Waterways Management Plan

Alexandra Park, Hastings

2016-2026

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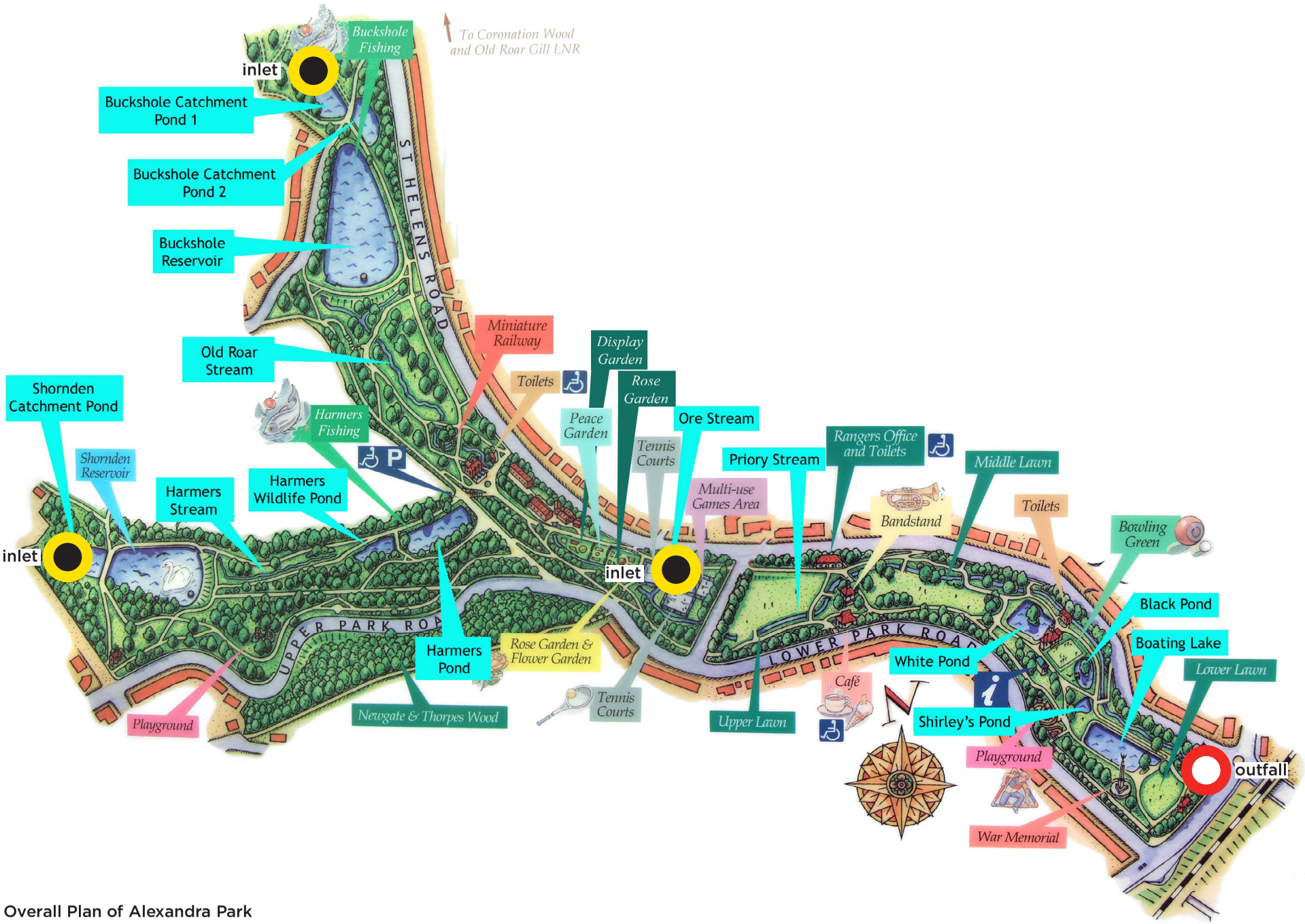
Contents



Overall Plan of Alexandra Park

1.0 Alexandra Park - A Public Space developed around the Old Roar Gill stream

Alexandra Park is a major public open space in Hastings focused around the Old Roar Gill stream before its final journey to the sea.

In 1852 Shornden and Harmers Reservoirs were built to supply water to the town's growing population quickly followed by Buckshole reservoir before the Park was laid out and planted by Robert Marnock in 1877. Remnants of this Victorian freshwater supply system are still in place today but no longer serving the community. There is also a main sewer pipe running through the valley floor of a Local Nature Reserve at the top of the park know as Old Roar Gill.

Alexandra Park was officially opened on June 26 1882 by the Prince and Princess of Wales. The 109 acre Park is a Grade 2 Designated Site in the 'Register of Parks and Gardens of Special Historical Interest'.

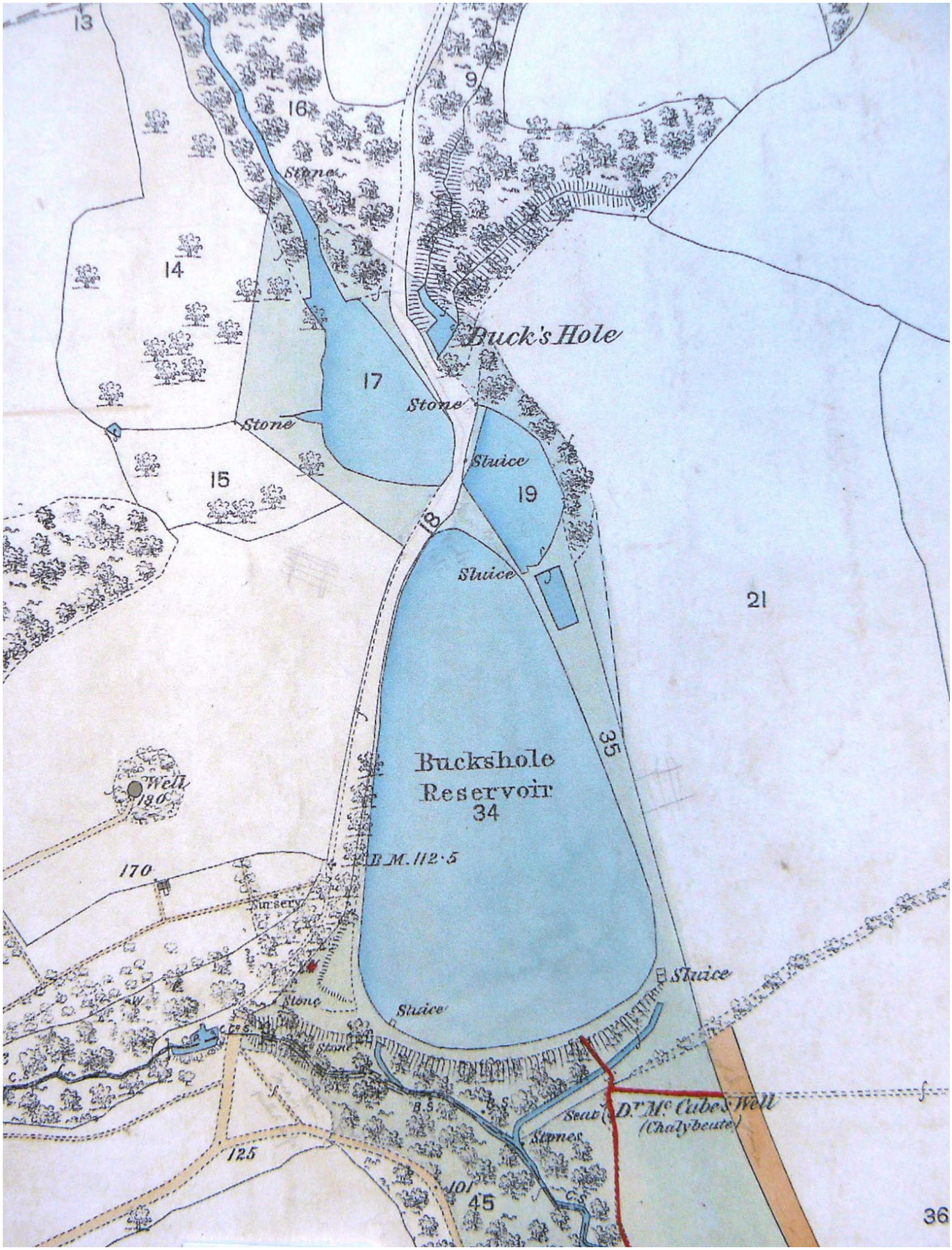
Water is a key feature within the Park. One of the main waterways begins where the Old Roar Gill rushes into the first of the settlement ponds, above Buckshole Reservoir and flows along concrete channels through the Arboretum and Ornamental Gardens where two other tributaries join it. The stream then flows past the Bandstand before passing by three ponds and the Boating Lake into a sewer that runs under Hastings town centre and onwards to the sea.

Two side streams enter the park, Harmers Stream which flows through Shornden Reservoir and Harmers Pond just upstream from where the Ore Stream makes its way from Helens Wood to join the park next to the tennis courts. A number of pipe inlets carry water from roads and surrounding development into the Park.

The collection of flows turn into Priory Stream, just upstream of the Bandstand passing to the north of White Pond, Black Pond, Shirley's Pond and the Boating Lake, before leaving the Park in a sewer which discharges into the sea some 3/4 of a mile away.

There are a number of small pools, wetland flushes, wells springs and seepages into the valley sides that complete the picture of the way water that has determined the character of the Park.

Water is at the heart of Alexandra Park.



Historic map of Buckshole Wetland

2.0 The Quality of water in the Park

In the past, long before the Park was created, the Old Roar stream would have risen gently as rain trickled through the woodland leaves and grassy meadows, on it's way through the valley.

The stream would have widened as it reached the flatter part of the valley flowing through wetlands full of reeds and other water loving plants on its journey to the sea. The water would have been clean and full of wildlife.

As the catchment area around the Park develops so the water runoff from buildings and hard standing surfaces reaching the valley stream grows. A lot of the muck and mess on these hard surfaces is carried straight to the stream. Housing and business developments has an even greater impact with many pipes containing sewage connected to the wrong outfall and flowed directly to the stream.

Dealing with misconnections and preventing run off entering the waterways has become very difficult. Some work has been done to correct these misconnections but this will always be an ongoing issue. These misconnections, which should have gone to the treatment works through the foul sewer have contaminated the stream. It has now become necessary to treat the waterways in a variety of ways to raise the quality of water flowing through the Park and out to sea.

Nature can work wonders but it requires the right set of conditions to do this effectively, by slowing the water down and allowing friendly microbes to flourish they can clean it for us. Firstly it is important to remove silt wherever possible and then spread the water across a wide planted wetland. In dry periods the stream flows slowly through vegetated channels to catch any remaining silt and allow natural breakdown of pollution. During heavy rain larger volumes of water can flow past some of these features as the effect of pollution is diluted.

Finally water is encouraged to flow through ponds and wetlands that mimic the original wetlands which probably existed in the distant past to 'polish' the quality of water before leaving the Park for the sea.

The improvements to the Park designed to increase the quality of water in the stream, are described in the following pages of this document.

Maintenance of wetland by hand

Take care during the bird nesting season

3.0 Management principles - Looking after the Park

The natural treatment of water in Alexandra Park predominately takes place in wetlands, the planted stream channels and enhanced ponds towards the lower Park.

All treatment in the Park happens passively by the beneficial effect of microbes. These microscopic organisms need a habitat to live in which is provided by the vegetation, gravel and soils through which the water flows. As water travels through the Park habitats, the microbes begin the treatment of pollution and the removal of pathogens that cause disease, by feeding on them and breaking down organic matter into simple compounds like carbon dioxide, oxygen and water.

The management of these habitats requires maintenance to keep the habitat healthy and support the microbes that do the work. In order to keep the microbes working effectively, it is better to manage little and often rather than disrupt the habitats where they live.

It is fortunate that the Ground Maintenance Team and Rangers are stationed with the Park as this allows regular care of the various elements of the Park pollution treatment system. Some of the necessary maintenance is included within routine maintenance of the Park.

Litter removal and disposal should be undertaken regularly as water features attract litter. More litter is not being generated, the features just act as a collection point where visible mounds build up these should be removed as soon as they are seen. Detritus, general litter and any physical blockage must be cleared as necessary throughout the year.

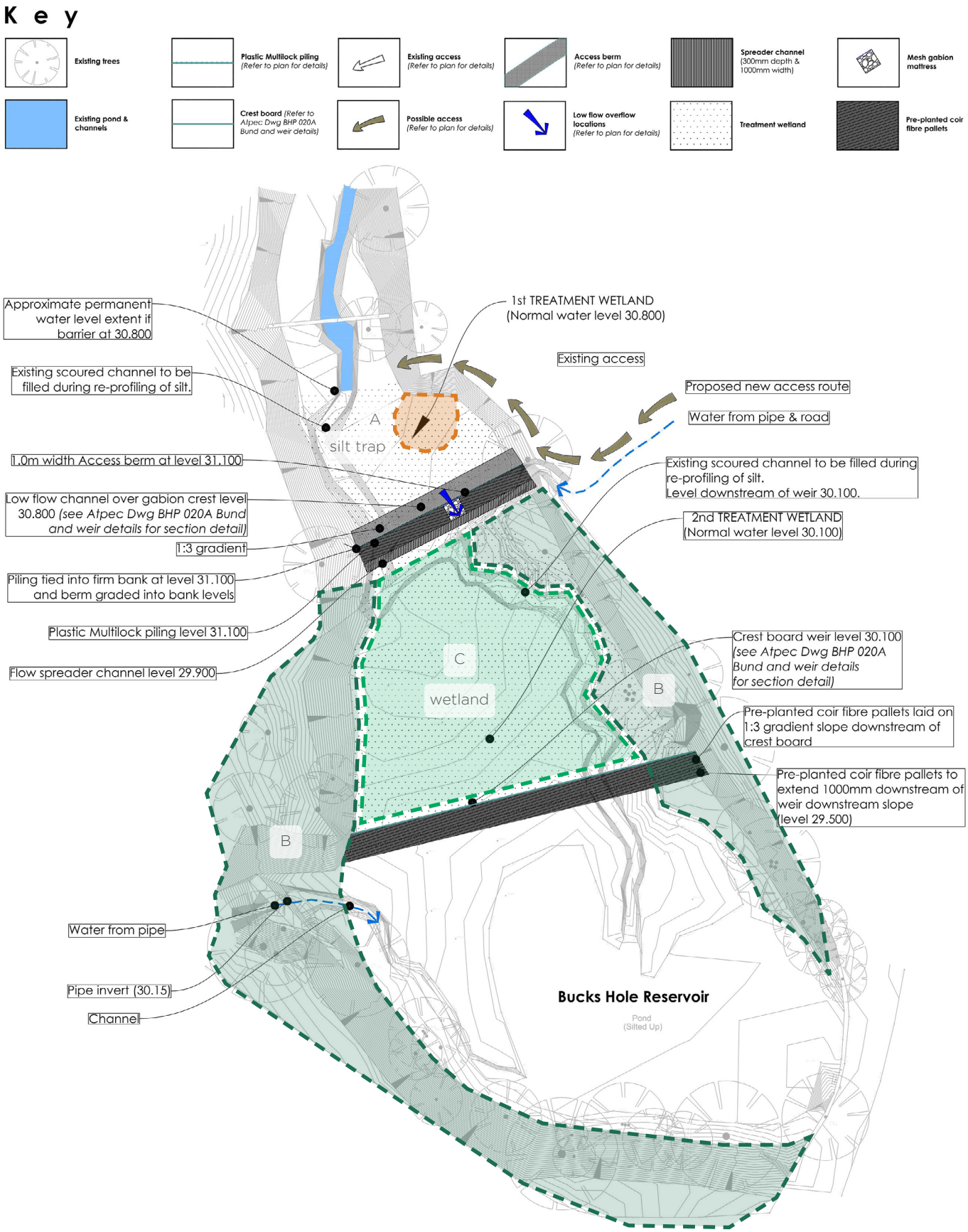
Fallen leaves need to be removed where necessary in autumn. Wetland vegetation should be left until early spring just before growth begins to ensure suitable habitat for microbes. Vegetation should be cut and removed in sections (maximum 30% at any one time) so that no area is completely denuded of cover. The outcome should be a mosaic of vegetation rather than a single clear cut.

Little work needs to be done from February onwards until the autumn and this late season work is largely cosmetic. This ensures minimum damage to the habitat that benefits all wildlife.

Tree work can be carried out early to late winter before the bird nesting season (1st March - 31st July) and all vegetation cutting and removal should be done before new growth happens in spring.

Most of the green waste generated on site will be re-cycled with the borough and reused as compost. Small quantities of silt can be removed from areas of the waterways and reused locally. Any large quantities must be disposed of at landfill in accordance with relevant guidelines and correct permits and exemptions sourced at www.gov.uk.

To encourage the greatest amount of sun light into the stream the vegetation needs to be controlled along both sides of the entire lenght by 2 meter and removed off site, as well as any saplings. Work should be carried out between February and March.



Plan of Buckshole Wetland

4.0 Managing treatment wetlands - The Buckshole wetland

Artificial wetlands, sometimes called Integrated Constructed Wetlands or ICWs, need good light to encourage vegetation growth. These systems therefore need occasional cutting to clear congested growth and the colonizing by trees need to be prevented.

It is important that water flows as a sheet through the vegetation to maximize treatment without the creation of any short cuts or channels to bypass any areas within the wetland. Therefore, a long weir stretching from one side of the valley to the other has been created to prevent any channelling of the flows in the Buckshole wetland.

Wherever silt is being brought down a stream, as with the Old Roar Gill, a silt trap enhances the life of the wetland. The silt trap is located where the Old Roar Gill leaves the steep sided valley and opens out into the wetland. A second weir reduces the flow rate and encourages silt deposition. The edges of the weir should be kept vegetated to trap silt but an area should be excavated annually, probably in late summer, to keep the silt trap functional.

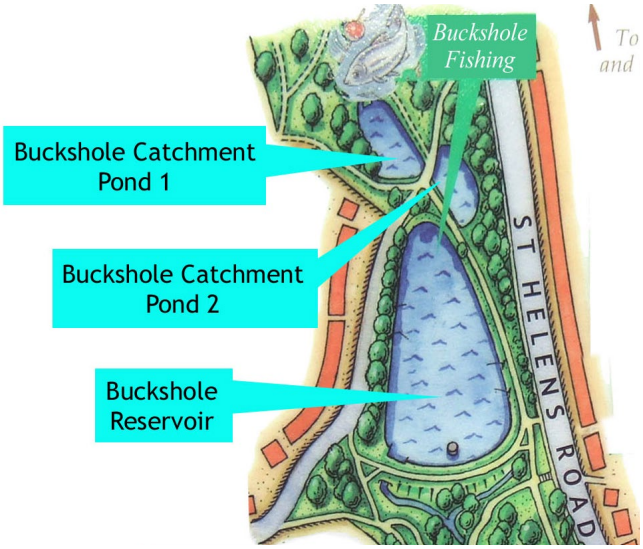
At some point in the future silt will build up to such an extent that the free flow of water from the pond outlet will stop. When this happens more silt will need to be cleared from the pond.

Management requires:

- Annual silt removal from silt trap, usually recommended in late summer when water flows are low and there is time for natural re-vegetating of edges. See map area A.
- Annual tree and shrub pruning to ensure maximum light penetration to the wetland, usually done in winter when the leaves are gone but before birds are nesting. See map area B.
- Annual or sometimes more infrequent removal of a maximum of one third of the vegetation at any one time, cut to 100mm to create a mosaic pattern of functional filtering wetland planting. Remove cuttings to wildlife pile. See map area C.
- Annual checking of all physical structures including weirs, inlets and outlets
- Removal of detritus and general litter as part of normal Park care.

Vegetated bund to encourage silt deposition

2nd Treatment Wetland



Plan of Buckshole Reservoir

Buckshole Reservoir

5.0 Buckshole Reservoir - Fishing lake

The first pond downstream from Old Roar Gill is Buckshole Catchment Pond 1 which contains the newly created wetland treatment area and silt trap (see section 4.0), it flows under the path to a second settlement pond Buckshole Catchment Pond 2.

Buckshole Catchment Pond 2 is currently an open body of water which is how Catchment Pond 1 would have been many years ago. These 2 catchment ponds are doing what they were designed to do which is to catch silt and other unwanted water born solids. As this pond is the next downstream pond we will expect this to eventually fill with silt to mimic the upper ponds appearance.

Management requires:

- Every 2 years or sometimes more infrequent micro chalk treatment
- Annual or sometimes more infrequent removal of trees and shrub pruning to ensure maximum light penetration to the water usually done in winter.
- Annual or sometimes more infrequent review on fish numbers with a view to extraction and relocation.
- Annual checking of all physical structures including weirs, inlets and outlets
- Removal of detritus and general litter as part of normal Park care.

This in turn flows into the Buckshole Reservoir, a Course Fishing Lake and major recreational feature.

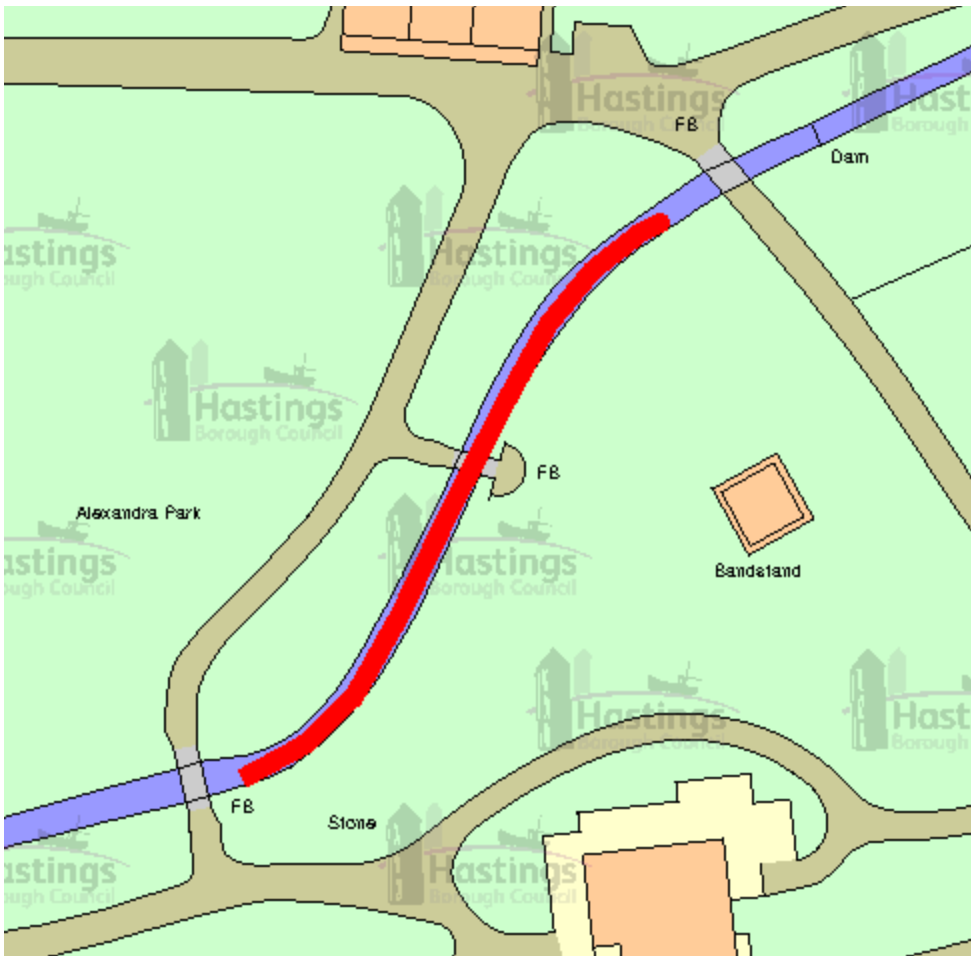
This reservoir is too deep to support much vegetation growth around the margins. The water itself can act as a cleaning system to some extent but the high fish population, the addition of fishing bait and polluted water from any pipe inlets probably neutralise any treatment benefit.

The reservoir will be managed as it is at present to foremost meet the statutory requirements of the Reservoirs Act 1975 and to facilitate the sport of fishing.

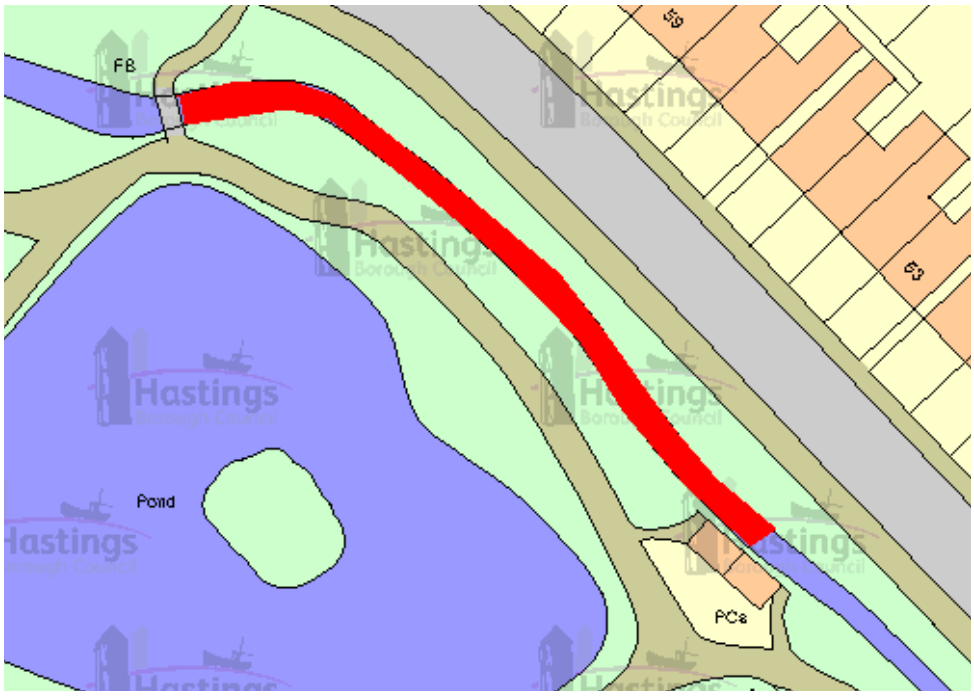
Management requires:

- Annual or sometimes more infrequent removal of trees and shrub pruning to ensure maximum light penetration to the water usually done in winter.
- Removal of detritus and general litter as part of normal Park care.
- Monthly checks of all physical structures including weirs, inlets and outlets carried out by Rangers.
- Quarterly operational checks of all valves carried out by the Grounds Maintenance Team.
- Annual check by Reservoir Engineer to include dam structure forming the downstream end of the reservoir. All maintenance carried out as prescribed by the Supervising Engineer's Annual Statement under Section 12(2) of the Reservoirs Act 1975. (See records on file).

Water continues its journey down a steep cascade, falling from the outfall of the lake down a spillway, into stream channels flowing through the Arboretum area of Alexandra Park.



Plan and Detail of newly planted Priory Stream - Bandstand Section



Plan of newly planted Priory Stream - White Pond

6.0 Managing stream channels - Ornamental Gardens and newly planted Priory Stream

The open lined concrete channels within the Park have historically been cleared out to remove silt and debris. This action prevented the establishment of vegetation and inadvertently prevented the natural cleaning of the stream. To promote natural colonization of plants silts and debris should be allowed to accumulate where it poses little risk of blockage. The flow of water through theses vegetated areas will assist in the natural cleaning of water.

Where the channel flows past the Bandstand and Middle Lawn, now called Priory Stream, two sections of pre-planted coir rolls with gravel infill have been installed. Designed to create wetland habitat and encourage colonization by local species, provide natural treatment of pollution and aid biodiversity.

Management requires:

- Regular inspection of the vegetation to ensure no blockage occurs due to excessive growth or trapping of debris.
- Evaluation after storm conditions to ensure no obstruction from waterborne debris has occurred
- Annual removal of dead vegetation during February, before new growth appears, largely for cosmetic reasons
- Removal of detritus and general litter as part of normal Park care.
- A small flow of water must be maintained past the White Pond stop logs at times of low flow to keep the stream habitat flourishing.
- Annual cutting back of streamside vegetation along both sides of the entire length by 2 meter and removed off site, as well as any saplings, between February and March.

Old Roar Stream to colonize naturally

Newly planted Priory Stream

Stop logs showing removed bolts and free flow of water

Penstock in closed position

Eel pass clips on in summer

7.0 Managing flow rate into lower pond system

Bathing water quality is sampled throughout the period of May to September. The lower ponds should be managed to maximise the amount of water flowing through the system (especially during the summer) whilst maintaining just a trickle of water passing down into the lower reaches to keep the lower stream habitat alive. Where the stream, now called the Priory Stream, reaches the first of the ponds there is a section where stop logs are to be seasonally installed. These are manufactured to EA specifications and will hold back water safely to allow work downstream. These stop logs are fitted to direct water into the lower pond system and through the penstock to White Pond the 1st of 4 water bodies. There is a low flow stop log (with 6 holes) it is essential that this is fitted from May to September to provide a constant flow of water (even at lower levels). Another essential item that is required is the eel pass, to facilitate the passage of eels upstream.

Stop log Management requires:
Parks maintenance contractor holds key and spare stop logs

- Weekly or sometimes more infrequent rake away floating debris from the up-stream side of the 6x holes in the low flow stop log (with the holes). The bolts regulate the flow of water through the holes.
- Annual or sometimes more infrequent removal of build up of silts from the upstream face of the stop logs. Silt to be used to build up surrounding bank levels.
- Seasonal adjustment of stop logs, winter 1st October to April 30 stop logs at base level. Summer May 1st to September 30th 1-2 stop logs in place, determined by flow rates.

Care:

- Access via Buckshole tower ladder to base level.
- Care must be taken when removing or installing stop logs. Keep them horizontal to avoid jamming.
- Keep rubber seals in line with housing to avoid pinching/damage.
- Keep grit and solid debris away from the joints.
- When relieving the water levels do so from downstream of stoplogs, wedge open a crack, allow water pressure to release and remove the stop log.
- Keep the low flow stop log (with the holes) clear and free flowing. This may need jet washing from time to time.
- Keep bolts free from grit and debris, occasional grease may help.
- Access to the stream bed via the use of the 'Buckshole tower ladder' as stored by the ground contractor.

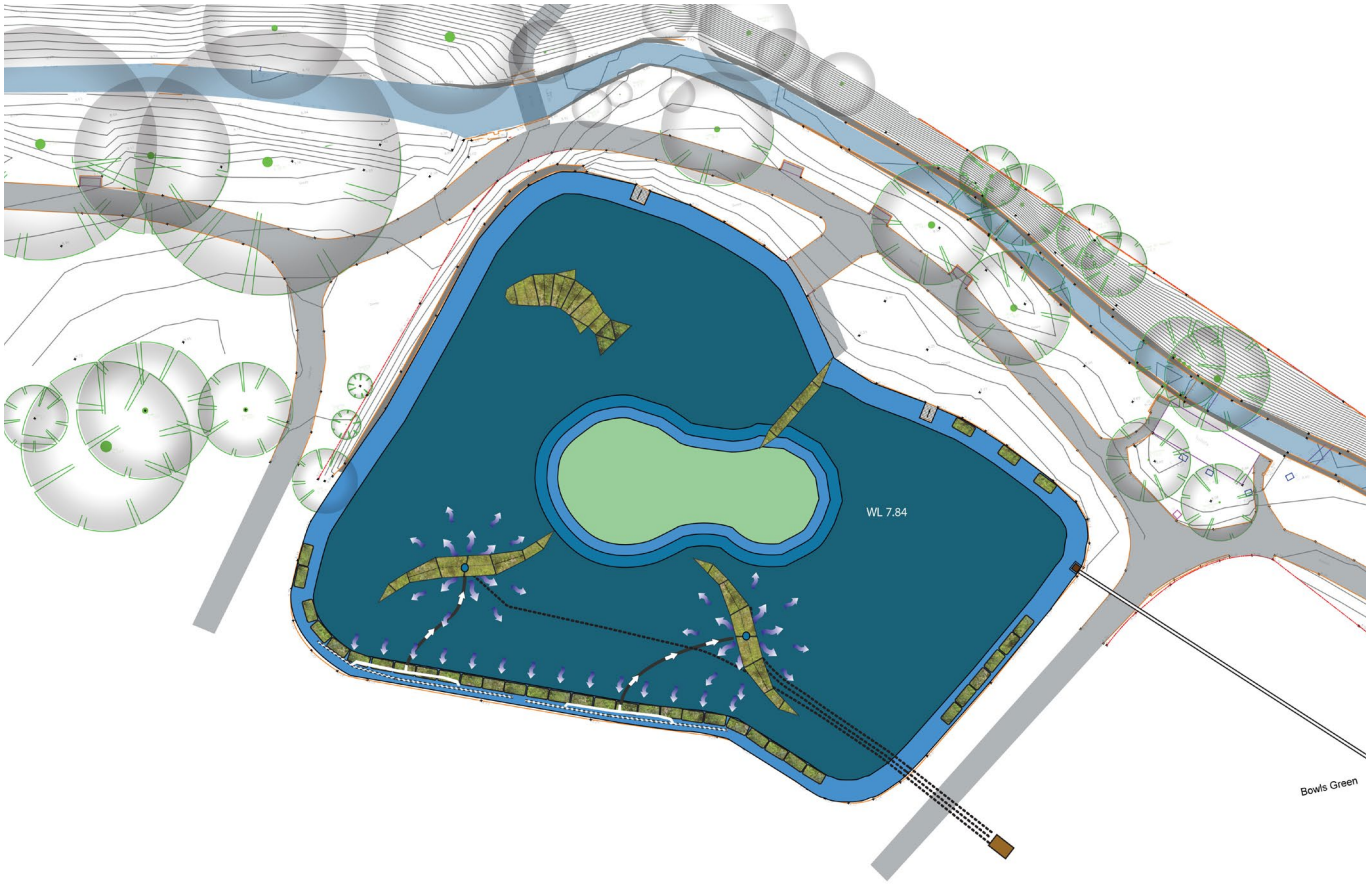
Eel pass seasonal maintenance:

- Inspect and report any defects
- Ensure pass is clipped on over the top stop log, both ends must remain in the water

Removal or adding stop logs should always be done with at least 2 people.

Penstock Management during seasonal stop log change over requires:

- Small amount of grease to the nipple on the central spindle. (Do not grease anywhere else).
- Fully open and close the penstock. Every 6 months.
- Inspect and report any defects
- Never set operational level of penstock beyond maximum marker point



Plan of White Pond

Compressor arrangement - showing standard position of levers and pressure

8.0 White Pond wetland edges and floating islands

White Pond is the first downstream pond in the lower waterway system with a combined CEFAS Registered EW071-V-989F. Secondly is Black Pond, then thirdly through Shirley's Pond before it flows into the Boating Lake. In principal all these ponds can help treat polluted water and each has been modified to enhance this potential. Maximum flow of water should be maintained especially during the summer, this way the flow that is most polluted, low summer flows and runoff from short, sharp showers, will pass through the 'polishing' wetland system.

White Pond has been greatly modified, using floating islands with submerged hanging baffles to re-direct and treat flows. Also an additional wetland edge treatment system is fitted. This treatment system is driven by a compression unit that forces air through three submerged pipelines. This compressed air is also be utilised to suck water through natural gravel and plant filtration systems to the west bank. The compressor is housed in the timber compound next to the bowls pavilion and is on a timer. A 9 inch outfall pipe runs from the southern corner under the Bowling Green and into Black Pond. This grill and pipe should be kept clear and jetted out periodically.

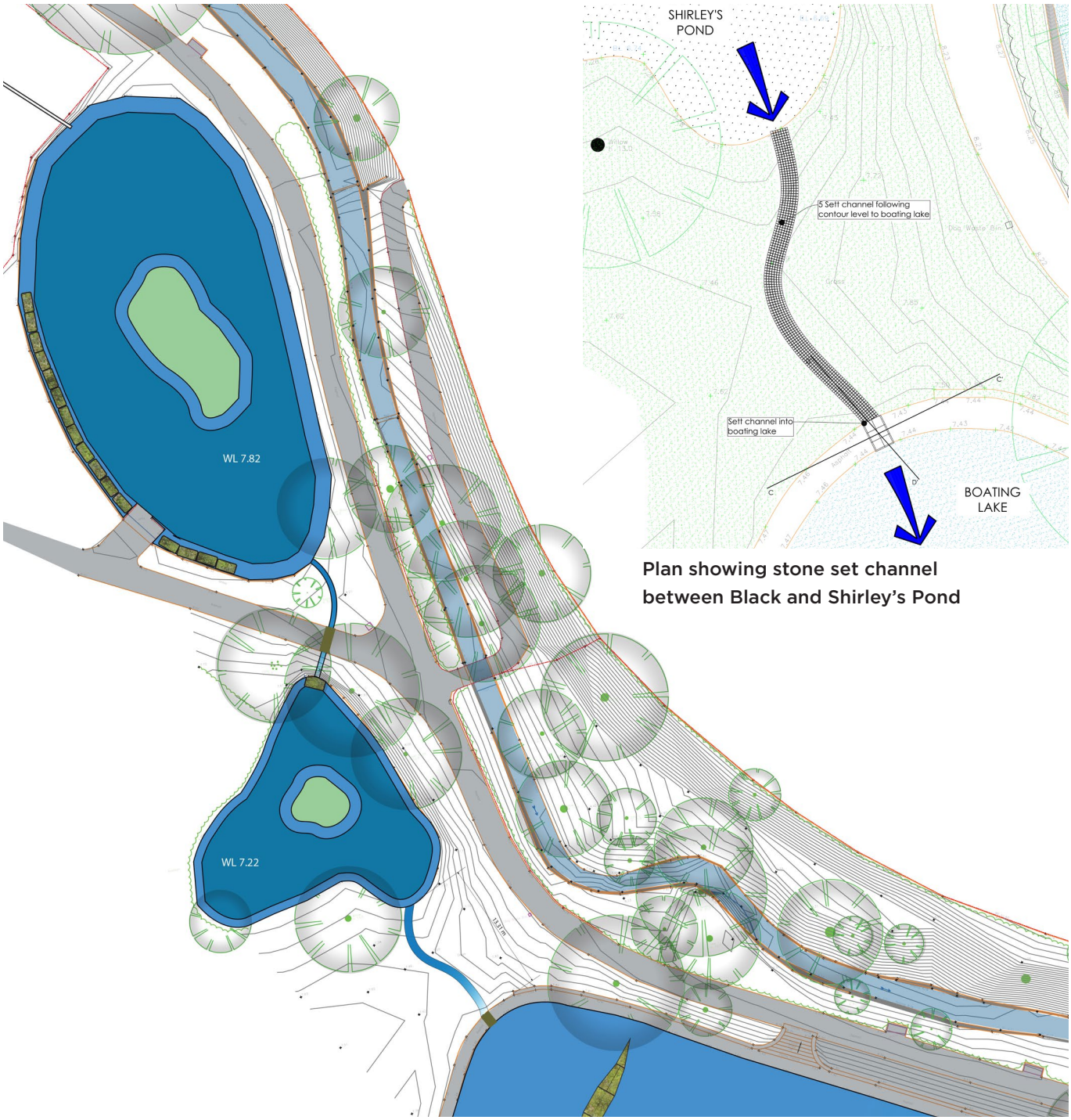
Management requires (see additional document: Alexandra Park Hastings Ecological Enhancements, Lower Ponds Phase 2, Overview and Operation):

- Compressor settings and function, monthly check, normal operation between 200 to 350mbar (see picture).
- Annual clearance of grill area to outfall, pull and cut vegetative growth by hand
- Jetting outlet pipe line to Black Pond
- Cleaning of diffusor (refer to Biomatrix for operations)
- Plant baskets, check autumn, pull unwanted species & saplings, trim if required.
- Every 3 years fish removal. The majority of fish were removed in Jan 2016 this should be repeated in 2019, review fish extraction in the future.
- Every 2 years or sometimes more infrequent micro chalk treatment
- Annual tree and shrub pruning to ensure maximum light penetration to the pond (1st March - 31st July)
- Annual checking of all physical structures including weirs, inlets and outlets
- Removal of detritus and general litter as part of normal Park care.

White Pond edge construction

White Pond island construction

Plan showing stone set channel between Black and Shirley's Pond



Plan of Black Pond and Shirley's Pond

9.0 Black Pond, Shirley's Pond and associated channels

Black ponds significant vegetative growth has been enhanced by additional wetland edge treatment. The 9 inch diameter low level outfall pipe from Black into Shirley's Pond has been blocked but not permanently with a plug. In its place a surface flow channel from Black pond into Shirley has been created. This has been constructed in such a way as to naturally aerate and disturb the water flow.

Under the bridge at the Black Pond channel there is a passive flow weir, this can be used to measure the rate of flow traveling through the pond system. (Check procedure with Biomatrix).

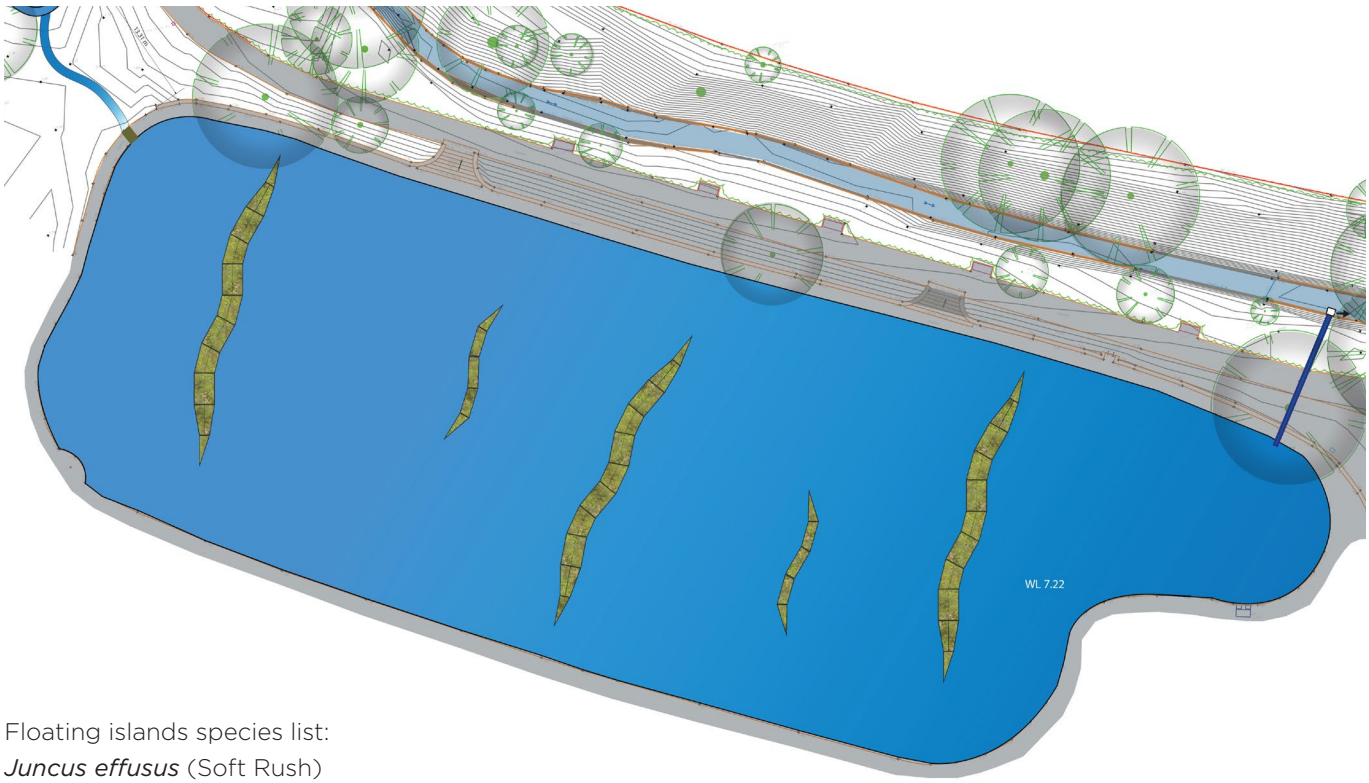
Shirley's Pond has had some edge planting baskets installed and the low lying flood prone ground built up. The 9 to 12 inch diameter low level outfall pipe from Black Pond into Shirleys Pond has been blocked with a plug but not permanently. The naturalised vegetative channel feeding into the boating lake will require some clearing away of detritus and some plant management.

Management requires (see Appendix by Biomatrix Water):

- Plant baskets, check autumn, pull unwanted species & saplings, trim if required.
- Every 3 years fish removal. The majority of fish were removed in Jan 2016 this should be repeated in 2019, review fish extraction in the future.
- Every 2 years or sometimes more infrequent micro chalk treatment.
- Annual tree and shrub pruning to ensure maximum light penetration to the pond (1st March - 31st July)
- Annual checking of all physical structures including weirs, inlets and outlets
- Weekly removal of detritus and general litter as part of normal Park care.
- Once established annual or sometimes more infrequent cutting back of marginal reeds and other aggressive plants.
- Annual, pond weed, leaf litter and branches should be raked out. Late November after leaf fall de-water and remove off site to compost.

Channel between Black and Shirley's Pond

Channel between Shirley's Pond and Boating Lake



Plan of Boating Lake

Floating islands species list:
Juncus effusus (Soft Rush)
Lythrum salicaria (Purple Loosestrife)
Iris pseudacorus (Yellow Flag Iris)
Caltha palustris (Marsh Marigold)
Mentha aquatica (Water Mint)
Myosotis palustris (Water Forget-me-Not)
Ranunculus flammula (Lesser Spearwort)
Alisma plantago (Water Plantain)
Carex acutiformis (Lesser Pond Sedge)
Phalaris arundinacea (Reed Canary Grass)
Glyceria maxima (Sweet Reed Grass)
Scirpus Lacustrus (Lakeshore Bulrush)

Coir Roll species list:
Phalaris arundinacea (Reed Canary Grass)
Carex acutiformis (Lesser Pond Sedge)
Juncus effusus (Soft Rush)
Lythrum salicaria (Purple Loosestrife)
Iris pseudacorus (Yellow Flag Iris)

Overflow Pipes

Root Filtration

10.0 The Boating Lake - Floating islands and modified outlet

The Boating Lake has suffered in the past from serious algal blooms during hot weather in the summer. This is caused by high temperatures combined with nutrients in the water creating ideal conditions for the algae to multiply. By opening the penstock valve and increasing the flow of water into the lake, much of the nutrients will be flushed out of the lake over time, in a controlled way, and therefore reduce the nutrient load in the water.

There are a series of floating islands that intercept and disrupt the flow of water moving down the lake, which are designed to provide maximum treatment through planting and two underwater baffles.

Water leaves the Lake through a modified 8 Inch outfall pipe in the southern corner into the sewer which flows to the outfall on the beachfront and into the sea. There are 2 outlet pipes to allow a greater flow back into the stream just before it leaves the Park. To regulate the flow the pipe elbow can be unbolted and twisted to decrease or increase the angle of uptake. The letter box overflows remain. Just after the pipes there is a 4ft chamber/silt trap that will require regular clearing.

The floating islands not only enhance treatment but also provide shade to reduce temperatures and provide a more balanced aquatic environment. Management of the submerged vegetation may need occasional, even annual, partial removal of plants in late summer to reduce nutrient load in the system and prepare for natural die off.

To help with the algae blooms in the future, Barley Straw can be added to the base of the “Continuum statue” a rate of 100kgs in loose packed netting just below the surface. This should be installed in April and taken out in Sept every year.

The lake was historically de silted annually; it is now likely that the character of the sediment build up in the lake has now altered due to all the improvements that have been undertaken. Leaf litter and branches should be raked out.

Management requires:

- Regular monitoring of pinch points, outlets and inlets for blockages by Park staff
- Annual, pond weed, leaf litter and branches should be raked out. Late November after leaf fall and allowed to de-water pond-side before removal off site to compost
- Cut and removal of dead vegetation in February for cosmetic reasons if required
- Removal of 50-75% of aquatic vegetation during early summer (last week in June) and 50-75% late summer (last week in August) by raking, lift onto pond edge ramp to de-water and remove off site to compost.
- Annual checking of all physical structures including weirs, inlets and outlets
- Floating litter around outlet grills should be cleared regularly, daily if necessary as park of the routine Park maintenance
- Every two years or sometimes more infrequent open areas of the boating lake should be cleared out.

Item	Section	Action	Benefit	Location	Frequency	Date	Who
1.1 Litter	3, 6, 8	Pick up all litter or debris in or within surroundings and remove from site.	To keep waterways free flowing, unrestricted and visually appealing.	All wetlands waterways and ponds	Monthly/ weekly.	All Year	Grounds Contractor
1.2 Litter	3	Gather all fallen leaves in autumn and remove to compost or wildlife piles.	To keep waterways free flowing, unrestricted and visually appealing.	All waterways and ponds	Weekly	Sept - Nov	Grounds Contractor
2.1 Wetland	3, 4	Remove 1/3 of vegetation, cut to 100mm, remove all cuttings to compost	To prevent secondary woodland and to promote diversity.	Buckshole catchment pond 1	Annually	Aug - Sept	Grounds Contractor
3.1 Stream & pondside vegetation	6	Strim 2m clearance either side of stream and dispose of arisings. Strim pond sides to boundary fence or as instructed and take off site. Cut and pull unwanted shrubs and saplings.	To prevent unwanted species/saplings and expose to UV light.	All waterways and ponds	Annually	Jan-Feb	Grounds Contractor
3.2 Floating islands	8, 10	Cut and remove dead vegetation pull unwanted species before new growth appears. Remove arisings off site and compost. Check and report structural defects.	Largely cosmetic.	White Pond & Boating Lake	Annually	Feb	Grounds Contractor
3.3 In stream vegetation	6	Removal of dead vegetation (cut) pull unwanted species before new growth appears.	Largely cosmetic.	All Waterways	Annually	Feb	Grounds Contractor
3.4 Plant baskets	8, 9	Removal of dead vegetation (cut) pull unwanted species before new growth appears. Check and report structural defects.	Largely cosmetic.	White pond & Black Pond	Annually	Feb	Grounds Contractor
4.1 Trees & woody growth	3	Cut all overhanging trees or woody branches and shrubs. Concentrate on clearing trees on south facing sides to open up area to more sun light.	To prevent unwanted species/saplings and to expose water to UV light.	All waterways	3 years	Nov-Jan (1st March - 31st July)	Arbs contractor
4.2 Trees & woody growth	3	Cut all overhanging trees or woody branches and shrubs. Concentrate on clearing trees on south facing sides to open up area to more sun light.	To prevent unwanted species/saplings and to expose water to UV light.	Buckshole, Buckshole Catchment Ponds 1 & 2	3 years	Nov-Jan (1st March - 31st July)	Arbs contractor
5.1 Silt Management	4	Remove 20 tones of silt allow to de-water, test silts and remove off site by specialist contractor	To keep silt build up to minimum levels and maintain open water.	Buckshole Catchment Pond 1	Due next winter 2019	Sept - Feb	Grounds Contractor
5.2 Silt management	10	Remove silt and other detritus at bottom of lake, allow to de-water, test silts and remove off site by specialist contractor. As per approved method.	To keep silt build up to minimum levels and maintain open water.	Boating Lake	3 years	March	Grounds Contractor
5.3 Silt management	6, 7	Inspect small silt traps natural and manmade, inlets and outlets for silt accumulation and remove as required. Small amounts of silt can be dewatered and used on site. E.g. Upstream of stoplogs.	To keep silt build up to minimum levels and maintain for free flow of water.	All waterways and ponds	As required, before winter, de water for 1 month	Sept - Oct	Grounds Contractor
5.4 Silt management	10	Remove silt from chamber down stream of Boating Lake outfall and 5 chambers by playarea. Jetting connecting pipe from White Pond to Black Pond	To keep silt build up to minimum levels and maintain for free flow of water.	Boating Lake. White Pond to Black Pond	Yearly	March	Specialist Contractor
6.1 Water flow system	7 , 8, 9, 10	Visually inspect stoplogs including weep holes, remove blockages and remove vegetation.	To allow free movement of water through system.	New White Pond penstock, stoplogs	Monthly	All year	Grounds Contractor
6.2 Water flow system	9	Visually inspect causeway remove blockages.	To allow free movement of water through system.	New causway between Black & Shirley's Pond	Monthly	All year	Grounds Contractor
6.3 Water flow system	9	Visually inspect stream remove blockages.	To allow free movement of water through system.	New stream between Shirley's & Boating Lake	Monthly	All year	Grounds Contractor

11.0 A Schedule of Maintenance Work

6.4 Water flow system	8	Visually inspect inlets and outlets remove blockages and remove vegetation.	To allow free movement of water through system.	Whites Pond outlet. Black Pond inlet	Monthly	All year	Grounds Contractor
6.5 Water flow system	7	Stoplogs summer/winter fitting. Clean & inspect, report any defects.	To align with water testing period allowing the most water throughout the lower pond system.	White pond stream inlet	2 x year	1 Oct (OUT) 30 April (IN)	Grounds Contractor
6.6 Water flow system	7	Eel pass, fit at same time as stop logs 6.5. Clean & inspect, report any defects.	To allow elvers to enter upper stream system.	White pond stream inlet	2 x year	1 Oct (OUT) 30 April (IN)	Grounds Contractor
6.7 Water flow system	7	Penstock. Full open and close. Apply (with gun) only small amount of grease to nipple on central spindle. Clean & inspect, report any defects.	To maintain operation.	White pond stream inlet	2 x year	1 Oct 30 April	Grounds Contractor
6.8 Water flow system	10	Inspect visually and clear upper outlet grill.	To allow free movement of water through system.	Boating Lake original upper level outfall weir	Weekly	All year	Grounds Contractor
6.9 Water flow system	10	Visually inspect outlets remove blockages and remove vegetation. Realign to change levels as required.	To allow free movement of water through system.	Boating Lake new lower level outfall pipes.	Monthly	All year	Grounds Contractor
6.10 Water flow system	7	Visually inspect lower pond water levels. Adjust penstock to maintain ponds to highest safe level possible.	To allow the most water through system to be treated.	White Pond's penstock to lower 4 ponds.	Weekly	All year mainly summer.	Grounds Contractor
7 Micro chalk	5, 9	6 ponds chalk treatment	To compact silts and maintain a larger volume of water in ponds	Harmers, Harmers Wildlife, Buckshole Catchment 2, White, Black & Shirley's ponds	2 years	Oct - Feb	Grounds Contractor
8 Fish removal	8, 9	Remove fish from 4 lower pond network.	To maintain a more balance eco-system, Prevent silt re-suspension due to fish movement. To reduce fish excrement.	White, Black, Shirley's Ponds & Boating Lake	3 years	Oct - March 2019	Specialist Contractor
9.1 Pond clearance submerged	10	Remove submerged pond weed, leaf litter, branches (all non silts) de water and remove for composting.	To improve the capacity of water in each pond. To help cosmetic appearance.	Boating lake Black and Shirley's Ponds.	Annually or less	Late Nov after leaf fall.	Grounds Contractor
9.2 Pond clearance	10	Remove 50-75% of pond weed, de water and remove for composting.	To improve the UV levels To help cosmetic appearance.	Boating Lake, Black & Shirley's Ponds	2x per year or less	Last week in June & last week in August.	Grounds Contractor
10 Barley straw	10	Install new barley straw, 100kgs to lie just beneath surface under "Continuum". Compost old straw.	To help reduce algae build up.	Boating lake	Yearly	Apr install. Sept removal.	Grounds Contractor
11 Aeration system	8	Check compressor functioning between 200 and 350mbar and set correctly. Inform HBC if any defects etc.	Helps promote beneficial microbial action, on submerged root systems	Bowls timber compound	Monthly	All year	Grounds Contractor
12. Valves grills	7 , 8, 9, 10	Check all valves are fully operable, grills, weirs, spilways are clear & funtioning. Report back to HBC as per "Weekly Waterways Inspection Sheet".	To sustain the highest volume of water through the Parks lower pond system.	All Park as listed in "Waterways Inspection Sheet"	Weekly	All Year	Grounds Contractor

For further details refer to 2016-2026 Waterways Management Plan Alexandra Park.2, Overview and operation

Alexandra Park Hastings Ecological Enhancements, Lower Ponds Phase