

Arboricultural Impact Assessment (AIA) Version 5

Trevor Basin, Llangollen.
Prepared for: Canal and River Trust

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1.0 Introduction

1.1 Instruction, Scope, Methodology, Mitigation & Limitations

- 1.2 My name is Simon Brain, I am a chartered arboriculturist, with over twenty years field experience holding the LANTRA Professional Tree Inspection certificate. I have been instructed by the client to prepare the following Arboricultural Impact Assessment (Version 4) for land at Trevor Bason, Llangollen.
- 1.3 This Arboricultural Implications Assessment (AIA) is based on the proposed developments as shown on the GA Proposed Site Plan Trevor Boat Base GA landscape plan V14 and incorporated into the Tree Protection Plans (TPP) in Appendix 1 of this report.
- 1.4 The assessment will be carried out in line with the recommendations in BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations* and will evaluate the direct and indirect impacts of the proposed design and where necessary recommend mitigation.
- 1.5 The AIA considers constraints posed above and below ground and where appropriate makes recommendations to mitigate impacts associated with development sites and retained trees.
- 1.6 Where specialist design, construction techniques or in areas where supervision of the works is required a Special Measure Area (SMA) has been shown on the TPP for the study areas.
- 1.7 Below ground constraints are influenced by the root protection area and are determined in line with the recommendations set out in BS 5837:2012. These recommendations quantify the root protection area based on a measured stem diameter in accordance with Annex C, and the root protection area determined from Annex D.
- 1.8 It is important to understand that when considering the Root Protection Area (RPA) with regards to the circular plot as delineated on the TPP

that a number of site factors can influence root morphology and disposition of tree roots.

- 1.9 Above ground constraints are considered above and below ground and in line with the recommendations in BS 5837:2012 to include; shade, dominance, current and future crown spread as well as the ultimate height of those retained trees.
- 1.10 Impacts associated with development sites and retained trees can be associated with single or multiple site operations that can subject trees to multiple impacts (*root severance, compaction, loss of photosynthetic material*), where this is applicable it will be highlighted in the AIA.
- 1.11 The mitigation measures proposed in this report are essential to ensure that trees marked for retention are adequately protected during the period of post/preconstruction.

2.0 Arboricultural Impact Assessment

2.1 Area for proposed development

2.2 The proposed development has been embedded within the Tree Constraints Plan which indicates the following developments associated with this site to have an arboricultural impact:

- Access arrangements and new surfacing
- Installation of proposed development infrastructure requiring tree removal

2.3 The arboricultural impacts of these items have been identified below.

2.3.1 Access alignments and new surfacing

New hard surfacing in the RPA of retained trees is located within a designated Special Measure Area (SMA) and construction will be managed by the following means, and shall be referred to as 'no dig' construction:

- Establishment of the California Bearing Ratio of the land in question order to inform engineers of type and capacity of load bearing cellular confinement system to be used.
- Appoint and confirm engineer for design and supply of a suitable load bearing geo cellular confinement system requiring no more than 25cm of excavation for top soil preparation only.
- Driveway is constructed and finished to the agreed specifications before any other general building activity commences on site.
- The cellular confinement system shall be guaranteed by the supplier so as not to cause subsequent compaction for a period of ten years.

- Typically, a 'no dig' approach (based on APN12 Driveways close to trees) will be taken with the confinement system being laid directly onto the existing ground level; where local cuts and fills are required this shall be no more than 75-100mm in depth.
- Typically, a confinement system of 150mm in depth is used.
- Edge restraints shall be required, and they shall be secured by means of small metal ties approximately 50cm+ long at appropriate intervals.
- The cellular confinement system shall be laid by pedestrian means under the consultant's on-site supervision. Small excavators can be used on the surface when it is newly laid and when ground boarding is provided.
- The system shall be filled with granular material that retains porosity and maintain a porous finished wearing surface such as pea gravel or resin bonded gravel. Proprietary surface coverings that may be suitable for some surfaces include Flexipave and Permadrive.
- All surface construction when complete shall be covered in on ground boarding throughout the SMA for the remainder of the build period.
- All surface construction is located with Special Measure Areas (SMA) which is designated on the Tree Protections Plan (TPP). All construction shall be supervised on site by a qualified arboricultural consultant whom shall record all progress and oversee all new surface installations in the RPA's affected and document the installation in the event of any future third party claims.

A typical no dig specification has been provided in Appendix 3.

NOTE: The chronological order of events shall be as follows.

Following installation of the CEZ access is installed under supervision to no dig specification provided and all new surfacing's are protected by on ground boarding such as scaffold boards prior to any other construction activity commencing in the vicinity. It is however critical that ground boarding is proportionate to the load anticipated to be exerted on the surface. Therefore, in areas of proposed driveway where vehicular (car) and pedestrian traffic is anticipated during / post construction scaffold boarding is enough above the newly laid surface. However, heavier construction related deliveries may be required and ground boarding shall be upgraded to bog mat or similar which must bear the anticipated load. Both types of on ground boarding are required for the construction duration.

2.3.2 Installation of proposed development infrastructure requiring tree removal. The impact of the installation of development requires the removal of the following twenty-one tree references (out of 75 arboricultural records):

T22;T23;T24;T31;T36;T37;T38;T39;T40;T41;T42;T43;T44;T45;T56;G5; G8;G11;T19, G4 /G9 (partial removal),W1(4no. trees) and a single tree in G7.

Five trees are affected for health and safety reasons (Cat. U trees):

- T50;T51;T55;T59;T20

3.0 Tree Preservation Orders

3.1 I have not checked with The Local Council over Conservation Area or Tree Preservation Order and if they apply to this site.

4.0 Trees to be removed and retained

4.1 The following trees have been identified for management due to their condition (Category U): T50;T51;T55;T59;T20

- 4.2 A total of twenty individual trees and 3 tree groups are identified to be removed / partially removed for the direct impact of development as listed in section 2.3.2.
- 4.3 The remaining trees are due to be retained and protected as outlined on the TPP.
- 4.4 Retained and removed trees – analysis.

There are twenty individual trees and 3 tree group references lost / partially lost for these developments, some of which are better to be replaced than retained in order to bolster long term visual amenity through a replanting scheme (Cat. C trees).

The removal of trees and their replacement with suitably sustainable species provides an opportunity to ensure further longer-term visual amenity is added to the immediate and wider landscape.

5.0 Root Protection Areas (RPA)-modifications

- 5.1 Root Protection Areas have been plotted in line with the guidance given in BS 5837: 2012 where ground constraints have had or are likely to effect the root morphology of trees e.g. where underground utilities or building foundations have obstructed root growth this shall require formal confirmation by excavation to establish presence or absence of significant rooting material. No RPA modifications have been shown for this scheme.

6.0 Post construction considerations

- 6.1 Not applicable due to nature of proposals (non-residential)

7.0 Tree pruning to facilitate development and future pruning

- 7.1 There are no requirements for minor levels of tree pruning to facilitate the proposed development.

8.0 New surfacing and ground level modifications

- 8.1 New surfacing is required in SMA/RPA of numerous retained trees as shown on the TPP. Refer to section 2.3.1 and appendix 3 for details of construction.

Note: Construction in RPA must be no dig.

9.0 Construction Exclusion Zones and Special Measure Areas

- 9.1 The Construction Exclusion Zone has been shown as a black fenced polyline on the TPP in Appendix 1 and shall be constructed using heras panels and rubber feet securely staked to the ground.
- 9.2 The CEZ must be installed as signed off as fit for purpose before any other works commence on site.

10.0 Site supervision and monitoring

- 10.1 Where a tree has been delineated on the TPP as requiring retention there will be a requirement to oversee construction operations in these areas in order to ensure that no damage occurs to the retained tree.
- 10.2 To ensure that there is an auditable system of site monitoring, reports will be compiled by an appointed arborist and following site visits they issued to the site manager and design team, copies of which will be available on site at all times for inspection by a Council planning/Tree officer.

11.0 Installation of below ground infrastructure

- 11.1 Plans (Drainage Layout V14) have been provided specifying the location of site utilities and where necessary design change has been provided previously in earlier revision of the drainage document. The arborist shall supervise works in G9.

- 11.2 Specialist advice with regards to the position of utilities will need to be sought from engineers and must be reviewed by the consulting arboriculturist prior to commencement on site.
- 11.3 The usual construction techniques for installing site utilities within an RPA will be unacceptable due to the level of root severance that would occur. The impact of root severance will have a detrimental effect on tree health as trees require a healthy root system in order to maintain water and mineral uptake from the soil. Trees need to maintain a balance between shoot and root growth to ensure that the resources supplied by each can meet the demand of the other. Severance of tree roots caused by trenching can lead to reduced water uptake which in turn impacts on the trees ability to supply water to the canopy, resulting in desiccation. A further complication associated with root severance can be problems associated with tree stability. The tree relies on an intact root system in order to maintain stability; this stability will be compromised by root severance.
- 11.4 The use of trenchless techniques can be acceptable provided the depth of service run that is excavated is below the anticipated root depth.

12.0 Design change requirements

- 12.1 Design change requirements have been necessary in earlier stages of the design development. Such change has now been implemented within the proposal to maximise tree retention across the site.

13.0 Amenity Value

The retention of significant arboricultural assets affords for maintenance of the existing visual amenity of the local area. It is considered that the successful establishment of replacement trees referred to in section in 4.4. shall mean an improvement in the long term wider visual public amenity associated with the trees on this site.

14.0 Concluding statement

- 14.1 The proposed scheme was assessed in line with guidance provided in BS 5837:2012 *Trees in relation to design demolition and construction – Recommendations* with the aim to achieve a harmonious relationship between trees and structures that can be sustained in the long term.
- 14.2 It is my professional opinion as an arboriculturist that the proposed development should be allowed to proceed claiming the design proposal has achieved a harmonious balance of retained and removed trees.
- 14.3 It is considered that a significant improvement in the longer-term visual amenity associated with the site will materialise through the suggested re plantings indicated in section 4.4.
- 14.4 A detailed Arboricultural Method Statement (AMS) will be needed to support the planning application.

Appendix 1 Tree Protection Plan

Appendix 2 Survey sheets (updated as a result of AIA)

Tree No.	Common Name	Latin name	Age	Diameter(mm)	Stems	Height (m)	Crown Height (m)	North (m)	South(m)	East (m)	West (m)	Category	Life Exp	Comments	Recommendations following AIA	RPA-R	RPA-Sqm
T1	Hornbeam	Carpinus betulus	EM	180	1	7	2	3	3	3	3	B2	40+		Unaffected, install CEZ as shown	2.2	15
T2	Ash	Fraxinus excelsior	M	510	1	11	2	5	5	5	5	A2	40+		Unaffected, install CEZ as shown	6.1	118
T3	Hornbeam	Carpinus betulus	EM	280	1	8	2	3	3	3	3	B2	40+		Unaffected, install CEZ as shown	3.4	35
T4	Hornbeam	Carpinus betulus	EM	170	1	6	2	2	2	2	2	B2	40+		Unaffected, install CEZ as shown	2	13
T5	Hornbeam	Carpinus betulus	EM	240	1	7	2	3	3	3	3	B2	40+		Unaffected, install CEZ as shown	2.9	26
T6	Hornbeam	Carpinus betulus	EM	290	1	7	2	3	3	3	3	B2	40+		Unaffected, install CEZ as shown	3.5	38
T7	Ash	Fraxinus excelsior	EM	290	0	8	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	3.5	38
T8	Damson	Prunus domestica	M	358	3	10	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	4.3	58
T9	Italian Alder	Alnus cordata	M	417	2	12	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	5	79
T10	Ash	Fraxinus excelsior	M	590	1	14	2	6	6	6	6	A2	40+		Unaffected, install CEZ as shown	7.1	157
T11	Ash	Fraxinus excelsior	M	552	2	12	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	6.6	138
T12	Crack Willow	Salix fragilis	M	670	1	15	2	6	6	6	6	B2	40+		Unaffected, install CEZ as shown	8	203
T13	Silver Birch	Betula pendula	M	430	1	15	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	5.2	84
T14	Silver Birch	Betula pendula	M	375	1	12	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	4.5	64
T15	Common Alder	Alnus glutinosa	M	773	2	12	2	6	6	6	6	B2	40+		Unaffected, install CEZ as shown	9.3	270

Tree No.	Common Name	Latin name	Age	Diameter(mm)	Stems	Height (m)	Crown Height (m)	North (m)	South(m)	East (m)	West (m)	Category	Life Exp	Comments	Recommendations following AIA	RPA-R	RPA-Sqm
T16	Sycamore	Acer pseudoplatanus	EM	586	2	14	2	6	6	6	6	B2	40+		Unaffected, install CEZ as shown	7	155
T17	Ash	Fraxinus excelsior	M	500	1	14	2	6	6	6	6	A2	40+	Part of linear group.	Unaffected, install CEZ as shown	6	113
T18	Ash	Fraxinus excelsior	M	600	1	14	2	6	6	6	6	A2	40+	Part of linear group.	Unaffected, install CEZ as shown	7.2	163
T19	Goat Willow	Salix caprea	M	804	4	8	2	7	7	7	7	B2	40+	Part of linear group. Ivy on stem. Unable to inspect stem due to Ivy. Included bark present in main fork.	Lost for unit, replace within landscape plan	9.6	292
T20	Sycamore	Acer pseudoplatanus	M	375	1	10	2	4	4	4	4	U	<10	Dead.	Remove following bat review	4.5	64
T21	Goat Willow	Salix caprea	M	590	4	10	2	5	5	5	5	B2	20+		Remove for development	7.1	157
T22	Common Alder	Alnus glutinosa	M	691	5	12	2	5	5	5	5	B2	20+		Lost for development	8.3	216
T23	Goat Willow	Salix caprea	M	350	1	12	2	5	3	5	5	B2	20+		Lost for development	4.2	55
T24	Goat Willow	Salix caprea	M	300	1	12	2	2	6	5	5	B2	20+		Lost for development	3.6	41
T25	Ash	Fraxinus excelsior	M	400	1	15	2	5	5	5	5	B2	40+		Retained within CEZ	4.8	72
T26	Common Alder	Alnus glutinosa	EM	190	1	8	2	3	3	3	3	C2	40+		Unaffected, install CEZ as shown. SMA applies for no dig surfacing in RPA	2.3	16
T27	Damson	Prunus domestica	M	420	1	8	2	4	4	4	4	C2	40+		Unaffected, install CEZ as shown. SMA applies for no dig surfacing in RPA	5	80
T28	Common Alder	Alnus glutinosa	EM	170	1	8	2	3	3	3	3	C2	40+		Unaffected, install CEZ as shown. SMA applies for no dig surfacing in RPA	2	13
T29	Ash	Fraxinus excelsior	EM	591	4	13	2	5	5	5	5	B2	40+		Unaffected, install CEZ as shown	7.1	158

Tree No.	Common Name	Latin name	Age	Diameter(mm)	Stems	Height (m)	Crown Height (m)	North (m)	South(m)	East (m)	West (m)	Category	Life Exp	Comments	Recommendations following AIA	RPA-R	RPA-Sqm
T30	Ash	Fraxinus excelsior	EM	513	2	13	2	5	5	5	5	B2	40+		Unaffected, install CEZ as shown	6.2	119
T31	Ash	Fraxinus excelsior	M	555	2	13	2	3	5	6	5	B2	40+		Remove for development	6.7	139
T32	Sycamore	Acer pseudoplatanus	M	430	1	13	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	5.2	84
T33	Ash	Fraxinus excelsior	M	607	3	13	2	5	5	5	5	B2	40+	Part of linear group.	Unaffected, install CEZ as shown	7.3	167
T34	Ash	Fraxinus excelsior	M	478	2	13	2	5	5	2	7	B2	40+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Unaffected, install CEZ as shown	5.7	103
T35	Ash	Fraxinus excelsior	M	610	2	14	2	6	4	5	5	B2	40+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Unaffected, install CEZ as shown	7.3	168
T36	Ash	Fraxinus excelsior	M	689	5	13	2	4	4	7	3	B2	40+	Part of linear group.	Remove for development	8.3	215
T37	Ash	Fraxinus excelsior	M	461	2	13	2	3	3	3	3	C2	40+	Part of linear group. Low bud/leaf density.	Remove for development	5.5	96
T38	Ash	Fraxinus excelsior	M	390	1	13	2	3	3	1	5	C2	40+	Part of linear group.	Remove for development	4.7	69
T39	Ash	Fraxinus excelsior	M	742	4	13	2	5	5	5	5	B2	40+	Part of linear group.	Remove for development	8.9	249
T40	Bird Cherry	Prunus padus	OM	545	1	14	2	6	4	4	4	C2	40+	Part of linear group.	Lost for development	6.5	134
T41	Goat Willow	Salix caprea	OM	865	1	12	2	8	4	6	6	C2	10+	Part of linear group.	Lost for development	10.4	338
T42	Silver Birch	Betula pendula	M	450	1	12	2	4	4	4	4	B2	20+	Part of linear group.	Lost for development	5.4	92
T43	Ash	Fraxinus excelsior	EM	325	1	12	2	4	4	4	4	B2	20+	Part of linear group.	Lost for development	3.9	48
T44	Goat Willow	Salix caprea	EM	379	3	9	2	4	5	4	4	C2	20+	Part of linear group.	Lost for development	4.5	65
T45	Ash	Fraxinus excelsior	EM	300	1	9	2	3	5	3	3	C2	20+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Lost for development	3.6	41

Tree No.	Common Name	Latin name	Age	Diameter(mm)	Stems	Height (m)	Crown Height (m)	North (m)	South(m)	East (m)	West (m)	Category	Life Exp	Comments	Recommendations following AIA	RPA-R	RPA-Sqm
T46	Ash	Fraxinus excelsior	M	375	1	12	2	4	4	4	4	B2	20+	Part of linear group.	Retained within CEZ	4.5	64
T48	Ash Goat Willow Bird Cherry Sycamore	Fraxinus excelsior, Salix caprea, Prunus padus, Acer pseudoplatanus	M	520	1	16	2	5	5	6	3	B2	20+	Part of linear group.	Retained within CEZ	6.2	122
T49	Ash Goat Willow Bird Cherry Sycamore	Fraxinus excelsior, Salix caprea, Prunus padus, Acer pseudoplatanus	M	575	1	18	2	6	6	6	6	B2	20+	Part of linear group.	Retained within CEZ	6.9	150
T50	Ash	Fraxinus excelsior	M	450	1	18	2	4	4	3	5	U	<10	Part of linear group. Cavity on stem. Major bark wounding on stem.	Pollard following bat review	5.4	92
T51	Goat Willow	Salix caprea	EM	397	2	10	2	5	5	6	3	U	20+	Low vitality. Declining. Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Pollard following bat review	4.8	71
T52	Sycamore	Acer pseudoplatanus	EM	520	2	14	2	5	5	5	5	B2	40+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Retained within CEZ	6.2	122
T53	Sycamore	Acer pseudoplatanus	M	375	1	14	2	5	3	5	5	B2	40+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Retained within CEZ	4.5	64
T54	Sycamore	Acer pseudoplatanus	M	350	1	14	2	4	4	4	4	B2	40+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Retained within CEZ	4.2	55
T55	Goat Willow	Salix caprea	M	450	1	10	2	4	4	4	4	U	<10	Dead. Part of linear group. Cavity on stem. Major bark wounding on stem. Unbalanced crown shape. Crown distorted due to group pressure.	Pollard following bat review	5.4	92

Tree No.	Common Name	Latin name	Age	Diameter(mm)	Stems	Height (m)	Crown Height (m)	North (m)	South (m)	East (m)	West (m)	Category	Life Exp	Comments	Recommendations following AIA	RPA-R	RPA-Sqm
T56	Goat Willow	Salix caprea	M	600	1	10	2	4	4	6	4	C2	20+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Remove for development	7.2	163
T57	English Elm	Ulmus procera	M	685	4	18	2	7	7	7	7	B2	20+	Part of linear group.	Retained within CEZ	8.2	212
T58	Hawthorn	Crataegus monogyna	M	350	1	9	2	4	4	6	4	B2	20+	Part of linear group. Ivy on stem. Unable to inspect stem due to Ivy.	Retained within CEZ	4.2	55
T59	English Elm	Ulmus procera	M	350	1	10.5	2	4	4	4	4	U	<10		Pollard following bat review	4.2	55
T60	Ash	Fraxinus excelsior	M	400	1	15	2	5	5	5	5	B2	40+	Part of linear group. Ivy on stem.	Retained within CEZ	4.8	72
T61	Hawthorn	Crataegus monogyna	M	300	1	9	2	4	4	6	4	B2	20+	Part of linear group. Ivy on stem. Unable to inspect stem due to Ivy.	Retained within CEZ	3.6	41
T62	Cypress	Cuppressus	Y	100	0	4	2	2	2	2	2	C2	20+		Remove for development	1.2	13
G1	Goat Willow Silver Birch Sycamore Rowan	Salix caprea, Betula pendula, Acer pseudoplatanus, Sorbus aucuparia	EM	220	1	7	2	2	2	2	2	B2	40+		Unaffected, install CEZ as shown	2.6	22
G2	Silver Birch	Betula pendula	M	495	2	12	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	5.9	111
G3	Common Alder Ash Hazel	Alnus glutinosa, Fraxinus excelsior, Corylus avellana	EM	495	2	12	2	4	4	4	4	B2	40+		Unaffected, install CEZ as shown	5.9	111
G4	Goat Willow Sycamore Common Alder	Salix caprea, Acer pseudoplatanus, Alnus glutinosa	EM	250	1	10	2	3	3	3	3	B2	40+	Part of linear group.	Some trees lost for unit as shown on plan	3	28
G5	Sycamore Goat Willow Common Alder	Acer pseudoplatanus, Salix caprea, Alnus glutinosa	EM	250	1	6	2	3	3	3	3	C2	20+		Lost for development	3	28
G6	Goat Willow	Salix caprea	M	350	1	10	2	2	6	5	5	C2	20+		Unaffected, install CEZ	4.2	55
G7	Goat Willow Sycamore	Salix caprea, Acer pseudoplatanus	EM	250	1	8	2	3	3	3	3	C2	40+		Single tree lost	3	28
G8	Goat Willow Sycamore	Salix caprea, Acer pseudoplatanus	EM	300	1	10	2	4	4	4	4	C2	40+		Lost for development	3.6	41

Tree No.	Common Name	Latin name	Age	Diameter(mm)	Stems	Height (m)	Crown Height (m)	North (m)	South(m)	East (m)	West (m)	Category	Life Exp	Comments	Recommendations following AIA	RPA-R	RPA-Sqm
G9	Ash	Fraxinus excelsior	M	350	1	13	2	4	4	4	4	B2	40+	Part of linear group.	4no. Trees on towpath edge to be removed for development	4.2	55
G10	Hawthorn Leyland Cypress	Crataegus monogyna, X Cupressocyparis leylandii	M	200	1	5	2	2	2	2	2	C2	40+	Part of linear group.	Unaffected, install CEZ as shown on plan	2.4	18
G11	Goat Willow Leyland Cypress	Salix caprea, X Cupressocyparis leylandii	EM	300	1	12	2	3	3	3	3	C2	20+	Part of linear group.	Lost for development	3.6	41
G12	Hazel	Corylus avellana	M	300	1	9	2	4	4	4	4	B2	20+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Unaffected, install CEZ as shown	3.6	41
G12a	Ash Goat Willow Bird Cherry	Fraxinus excelsior, Salix caprea, Prunus padus	EM	300	1	12	2	3	3	3	3	B2	20+	Part of linear group. Unbalanced crown shape. Crown distorted due to group pressure.	Unaffected, install CEZ as shown	3.6	41
G13	Hazel Ash Goat Willow	Corylus avellana, Fraxinus excelsior, Salix caprea	EM	200	1	9	2	3	3	3	3	B2	20+	Part of linear group.	Unaffected, install CEZ as shown	2.4	18
W1	Ash Sycamore Common Alder Hawthorn	Fraxinus excelsior, Acer pseudoplatanus, Alnus glutinosa, Crataegus monogyna	M	Av. 375	1	14	2	Av.4	Av.4	Av.4	Av.4	A2	40+		4no. trees removed as shown on plan	4.5	64

Power lines constraint / Hazard

Single vehicular access route to Rose Cottage retained

Site pedestrian access route (1.5m width)

Existing Trees to be retained

Tree to be planted of native species

Soft landscaping, retained as existing or native grass germinal seeded mix planted to make good as required

Woodland meadow native mix, to be agreed with Canal & River Trust Ecologist

Wild meadow native mix, to be agreed with Canal & River Trust Ecologist

Medium grade reinforced grass mesh strip along route to Rose Cottage

Tar and chip, stone chip finish, feathered edge

Existing tar and chip surface

Made ground, to remain as existing and topped with matching wearing gravel finish where required

Wearing gravel finish to match made ground finish in appearance

Asphalt road surface as existing

Asphalt road surface as proposed (to widen existing access route)

Demarcation with metallic domed studs to 1.6m wide pedestrian route

Proposed stone retaining wall with rail fixed to top of coping as follows;
5 bar estate rail, galvanized, coated RAL 9005

Proposed stone retaining or screening wall (1.2m high)

Proposed railway sleeper retaining boundary

Boundary fence to remain as existing

dark green V-MESH (RAL 6005)

Metallic flat top railing, galvanized coated RAL 9005

Cast Iron bollard , Broxap Cardiff or similar approved

External Bike Stand , traditional Sheffield Style (x3)

Traditional mooring ring, black painted finish. Fixing methodology and location to be approved by Canal & River Trust Heritage Advisor

Micro surface recessed LED. Emits a low level light strip onto the pedestrian surface for way finding along general external circulation

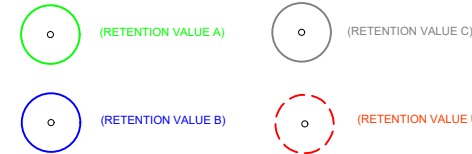
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Site Entrance



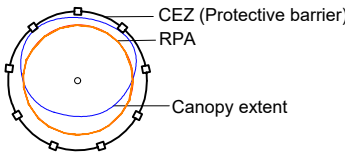
TREE PROTECTION PLAN

Retention value key



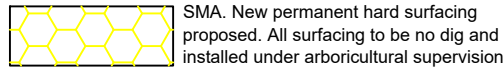
Root Protection Areas (RPA) & Construction Exclusion Zones (CEZ)

Root Protection Areas (RPA's) have been identified and are based on BS5837:2012. RPA's and Construction Exclusion Zones (CEZ) have been shown as detailed below. The CEZ shall act as the protective barrier for retained trees.



Special Measure Areas (SMA)

Special Measure Areas (SMA's) have been identified for construction in these areas and they have been shown as detailed below.



Refer to Arboricultural Implications Assessment (AIA) for details of recommended construction in SMA's.

NOTES

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CRT

Project:

Trevor Basin

Detail:

TREE PROTECTIONS PLAN

Drawn By:

SB

Date:

14.10.21

Scale:

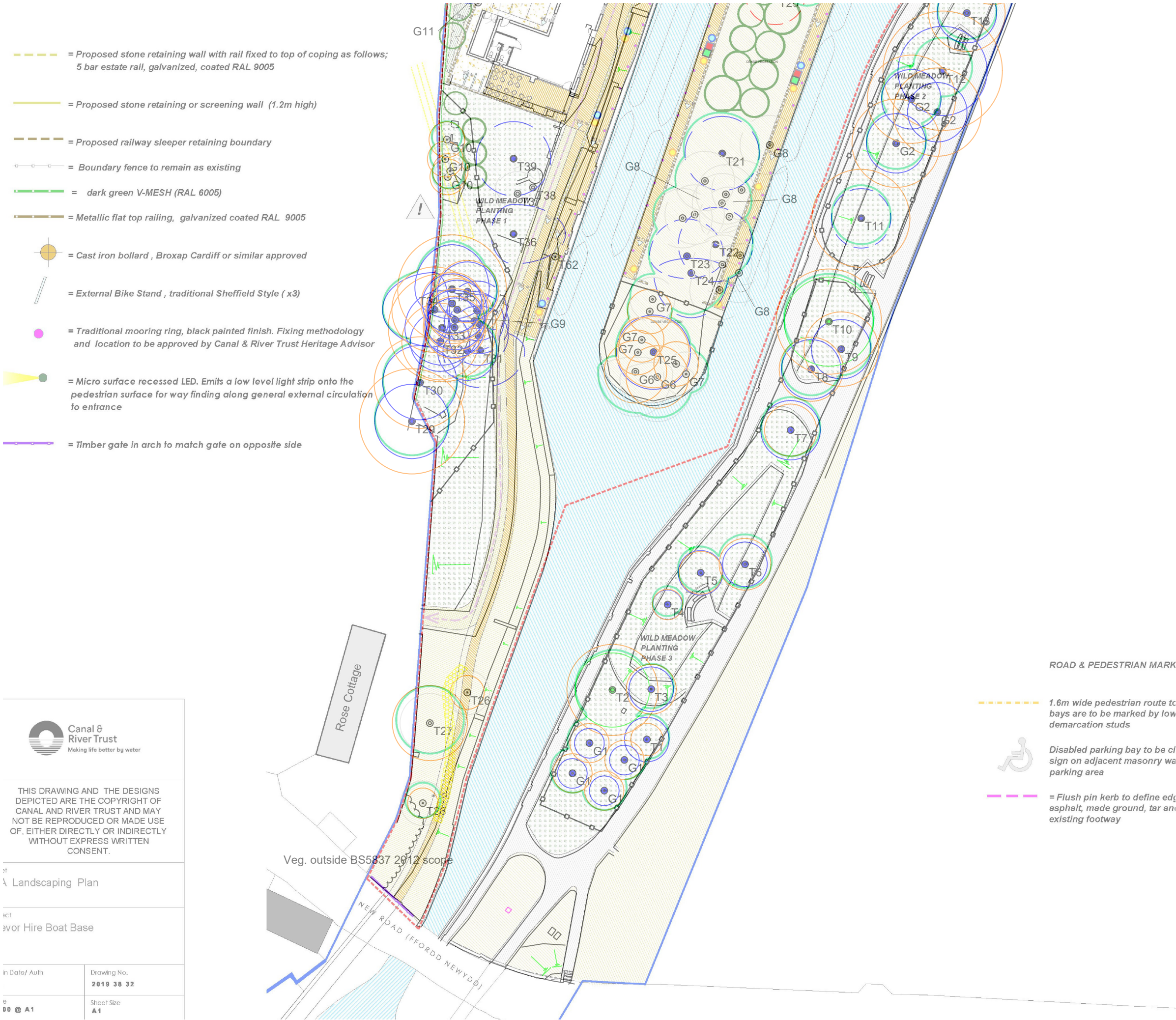
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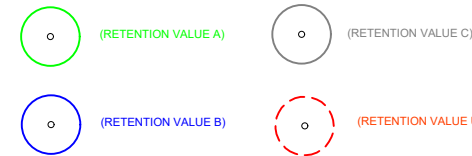
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V5



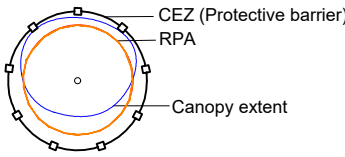
TREE PROTECTION PLAN

Retention value key



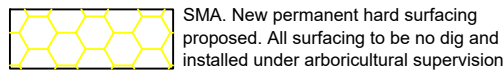
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ROAD & PEDESTRIAN MARK





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Making life better by water

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31

Landscaping Plan

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avor Hire Boat Base

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Arboricultural Method Statement

Trevor Basin, Llangollen

Prepared for: Canal and River Trust

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- Appendix 1 Cellular confinement specification
- Appendix 2 Tree Protection Plan

1.0 Introduction

- 1.1 The scope of this report is to provide an arboricultural method statement, specifically in relation to the construction of pathways within a tree rooting zone. To demonstrate the methods for working in or adjacent to root protection areas in order to avoid unacceptable impacts between the proposed design and retained trees and offer a level of protection for those trees that are to be retained on site.
- 1.2 It is important that the guidance in the method statement is followed and understood by all persons involved in the design and construction of the proposed scheme.

2.0 Communication Details, Monitoring and Compliance

- 2.1 It will be the responsibility of the site manager and appointed arboricultural consultant to brief all contractors on site as to the adherence to the arboricultural method statement. A copy of this method statement will be made available to site contractors at all times during the period of development.
- 2.2 A list of site contacts is available to the rear of this document.
- 2.3 All Special Measure Area works (no dig surfacing) shall be fully supervised on site by the arborist.
- 2.4 In order to outline working methods in relation to trees prior to any construction activity on site, a site meeting shall take place between the main contractor and arboricultural clerk of works. The organisations and individuals performing these roles shall be appointed prior to a pre start meeting. A record of the meeting will be taken and distributed to relevant parties and the meeting will confirm the duration of the works and any phasing implications or specific contractor related issues and how they are to be resolved.

The following will be explained at the pre start meeting:

- The central aspect of tree protection on this site is that the area of new surfacing located in protected areas (Special Measure Areas SMA) shall be complete and protected before any other construction works commence thereby avoiding the typical construction related issues such as compaction or direct damage from excavation that occur during site works and prior to new surfacing being installed.
- The Construction Exclusion Zone is purposefully located within the permanent works (dwelling elevation and new surfacing). This is to ensure the SMA associated with new surfacing remains undisturbed. When the new surfacing is

complete the CEZ will be relocated following arborist confirmation. Ground boarding to protect the Special Measure Areas (SMA) will be installed immediately over the new surface and it will be required for the construction duration.

- It is noted that arboricultural input is prior to construction (pre start) and whilst supervision is required throughout the build period all operations in the SMA must be overseen by the arboricultural clerk of works and must be carried out prior to any other works on site unless otherwise agreed with the LPA.
- Seasonally these works shall be carried out when the ground is dry and preferably in summer after which main construction can begin, the purpose of this is to avoid detrimental damage such as compaction of soils caused by traffic in wet conditions.

3.0 Tree pruning

- 3.1 Only tree works permitted and agreed with the subsequent planning permission shall be permitted. Where tree pruning is required in addition to that already specified in the preliminary tree survey schedule, it will be agreed in writing with the LPA Tree Officer prior to commencement.
- 3.2 All arboricultural works shall conform to the recommendations of BS3998:2010 British Standard Recommendations for Tree Work unless otherwise specified.

4.0 Protective barrier

- 4.1 Before commencing any site works Construction Exclusion Zones (CEZ) will be constructed in line with the Tree Protection Plan (TPP) and specification for the CEZ contained within the plan.
- 4.2 The protective barriers will be constructed to the specification as detailed in BS 5837:2012 and consist of a 2m high steel mesh panels (Heras panels) secured to the ground via rubber feet and metal stakes. The fencing will be secured by uprights driven into the ground to a minimum depth of 0.4m. Please refer to Appendix 2 showing a detailed specification for the construction of the barrier fencing within the Tree Protection Plan.
- 4.3 All weather notices will be secured to the barriers showing the following wording: "CONSTRUCTION EXCLUSION ZONE – NO ACCESS".

- 4.4 Once installed all fencing will be inspected by the consulting arboriculturist and signed off as secure prior to any works.

5.0 Additional precautionary measures

- 5.1 Plant and materials will be stored in designated areas outside the CEZ.
- 5.2 Movement of cranes on site will be conducted under the supervision of a banks man to ensure that a suitable distance is maintained from trees on site.
- 5.3 Materials will be stored in such a way that if spillage did occur no chemicals would leach into the CEZ.
- 5.4 Wash points for tools and equipment will be placed outside of the CEZ. When determining the proposed location for wash point's consideration will be given to the design of the station to ensure that run off does leach into the RPA.
- 5.5 Fires on site will be no be permitted

6.0 Method for new hard surfacing and construction

- 6.1 The new hard standing proposal crosses the RPA of retained trees RPA and therefore the proposal is to be constructed by the use of a no dig method as detailed in BS5837:2012 Trees in relation to design, demolition, and construction recommendations subsection 7.4.2. As a result of this measure the TPP has a designated Special Measure Area (SMA) where the new surface shall be laid.
- 6.2 The design will consist of a three dimensional cellular confinement system (cross section detailed in Appendix 1 and will be employed as a sub-base to a depth suitable for pedestrian use. The cellular system will be laid onto a geotextile membrane in order to prevent pollution contaminating the rooting area. The cellular structure is then expanded and pinned in place using steel rods and back filled using an angular aggregate that contains no fines.

Note: The infill aggregate must not contain any fines as these become compacted overtime and reduce water infiltration. The recommended size of aggregate is 20-40mm in diameter.

- 6.3 In order for the system to allow for gaseous exchange and water infiltration the finished surface treatment will be permeable to allow for water infiltration. In such cases where vehicles or pedestrians are intending to use the new driveway the use of permeable resin bounded gravel would be recommended. (Hoggin or self-binding gravel will not be used as they compact easily and prevent water infiltration)
- 6.4 The finished permeable surface will be protected during construction works in order to prevent the interstices from becoming blocked by excessive construction debris.
- 6.6 Where ground vegetation is present and requires removing in order to construct the cellular system the vegetation will be cleared using hand tools only.
- 6.7 Where the topography of the ground is such that required levels are not met for installing the cellular system, the levelling of the area can be achieved by using sharp sand in order to create an even surface.

Note: Builders sand is not to be used to create a level surface due to the high salt content.

- 6.8 Consideration will be given to ground conditions at the time of installation as during the winter months the ground is more likely to be saturated leading to an increased risk of compaction.
- 6.9 The operator will take care not to place an exaggerated angular force on the cellular system when filling with the aggregate to prevent compaction and smearing of the soil subgrade layer.
- 6.10 The granular infill will be spread using hand tools and be loaded from outside the area of works. Machinery will only access the cellular system once a suitable area has been prepared by hand in order to prevent compaction and damage to the cellular system.

Note: a single passage of machinery over a root protection area can cause irreparable damage to tree roots, 90% of which are located within the top 400mm of the soil.

7.0 Edge supports

- 7.1 Edge supports will consist of a peg and board system. Where a more stable option is required, railway sleepers may be used and secured in place by steel pins. Excavation

will not take place in order to secure edging or kerbing in place due to the damage caused by root severance.

8.0 Services within the RPA

- 8.1 At present there are no plans for services in the RPA of retained trees. Where there is a need to route services with an RPA technical design, plans will be produced in association with the arboriculturist to ensure that the least destructive path is identified. Specialist equipment (ground penetrating radar) may be required in order to accurately map the root system to ensure that the route of least impact is found. It is preferable that where the need to route services through a trees rooting zone, all apparatus will be located together in common ducts. Inspection chambers will be located outside of the RPA.

Note: The desired option will always be to route the proposed new services away from the RPA due to the high probability of significant damage occurring to tree roots.

- 9.2 The favoured method of insertion for services is a trenchless insertion method which differs on the requirement of the utility apparatus and includes micro-tunnelling, surface launched directional drilling, pipe ramming and impact moling. Where any of these methods is utilised then the entry and retrieval pits will be located outside of the RPA.

Ref: Volume 4: NJUG Guidelines For The Planning, Installation And Maintenance Of Utility Apparatus In Proximity To Trees (Issue 2) – Operatives Handbook

- 9.3 Any roots un-earthed during the excavation are to be pruned in accordance with British Standard BS5837:2012. Pruning of roots in excess of 25mm is to be agreed with the LPA's Tree Officer and pruning is to be carried out under supervision of the consultant arboriculturist. Exposed roots not to be pruned are to be covered immediately in order to prevent desiccation and to protect from rapid changes in temperature. All protective materials shall be removed prior to infilling with topsoil; care will be taken to ensure that no contaminated material is introduced into the excavation.

10.0 Contact details

10.1 The following list details key project consultants and officers who can provide appropriate advice on arboricultural matters relating to the above project.

Site manager:

Site supervisor:

Arboricultural consultant:

Amenity Tree Care Ltd
Burwardsley
Chester
Tel: 01829 770075

Tree officer (Wrexham Council):

Planning officer (Wrexham Council):

Please do not hesitate to contact me should you require further assistance.

Yours sincerely



Simon Brain *Ba. Tech Cert Arb. PG Cert (Bio Rec)*
Chartered arboriculturist. ecologist
Managing Director

Appendix 1

Cellular confinement specification

