Hampstead Heath Ponds Project

Arboricultural Method Statement

January 2015

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Document history

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Rev P1	For costing	TD	HC	LB	LB	14.10.14
Rev C1	For construction	TD	BJ	LB	MW	28.01.15

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Definitions

For ease of reference, the following terminology has been used throughout this Arboricultural Impact Assessment:

Term	Definition
The Proposed Development	As specified in The Application which is the subject of this Planning, Design and Access Statement
The Site	Land area of the Proposed Development
The Application	Proposed engineering works to the Hampstead and Highgate chains of ponds comprising dam raising at Model Boating Pond (2.5m) and Mixed Bathing Pond (1m), new walls along dam crest to increase the height of the dams at Men's Bathing Pond (1m) and Highgate No.1 Pond (1.25m), a 190mm kerb along part of the crest at Hampstead No.2 Pond, a new flood storage dam (5.6m) in the catchpit area, grass-lined spillways at most ponds, dam crest restoration, pond enlargement at Model Boating Pond, a replacement changing room building at Ladies Bathing Pond and associated landscaping, habitat creation and de-silting.
The Applicant	The City of London Corporation

1 Introduction

1.1 Terms of Reference

Atkins Limited (Atkins) has been commissioned by the City of London Corporation (CoL) to provide an Arboricultural Method Statement (AMS) and updated Tree Protection Plans (TPPs) in accordance with BS5837:2012 Trees in relation to design, demolition and construction – Recommendations. The AMS and TPPs are appropriate to the proposals and provide a finalised tree works schedule and technical details that the Contractor shall adopt to minimise the risk of adverse impact on trees to be retained during the construction of improvements to the ponds on the Hampstead and Highgate chains of ponds within Hampstead Heath (the scheme).

1.2 The Site

The Hampstead and Highgate chains of ponds are both located on Hampstead Heath in the London Borough of Camden. The location of the ponds are illustrated within the key plan off the tree protection plan drawings that accompany this report.

1.3 Proposed Development

This AMS has been prepared using construction engineering drawings and related specifications. On reviewing the impacts of the works to each pond the following tree mitigation measures are required to facilitate the proposals;

- Tree protective barriers (referred to as fencing) to limit encroachment into the root protection areas (RPA) of retained trees;
- Ground protection to protect RPAs of retained trees during construction operations;
- Hand excavations within the RPAs of retained trees;
- Root pruning and preservation of revealed roots during excavations;
- No-dig construction of temporary and permanent vehicular and pedestrian routes; and,
- Arboricultural supervision.

1.4 Scope of Works

This report has been informed by Arboricultural information captured by Atkins Arboriculturists between June 2013 and June 2104. The surveys were conducted by a team of professional and experienced Arboriculturists. This report has been produced by the Atkins Arboricultural Team Leader Tom Dale BSc (Hons) M.Arbor.A.

The AMS will also make reference to specific construction operations that shall be occurring within RPAs of retained trees and the necessary measures the Contractor must adhere to in order to minimise the risk of adversely affecting the retained trees. These specific construction operations include;

- The installation of reinforced turf around trees for the new spillways;
- The installation of reinforced earth bunds in the RPAs of trees;
- The excavation of new open channels as overflows.

The AMS will also provide a tree works schedule for each pond including the provision of facilitation pruning operations to facilitate the proposals.

2 Methodology

2.1 General

This AMS has been produced in accordance with BS5837:2012 Trees in relation to design, demolition and construction – Recommendations and using current Arboriculture and Forestry Advisory Group (AFAG) or applicable Forestry Industry Safety Accord advice published by the Health and Safety Executive (HSE) or FISA.

2.2 Spatial Scope and Terminology

The tree survey works commenced on site on 17th June 2013 and given the iterative design process, to the benefit of retaining trees where possible, continued intermittently until October 2014.

The trees within close proximity of any proposed construction operations have been considered and recorded. The term 'close proximity' relates to the distance judged by the Arboriculturists, based on the size of the tree, where a tree is considered to be at risk of harm from the proposals if they were to commence. The reference to harm includes direct tree root or crown damage or indirect damage from construction plant undertaking the engineering works. The AMS shall serve to minimise the risk of harm to retained trees.

2.3 Limitations to AMS

The tree survey undertaken is not intended to be a tree risk management survey targeting safety related issues. However, where specific hazards have been identified these have been recorded and management recommendations provided. These works do not form part of the tree works schedule within this AMS as they are not related to the construction operations. Any tree works recommendations made within the Atkins AIA report should be incorporated into the City of London's tree risk management strategy where deemed appropriate by the City of London's tree team.

The locations of the trees and the outline of groups were plotted by a land survey team from Plowman Craven. The land survey team recorded individual trees with stem diameters greater than 100mm or the outlines of groups showing overall extent of canopy where individual trees in a cohesive group were less than 150mm diameter at 1.5m above ground level. The trees were tagged with aluminium numbered discs or in some cases the existing tree tag reference number was recorded. It is to be noted that some trees do not have tree tags, instead they have a received a specific reference number. If the Contractor is unsure of the position of a particular tree, especially if a tree tag has been removed or not fixed to the tree, then confirmation shall be requested from the Atkins Arboriculturists.

Validity, accuracy and findings of the tree locations will directly relate to the accuracy of the supplied topographical information at the time of the survey, specifically the locations of the plotted trees. This includes the outlines of tree groups where individual trees have not been recorded. Where tree groups have been shown for part or full removal numbers of trees have been provided within the tree works schedule. These numbers have been given without prejudice and could be subject to change depending on the ability of the Contractor to access the particular areas.

The AMS does not comment on possible damage to, or possibility of damage to, any structure installed or retained as part of this scheme. Trees are dynamic organisms whose tree roots can cause direct and indirect damage to structures through the uptake and release of water from tree roots and through passing damaging loads onto structures that they may come into contact with both above and below ground. The continued periodic monitoring of the heath tree's by the City's tree team will potentially reduce the occurrence of damage to the structures.

Trees are living organisms subject to changes outside man's control, the information captured for the trees relates to that particular moment in time and could be subject to change from factors such as harsh or unexpected weather events which result in tree crown's or other key structurally elements being damaged.

3 Pre-commencement site meeting

3.1 General

A pre-commencement site meeting shall take place prior to the construction operations commencing on site. This meeting is to include the supervising Arboriculturist, a representative from the heath's tree team and the Contractors undertaking the works. This meeting is to raise awareness with the relevant parties of the trees on site and the specific mitigation measures required to protect the retained trees. It is also to confirm the specific site events requiring input or supervision from an Arboriculturist to ensure an auditable system of arboricultural site monitoring.

Given the sensitivity of the site the Contractor shall ensure all staff attending site shall be fully briefed on the protection measures for trees and the works that are prohibited in and around retained trees. This details shall form part of any site induction for operatives attending site.

3.2 Contact details

Arboriculturist contact details shall be confirmed at the pre-commencement site meeting and is dependent on who will be undertaking the supervision of the works. As in some cases it may be prudent for the heath's tree team to carryout supervision of works or undertake site audits to confirm mitigation measures are being adhered to.

4 Construction exclusion zones (CEZs) & protective barriers

4.1 CEZ definition

For the purpose of this AMS the CEZs can be defined as all the soft surfaces behind areas of tree protective fencing or areas of installed safety fencing that encapsulate retained trees.

Site operations not permitted in the CEZs **without consultation with an Arboriculturist or as agreed within this document** include storage of plant, equipment or materials, vehicular or plant access, washing down of vehicles or machinery, handling, discharge or spillage of any substances, including cement washings, actions likely to cause localised water-logging, no mechanical digging, scraping or excavation shall be permitted in the CEZs and no earthworks or changes in the finished ground levels other than those agreed by an Arboriculturist.

In the majority of cases the CEZs will have construction operations being undertaken within them. As such the Contractor shall ensure measures detailed within this AMS are adhered to.

4.2 Tree Protection Plans (TPPs)

The TPPs have been produced using the agreed construction issue drawings. It is to be noted that where the construction layout changes beyond the submission of the AMS and TPPs or if construction methods change then additional areas of arboricultural mitigation may have to be defined and will have to be confirmed in writing.

The TPPs illustrate the location of protective barriers and the location of specific arboricultural mitigation measures. It is to be noted that the requirements for arboricultural mitigation measures that are detailed in this AMS may not be illustrated on the drawings. Therefore, the Contractor shall make themselves aware of the mitigation measures that are required for the different elements of the works.

The TPPs and this AMS are to be pinned up in a highly visible place so that all staff involved in the works have a point of reference for tree protection issues.

The TPPs are as follows:

- Vale of Health Pond – illustrated on drawing number: 5117039-ATK-P11-ZZ-DR-Y-20007
- Viaduct Pond - illustrated on drawing number: 5117039-ATK-P7-ZZ-DR-Y-2000
- Catchpit Area - illustrated on drawing numbers: 5117039-ATK-P7-ZZ-DR-Y-2000; 5117039-ATK-P12-ZZ-DR-Y-2000; 5117039-ATK-P12-ZZ-DR-Y-2001
- Mixed Bathing Pond - illustrated on drawing number: 5117039-ATK-P8-ZZ-DR-Y-2000
- Hampstead No. 2 - illustrated on drawing number: 5117039-ATK-P9-ZZ-DR-Y-2000
- Hampstead No. 1 - illustrated on drawing number: 5117039-ATK-P10-ZZ-DR-Y-2000
- Stock Pond - illustrated on drawing number: 5117039-ATK-P1-ZZ-DR-Y-2000
- Kenwood Ladies' Bathing Pond - illustrated on drawing number: 5117039-ATK-P-ZZ-DR-Y-2000
- Bird Sanctuary Pond - illustrated on drawing number: 5117039-ATK-P3-ZZ-DR-Y-2000
- Model Boating Pond - illustrated on drawing numbers: 5117039-ATK-P3-ZZ-DR-Y-2000; 5117039-ATK-P4-ZZ-DR-Y-2000; 5117039-ATK-P4-ZZ-DR-Y-2001; 5117039-ATK-P4-ZZ-DR-Y-20002
- Men's Bathing Pond - illustrated on drawing number: 5117039-ATK-P4-ZZ-DR-Y-2002
- Highgate Number 1 Pond - illustrated on drawing numbers: 5117039-ATK-P6-ZZ-DR-Y-2000; 5117039-ATK-P6-ZZ-DR-Y-2001

Preliminary management recommendations have been recorded for certain of trees surveyed on site. These works have been identified as part of managing the risk of failure or damage to people or property within proximity of the particular tree. These works should form part of the tree risk management strategy for the heath and be undertaken independent of the proposals.

4.3 Tree protective barriers (fencing)

The locations of the protective fencing have been illustrated on the TPPs. It is to be noted that these positons shall be subjected to change at the discretion of the supervising Arboriculturist depending on the works being undertaking.

Tree protective fencing is to be erected to exclude **construction activity** in the RPAs and crown extents of retained trees. The default fencing specification shall comprise 2m tall welded mesh panels on rubber or concrete feet. The panels are to be joined together using a minimum of two anti-tamper couplers, installed so they can only be removed from inside the fence. The distance between the fence coupler is to be at least 1m and is to be uniform throughout the fence; the panels are to be supported by inner side stabiliser struts attached to a base plate secured on a block tray. See figure 3b of BS5837:2012 (page 21).

Where agreed with the supervising Arboriculturist sections of chestnut pale fencing shall be used as substitute to the heras fencing. This shall only be agreed to in locations of reduced construction activity or through input from stakeholders/City of London where it is deemed the visual intrusion of large sections of heras fencing will be inappropriate for the locality.

The areas of fencing shall be seen as sacrosanct and once installed shall not be moved or altered without recommendation by the supervising Arboriculturist. The fencing shall be installed prior to any construction operations commencing on the particular pond being worked upon.

4.4 Temporary ground protection

All RPAs of retained trees and groups of trees shall be protected where plant has to pass over these areas to provided construction access, especially for the sheet piling operations and construction access into the Catchpit area. In the first instance the Contractor shall position or utilise existing hard surface pathways or soft areas outside of the RPAs of trees to undertake their construction operations. If this is not possible then ground protection is to be used for plant access. The ground protection matting is to dissipate the likely loading potential of the plant to preserve the underlying soil structure from compaction and from rutting. The types of ground protection that are acceptable include navvy matting and high density polyethylene boards. The locations of the ground protection matting have not been illustrated on the TPPs as the Contractor has not confirmed access routes for the plant. However, as all RPAs are to be protected by ground protection matting the Contractor will have to confirm the locations of the matting with the supervising Arboriculturist prior to commencing any plant access.

Where instructed on site by the supervising Arboriculturist temporary ground protection can be laid over the top of coppiced trees and shrubs. This shall be undertaken for access routes into the Catchpit area, Ladies Bathing Pond and at locations determined by the Arboriculturist on site. Where trees can be retained as coppice stools the brash from the felling operations shall be chipped and placed around the stools to provide a suspension layer between the matting and the stool. A minimum of 100mm layer of wood chips shall be placed over the top of the coppice stools. On completion the wood chips are to be pushed away from the stools.

5 Specific tree mitigation measures

5.1 General

This AMS takes into account the tree stock that shall be protected during the scheme and shall be read in conjunction with the TPPs.

The British Standard relies heavily on the creation of a protected zone referred to as the RPA around each tree. This is the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. These areas have influenced the layout of site specific protection measures to ensure the retention of trees on site.

5.2 No-dig construction for temporary and permanent vehicular and pedestrian routes

The no-dig construction cross section is provided on drawing number 5117039-ATK-ZZ-ZZ-DR-L-7500. It is to be noted that the areas of no-dig construction for access routes relate solely to areas where the routes traverse over RPAs of retained trees. Outside of these areas the Contractor can follow the standard specification for the access roads/footpaths.

Prior to the installing the no-dig construction access routes all debris such as vegetation within the footprint of the haul road or access road is to be removed. This is to be achieved by hand removal of existing vegetation or the application of a translocated glyphosate based herbicide to any herbaceous vegetation. Once the herbaceous vegetation has died off all the dead organic material is to be removed using a spring tined rake. The hollows and any other holes revealed within the proposed access route are to be filled to a common level with sharp sand or aggregate. Do not roll or consolidate the area to prevent compaction to underlying soils. Once site preparation is complete the construction profile shall accord with the cross section provided on drawing number 5117039-ATK-ZZ-ZZ-DR-L-7500

5.3 Installation of reinforced turf around trees

The ponds to receive pre-grown turf reinforcement matting (TRM) include Stock Pond, Ladies Bathing Pond and Model Boating Pond and are detailed on the engineering drawings and further details are contained within the Reinforced Turf specification document reference 5117039-ATK-XX-ZZ-SP-C-0012.

Where trees are to be retained within spillways the installation of the reinforced turf shall be undertaken in accordance with the following specification where the works are undertaken within the RPAs of retained trees:

- The pre-grown turf shall be Enkamat Standard 7020, or similar approved product.
- Prior to the installing the TRM all debris such as vegetation within the footprint of the TRM is to be removed. This is to be achieved by hand removal of existing vegetation or the application of a translocated glyphosate based herbicide to any herbaceous vegetation. Once the herbaceous vegetation has died off all the dead organic material is to be removed using a spring tined rake. The hollows and any other holes revealed within the TRM area are to be filled to a common level with topsoil. This topsoil is to be lightly consolidated using the head of a rake. Do not roll or over consolidate the area to prevent compaction to underlying soils.
- The Contractor shall ensure a minimum of 50mm thick layer of topsoil is provided prior to laying the TRM.
- No tree roots are to be cut or the damaged during the laying of the matting.
- Where the anchor trenches are required within the RPAs of retained trees the trenches shall be excavated by hand and any tree roots revealed over 25mm preserved and the depth of the trench adapted to facilitate their retention. Any revealed roots are to be covered within wet hessian or topsoil if the trench is to be left open for longer than 2hours to prevent desiccation. The TRM shall extend to the back of the trench and be anchored with reinforced trenching pegs at 1m centres. The number of pegs shall increase if the depth of the trench is reduced, details to be confirmed by Atkins engineers. The trench shall be backfilled with cohesive clay overlaid with 150mm of topsoil and compacted after the TRM has been laid

- Trench pegs shall be required at a rate of 1 pin every 2-3m^2 to secure the TRM to the existing ground.
- The diameter and length of the fixing pins shall be chosen to suit the site and soil conditions; minimum dimensions are 8mm diameter and 500mm length for TRM. The trench pegs shall be made of ribbed mild steel and repositioned if a tree root is struck during their installation.

The ponds to receive pre-grown turf include Stock Pond Ladies Bathing Pond, Model Boating Pond, Men's Bathing Pond, Highgate 1, Vale of Health, Viaduct, Catchpit dam and Mixed Bathing, the Contractor shall accord to the following:

- Prior to the installing the turf all debris such as vegetation within the footprint is to be removed. This is to be achieved by hand removal of existing vegetation or the application of a translocated glyphosate based herbicide to any herbaceous vegetation. Once the herbaceous vegetation has died off all the dead organic material is to be removed using a spring tined rake. The hollows and any other holes revealed within the turf area are to be filled to a common level with topsoil. This topsoil is to be lightly consolidated using the head of a rake. Do not roll or over consolidate the area to prevent compaction to underlying soils.
- The Contractor shall ensure a minimum of 50mm thick layer of topsoil is provided prior to laying the turf.
- No tree roots are to be cut or the damaged during the laying of the matting

5.4 Installation of reinforced earth bunds in the RPAs of trees

No excavations are permitted for this element of work within the RPAs of retained trees. The herbaceous vegetation or turf layer within the footprint of the bunds are to be screefed off using hand tools or strimmed to the topsoil layer and the arisings raked up and removed prior to commencing work.

The areas to receive reinforced earth bunds are detailed on the engineering drawings and on the TPPs. Sections of the reinforced earth bunds shall be installed within the RPAs of retained trees, where this is being carried out their installation shall take into account the surrounding trees. Therefore, any plant involved in their installation shall be positioned on adjoining hard surfaces or on temporary ground protection matting. Banks men shall be in place where small plant has to operate close to trees to avoid striking the stems or branches of overhanging retained trees.

5.5 Excavation of new open channels as overflows

The new open channels have been illustrated on the engineering drawings and are illustrated on the TPPs. Their positions are provisional at present and shall be subject to change with the exact position and dimensions for the open channels being determined on site through consultation with the supervising engineers and Arboriculturist.

The open channels shall be excavated by hand where they are within the RPAs of retained trees. Where the channels pass close to trees not included on the TPPs the supervising Arboriculturist will inform the Contractor of the RPA extents to ensure adequate protection of root zones. Any revealed roots during the course of these operations shall only be pruned on the advice of an Arboriculturist where they are above 25mm in diameter. All roots below 25mm diameter can be pruned by the Contractor using bypass secateurs to the extents of the channel. Larger tree roots are to be preserved and the channel diverted where deemed appropriate by the Arboriculturist.

5.6 Hand excavations & removal of existing hard surfaces within RPAs

The areas of hand excavations relate to excavations for the posts for new fencing and timber training walls. Any fence posts for new fencing or timber training walls outside existing fence post holes shall be excavated by hand to a depth of 1m, where the works are within the RPAs of retained trees. Beyond 1m mechanical tools maybe used such as an auger. The post holes shall be repositioned if tree roots are encountered over 25mm in diameter or as confirmed with the supervising Arboriculturist.

Where existing hard surfaces are to be removed within RPAs of retained trees and built upon for crest restoration operations the Contractor is not to excavate beyond the existing sub-base material in order to preserve the underlying tree roots that may be growing in these areas. This is particularly relevant for the works at the Ladies Bathing Pond.

5.7 Root pruning and preservation of revealed roots

Root pruning and tree root preservation is relevant for the excavation of soils for new channels, stilling basins and box culverts. Where these operations reveal tree roots any roots below 25mm diameter shall be pruned by the Contractor without consultation with the supervising Arboriculturist. Where tree roots are revealed above 25mm diameter they are only to be severed on consultation with the Arboriculturist as they may be vital to the stability of the tree. Where tree roots are revealed they shall be covered after a period of time in excess of 1hour to prevent desiccation. The roots shall be covered with soil or wet hessian. Any wet hessian shall be removed on completion of the works where the trenches are backfilled.

Where tree roots are to be pruned then they are to be cut back level to the extents of the excavation using a sharp pair of secateurs, loppers or hand saw. This is to ensure a clean cut is achieved and to aide occlusion.

5.8 Arboricultural supervision

Arboricultural supervision shall be required during the course of the construction operations. The extent of the supervision is to be agreed within the pre-commencement site meeting.

5.9 Hampstead no.2 Pond – exploratory trench

If confirmed through consultation with the Contractor, Atkins engineers, Arboriculturist and the Heaths tree team, then an exploratory trench is to excavated adjacent to tree number 0177. This is to assess whether the tree could be safely retained through remedial measures. The trench shall be excavated to a depth of 1m and a width of 300mm on the western extents of the construction footprint. The trench is to be excavated using hand tools and an air-spade rig. These operations shall be subject to a risk assessment and method statement process by the sub-Contractor to ensure safe operation. The works shall involve the gradual removal of soils using a combination of the air-spade lance and hand tools. The loosened soil is to be removed by hand or through use of a suction device. Where tree roots are revealed they are not to be damaged and shall be covered after a period of time in excess of 1hour to prevent desiccation. The roots shall be covered with wet hessian. Any wet hessian shall be removed on completion of the works when the trench is backfilled. These works are to be supervised by the Arboriculturist. The trench shall be excavated to the southern extents of the existing hard surface footpath to the south of the tree. On completion of the assessment the trench is to be backfilled in 100mm layers and consolidated by heeling in.

6 Tree works

6.1 General

All tree works are to be undertaken in line with current recommendations in accordance with BS3998:2010 Tree work – Recommendations and comply with the current Arboriculture and Forestry Advisory Group (AFAG) or applicable Forestry Industry Safety Accord advice published by the Health and Safety Executive (HSE) or FISA.

Tree works are to be planned to ensure protection of people, property and wildlife. If the works are to be undertaken during the bird nesting season then advice is to be sought from an Ecologist prior to undertaking tree works.

The tree works Contractor is to be made aware of the site access limitations. The Contractor will have to submit a risk assessment and method statement for review by the Contractor or Supervisor prior to commencing works on site.

The tree works schedule has been produced using the construction issue drawings and through consultation with the Contractor. If there are additional trees that require works to facilitate the proposals then the Contractor shall seek confirmation from the supervising Arboriculturist that the additional works can proceed. This shall be supported by written confirmation for the works to proceed by the supervising Arboriculturist or a representative from the City of London. On no account are trees to be felled or worked upon that have not been agreed with the supervising Arboriculturist.

6.2 Tree felling & arisings

Prior to any pruning operations, all specimens affected shall be clearly marked by means of an easily visible band of paint or the start and end points of tree groups to receive the same operations will be marked through installing wooden stakes or placing a visible band of paint on the start and end trees, and such markings shall be inspected by the *Supervisor* and deemed as "essential" before such operations are undertaken.

The trees to be removed shall be felled in a manner suitable to the locality. Suitable felling options include straight felling, sectional felling from a rope and harness or sectional felling using mobile elevated works platforms. The tree works Contractor is to satisfy themselves of the suitable method of felling through undertaking site specific risk assessments.

All the waste produced by the tree works shall be processed through chipping or placement in brash piles and either removed off site, dispersed in the locality or at another location as determined by the heath's tree team.

6.3 Tree stumps

Any felled tree stumps that are located within the footprint of the spillways, dams or other hard construction are to be grubbed out using appropriate plant located outside of the RPAs of retained trees or positioned on adjoining hard surfaces or temporary ground protection matting. If plant access is restricted then a stump grinder is to be used and the stump and all visible surrounding surface roots ground out to a depth of 300mm or to a depth as instructed on site by the supervising Arboriculturist. If the trees are outside of the construction areas then the stumps can remain in situ for all broad leaf tree species felled to enable regeneration from coppice stools.

6.4 Tree works schedule

The tables below detail the tree works to be undertaken:

Table 5.1 – Tree Stock and Works

Hampstead Chain – Vale of Health Pond
Drawing 5117039-ATK-P11-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Tree Works.
				Cons	Cond	
P11	0280	False Acacia	B2	X	N/A	Tree to be felled in sections and lowered to the ground using ropes or straight felled as appropriate to the site location.

Table 5.2 – Tree Stock and Works

Hampstead Chain – Viaduct Pond
Drawing 5117039-ATK-P7-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Tree Works.
				Cons	Cond	
P7	0247A (no tag)	Alder	C1	X	N/A	Tree to be coppiced
P7	0247B (not tag)	Crack Willow	U	X	X	Tree to be felled in sections and lowered to the ground using ropes or straight felled as appropriate to the site location
P7	0247C (no tag)	Crack Willowx2, Sycamorex1, Goat Willowx1	C2	X	n/a	Trees to be felled in sections and lowered to the ground using ropes or straight felled as appropriate to the site location 4x Cat C trees to be felled.

Table 5.3 – Tree Stock and Works

Hampstead Chain – Catchpit
Drawings 5117039-ATK-P7-ZZ-DR-Y-2000
5117039-ATK-P12-ZZ-DR-Y-2000
5117039-ATK-P11-ZZ-DR-Y-2001

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P12-2001	W1	Mixed	C2	X	N/A	Part of W1 to be felled - Approx. 26 BS Cat C trees to be felled. Mix of Hawthorn, Sycamore & Silver Birch.
P7	W2	Wet Woodland, Mixed Willow, Ash, Sycamore, Hawthorn	C2	X	N/A	Part of W2 to be felled - Approx. 6 BS Cat C trees to be felled. Mix of Hawthorn & Willow species.

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P12-2000	0233	Common Ash	C1	X	N/A	Tree to be felled.
P12-2001	G34-0234	Lime, Common Ash, Crack Willow, Sycamore, Hawthorn	C2	X	N/A	Part of G34 to be felled - Approx. 11 BS Cat C trees to be felled. Mix of Holly, Hawthorn, Common Ash
P12-2001	G35 0235	Mixed Group, Crack Willow, Small leaved Lime, Holly, False Acacia, Hawthorn	C2	X	N/A	Part of G35 to be felled - Approx. 5 BS Cat C trees to be felled. Mix of Holly, Crack Willow, Hawthorn, Small Leaved Lime
P12-2000	G37 0237, 1053	Mixed group. Hawthorn, Elder	B2	X	N/A	Part of G37 to be felled - Approx. 12 BS Cat B trees to be felled. Mix of Hawthorn & Elder.
P12-2000	G1127	Crack Willow	U	X	N/A	Part of G1127 to be cleared to facilitate construction access. Approx. 10 BS Cat U trees. Trees to be coppiced and allowed to regenerate, temporary access matting to be placed over the top of the stools where instructed on site by the Arboriculturist.
P12-2000	1128	Crack Willow	C2	X	N/A	Tree to be coppiced. Any temporary access route surface to be laid over the top of the stump to allow for regeneration on completion of the works.
P12-2000	1129	Common Ash	C2	X	N/A	Tree to be coppiced. Any temporary access route surface to be laid over the top of the stump to allow for regeneration on completion of the works.
P12-2000	1051	Hawthorn	C2	X	N/A	Tree to be coppiced. Any temporary access route surface to be laid over the top of the stump to allow for regeneration on completion of the works.

Table 5.4 – Tree Stock and Works

Hampstead Chain – Mixed Bathing Pond
Drawing 5117039-ATK-P8-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P8	G1136	Hawthorn, Common Ash, Blackthorn	C2	X	N/A	Part of group to be felled - Approx. 5 BS Cat C trees to be felled. Hawthorn & Blackthorn trees.
P8	G27 0205	Hawthorn, Elm and Hawthorn group.	C2	N/A	N/A	Tree group to be retained.
P8	G28 0207	Crack Willow	C2	N/A	N/A	G28 to receive crown reduction to branches infringing on works access.

Table 5.5 – Tree Stock and Works

Hampstead Chain – Hampstead No. 2 Pond
Drawing 5117039-ATK-P9-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P9	G18B-0175-0176, 2135, 2136	London Plane	A2	X	N/A	Tree 0175 is located within the footprint of the proposed culvert. Tree to be felled in sections and lowered to the ground using ropes
P9	0177	London Plane	A2	X	N/A	Prior to felling, confirmation to be obtained from Atkins over the possibility of retaining the tree through the excavation of the exploratory trench. Tree to be felled in sections and lowered to the ground using ropes.

Table 5.6 – Tree Stock and Works

Hampstead Chain – Hampstead No.1 Pond
Drawing 5117039-ATK-P9-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P10	G23 0194 0195	Common Ash	C2	N/A	N/A	Reduce crowns by up to 8m in height and spread as instructed on site by the Arboriculturist.
P10	0196	Common Ash	U3	X	N/A	Tree to be felled.
P10	0197	Cherry	C2	X	N/A	Tree to be felled.

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P10	0198	Hawthorn	C2	N/A	N/A	Reduce tree crown by 2m in height and spread to facilitate adjacent works.
P10	G24 0202	Cherry, Hawthorn, Silver Birch, Common Ash	C2	X	N/A	Part of group to be felled - Approx. 1 BS Cat C Hawthorn to be felled to facilitate the proposals.
P10	G25 0200	Hawthorn, Cherry and Sycamore group.	C2	X	N/A	Part of group to be felled - Approx. 3 BS Cat C trees to be felled. Mix of Hawthorn and Cherry to facilitate the proposals.

Table 5.7 – Tree Stock and Works

Highgate Chain – Stock Pond
Drawing 5117039-ATK-P9-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P1	0029	English Oak	B2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	0030	English Oak	C2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	0031	English Oak	B2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	0032	English Oak	B2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	0033	Holly	C2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	0034	English Oak	B2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	0035	English Oak	C2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	0036	English Oak	n/a	N/A	N/A	Tree has failed near to ground level. The impacts of the proposals are not deemed relevant for the remaining stump.
P1	0037	English Oak	B2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	0038	English Oak	n/a	N/A	N/A	Tree has failed near to ground level. The impacts of the proposals are not deemed relevant for the remaining stump.

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P1	0039	Common Beech	B2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	G1-0051	Hawthorn, Elm, Field Maple	C2	X	N/A	Part of G1 to be felled - Approx. 5 BS Cat C Hawthorns to be felled to facilitate the works.
P1	G3-0053	Hawthorn	C2	X	N/A	Part of G3 to be felled - Approx. 5 BS Cat C Hawthorn to be felled to facilitate the works. Trees to be coppiced where feasible, stumps to be retained where outside of the works footprint.
P1	0058	Hawthorn	C2	N/A	N/A	Tree to be retained as a coppice stool.
P1	G5-0059	Group- 2 x Hornbeam	C2	X	N/A	G5 to be felled - Approx. 2 BS Cat C Hornbeams to be felled to facilitate the construction of the spillway.
P1	1151	English Oak	B2	N/A	N/A	Reduce trees west crown by 3m to facilitate the proposals.
P1	1152	Crack Willow	C2	N/A	N/A	Reduce crown by up to 8m in height and spread as instructed on site by the Arboriculturist. This is due to the poor structural condition of the tree and the safety of the workers that shall be working underneath its canopy.
P1	1153	English Oak	B2	X	N/A	Tree to be felled to facilitate the construction of the spillway.
P1	1136	English Oak	B2	X	N/A	Tree to be felled to facilitate the construction of the spillway.

Table 5.8 – Tree Stock and Works

Highgate Chain – Kenwood Ladies' Bathing Pond
Drawing 5117039-ATK-P2-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P2	0107	Wild Cherry	B2	N/A	N/A	No soil level increase around the tree base to exceed 100mm within soft surfaces of RPA.
P2	0111	Hawthorn	C2	X	N/A	Tree located at the foot of the proposed bund. Tree to be coppiced.
P2	G1157	Hawthorn	C2	X	N/A	Part of G1157 to be felled - Approx. 5 BS Cat C Hawthorns

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
						to be felled to facilitate access to the pond for construction plant. Trees to be coppiced and allowed to regenerate where instructed on site.
P2	G1159	Holly x5	C2	X	N/A	G1159 to be felled - Approx. 2 BS Cat C Holly's to be felled. Trees to be retained where feasible and coppiced where they fall outside of the direct works footprint.
P2	1159B	English Oak	C2	N/A	N/A	Tree constraints outside of works footprint. No direct impact. However, tree located adjacent to proposed construction access point. Facilitation pruning required to provide sufficient crown height for plant access.
P2	1160	Silver Birch	C2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.
P2	1161	English Oak	B2	N/A	N/A	Tree located to the west of the proposed crest of the spillway. The close proximity of tree 1165 and the confined/sheltered aspect of this corner of the pond means that the tree's RPA is unlikely to extend as far as illustrated on the TPP. Arboricultural supervision during any excavations in the RPA of tree 1161, protective barriers to be installed as per TPP.
P2	G1164-1163	Silver Birchx7	C2	X	N/A	1XTree in group to be felled to facilitate access to the site. Remaining tree stock to be retained within reinforced matting being placed around the trees.
P2	1165	English Oak	B2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.
P2	1166	Sycamore	C2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.
P2	1167	Alder	C2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P2	1168	Hawthorn	C2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.
P2	1169	English Oak	B2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.
P2	1170	Hawthorn	C2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.
P2	1171	English Oak	B2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.
P2	1172	Hawthorn	C2	X	N/A	Tree located within the footprint of the proposals. Tree to be felled.

Table 5.9 – Tree Stock and Works

Highgate Chain – Bird Sanctuary Pond
Drawing 5117039-ATK-P3-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P3	G0063B	Alderx20, Silver Birchx2, Goat willow x2	C2	N/A	N/A	2m of scrub clearance to facilitate access for the installation of the new outflow pipe. Existing gaps in vegetation to be utilised where feasible.

Table 5.10 – Tree Stock and Works

Highgate Chain – Model Boating Pond
Drawing 5117039-ATK-P3-ZZ-DR-Y-2000;
5117039-ATK-P4-ZZ-DR-Y-2000;
5117039-ATK-P4-ZZ-DR-Y-2001;
5117039-ATK-P4-ZZ-DR-Y-2002.

Sheet no.	Group/Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P4-2000	0165	English Oak	C2	X	N/A	Tree located within the footprint of the new pond area. Tree to be felled
P4-2000	0167	Sycamore	B2	X	N/A	Tree located within the footprint of the new pond area. Tree to be felled in sections and lowered to the ground using ropes or straight felled as appropriate to the site location

Sheet no.	Group/Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P4-2000	0168	Weeping Willow	B2	X	N/A	Tree located within the footprint of the new bund. Tree to be felled in sections and lowered to the ground using ropes or straight felled as appropriate to the site location
P4-2000	0169	Weeping Willow	B2	N/A	N/A	Tree to be pollarded as instructed on site by the supervising Arboriculturist.
P4-2000	0171	Hawthorn, English Oak	C2	N/A	N/A	Tree on the periphery of the bund construction. Tree shown for retention at present.
P4-2002	0084	Grey Poplar	C1	X	N/A	Tree located within the footprint of the proposed earthbund. No mitigation measures feasible to retain the tree. Tree to be felled in sections and lowered to the ground using ropes or straight felled as appropriate to the site location
P4-2002	G18-0086	Hornbeamx3	C2	X	N/A	Trees located within the footprint of the new dam crest. Trees to be felled.
P4-2001	0088	Common Ash	C1	X	N/A	Tree to be felled.
P4-2001	0164	Weeping Willow	C1	N/A	N/A	Tree crown to receive crown lifting for footpath clearance. Extents of crown lifting to be confirmed by Arboriculturist on site.
P4-2002	0346	Crack Willow	U	N/A	N/A	Tree crown to receive crown reduction works for footpath clearance and as part of tree risk management operations.

Table 5.11 – Tree Stock and Works

Highgate Chain – Men's Bathing Pond
Drawing 5117039-ATK-P4-ZZ-DR-Y-2001;
5117039-ATK-P4-ZZ-DR-Y-2002;
5117039-ATK-P5-ZZ-DR-Y-2000

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P4-2002	G347	Common Ash, Elm, Hawthorn	C2	X	N/A	Localised scrub clearance.

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P4-2002	0341	Common Ash	B1	N/A	N/A	Proposed ditch renovation to east of the tree. Requirements for crown lifting to facilitate access to be determined on site through consultation with Arboriculturist.
P4-2002	0342	Common Ash	B1	N/A	N/A	Proposed ditch renovation to north of the tree. Requirements for crown lifting to facilitate access to be determined on site through consultation with Arboriculturist.
P5	G1143	Ash, Hawthorn, Blackthorn, Cockspur thorn	C2	X	N/A	Part of G1143 to be felled - Approx. 5 BS Cat C trees to be felled, mix of Hawthorn, Blackthorn and Ash. Trees located within the footprint of the spillway construction.
P5	G1145	Hawthorn, Cherry, Blacthorn, Cockspur thorn	C2	X	N/A	Part of G1145 to be felled - Approx. 10 BS Cat C trees to be felled, mix of Hawthorn, Blackthorn and Cherry. Trees located within the footprint of the spillway construction.
P5	1146	Crack Willow	C3	N/A	N/A	Tree to be retained where feasible.
P5	G1147	Hawthorn, Cherry, Blackthorn	C2	N/A	N/A	North crown extents to be reduced by 2m to facilitate construction access.
P5	G2628	Privet, Elm, Common Ash, Crack Willow	C2	X	N/A	Coppice Willow. Fell dead elm. Clear privet to facilitate access into area for sheet piling and bund construction.
P5	2628B	Alder	C2	N/A	N/A	Tree to be pollarded to 8m and retained as reduced specimen.

Table 5.12 – Tree Stock and Works

Highgate Chain – Highgate No. 1 Pond
Drawing 5117039-ATK-P6-ZZ-DR-Y-2000;
5117039-ATK-P6-ZZ-DR-Y-2001.

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P6-2001	0134	Common Ash	U	N/A	N/A	Tree to be retained, dam wall re-positioned.
P6-2001	0135	Common Ash	C2	N/A	N/A	Tree to be retained, dam wall re-positioned.

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P6-2001	0141	Alder	B2	X	N/A	Tree located within footprint of the spillway. Tree to be felled
P6-2001	0142	Lime	B2	X	N/A	Tree located within footprint of the spillway. Tree to be felled
P6-2001	0144	Alder	B1	X	N/A	Tree located within footprint of the spillway. Tree to be felled
P6-2001	G16-0151	Hawthornx1, Ashx1, Elderx2	C2	X	N/A	Tree 0151 to be felled. Tree located in the footprint of the spillway
P6-2001	0153	Lime	B2	N/A	N/A	Tree to receive pollarding operations as instructed onsite by the supervising Arboriculturist.
P6-2000	G14-0161	Sycamore, Alder, Elm, Hawthorn	B2/3	N/A	N/A	Adjacent sheet piled wall to be located as directed on site by the Arboriculturist. Requirements for facilitation pruning to be confirmed during onsite walk through with the Contractor, Arboriculturist and engineers.
P6-2000	G0156	Sycamore, Elm, Yew	C2	X	N/A	Approximately 6no. Trees to be coppiced to facilitate the installation of the sheet piled wall along the dam crest. The approximately 5no. trees to be coppiced where the sheet piled wall heads down the dam slope as illustrated in the red hatch on the TPP shall be carried out at a later date. Requirements for facilitation pruning to be confirmed during onsite walk through with the Contractor, Arboriculturist and engineers.
P6-2000	G1120	Sycamore	C2	N/A	N/A	Trees to be retained.
P6-2000	G1125	Elmx3	C1	N/A	N/A	Trees to be retained.
P6-2000	1126	Sycamore	B2	N/A	N/A	Tree to be retained.
P6-2000	1119	Sycamore	U	X	N/A	Tree to be coppiced.
P6-2000	1119A	Common Ash	B2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
						the contractor and the supervising Arboriculturist.
P6-2000	G1119B	Yewx1, Hollyx6, Sycamore x1	C2	X	N/A	1xtree to be felled.
P6-2000	1119C	Cherry	C2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119D	Sycamore	B2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119E	Sycamore	C2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119F	Field Maple	B2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119G	Hawthorn	C2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119H	Cherry	C2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119I	Beech 'japonica'	B2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119J	Cherry Plum	B2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.

Sheet no.	Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build layout affects trees and mitigation.
				Cons	Cond	
P6-2000	1119K	Lawsons Cypress	B2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119L	Whitebeam	B2	N/A	N/A	Tree to be retained. Foundations for new flood wall to be excavated by hand in the RPA of tree 1119L. Works to be supervised by the supervising Arboriculturist. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.
P6-2000	1119M	Holly	B2	N/A	N/A	Tree to be retained. Requirements for tree protective barriers to be confirmed during an onsite walkthrough between the contractor and the supervising Arboriculturist.

7 Sequence of Events

7.1 General

The works at each pond shall comply with the following sequence:

1. Pre-commencement site meeting including all relevant stakeholders and to provide contact details of all relevant stakeholders once they have been agreed;

2. Marking of trees to be removed by Arboriculturist;

3. Implementation of protective barriers as per the TPP or by agreement with the supervising Arboriculturist;

4. Hand digging operations and root pruning (if applicable)

5. Construction operations

6. Removal of protective barriers;

7. Post-completion site meeting with all relevant stakeholders.