TPH (Total Petroleum Hydrocarbons). Additionally WAC (Waste Acceptance Criteria) analysis indicated that due to elevated concentrations of sulphate, antimony, loss of ignition (LOI) and total organic carbon (TOC) the lake silt would be likely to be classified as 'non-hazardous' for disposal to landfill. Additionally the volume of silt for each lake was calculated by measuring the depth in several locations. The average depth and volume is shown opposite, although this will be updated during the Development Phase.

One of the main causes of the silt accumulation within the lakes is due to the natural water courses and residential/road run-off that enters Lake 1 from the southern most part of the park. Following a combined meeting with the BRA, SDC, Thames Water and Kent Highways in 2014 it was agreed that Thames Water would be responsible for routine inspection, maintenance and emptying of the silt traps at the main water course entry point, and Kent Highways would carry out bi-annual cleansing and clearing of appropriate street gullies.

Another contributing factor to excessive silt build-up is from the many over-hanging trees and vegetation that surround the lakes and deposits leaf material and branches straight into the water. Geese feces is another contributing factor.

Silting



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Accumulation of silt and debris within the waterfall area close to the ornamental lake



Excessive silt material within the south east corner of Lake 4

Hydrology



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Waterfall within ornamental lake



Outlet in north lake



Sluice within the central lake



Waterfall in central lake

The five artificial lakes which form Bradbourne Lakes were created on a tributary of the River Darent which flows into the park moving from south to north.

The lakes receive water from a catchment area which makes up much of Sevenoaks. They largely depend on ground water levels although a water pump pumping water from nearby Redlands Lakes is activated when water levels are low due to dry weather. The pump flows directly into the south lake from the north-eastern corner. The lakes are also supplemented by two natural springs on the south-east of the park also flowing into the south lake.

The interconnected chain of lakes are linked through a series of waterfalls, and controlled by sluices to limit flow rates. A number of these flow control features require attention to increase their functionality and aesthetic value.

Overgrown vegetation

The trees and shrubs that surround the lakes are overgrown and lack regular maintenance beyond that which is necessary for safety, access or the health of the vegetation. There are numerous self-seeded trees, and in some places their position on the edge of the lake is contributing to the erosion, silt accumulation, and destruction of structural and ornamental features. The BRA organise volunteer working groups (with the agreement of SDC) to undertake small scale maintenance work within the capabilities of the participants, such as cutting back of bushes and small trees. But a thorough arboricultural assessment is required, that seeks to rationalise the existing trees and make recommendations for long-term management.



Overgrown vegetation and trees collapsing into lake



Vegetation beginning to break up wall structures

Eroded Pathways

The majority of pathways in both the north and south park are in need of either resurfacing or complete relaying.

Many of the paths are too narrow to accommodate wheelchairs and push chairs. The surface has also become quite uneven and fractured due to tree root damage. There is an existing circular walking route within the park, although there are sections that are not joined with a hard surface. The park would benefit from a fully surfaced joined up walking route, providing the opportunity for a meaningful circular route.

These access issues have reduced the audience with some visitors no longer able to safely use the park.



Macadam paths disintegrating



Pathways with no clear edges



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Too narrow to accommodate a wheelchair or buggy



Pathways end abruptly



Hazardous crazy paving in need of repair



Damage to macadam due to tree roots

Structural decay of walls, edges and features

Many of the structural features require repair. As trees have naturalised along lake edges they have caused stone and brick work to crumble and collapse into the lake.

Similarly the waterfall close to the ornamental lake has begun to fall into the water.

Initial assessments have been carried out in order to cost up the repair work required.

It is also felt that, once de-silted, the ornamental lake would benefit from a full condition assessment.



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Gargoyle head in need of maintenance



Repairs to stonework required



Eroded lake banks in central lake



Crumbling walls



Collapsed stream wall



Waterfall wall in need of repair



Naturalised trees damaging edges



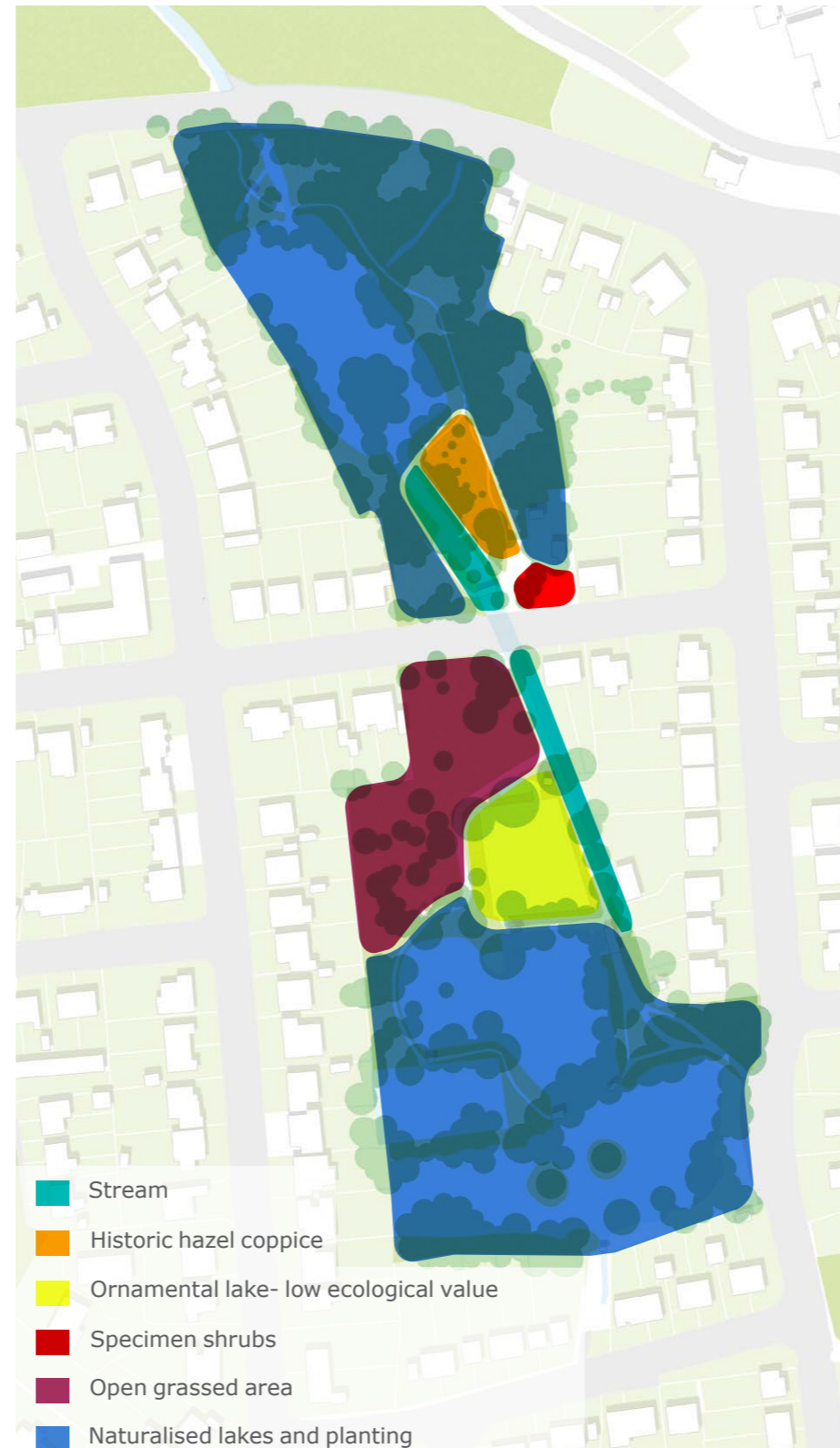
Tree roots pushing out stone walls

Ecology

The park currently offers varied opportunity for ecology and biodiversity through the differing landscape characteristics. Although there are considerable issues with large areas of stagnant water with low nutrient and ecological value. The areas of naturalised planting which bookend the park at the northern and southern sections provide the greatest opportunity for a variety of wildlife habitats.

The varying types of water in the park attracts numerous waterbirds. An ecology study was carried out in 2006 which revealed over 15 types of birds visited the park including - Moorhen, Mallard, Greyleg Goose, Coot, Egyptian Goose and Aylesbury duck. The number of waterbirds visiting the park, though welcome, do contribute to poor water quality, silt and a reduction in broader ecological diversity. The more formal lakes such as the ornamental lake have a lower ecological value while the streams and less formal lakes, namely the north, south and central lakes have greater potential for biodiversity to thrive.

The park is also home to a number of veteran trees which are vital for a wide range of flora, fauna and, in particular, fungi. These veteran trees are traces of the historic Bradbourne Estate which include a scattering of specimen trees and shrubs such as a monkey puzzle tree in the south park, as well as a small hazel coppice and a veteran plane tree in the north. Also, memorial trees such as a Dawn Redwood found in the North park. Other notable tree species include alder and willow which are typical of a waterside location, and also a number of cob and plane trees.



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Waterbirds



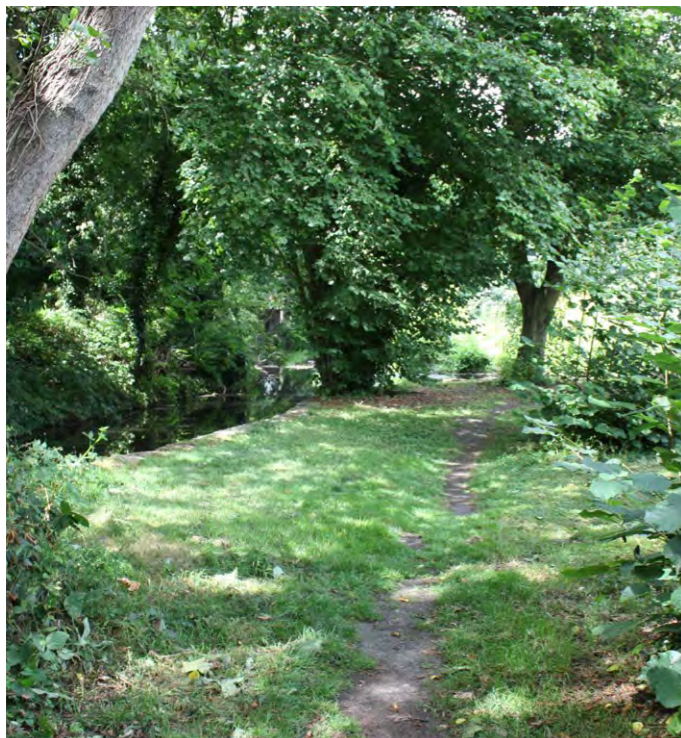
Mature tree propped up to prevent uprooting



Specimen trees remnants of the historic estate



Impressive veteran trees



Shaded woodland style areas



Areas of stagnant water that offer low ecological value

Other issues

- **Removal or degradation of features that encourage long stay visitors**
The lack of public conveniences was cited in the BRA's survey as deterring some visitors from staying longer and it is believed their inclusion would also help encourage greater attendance at events at the park. Despite the recent addition of new benches, it was felt seating could be improved too which would also likely increase dwell time.
- **Unknown historic value**
The history of the park is poorly known to the local community. The park has a rich and varied history, once being part of a much larger estate, but it is the remains of a history now built over. For instance the north park is home to the second largest plane tree in Sevenoaks, which has been included in the 'focal' first by the Sevenoaks Society. There are some small interpretation panels at the entrances to both the north and south park, but these provide a limited amount of information.
- **Lack of visitor facilities**
The BRA have identified that the introduction of other park features such as a pavilion structure or a small children's play area could enrich the area and provide additional reasons for local people to visit and spend time in the park. There are considerable opportunities to link to wider town footpath/walking routes and the wetlands beyond.
- **Lack of volunteer facilities**
There is currently an old shed that is used for storage of tools and materials for volunteers and events. If this could be replaced by a simple building offering toilets, tea making facilities and shelter a wider range of volunteering activities and events could be accommodated.
- **Links to the wider landscape**
As well as promoting the park to the local population the project would aim to draw in visitors from the wider area. There is also the Sevenoaks Wildlife Reserve to the north which is run by Kent Wildlife Trust which could be promoted alongside Bradbourne Lakes, potentially sharing facilities

Vision Plan

Water aeration fountains to help move water and increase oxygen levels

Marginal aquatic planting to increase biodiversity and water quality

Restore existing wall either side of stream

Continuation of existing pathway and creation of stepping stones over stream

Native hedge planting to screen residential fences

Repair waterfall wall

Wildflower planting

New pathways to connect to existing

Water aeration fountains to help move water and increase oxygen levels

Use of silt to screen road

Log piles

Re-surface paths

New natural play area

Site office style volunteer building

Repair existing stream wall

Resurface crazy paving

Desilting of ornamental lake and conservation of the lake edge

Interpretation boards/signs strategically positioned around the park














Re-surface paths

New seating positioned around the park

Management of 'islands' with overgrown trees



Notes
 Do not scale from this drawing.
 All dimensions are drawn in millimetres.
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- Key**
-  Site Boundary
 -  Existing trees
To be retained. Dashed line indicates Root Protection Area. Refer to Arboricultural Report and LUC drawing no. 12135-LD-PLN-102 & 102 for further details.
 -  Existing planting
To be retained.
 -  Existing shrubs
To be retained.
 -  Proposed hedge planting
Refer to LUC drawing no. 12135-LD-PLN-401-402 for further details.
 -  Proposed marginal planting
Refer to LUC drawing no. 12135-LD-PLN-401-402 for further details.
 -  Proposed trees
Refer to LUC drawing no. 12135-LD-PLN-401-402 for further details.
 -  Macadam
Refer to LUC drawing no. 12135-LD-PLN-201-202 for further details.
 -  Self binding gravel
Refer to LUC drawing no. 12135-LD-PLN-201-202 for further details.
 -  Stepping stones
Refer to LUC drawing no. 12135-LD-PLN-201-202 for further details.
 -  Yorkstone paving
Refer to LUC drawing no. 12135-LD-PLN-201-202 for further details.
 -  Bark mulch
Refer to LUC drawing no. 12135-LD-PLN-201-202 for further details.
 -  Resin Bound Gravel
Refer to LUC drawing no. 12135-LD-PLN-201-202 for further details.



No	Date	Description	Drn	Chk
A	02.08.22	Stage 2 - Final Issue	LC	BS

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Project
BRADBOURNE LAKES

Client
 Sevenoaks District Council

Scale @A1
 1:500

Status
 RIBA Stage 2

Drawing Title
 Landscape Masterplan

Job Nr
 12135

Drawing Nr
 12135-LD-PLN-100

Issue
 A



Environmental Information

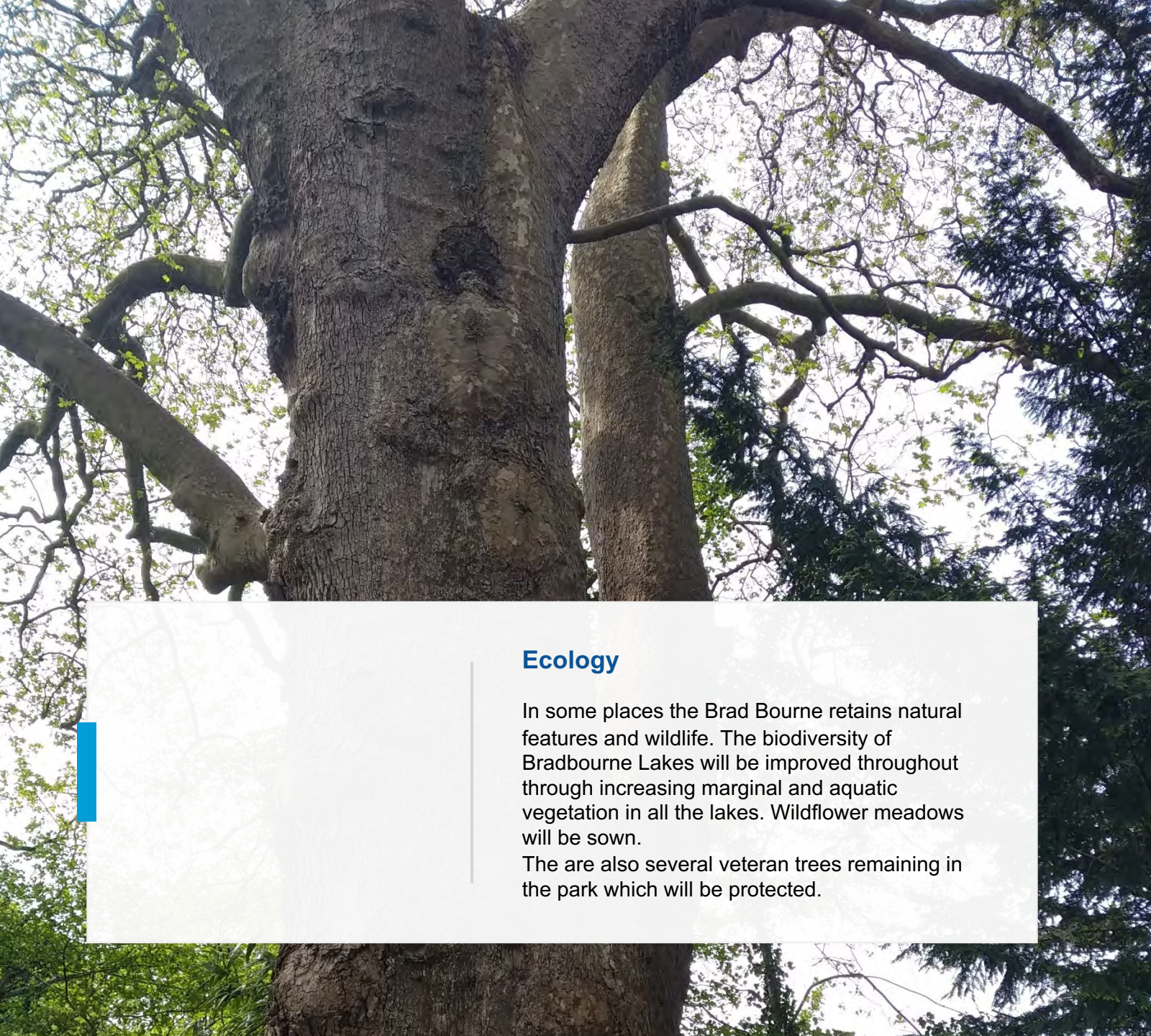
Bradbourne Re-bourne

Water Quality

The water quality is sometimes reduced through pollution incidents. This can be through misconnections or contaminated water being disposed of down drains. Bradbourne Re-bourne will take a multi-agency and community approach to tackling this. Reedbeds will clean the water before it leaves the lakes.

Eutrophication is an issue with algal blooms in summer. This is mainly due to the silt. This will be resolved through removing silt, and the reedbeds will remove additional nutrients. These reedbeds will be maintained through periodically removing vegetation.

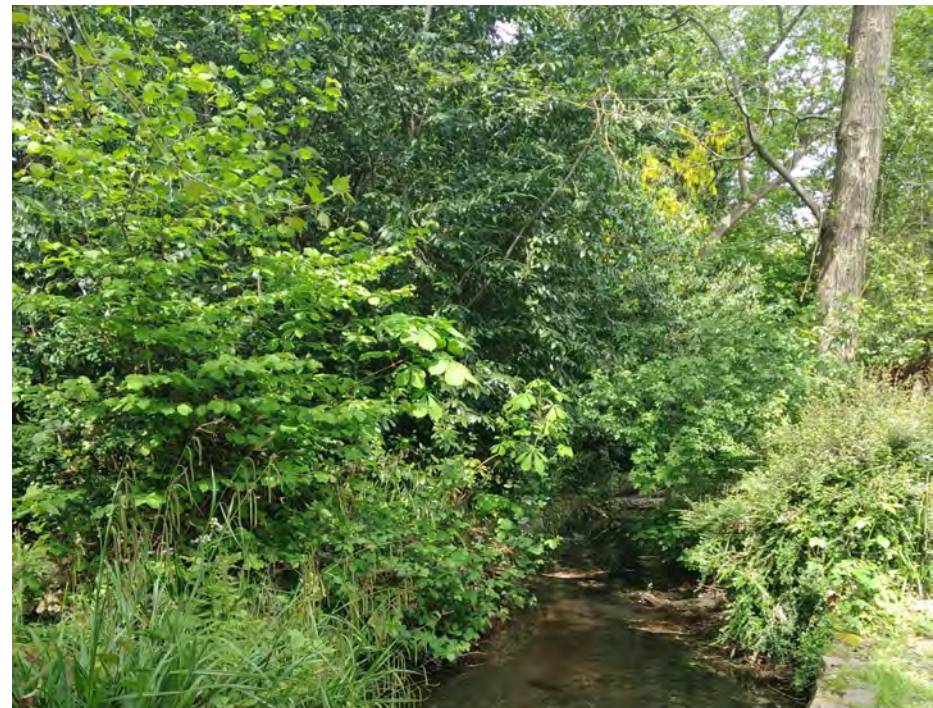




Ecology

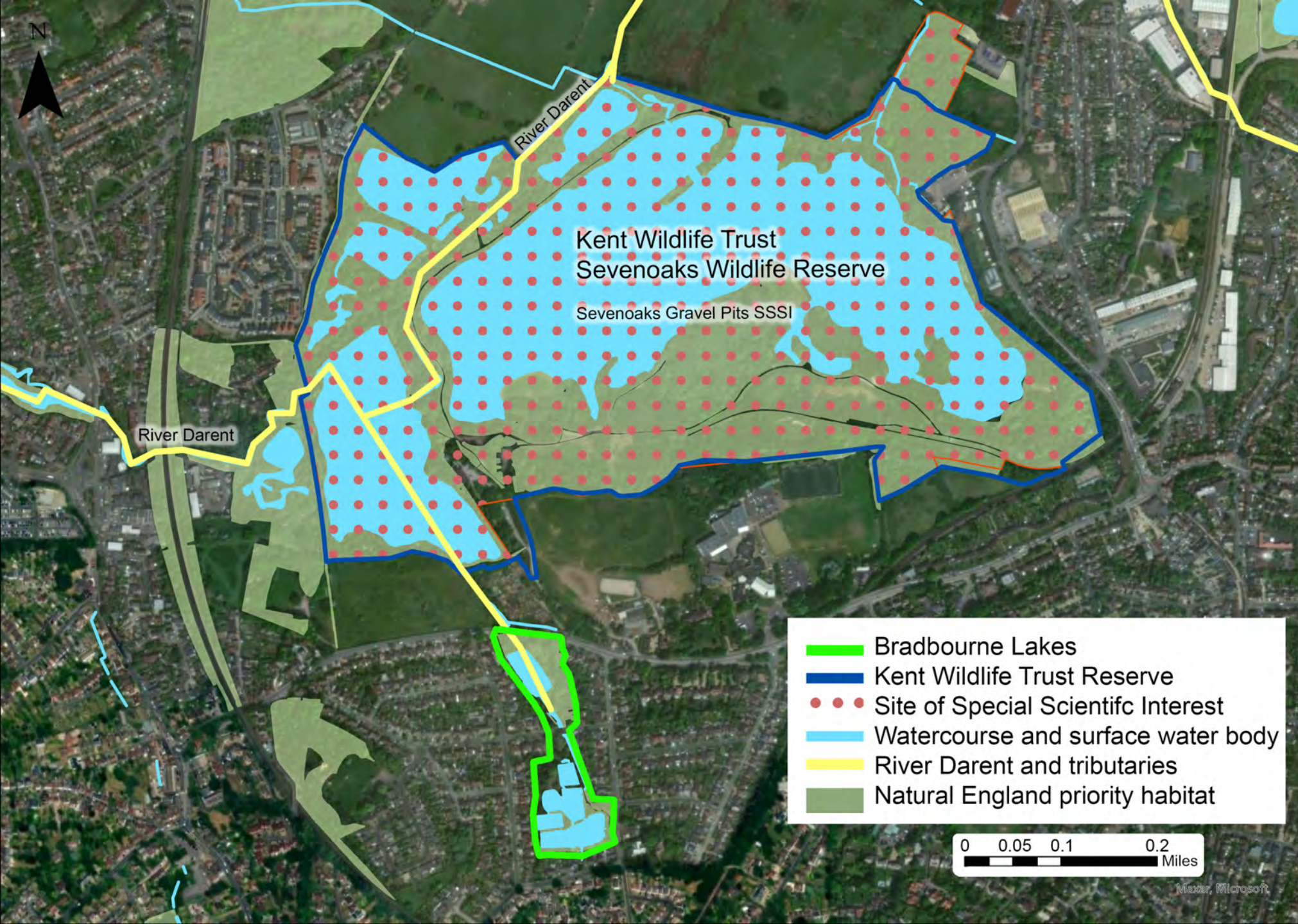
In some places the Brad Bourne retains natural features and wildlife. The biodiversity of Bradbourne Lakes will be improved throughout through increasing marginal and aquatic vegetation in all the lakes. Wildflower meadows will be sown.

There are also several veteran trees remaining in the park which will be protected.



Marginal and aquatic vegetation will be planted, improving biodiversity across the whole park and in all the lakes.








Hydrological and Ecological Connections

Water from Bradbourne Lakes feeds directly into the Kent Wildlife Trust Sevenoaks Wildlife Reserve, which is a SSSI, and into the River Darent.



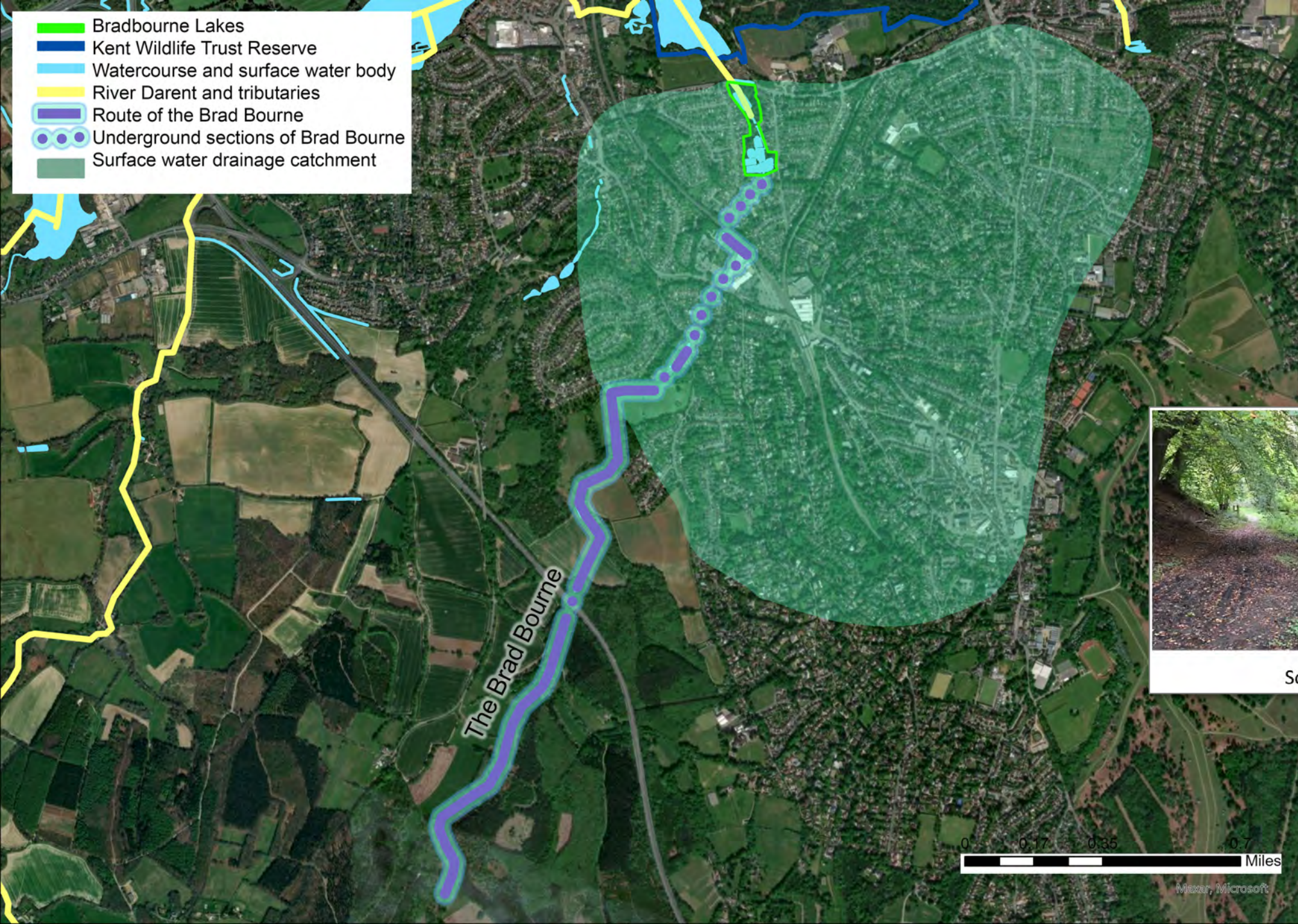
SSSI Impact Risk Zones (England) © Natural England

Discharge

-  Any discharge of water or liquid waste of more than 2m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.
-  Any discharge of water or liquid waste that is discharged to ground (ie to seep away) or to surface water, such as a beck or stream.
-  Any discharge of water or liquid waste that is discharged to ground (ie to seep away) or to surface water, such as a beck or stream.

SSSI Impact Zone

Bradbourne Lakes is within the SSSI impact zone.



- Bradbourne Lakes
- Kent Wildlife Trust Reserve
- Watercourse and surface water body
- River Darent and tributaries
- Route of the Brad Bourne
- Underground sections of Brad Bourne
- Surface water drainage catchment

The Brad Bourne and Surface Water Drainage Catchment

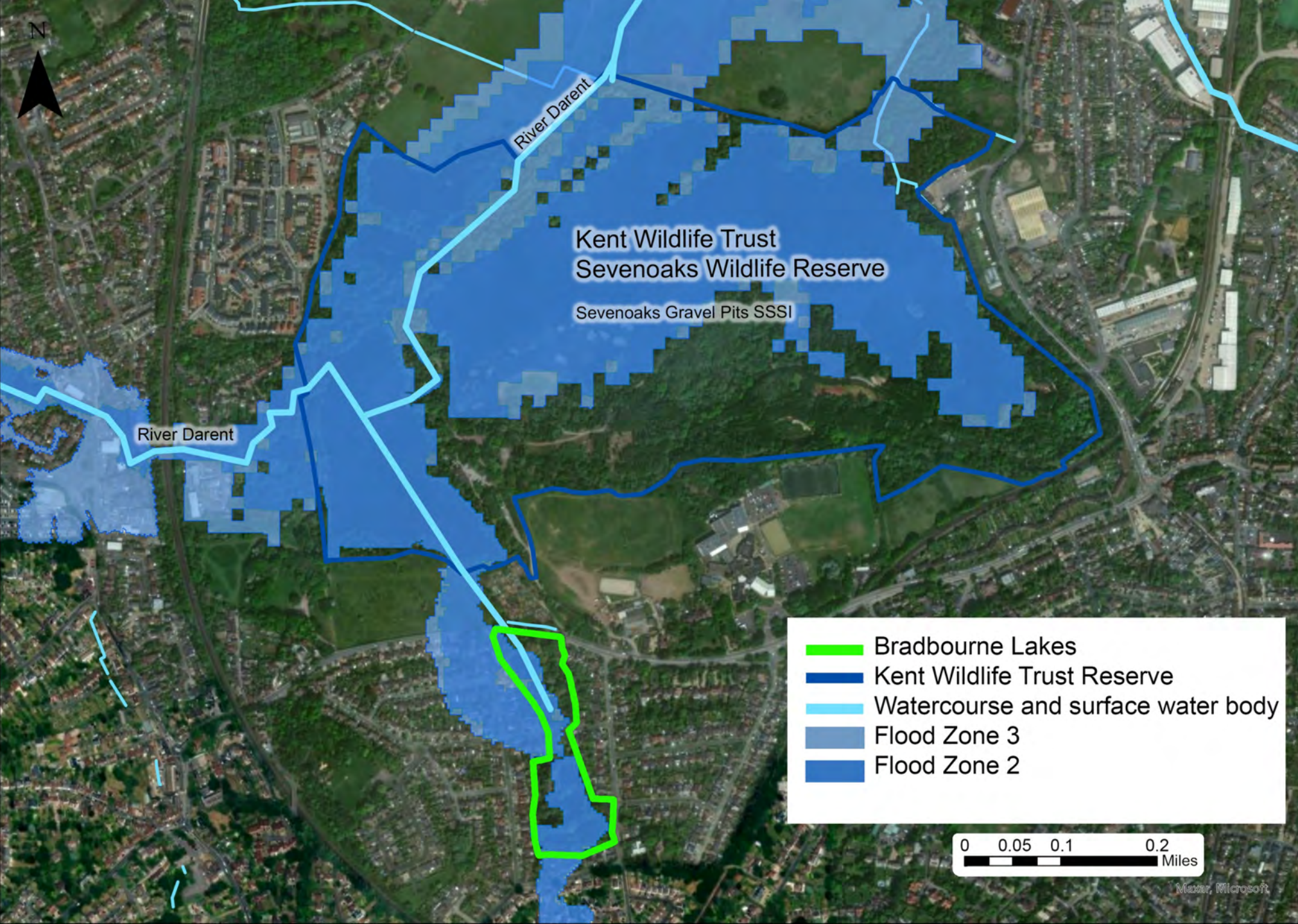
The Brad Bourne flows from the south west originating in the countryside beyond urban Sevenoaks. It flows underground as it nears Bradbourne Lakes.



Source of The Bradbourne

Water from a large surface water drainage catchment now also enters the lakes.



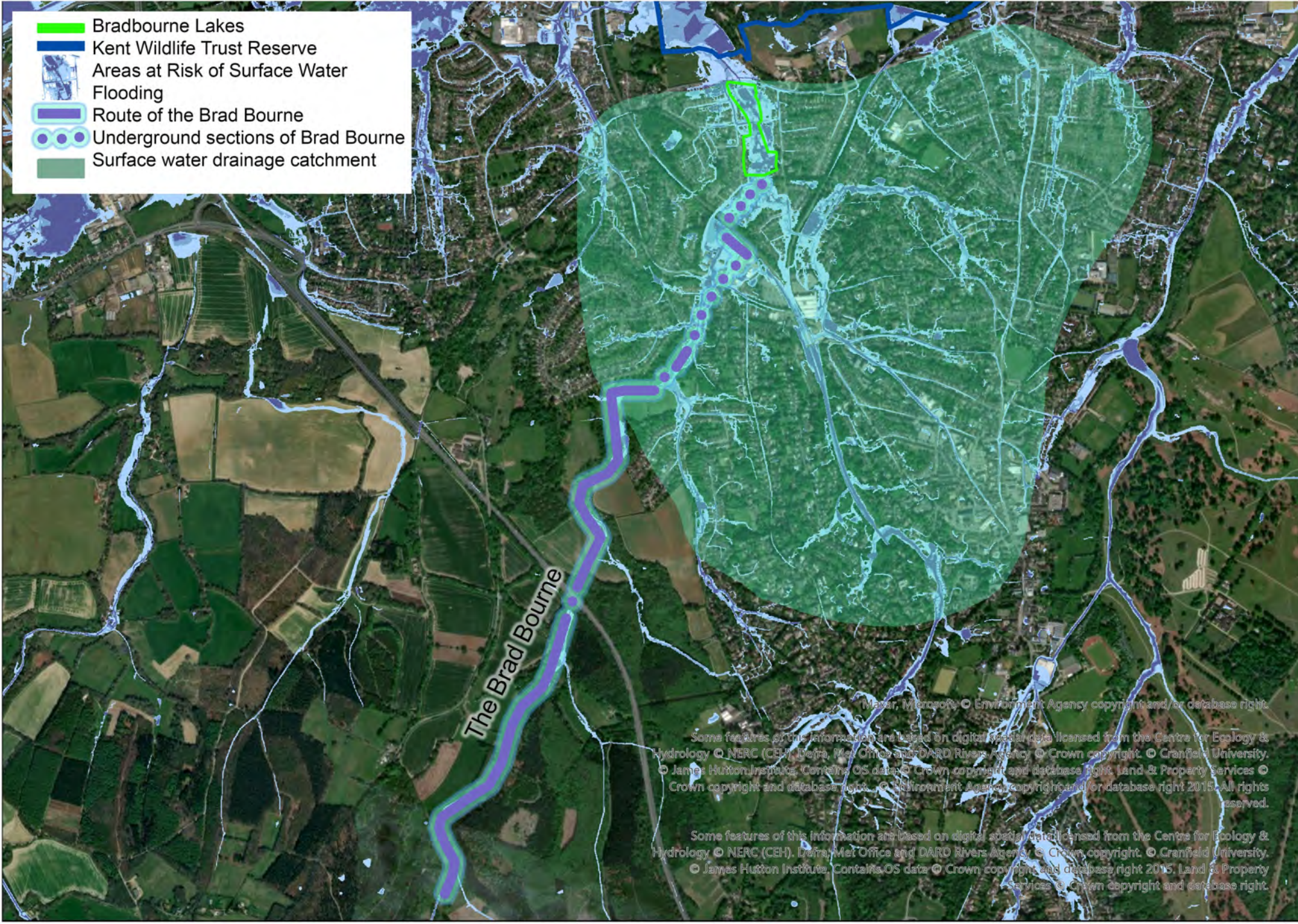


Flood Zones 2 and 3

Bradbourne Lakes lies within the Environment Agency's Flood Zones 2 and 3.

The Brad Bourne in flood through the park shown below.





Risk of Surface Water Flooding

Surface water flooding and overtopping of the surface drains will increase pollutants. The reedbeds in the lakes will clean the water before it flows into the SSSI, KWT Reserve and River Darent.