BS 5837:2012

Arboricultural Implications Assessment and Arboricultural Method Statement

At

Belper Bridgefoot Sewage Pumping Station
Belper
Derbyshire

Prepared for

Mr Roger Brailsford
North Midland Construction NOMENCA

Prepared by

David Kolebuk – Principal Consultant

Dated – 17 September 2014
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1.0 Introduction

1.1 Mr Roger Brailsford of North Midland Construction NOMENCA employed Amber Arboricultural Consultancy (AAC) to advise them and other parties on arboricultural matters regarding a proposed and essential refurbishment of the Bridgefoot sewage Pumping Station and associated access roadways at Belper, Derbyshire. Our main brief was to draw up arboricultural impact and method statements as per British Standard BS 5837:2012 ‘Trees in relation to design, demolition and construction - Recommendations’ to ensure that trees shown for retention were protected during the life of the development.

1.2 A Tree Condition Survey was undertaken prior to our knowledge of site layout to both inform and accompany an application for planning permission for a residential development by AAC. This survey assessed the condition of the tree resource, categorised the trees and provided the Root Protection Area (RPA) information according to the BS 5837: 2012 ‘Trees in relation to design, demolition and construction – Recommendations section 4.4. The survey, schedule plan and cascade chart for tree quality assessment (Table 1) is in Appendix 1.

1.3 Following preparation of the Tree Condition Survey and in line with our arboricultural advice a site layout was forwarded for consideration.

1.4 We have been provided with a copy of the following drawing(s) by: NMC Nomenca

- Drawing Number: DXF

1.5 The tree numbers referred to in this report are the same as shown on the tree survey schedule and plan (Appendix 1).

2.0 Scope of Report

2.1 This report addresses the arboricultural issues relating to the proposed development at the above site.

2.2 The purpose of this report is to comment on the arboricultural implications of the proposed development and to aid the preservation of trees to be retained within and adjacent to the site during the construction works by setting out the tree protection methods, construction techniques and working practices that are to be adopted on this site.

2.3 If all the guidelines and principles outlined in this report are not adhered to, as with all development sites, there is a risk that the construction activities will result in damage to and potentially the death of the retained trees. Damage to the trees will significantly increase the risk of their health declining and may increase the risk of their complete or partial failure.

2.4 The success of the recommendations set out in this report are dependent on the development adhering to the principles set out within, which are to be approved and enforced by the Local Planning Authority (LPA). If the recommendations contained within this document are acceptable to the LPA then we suggest that they be controlled by standard planning conditions and arboricultural supervision at key stages of the development. See section 7.7.2 and Appendix 4 for arboricultural schedule
3.0 Site Description

3.1 The main site is a current sewage pumping station situated adjacent to the River Derwent to the west of the town. It consists of a small brick building at the southern end of an access track. There is a turning head for service vehicles and the surface is metalled.

4.0 Background

4.1 Within the development site there will be a high level of competition for any available space and unless protected with a strong physical barrier the retained trees both above and below ground level will be at risk from damage. The open ground beneath trees may become used for the storage of building materials, topsoil or used by site traffic. All these activities in proximity to trees have the potential to be detrimental to the health of the retained trees.

4.2 It is generally agreed that the majority of tree roots, even for a mature tree, are found in the top 90cm of the soil and are vulnerable to sudden changes in the rooting environment. These roots absorb moisture and nutrients needed for growth and contrary to popular belief, mature trees do not have a large deep taproot that obtains moisture from great depth.

4.3 An ideal soil for root growth is about 50% pore space (in urban areas this is often significantly reduced). These pores, the spaces between soil particles, are filled with water and air. Construction activity compacts the soil and can dramatically reduce the amount of pore space. This not only inhibits root growth and penetration but also decreases oxygen in the soil that is essential to the growth and function of the roots.

4.4 Any damage to the rooting environment can upset the balance between the crown and roots established by a tree over many years, and this may be detrimental to the health status or may compromise the stability and structural integrity of the tree. It should be noted that healthy trees will usually withstand a loss of a proportion of their root system.

4.5 The two main possibilities for injury to trees during and following the construction process are from direct and indirect damage.

4.5.1 Direct damage can be defined as injury resulting from physical contact including contact with machinery or fire and excavation of the rooting area.

4.5.2 Indirect damage can be defined as injury from activities that take place near the tree such as level changes, compaction of the soil or contamination by chemical spillage in the proximity of the root plate.

4.6 Light tree surgery such as crown lifting and/or the provision of high quality tree protection measures coupled with suitably supervised and implemented construction methods can reduce the risk of damage to retained trees.

4.7 With reference to BS 5837:2012 ‘Trees in relation to design, demolition and construction – Recommendations’ an assessment of the tree resource has been undertaken and those trees suitable for retention within the proposed development are identified. Following the guidance in BS 5837:2012 a calculation has been made.
for the area of soil estimated to be required to ensure the survival of the retained trees and this is represented by the RPA as shown on the attached Tree Protection Plan.

4.8 With consideration of the RPA and existing site features (including natural and man-made topography) it is my opinion that by adopting construction and tree protection techniques that minimise root disturbance it will be possible to achieve the successful construction of the proposed development. By adopting such methods lasting damage to retained trees will be avoided and amenity value will be preserved for future generations.

5.0 Arboricultural Issues Relating to the Proposed Development
(Arboricultural Impact Assessment)

5.1 The most significant arboricultural implications associated with the proposal to construct a new school facility and increased parking provision on this site is the removal of two trees to accommodate these essential works to the sewage pumping station.

5.2 Tree Removal

5.2.1 As a result of the recommendations set out in this report, in light of the pre-development Tree Condition Survey and to implement the new educational facility a number of trees and other peripheral vegetation will have to be removed:

Tree Removal

T1 – Sycamore
T2 - Thorn

5.2.2 The removal of the two trees is necessary to ensure safe working for the engineering project to proceed. The amount of excavation required would sever up to 60-70% of the trees rooting area and make them structurally unsound as well as physiologically compromised. The trees form part of an extensive tree belt running alongside the River Derwent and their loss would not detract from the amenity of this particular location to a significant degree.

5.2.3 The construction of the access roadway is beyond the RPA of four sentinel trees within the fields of the proposed route. These will not be compromised but will be protected by fencing to ensure no intrusion into the RPA occurs. There may be a requirement to remove an area of scrub adjacent to the A517 to facilitate the access but this is of little value and will not result in loss of amenity in this area.

5.2.4 Within the main area of works several trees will have to be crown raised to 5.2 metres from ground level to ensure that no damage occurs via vehicle strikes. It also ensure that the plant can safely manoeuvre. The trees in question are in third party ownership and owners will be informed of the works suggested in the schedule at appendix 2.
5.3 **Tree Retention/Arboricultural Works**

5.3.1 These will be undertaken prior to any major site activity where/if necessary. Arboricultural works will consist of the felling of two trees (T1 & T2) raising the crowns of trees (T3-6) to give 5.2 metres clearance from ground level to ensure that no serious damage occurs during site activity.

6.0 **Sequenced Methods of Demolition, Construction and Tree Protection**

6.0.1 With reference to relevant published guidance, the methodology of this statement follows a logical sequence essential to the efficacy of the protection measures. Reference may include: British Standard BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations; British Standard BS 3998:2010 Tree Work and National Joint Utilities Group Guidelines for the planning, installation and maintenance of utility services in proximity to trees. It is essential to the successful implementation of the principles set out in this document that effective supervision and enforcement are put in place from the outset.

6.1 **Phase 1 Undertake Arboricultural Works**

6.1.1 The presence and relevance of any statutory protection of the trees including tree preservation orders (TPO), conservation area status, planning conditions and felling licence requirements has been investigated by AAC. We have had no response from the LPA.

6.1.2 Any works recommended will be shown in Appendix 2.

6.1.3 A legal Duty of Care requires that all works specified should be performed by qualified arboricultural contractors who have been competency tested to determine their suitability for such works in line with Health and Safety Executive guidelines. Additionally all works should be carried out in accordance with British Standard BS 3998:2010 Recommendations for Tree Work.

6.1.4 All tree work is to conform to BS 3998:2010 ‘Tree Work’ and to current arboricultural best practice. Tree works are due to be undertaken by a professional and specialist arboricultural contractor, who carries the appropriate experience and insurance cover and following formal approval from the LPA. All tree works will need to be informed by the presence of statutory protection and unless considered urgent and unavoidable due to health and safety issues are subject to compliance with the relevant wildlife legislation.

6.1.5 Particular care needs to be addressed in dealing with legally protected species such as nesting birds and roosting bats which are protected under the Wildlife and Countryside Act 1981 (as amended) from intentional harm and killing and applies to roosting and hibernating bats and active bird nests. The protection of bird nests applies from the moment birds start constructing nests and therefore no tree work should be programmed between mid-February to August inclusive unless adequate mitigation has been introduced to discourage bird nesting in any one area before the start of February.
6.2 **Phase 2 Demolition and Enabling Works**

6.2.1 During demolition arboricultural supervision will not be required as no operations are necessary in the vicinity of retained trees.

6.3 **Phase 3 Tree Protection Fencing**

6.3.1 Tree protection will be installed prior to any demolition or ground-works commencing, remaining in place throughout construction and be removed only after completion.

6.3.2 Tree protection will be installed as agreed with the Local Authority Arboricultural Officer and with reference to the British Standard 5837:2012 ‘Recommendations for Trees in Relation to design, demolition and construction’. The default specification as per section 6.2.2.2 of BS 5837:2012 will be used (see Appendix 3) where the risk of damage to roots is negligible. Where the protective fencing is within the RPA then an appropriate above ground stabilization system will be used as shown in Figure 3 of the BS and at Appendix 3 also.

6.3.3 Within the fenced zone, no materials or chemicals should be stored at any time, no fires should be lit, no pedestrian or vehicle traffic, and level changes within these areas should be kept to an absolute minimum. Every effort should be taken to protect a maximum possible area of the root system.

6.3.4 Within the RPA no level changes or excavation within the RPA should be undertaken without the consent of the LPA Arboricultural Officer or AAC.

6.3.5 Clear notices are to be fixed to the outside of the fencing with words such as ‘TREE PROTECTION AREA – NO ACCESS OR WORKING WITHIN THIS AREA’. See Appendix 4. These notices shall be in A3 in size, laminated and fixed to the fencing using suitable aids such as tie wires.

6.3.6 The site agent, all contractors and other relevant personnel are to be informed of the role of the Tree Protection Fencing and their importance. A copy of the Tree Protection Plan will be displayed on site at all times during construction.

6.4 **Phase 4 Ground Protection**

6.4.1 It may be necessary to gain access within the RPA of the trees for sufficient, safe working area so ground protection detail is required. This will be for pedestrian operated plant up to a gross weight of 2 tons. Interlinked ground protection boards placed atop of 150mm of woodchip laid on to a geotextile membrane will be used. This is in accordance with BS 5837:2012 sections 6.2.3 (6.2.3.1 – 6.2.3.5). Detail, of the proposed ground protection is in Appendix 3

6.5 **Phase 5 Groundworks, Level Changes, Foundations and Services**

6.5.1 All demolition debris comprising of building materials (bricks, concrete, corrugated sheets etc.) will be removed from site. No top or sub-soil is likely to be removed and storage will be beyond tree protection barriers.
6.5.2 Drainage and underground service routes shall be located beyond the RPA of all retained trees. Any excavation for services within the tree protection area should be undertaken following the guidelines published by NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees and advice from the Arboricultural Consultant.

6.5.3 If the service runs are located within the RPA due to engineering difficulties post permission, we recommend that the route is designed to be as far from any of the trees and all possible trenchless techniques are considered.

6.5.4 If a trench has to be excavated within the area designated as the RPA then this activity must be supervised by the Arboricultural Consultant. It must be remembered that hand digging is time consuming, and its efficacy is often compromised due to the size and space required to install the piping, ducting or actual service run within the trench, all these factors need to be considered when locating services within the RPA.

6.6 Phase 6 Dismantling Protection Barriers

6.6.1 Dismantling the protection barriers around retained trees may be required to allow completion of final surface treatments and landscaping. Supervision of this exercise and control of the landscaping thereafter will be administered by the appointed Arboricultural Supervisor. The removal of the Tree Protection Fencing is not an opportunity for machinery to access the previously fenced off area.

6.6.2 No further excavation will be carried out during this process and soil levels will not be raised above that existing by greater than 100mm and not within 2m of the trunk. Any removal of existing structures within the RPA including garden type walls or paths will be carried out by hand.
7.0 ARBORICULTURAL METHOD STATEMENT

7.1 Removal of Existing Structures

7.1.1 The removal of the existing structures on the site is well beyond the RPA of any retained tree.

7.2 Installation of Temporary Protective Fencing Ground Protection

7.2.1 Protective fencing will be the first operation undertaken on the site and will conform to the default specification shown in section 6.2.2.2 of BS 5837:2012 and, where appropriate, the above ground stabilization method will be used as per section 6.2.2.3 of the BS and also shown in Appendix 3.

7.2.2 Although the majority of the site activity is beyond the RPA of the retained trees and with other mitigation measures will be put in place such as no dig surfacing, the fencing will reduce the temptation to store materials, spoil, and store plant and other vehicles within the RPA.

7.2.3 Ground protection, if required in the opinion of the Arboricultural Consultant will consist of interlocking ground protection boards laid on a geotextile membrane which in turn will be covered by 150mm of woodchip. See Appendix 3 for the type of boards to be used.

7.3 Specialist Foundation Type

7.3.1 Not required due to present or future tree constraints.

7.4 Structures within RPA

7.4.1 Not applicable

7.5 Retaining structures

7.5.1 No actual retaining structures are to be constructed within the RPA of any retained tree.

7.6 Permanent Hard Surfacing

7.6.1 Hard surfacing already exists around the pumping station temporary access routes are beyond the RPA of any retained tree

7.7 Replacement/Additional Planting Opportunities

7.7.1 If required by the LPA the size, species and location of any replacement planting will be forwarded.
7.8 Site Monitoring

7.8.1 The table below is an auditable system detailing specific site events requiring arboricultural input/supervision as per BS 5837:2012 section 6.3.

7.8.2 Arboricultural Monitoring Schedule
An additional copy of this schedule is at Appendix 4 and can be removed, copied and used by site supervisors.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Arboricultural Supervision required, and by whom?</th>
<th>Date action undertaken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undertaking of suggested tree work</td>
<td>Yes by appointed contractor</td>
<td></td>
</tr>
<tr>
<td>Erection and Dismantling of Protective fencing and ground protection (if necessary)</td>
<td>Yes by Arboriculturist and site supervisor</td>
<td></td>
</tr>
</tbody>
</table>

**Note** Existing planning regulations include the provision for local planning authorities to enforce planning requirements. The project Arboriculturist appointed by any developer can only help monitor site activity. Any enforcement is the responsibility of the local authority.

7.9 Conclusion

7.9.1 There are trees destined for removal to safely implement the necessary works to the sewage pumping station. However, the majority of trees within the rural and riparian landscape will not be compromised. There are no significant arboricultural reasons that should preclude these essential engineering works.
APPENDIX 1

Arboricultural Survey and Root Protection Area Plan and
BS 5837:2012 Cascade Chart for Tree Quality Assessment
BS 5837:2012 Pre-Development Tree Condition Survey

At

Belper Bridgefoot SPS

Prepared for:
Mr Roger Brailsford

Prepared by
David Kolebuk – Principal Consultant

Dated – 12 August 2014
## CONTENTS

1.0 Introduction  
2.0 Instructions and Brief  
3.0 Observations and comments  

Appendix 1 Tree Survey, Tree Location Plan with Root Protection Area Plan  
Appendix 2 Trees in Relation to Construction – Recommendations BS 5837:2012 Cascade chart for tree quality assessment  
Appendix 3 David Kolebuk CV
1.0 Introduction

1.1 I am David Kolebuk, Managing Director of Amber Arboricultural Consultancy (AAC). I hold The Arboricultural Associations Technicians Certificate in Arboriculture, Lantra Professional Tree Inspectors Certificate and NVQ Level 4 in Management and I am currently undertaking the recently devised Level 6 Professional Diploma in Arboriculture. I have been involved in Arboriculture for over 25 years. A full list of qualification, membership of professional bodies and details of CPD is given in Appendix 3.

2.0 Instructions and Brief

2.1 The brief was to undertake a pre-development tree survey in accordance with British Standard 5837:2012 ‘Trees in relation to design, demolition and construction: Recommendations.’

2.2 Plans supplied by the client were:

2.2.1 DXF existing site layout/Topo survey

2.3 The site was surveyed by David Kolebuk on the 12 August 2014 and a detailed inventory of the trees undertaken. The following survey is based upon the findings of that visit and the conditions found on the day. This survey provides quantitative data on tree species, height, stem diameter, height and direction of first significant branch, crown spread, age class and a brief qualitative assessment on tree condition and future potential. A detailed inspection of individual trees with respect to decay, defects and hazard is also included. Trees found to be in a structurally dangerous condition are identified.

2.4 With reference to BS 5837:2012 ‘Trees in relation to design, demolition and construction – Recommendations’, an assessment of the tree resource has been undertaken following the guidance in BS 5837:2012 and a calculation has been made for the theoretical Root Protection Areas (RPA) as shown in the survey schedule in metres.

2.5 This survey should be regarded as an initial appraisal and observations, assessments or recommendations relating to tree protection zones, remedial tree works, protective fencing, foundation design, material specification or project design are beyond the scope of this survey.

2.6 The location of the trees is shown on the attached drawing, Appendix 1

2.7 Information recorded in the survey includes:

Sequential Survey Reference Number – Recorded on survey plan.
Species – The species identification is based on visual observations and the common English name of what the tree appeared to be is listed first. The botanical name will appear after in brackets.
Tree Heights – These are estimated in meters. Estimated mature heights are given in brackets.
Stem Diameters – Measured by and recorded in millimetres to the nearest 10mm. In the case of groups of trees the maximum diameter is recorded.

Crown Radius – Recorded in meters along each cardinal point. In the case of groups the maximum peripheral spread is recorded.

Existing Height Above Ground Level of:

1) First significant branch and direction of growth (e.g. 2.5 – W)
2) Canopy height

To inform ground clearance, crown stem/ratio and shading.

Life Stage – Recorded as prescribed in BS 5837:2012 (e.g. young, semi mature, early mature, mature, over mature);

Condition – Particularly of structural and/or physiological condition (e.g. the presence of any decay and physical defect, and/or preliminary management recommendations.

In the case of groups and/or woodlands the condition stated will be typical of the feature. Groups and woodland will be depicted by green hatch and the RPA is included in the total area shown. RPA is measured by taking an average measurement of stem diameter.

Life Expectancy – estimated; i.e. Less than 10 years, 10-20 years, 20-40 years, more than 40 years.

Retention Category – Is given as follows and corresponds with Table 1 of BS 5837:2012.

A – Trees of high quality and value, including visual amenity value (sub categories 1, 2, 3). It is usual for such trees to be retained unless the planning merits of a particular scheme or layout over-ride.

B - Trees of moderate quality and value, including visual amenity value (sub categories 1, 2, 3). Such trees should be considered for retention.

C – Trees of low quality and value including visual amenity (sub categories 1, 2, 3)

U – Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

Sub categories – trees in categories A to C will qualify under one or more of three sub-categories (1, 2, 3). Sub categories 1, 2 and 3 are intended to reflect arboricultural and landscape qualities, and cultural values, respectively.

The tree survey schedule will list which sub category applies. It is intended that each sub category has equal weight such that, for example, an A1 tree has the same retention priority as an A2 tree. Some trees could qualify under more than one criterion.

Root Protection Area (RPA) – In respect of all Retention Category A, B and C trees the RPA has been calculated and is given in the Tree Survey Schedule. The figure given represents the radial distance, from the trees trunk, at which the barriers should be erected. The RPA is calculated as per section 4.6 of BS 5837:2012.
For single stemmed trees, the RPA should be calculated as an area equivalent to a circle with a radius 12 times the stem diameter. For trees with more than one stem, one of the two calculation methods should be used. In all cases, the stem diameter (s) should measure in accordance with Annex C and the RPA should be determined from Annex D (shown in Appendix). The calculated RPA for each tree should be capped at 707m².

(a) For trees with two to five stems, the combined stem diameter should be calculated as follows:

\[ \sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 + (\text{stem diameter 5})^2} \]

(b) For trees with more than five stems (not illustrated in Annex c), the combined stem diameter should be calculated as follows:

\[ \sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}} \]

The RPA for each tree will initially be plotted as a circle on the base of the stem. Where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area will be produced. Modifications to the shape of the RPA will reflect a soundly based arboricultural assessment of likely root disruption.

Any deviation in the RPA from the original circular plot will take account of the following factors whilst still providing adequate protection for the root system:

a) the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures and underground apparatus);

b) topography and drainage;

c) the soil type and structure;

d) the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.

This will be shown on the tree constraints plan.

3.0 Observations and comments

3.1 The main site is a current sewage pumping station situated adjacent to the River Derwent to the west of the town. It consists of a small brick building at the southern end of an access track. There is a turning head for service vehicles and the surface is metalled.

3.2 The Trees

3.2.1 The site where of the sewage pumping station is surround by mature trees, most of which are to the north and west of it. They are part of a significant band of vegetation that runs adjacent to the river. Beyond this to the south and west are trees typical of a rural setting. These are either situated along field boundaries or stand sentinel within fields.
3.2.2 At the time of the survey no definitive layout was shown or any detailed access proposals agreed. In arboricultural terms the site is deemed suitable for development providing the better trees within the site are retained and protected during development.

3.2.3 An Arboricultural Impact Assessment and Method Statements will be prepared in the future to accompany any application for full planning permission.
Tree survey, Tree Location Plan and Root Protection Area Plan
(Indicative only not to scale)
<table>
<thead>
<tr>
<th>Tree No</th>
<th>Species</th>
<th>Scientific name</th>
<th>HT (M)</th>
<th>No of Stems</th>
<th>Stem Dia (MM)</th>
<th>Height above ground level of 1st sig branch</th>
<th>Crown HT (m)</th>
<th>Branch Spread (M)</th>
<th>Life stage</th>
<th>Structural condition</th>
<th>Physiological condition</th>
<th>Comment Preliminary Recs</th>
<th>Est rem cont (yrs)</th>
<th>BS category</th>
<th>RPA (radius) (M) &amp; RPA in M2</th>
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<tbody>
<tr>
<td>T1</td>
<td>Sycamore</td>
<td>Acer pseudoplatanus</td>
<td>16</td>
<td>2</td>
<td>770; 370</td>
<td>1.5w</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>Good</td>
<td>Will be compromised by essential works to pumping station</td>
<td>10-20</td>
<td>B1</td>
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<td>272</td>
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<td>T2</td>
<td>Thorn</td>
<td>Crataegus monogyna</td>
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<td>4</td>
<td>130; 140; 150</td>
<td>1w</td>
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<td>T3</td>
<td>Ash</td>
<td>Fraxinus excelsior</td>
<td>14</td>
<td>3</td>
<td>250; 370; 440</td>
<td>4e</td>
<td>3</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>Ivy covered, low crown over area of works. Crown raise to give 5.2 metre clearance</td>
<td>10-20</td>
<td>C1</td>
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<td></td>
<td></td>
<td></td>
<td>272</td>
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</tr>
<tr>
<td>T6</td>
<td>Sycamore</td>
<td>Acer pseudoplatanus</td>
<td>16</td>
<td>2</td>
<td>310; 400</td>
<td>3w</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>Ivy covered, low crown over area of works. Crown raise to give 5.2 metre clearance</td>
<td>10-20</td>
<td>B1</td>
<td>6.60</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>137</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T7</td>
<td>Oak</td>
<td>Quercus robur</td>
<td>20</td>
<td>1</td>
<td>1400</td>
<td>2n</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>Ivy covered, low crown over area of works. Crown raise to give 5.2 metre clearance</td>
<td>20-40</td>
<td>A1</td>
<td>15.0</td>
</tr>
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<td></td>
<td>707</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T8</td>
<td>Oak</td>
<td>Quercus robur</td>
<td>20</td>
<td>1</td>
<td>1200</td>
<td>4n</td>
<td>3</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>Ivy covered, low crown over area of works. Crown raise to give 5.2 metre clearance</td>
<td>20-40</td>
<td>A1</td>
<td>14.70</td>
</tr>
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<td>T9</td>
<td>Sycamore</td>
<td>Acer pseudoplatanus</td>
<td>17</td>
<td>1</td>
<td>690</td>
<td>2s</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>Ivy covered, low crown over area of works. Crown raise to give 5.2 metre clearance</td>
<td>20-40</td>
<td>A1</td>
<td>8.40</td>
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<td>T10</td>
<td>Oak</td>
<td>Quercus robur</td>
<td>20</td>
<td>1</td>
<td>1000</td>
<td>4n</td>
<td>3</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>Ivy covered, low crown over area of works. Crown raise to give 5.2 metre clearance</td>
<td>20-40</td>
<td>A1</td>
<td>12.0</td>
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<td></td>
<td>452</td>
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<tr>
<td>G1</td>
<td>See comments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Group of sycamore, ash, thorn and understory. Beyond the scope of the works</td>
<td>10-20</td>
<td>B/C1</td>
<td>3.0</td>
</tr>
<tr>
<td>G2</td>
<td>See comments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sycamore and thorn in adjacent field. Mainly self seeded. Low crowns over proposed access track. Raise crowns to give 5.2 metre clearance from ground level if problematic</td>
<td>10-20</td>
<td>BC1</td>
<td>3.0</td>
</tr>
</tbody>
</table>
RPA's amended due to physical constraints present ie: Roadway

G1 - B/C1 Sycamore, thorn & ash. Beyond scope of works

G2 - C1 Sycamore and thorn in adjacent field

Existing Manhole

Existing Air valve chamber.
British Standard Trees in Relation to Construction – Recommendations BS 5837:2012
Cascade chart for tree quality tree assessment
**TREES FOR REMOVAL**

<table>
<thead>
<tr>
<th>Category and Definition</th>
<th>Criteria</th>
<th>Identification on Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category U</td>
<td>Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years. Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other U Category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning). Trees that are dead or showing signs of significant, immediate, and irreversible overall decline. Trees infected with pathogens of significance to the health and/or safety of other trees nearby (e.g. Dutch elm disease), or very low quality trees suppressing adjacent trees of better quality. (NOTE: Category U trees can have existing or potential conservation value which might be desirable to preserve; see section 4.7.5)</td>
<td>DARK RED RGB code 127-000-000</td>
</tr>
</tbody>
</table>

**TREES TO BE CONSIDERED FOR RETENTION**

<table>
<thead>
<tr>
<th>Category and Definition</th>
<th>Criteria Subcategories</th>
<th>Identification on Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A</td>
<td>1. Mainly arboricultural values Trees that are particularly good examples of their species especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)</td>
<td>LIGHT GREEN RGB code 000-255-000</td>
</tr>
<tr>
<td><strong>Trees of high quality</strong>: with an estimated remaining life expectancy of at least 40 years</td>
<td>2. Mainly landscape values Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider area</td>
<td>MID BLUE RGB code 000-000-255</td>
</tr>
<tr>
<td><strong>Trees of moderate quality</strong>: with an estimated remaining life expectancy of at least 20 years</td>
<td>3. Mainly cultural values, including conservation Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit.</td>
<td>GREY RGB code 091-091-091</td>
</tr>
<tr>
<td>Category C</td>
<td>1. Mainly arboricultural values Unremarkable trees of very limited merit or such impaired condition that they do not qualify in the higher categories</td>
<td>BS 5837:2012 Table 1 Cascade chart for tree quality assessment</td>
</tr>
<tr>
<td><strong>Those of low quality</strong>: with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm</td>
<td>2. Mainly landscape values</td>
<td></td>
</tr>
<tr>
<td><strong>Trees of moderate quality</strong>: with an estimated remaining life expectancy of at least 20 years</td>
<td>3. Mainly cultural values, including conservation Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit.</td>
<td>GREY RGB code 091-091-091</td>
</tr>
</tbody>
</table>
Appendix 2

Tree Works Schedule and Plan
### Tree Works Schedule

<table>
<thead>
<tr>
<th>Tree No</th>
<th>Species</th>
<th>Recommendations</th>
<th>BS Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Sycamore</td>
<td>Fell to allow engineering works</td>
<td>B</td>
</tr>
<tr>
<td>T2</td>
<td>Thorn</td>
<td>Fell to allow engineering works</td>
<td>C</td>
</tr>
<tr>
<td>T3-6</td>
<td>Ash and sycamore</td>
<td>Raise crowns over working area to give 5.2 metres clearance over ground level</td>
<td>B/C</td>
</tr>
</tbody>
</table>
For proposed pumping station
would refer to drawing
37375/020.

G1 - B/C1 Sycamore, thorn & ash. Beyond scope
of works

G2 - C1 Sycamore and thorn in adjacent field

Amber Arboricultural Consultancy
10 Argyle Street, Langley Mill, Derbyshire NG16 4ET
Tel: 07538094777; e-mail amber@amberconsult.com
Website: amberconsult.co.uk

Belper Bridgefoot SPS
Tree Removal/Retention Plan
Dashed Line = Trees to be Removed

SCALE: 1:500
DATE: 8/19/2014

MAP FILENAME: BBSPSTRRP
Appendix 3

Tree Protection Plan, Protective Fencing Detail, Ground Protection Detail, “No Dig” Surfacing Detail
G2. C1 Sycamore and thorn in adjacent field

G1 - B/C1 Sycamore, thorn & ash. Beyond scope of works

Amber Arboricultural Consultancy
10 Argyle Street, Langley Mill, Derbyshire NG16 4ET
Tel: 07530094777  e-mail amber@ambers.co.uk - Website amber@ambers.co.uk

SCALE: 1:500
DATE: 8/19/2014
MAP FILENAME: BBSPSSTRRP

Existing Manhole
Existing Air valve chamber.
Fencing not strictly required. Precautionary measure to ensure RPA to south remains intact.
Default specification for protective barrier

Key

1. Standard scaffold poles
2. Heavy guage 2m tall galvanized tube and welded mesh infill panels
3. Panels secured to uprights and cross-members with wire ties
4. Ground level
5. Uprights driven into the ground until secure (minimum depth 0.6m)
6. Standard scaffold clamps
Examples of above-ground stabilizing systems

(a) Stabilizer strut with base plate secured with ground pins

(b) Stabilizer strut mounted on block tray
Ground Protection for Plant Access within RPA if required

Ground-Guards

Ground protection and site access system

Ground-Guards are an “Instant Roadway” system of lightweight plastic panels, capable of taking vehicles of up to 50 tonnes weight.

Introduction

The GreenTek Ground-Guards have become established as a proven alternative to the conventional method of stripping and re-angling access roads on construction sites. By using this roadway system, ground disturbance and reclamation work are minimised. This is an ideal method to use where there are tree roots and the surface is unsuitable for root collar excavation.

Applications

The Ground-Guards site access system is designed to form temporary roads, car parks and boardpaths. It is suitable for protecting grassed areas from erosion and cutting during construction projects and for the protection of root collars where site access routes need to pass close to trees.

Seven issues

Ground-Guards are a very environmentally friendly product. They:
- Protect sensitive ground from erosion
- Are made from 100% recycled plastic, which is 100% fully recyclable
- Provide a sustainable alternative to using up sheets of plywood for ground protection purposes

Description

The Ground-Guards site access system consists of virtually indelible, lightweight plastic boards which clip together without tools to quickly form temporary roads, car parks and boardpaths. They are made from 100% HDPE recycled plastic and are guaranteed unbreakable by vehicles of up to 50 tonnes. These track mats can be easily moved around the site by just two people, with no need for a crane or forklift.

Ground-Guard mats are available with a choice of different tread patterns. The “Standard” tread pattern creates a track way with a high level of traction for vehicles, while the “Wall” pattern is designed for pedestrian walkways and avant flooring.

Ground-Guards are also available with one side smooth which is ideal for trenching and utilitv work as it enables the spoil to be easily backfilled into the trench afterwards. When being used to protect tree roots, a base layer of Ground-Guard shaver should be covered by a sowing layer of 150 mm of wood chippings. The Ground-Guard trackway is then laid over the top of this in the normal way.

Dimensions

Ground-Guard mats are available in sizes ranging from 1835 mm (W) x 610 mm (L) to 2438 mm (W) x 1219 mm (L) with a choice of different tread patterns.

Supply

GreenTek supply and hire Ground-Guards direct to construction companies nationally.

Services

GreenGuard Engineering provides technical advice to specifiers and contractors. Brochures and samples are available on request.

GreenGuard Engineering
GreenTek
Manor Farm
Ollaby Road
Ashill
Lincoln
L516 7AL
Tel: +44 (0)115 967 6000
Fax: +44 (0)115 967 6222
Email: info@ground-guards.co.uk
Website: www.ground-guards.co.uk
Contact: Phil Eatts
VAT no: 311298

Arboricultural Report
Belper Bridgefoot SPS
Our ref – 17-14-15
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Intended use of specialised drive construction using no-dig cellular confinement system

EXAMPLE
Appendix 4

Tree Protection Site Notice and
Arboricultural Monitoring Schedule
PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.

TREE PROTECTION AREA KEEP OUT!
(TOWN & COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A TREE PRESERVATION ORDER. CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL PROSECUTION.
ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY.
## Arboricultural Supervision Schedule

<table>
<thead>
<tr>
<th>Activity</th>
<th>Arboricultural Supervision required, and by whom?</th>
<th>Date action undertaken</th>
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</thead>
<tbody>
<tr>
<td>Undertaking of suggested tree work</td>
<td>Yes by appointed contractor</td>
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</tr>
<tr>
<td>Erection and Dismantling of Protective fencing and ground protection (if necessary)</td>
<td>Yes by Arboriculturist and site supervisor</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 5

David Kolebuk CV
David Kolebuk

Curriculum Vitae

I have been involved in arboriculture for over 25 years and in that time have gained a vast amount of knowledge and experience in all aspects of the industry. I have been employed in local Government for the majority of my career thus far and this has given me a sound footing on which to develop my skills in a consultancy role. See the list below for qualifications and continual professional development as well as a resume of my career path to date.

<table>
<thead>
<tr>
<th>Formal Qualifications</th>
<th>Date completed</th>
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<tbody>
<tr>
<td>AA Technicians Certificate in Arboriculture.</td>
<td>2001</td>
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<tr>
<td>NVQ Level 4 in Management</td>
<td>2009</td>
</tr>
<tr>
<td>Lantra Professional Tree Inspection Certificate.</td>
<td>2007</td>
</tr>
<tr>
<td>RFS Certificate in Arboriculture</td>
<td>1995</td>
</tr>
<tr>
<td>City &amp; Guilds Arboriculture</td>
<td>1988</td>
</tr>
<tr>
<td>City &amp; Guilds Horticulture</td>
<td>1987</td>
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<table>
<thead>
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<th>Certificates of Competence</th>
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<tr>
<td>IPAF Mobile Elevated Work Platform</td>
<td>2009</td>
</tr>
<tr>
<td>CS39 Use of a Chainsaw from a Rope and Harness</td>
<td>2008</td>
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<tr>
<td>CS38 Climb a Tree Conduct Aerial Rescue</td>
<td>2008</td>
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<tr>
<td>CS30.1 CS30.2 &amp; CS31 Chainsaw Related Operations</td>
<td>2008</td>
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<tr>
<td>PA1 PA6A Use of Pesticides</td>
<td>1991</td>
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<table>
<thead>
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<th>Arboricultural Association and other courses</th>
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<td>Arboricultural Consultancy</td>
<td>2010</td>
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<tr>
<td>Getting To Grips With Subsidence</td>
<td>2009</td>
</tr>
<tr>
<td>Risk Assessment for Commercial Arboriculture</td>
<td>2008</td>
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<td>QTRA</td>
<td>2007</td>
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<table>
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<th>Professional Memberships</th>
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<tbody>
<tr>
<td>Derbyshire &amp; Nottinghamshire Chamber of Commerce</td>
<td>2010</td>
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<tr>
<td>International Society of Arboriculture</td>
<td>2007</td>
</tr>
<tr>
<td>Arboricultural Association Technician Member</td>
<td>1994</td>
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</table>
Employment History

Sheffield City Council Street Force
March 07 - 11
Operations Manager - Arboriculture

Mansfield District Council
April 06 - March 07
Arboricultural Officer

North Kesteven District Council
January 03 - April 06
Tree Officer

Birmingham City Council
May 00 - Jan 03
Tree Officer (Planning)

Lichfield District Council
April 99 - May 00
Countryside Assistant

Derby City Council
April 97 - April 99
TPO Officer

Derbyshire County Council
November 94 - April 97
Technical Assistant in the Landscape Section

Derbyshire County Council & Derby City Council
May 86 - November 94.
Arborist
Document Completed: 17 September 2014

By: David Kolebuk

Signed

[Signature]

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