



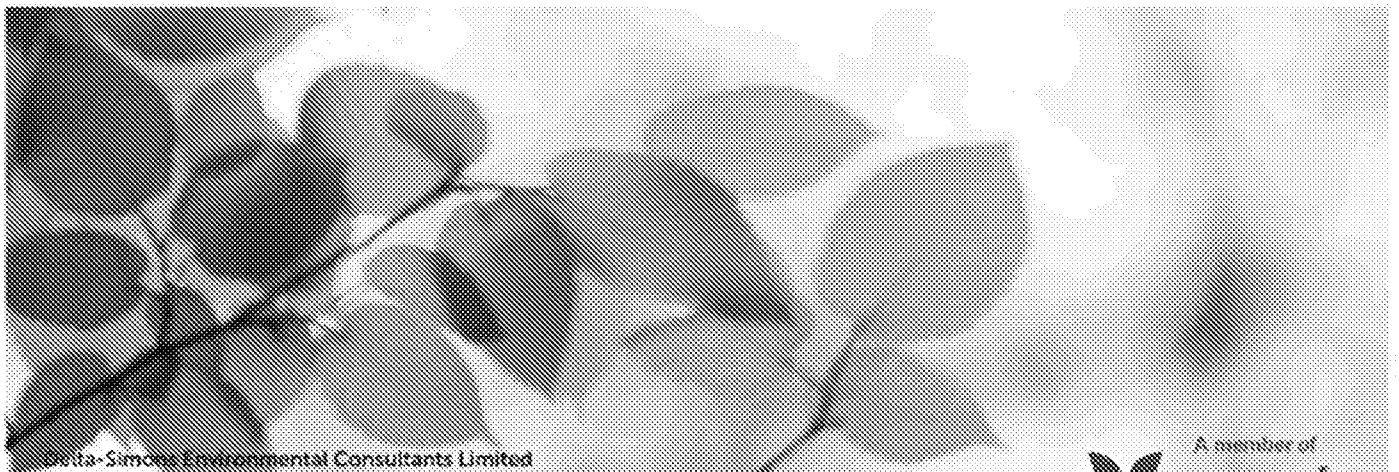
BS 5837:2012 Arboricultural Survey

DBN3 Norway Lane, Littlehampton

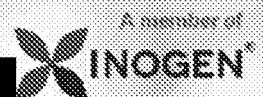
Presented to Gleave Partnership

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Delta-Simons Environmental Consultants Limited



Report Details

Client	Gleave Partnership
Report Title	BS 5837:2012 Arboricultural Survey
Site Address	DBN3 Norway Lane, Littlehampton
Project No.	19-0138.02
Delta-Simons Contact	Peter Morrell (pete.morrell@deltasimons.com)

Quality Assurance

Issue No.	Status	Issue Date	Comments	Author	Technical Review	Authorised
2.	Final	19 th February 2019		Peter Morrell Principal Arboriculturalist	Sue Shannon Principal Ecologist	Sue Shannon Principal Ecologist

About us

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Executive Summary

Purpose	Delta-Simons Environmental Consultants Ltd was instructed by Gleave Partnership ('the Client'), to undertake a Tree Survey to BS 5837:2012 standard of an area of land off Norway Lane, Littlehampton in West Sussex ('the Site'). The survey was undertaken on 4 th February 2019. The survey was undertaken to inform a planning application for the Site.
Current Site Status	The Site comprises three distribution warehouses (Buildings 1, 2 and 3) surrounded by hardstanding. Buildings 1 and 2 were bordered by areas of introduced shrubs to the south. In the east and west of the Site were areas of amenity grassland, scattered mixed trees and scattered broadleaved trees. To the north of the Site were scattered mixed trees, beneath which was dense scrub and ruderal vegetation. The Site was surrounded on all aspects by a security fence.
Proposed Development	The Site comprises three distribution warehouses (Buildings 1, 2 and 3) surrounded by hardstanding. Buildings 1 and 2 were bordered by areas of introduced shrubs to the south. In the east and west of the Site were areas of amenity grassland, scattered mixed trees and scattered broadleaved trees. To the north of the Site were scattered mixed trees, beneath which was dense scrub and ruderal vegetation. The Site was surrounded on all aspects by a security fence.
Results	It is understood that the proposed development will comprise minor alterations to the external internal access routes, including the widening of the road within the north of the Site and resurfacing works.
Recommendations	<u>Recommendation 1 (Adequate Tree Protection)</u> Those trees identified within the proposed development plan for retention will need to be adequately protected during any approved development works. Measures to protect trees should follow the best practice principles set out in BS 5837: Trees in Relation to Design, Development and Construction (2012). Prior to any construction or development work proceeding, the Root Protection Area (RPAs) of individual trees to be retained should be marked out. Marking out should be completed by a competent person with arboricultural expertise. All trees retained on-Site and adjacent to the Site should be protected by barriers or ground protection around the calculated RPA, and as indicated on the Tree Constraints Plan (TCP) produced in association with this survey. <u>Recommendation 2 - Bats (Low Bat Roost Potential (BRP) Trees)</u> ⌘ If any works are required to TG32 assessed as having low BRP, these should be completed under a method statement which could include a single dawn survey completed during the active bat season (April-October, inclusive) on the morning prior to the works being undertaken; or ⌘ Alternatively, a licenced bat ecologist trained to use specialist tree climbing equipment could undertake a thorough inspection of the potential roost features immediately prior to works commencing.
This Tree Survey Executive Summary is intended as a summary of the assessment of the Site based on information received by Delta-Simons at the time of production. This Executive Summary should be read in conjunction with the full Report.	

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1.0 Introduction

1.1 Purpose and Scope of the Survey

Delta-Simons Environmental Consultants Ltd was instructed by Gleave Partnership (the 'Client') to undertake an Arboricultural Survey to BS 5837:2012 standard. The survey was undertaken of land off Norway Lane to the north-east of Littlehampton in West Sussex (hereafter referred to as 'the Site'). The survey was undertaken on 4th February 2019. The Site location and the area surveyed are shown in Figure 1. The survey was undertaken in order to inform a planning application for minor alterations to the Site layout.

The aims of the Tree Survey were to:

- ▲ Identify the individual tree species present at the Site by means of visual inspection;
- ▲ To define the approximate age, condition and canopy spread of all individual mature trees identified and the value of these within the development;
- ▲ To identify any trees that present a risk to existing or proposed foundations or other structures that may be constructed on the Site and recommend actions to remove this risk; and
- ▲ Recommend tree management or mitigation measures where appropriate.

1.2 Site Description

The Site is centred at Ordnance Survey (OS) grid reference TQ 03807 03535 off Norway Lane to the north-east of Littlehampton in West Sussex. The Site covers an area of 5.2 hectares (ha) and comprises three distribution warehouses (Buildings 1, 2 and 3) surrounded by hardstanding. Buildings 1 and 2 were bordered by areas of introduced shrubs to the south. To the east and west of the Site were areas of amenity grassland and scattered trees. To the north of the Site were mixed scattered trees, beneath which was dense scrub and ruderal vegetation. The Site was surrounded on all aspects by a security fence. Topographically the Site was flat, and the Site did not support any standing water at the time of the survey.

The Site is situated within a largely urban setting with surrounding industrial, commercial and residential properties. Residential housing extended to the west and south-west. To the north was a railway line beyond which were large industrial sheds. To the east was a large pond (Waterbody 1) surrounded by grassland and broadleaved trees, with the A259 beyond. To the south of the Site was a large car park and Chinese style office building, and beyond this was a roundabout associated with the A259 and a large cemetery.

The Site layout is shown in Figure 2.

1.3 Proposed Development

It is understood that the proposed development comprises minor alterations to the internal access routes, including the widening of the road within the north of the Site and resurfacing works (Figure 3).

2.0 Legislation

2.1 Trees

Local planning authorities look upon trees as being highly beneficial to the locality. To ensure that any important specimens, or significant groups of trees are retained, they may place Tree Preservation Orders (TPOs) on them. In other situations, villages or whole districts may be classified as conservation areas. In these instances certain trees in the designated area will be protected. When trees are protected, legal procedures must be followed before any work is carried out.

When trees are protected by Preservation Orders, no work should be carried out on them without prior written consent from the Local Planning Authority (LPA). Once an application is made, the Authority personnel must inspect the trees, and make a decision within a statutory eight-week period as to whether work can go ahead. If no decision is made within the eight weeks period, the appellant can appeal to the Office of the Deputy Prime Minister for non-determination. If the Local Authority (LA) refuses the application the appellant still has the right to appeal.

If a tree protected by a Preservation Order is either killed or wilfully destroyed, the owners of the tree, and the contractor who did the work, can both be prosecuted. The fines for killing or wilfully destroying a tree can be high, i.e. the current maximum is £20,000 per tree, and there is an automatic requirement to re-plant. The current maximum for minor unlawful infringements, such as pruning, is £2,500.

Trees which are dead, dying, or dangerous are exempt from the legislation, although if such trees are removed, the onus on proving they fell into one of these categories lies with the tree owner. Whenever possible it is strongly recommended that the LA be given at least five days' notice before any work on such trees is carried out.

Trees in a conservation area that are already protected by a TPO are subject to the normal procedures and controls for any tree covered by such an Order.

Trees in a conservation area that are not protected by a TPO are protected by the provision in Section 211 of The Town and Country Planning Act (1990). These provisions require people to notify the LPA, using a 'section 211 notice', six weeks before carrying out certain works on such trees, unless an exception applies. The works may go ahead before the end of the six-week period if the LPA gives consent. This notice period gives the Authority an opportunity to consider whether to make an Order on the tree.

3.0 Methodology

The methodology set out below is a detailed summary of the suggested approach to tree assessment as described in British Standard 5837:2012. This Report has applied the methodology to all significant individual trees or groups of trees present at or near to the Site. Trees below 15 cm trunk diameter were generally excluded from the survey. All floral names follow the nomenclature of Stace (2010).

3.1 Trees

Trees have been broadly assessed based on guidance set out within the British Standard BS 5837:2012 Trees in Relation to Design, Development and Construction. This standard provides recommendations and guidance on the principles to be applied to achieve successful integration of development with trees, shrubs and hedgerows. Where development is to occur, the standard provides guidance on the approach needed to decide which trees are appropriate for retention, and the means for protecting these trees during the development (including demolition and construction works) and the means of incorporating trees into the developed landscape.

Trees on or adjacent to the Site have been divided into one of four categories (based on the cascade chart for tree quality assessment). These are classed as A, B, C or U (Section 4 of BS 5837) within Table 1. This gives an indication as to the tree's importance in relation to the Site, the local landscape and, also, the value and quality of the existing trees on-Site. This assists informal decisions concerning which trees should be removed or retained should development occur. For a tree to qualify under any given category it should fall within the scope of that category's definition (see below).

Categories A, B and C cover trees that should be a material consideration in the development process, each with three further sub-categories (i, ii, iii) which are intended to reflect arboricultural, landscape and cultural (nature conservation) values. Category U trees may have no significant landscape value but it is not presumed that there is any overriding need to remove these unless stated otherwise in the description and recommendations. They are for this reason not considered as being significant within the planning process. In assigning trees to the A, B or C categories, the presence of any serious disease or tree-related hazard is taken into account. If the disease is considered fatal and/or irremediable, or likely to require sanitation for the protection of other trees it may be categorised as U with a recommendation for work or even removal, even if they are otherwise of considerable value.

Category (A): Trees whose retention is most desirable and are of high quality and value. These trees are considered to be in such a condition as to be able to make a lasting contribution (a minimum of 40 years) and may comprise:

- ⌘ Trees which are particularly good examples of their species, especially 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);
- ⌘ Trees, or groups of trees, which provide a definite screening or softening effect to the locality in relation to views into or out of the Site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups); and
- ⌘ Trees or groups of significant conservation, historical, commemorative or other value (e.g. Veteran or wood-pasture trees).

Category (B): Trees whose retention is considered desirable and are of moderate quality and value. These trees are considered to be in such a condition as to make a significant contribution (a minimum of 20 years) and may comprise:

- ⌘ Trees that might be included in the high category but because of their numbers or slightly impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage), are downgraded in favour of the best individuals;
- ⌘ Trees present in numbers such that they form distinct landscape features and attract a higher collective rating than they would as individuals. Individually these trees are not essential components of formal or semi-formal arboricultural features, or trees situated mainly internally to the Site and have little visual impact beyond the Site; and

- 🌳 Trees with clearly identifiable conservation or other cultural benefits.

Category (C): Trees that could be retained but are considered to be of low quality and value. These trees are in an adequate condition to remain until new planting could be established (a minimum of ten years) or are young trees with a stem diameter below 150 mm and may comprise:

- 🌳 Trees not qualifying in higher categories;
- 🌳 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; and
- 🌳 Trees with very limited conservation or other cultural benefits.

Category (U): Trees that are considered to have no significant landscape value but it is not presumed that there is any overriding need to remove these unless stated otherwise in the description and recommendations. They are for this reason not considered as being significant within the planning process. These trees will be in such a condition that any existing value would be lost within 10 years and which should in the current context be ignored or removed for reasons of sound arboricultural management. Trees within this category are:

- 🌳 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 category U trees;
- 🌳 Trees that are dead or are showing signs of significant, immediate or irreversible overall decline; and
- 🌳 Trees infected with pathogens of significance to the health and or/safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality.

Species have been recorded by common and scientific name. Height has been estimated in metres and stem diameter measured in centimetres unless impractical, taken at a height of 1.5 m from the base of the tree.

In the assessment particular consideration has been given to:

- 🌳 The health, vigour and condition of each tree;
- 🌳 The presence of any structural defects in each tree and its life expectancy;
- 🌳 The size and form of each tree and its suitability within the context of the proposed scheme; and
- 🌳 The location of each tree relative to existing Site features, e.g. its value as a screen or as a skyline feature.

Age class is assessed according to the age class categories referred to in BS 5837.

- 🌳 Y: Young trees age less than 1/3 life expectancy;
- 🌳 SM: Middle age trees 1/3 – 2/3 life expectancy;
- 🌳 M: Mature trees over 2/3 life expectancy; and
- 🌳 OM: Over mature – declining or moribund trees of low vigour.

The overall condition of any individual tree, or group of trees, has been referred to using one of the definitions listed below. A more detailed description of condition has been noted in the Tree Schedule:

- 🌳 **G Good:** A sound tree or trees needing little, if any, attention;
- 🌳 **F Fair:** A tree or trees with minor but rectifiable defects or in the early stages of stress, from which it may recover;
- 🌳 **P Poor:** A tree or trees with major structural and physiological defects or stressed such that it would be very expensive and inappropriate to retain; and
- 🌳 **D Dead:** A tree or trees no longer alive. However, this could also apply to those trees that are dying and will be unlikely to recover, or are becoming or have become dangerous.

Major defects or diseases and relevant observations have also been recorded. Dead wood has been defined as the following:

Twigs and small branch material	-	Up to 5 cm in diameter.
Minor dead wood	-	5 cm to 10 cm in diameter.
Major dead wood	-	10 cm in diameter and above.

The survey was completed from ground level only. Aerial inspections were not undertaken. Evaluations of tree conditions given within this assessment apply to the date of survey and cannot be assumed to remain unchanged, and it may be necessary to review these within 24 months, in accordance with good arboricultural practice.

3.2 Potential for Protected Species

Potential bat roost locations are described within this Report using the methodology as that recommended by the Bat Conservation Trust (BCT), see Collins J. (ed) (2016) in references (Appendix A). Each tree of significant size assessed within this survey has also been assessed for the potential to provide roosts for bats and the table in Appendix B includes reference to this.

3.3 Tree Plans and Tree Schedules

The extent and positions of significant individual trees or groups of trees close to the Site are shown on the Arboricultural Survey Plan (Figure 2). The Root Protection Areas (RPA) of the key trees of value identified for, or recommended for retention have been marked within the Constraints Plan (Figure 4) using the RPAs provided in the Tree Schedule within Table 1.

A summary that includes the trees identified on or near to the Site is included in the Tree Assessment Report detailing information on each group of trees. This is also provided in Table 1. Within the summary table maximum RPAs (m²) for estimated tree diameters have been included where appropriate, as well as a calculated corresponding radius of the circle for that RPA. The RPAs are formulated as described below and assist when designing layouts in relation to trees.

3.4 Root Protection Area

Below ground constraints to development are represented by the root plate around a tree, which needs protecting in order for the tree to be incorporated into a proposed scheme without adverse harm to the tree or structural integrity of any proposed foundation structures.

This area is illustrated by the RPA and is calculated according to the formula set out in BS 5837:(2012). This area is equivalent to a circle with a radius 12 x the stem diameter for single stem trees or the basal diameter for trees with more than one stem arising less than 1.5 m above ground level.

$$\text{RPA (m}^2\text{)} = (\text{stem diameter (mm)} \times 12 / 1000)^2 \times 3.142$$

This figure should be capped to 707 m², that is, equivalent to a circle with a radius of 15 m, or a square with approximately 26 m sides

Taken from Table 2: Calculating the RPA, BS 5837 (2005).

4.0 Results

4.1 Data Search

The results of the desk search indicated that all trees within the proposed development Site are outside of any Conservation Area. No trees on-Site nor on land adjacent to the Site are covered by a TPO.

4.2 Survey Details

The tree inspection took the form of a walkover inspection completed by Peter Morrell on 4th February 2019. Each individual semi-mature or young tree of significance that could be impacted upon by any proposed development was identified and visually inspected and classified. The trees identified during the survey at the Site have been individually noted and identified within this Report and are shown in the Tree Survey Plan within Figure 2, and within the Photograph Section of this Report (Appendix C).

4.3 Semi-Mature and Young Trees

A total of 26 trees (T) and six tree groups (TG) have been identified and assessed as part of the tree survey. All trees surveyed with the exception of three tree groups were within the Site boundary.

4.3.1 Species and their Arrangement in the Landscape

There are a limited range of tree species on, and immediately adjacent to, the Site, with no dominant species. Hawthorn *Crataegus monogyna*, Leyland cypress *X Cupressocyparis leylandii*, horse chestnut *Aesculus hippocastanum*, pedunculate oak *Quercus robur*, Norway maple *Acer platanoides*, beech *Fagus sylvatica* and hazel *Corylus avellana* are present in multiple numbers. The following species are represented as single specimens: Apple *malus* sp., crack willow *Salix fragilis*, cherry *Prunus* sp., Indian bean tree *Catalpa bignonioides*, plum *prunus* sp., and silver birch *Betula pendula*.

The distribution of the trees and tree groups across the Site is limited to being randomly dispersed within the northern extent and along the eastern and western boundaries of the Site. The three tree groups off-site adjacent to the eastern and western boundaries have canopies that extend into the Site.

4.3.2 Height and Significance in the Landscape

Trees and tree groups T5 to T27, whilst not of a great height, are by their positions along, and adjacent to, the Site's northern boundary highly visible when viewed from the south and provide screening that is anticipated to increase as the trees mature. For this reason these trees are placed within Category B (see Table 1).

A number of other individual trees and tree groups that line Norway Lane, are quite prominent within the commercial landscape and contribute to the street scene. For this reason these trees are also placed within Category B where their condition merits.

T29, an Indian bean tree, present adjacent to the east boundary is a memorial tree and as such is placed within Category A. Special consideration should be given to the retention of this tree.

If retained, these trees will require protection measures to ensure no impact occurs as a result of any development.

4.3.3 Age and Condition

All trees present within the Site are semi-mature or young. Two trees within the Site boundary show signs of past management. All on-Site trees appear to be in fair to good condition.

4.3.4 Environmental Condition

Given the Site's commercial use and the young age of the majority of the trees, it is surmised that no damage to the root system of on-Site trees has been sustained through any recent on-Site working practices. The trees on-Site and immediately adjacent to the Site are not in an exposed position, having been protected from prevailing winds by the surrounding buildings.

Groundwater conditions are not assessed to be a significant factor in present or future growth or health of trees since the generally flat Site appears to be well drained and this situation will probably improve further following completion of any development.

4.3.5 Bat Roost Potential

No trees within the Site provide roosting opportunities for bats.

4.4 Tree Schedule

Table 1 – BS 5837:2012 Tree Schedule

Tree Number	Tree Species		Measurements				Crown (m)					Tree Condition										Management
	Common Name	Latin Name	Maturity	Height (m)	Stems	Stem Diameter (mm)	Average	N	E	S	W	Roots	Stem	Crown	Comments	Structural	Life Expectancy (yrs)	Category	RPA (m)	Works		
T1	Silver birch	<i>Betula pendula</i>	SM	7	1	275	2	3	3	3	3	No obvious visual damage	Single stem. Vertical.	Balanced.		G	20-40	B	3.3			
TG2	Hawthorn	<i>Crataegus monogyna</i>	SM	6	1	AV 225	1	3	5	3	3	No obvious visual damage	Single stem. Vertical	Balanced. Read as one.		F	20-40	B	2.7			
T3	Apple	<i>Malus sp.</i>	SM	5	1	150	2	3	3	3	2	No obvious visual damage	Single stem. Vertical	Spreading. Scattered deadwood.	Bark damage on stem	F	20-40	C	1.8			
TG4	Leyland cypress	<i>X Cupressocyparis leylandii</i>	SM	8	1	Av 300	0	3	3	3	3	No obvious visual damage	Single stems. Vertical	Balanced. Reads as one.		G	20-40	B	3.6			
T5	Horse chestnut	<i>Aesculus hippocastanum</i>	SM	9	1	350	3	5	5	5	5	No obvious visual damage	Single stem. Vertical	Balanced.		G	20-40	B	4.2			
T6	Horse chestnut	<i>Aesculus hippocastanum</i>	SM	8	M S	350	0	3	5	5	5	No obvious visual damage	Multi-stemmed from base. Vertical	Balanced.		F	>40	B	4.2			
T7	Horse chestnut	<i>Aesculus hippocastanum</i>	SM	9	1	350	2	5	5	5	5	No obvious visual damage	Single stem. Vertical	Balanced.		G	>40	B	4.2			
T8	Norway maple	<i>Acer platanoides</i>	Y	9	1	200	1	3	3	3	1	No obvious visual damage	Single stem. Vertical	Slightly unbalanced		F	>40	B	2.4			
T9	Norway maple	<i>Acer platanoides</i>	Y	8	3	3 x 100	0	1	1	1	1	No obvious visual damage	Trifurcated at 0.5 m. Vertical	Balanced.		F	20-40	B	2.1			
T10	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	8	3	150 100 175	1	4	4	4	4	No obvious visual damage	Single stem. Vertical	Balanced.		F	20-40	B	3.0			
T11	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	9	4	150 300 250 150	1	5	5	5	5	No obvious visual damage	Single stem. Vertical	Balanced.		G	>40	B	5.4			
T12	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	9	1	300	2	5	5	5	5	No obvious visual damage	Single stem. Vertical	Balanced.		F	>40	B	3.6			
TG13	Horse chestnut	<i>Aesculus hippocastanum</i> <i>Quercus robur</i>	Y	5	1	Av 100	1	1	1	1	1	No obvious visual damage	Single stems. Vertical	Balanced.	Tree guards present	F	>40	B	1.2			

	Pedunculate oak																			
T14	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	5	1	300	0	5	5	5	No obvious visual damage	Single stem. Vertical	Balanced.	Trifurcated at 2 m	F	>40	B	4.2		
T15	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	5	4	175 125 275 150	2	1	5	1	1	No obvious visual damage	Single stem. Vertical	Unbalanced.	Stubs present	F	>40	B	4.8	
T16	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	5	1	400	1	3	3	6	3	No obvious visual damage	Single stem. Vertical	Spreading		G	>40	B	4.8	
TG17	Leyland cypress	X <i>Cupressocyparis leylandii</i>	Y	11	1	Est 375	0	3	3	3	3	No obvious visual damage	Single stem. Vertical	Balanced.		F	20-40	B	4.5	
T18	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	9	1	300	1	4	4	4	4	No obvious visual damage	Single stem. Vertical	Balanced.		F	20-40	B	3.6	
T19	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	8	1	450	0	6	6	6	6	No obvious visual damage	Single stem. Vertical	Spreading. Balanced.		G	>40	B	5.4	
T20	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	6	1	250	0	3	3	3	3	No obvious visual damage	Single stem. Vertical	Balanced.		F	20-40	B	3.0	
TG21	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	2	1	100	0	1	1	1	1	No obvious visual damage	Single stem. Vertical.	Balanced		G	>40	B	1.2	
T22	Leyland cypress Beech Hazel	X <i>Cupressocyparis leylandii</i> <i>Fagus sylvatica</i> <i>Corylus avellana</i>	Y	8	1	Est 300	0	3	3	3	3	No obvious visual damage	Single stem. Vertical	Balanced.		F	20-40	B	3.6	
T23	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	7	1	300	1	5	5	5	5	No obvious visual damage	Single stem. Vertical	Balanced.		F	>40	B	3.6	
T24	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	8	1	300	1	5	3	5	3	No obvious visual damage	Single stem. Vertical	Slightly unbalanced		F	20-40	B	3.6	
T25	Leyland cypress	X <i>Cupressocyparis leylandii</i>	Y	9	1	Av 300	1	1	2	1	1	No obvious visual damage	Single stems. Vertical	Suppressed by adjacent tree.		F	20-40	C	3.6	
T26	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	8	3	250 325 250	0	5	5	5	5	No obvious visual damage	Trifurcated at 1.5 m. Vertical	Balanced		F	>40	B	4.8	
T27	Horse chestnut	<i>Aesculus hippocastanum</i>	Y	6	3	150 150 250	0	3	5	3	3	No obvious visual damage	Trifurcated at 1 m. Vertical	Balanced		F	>40	B	2.4	
TG28	London plane	<i>Platanus x acerifolia</i>	SM	11	1	Av 450	3	6	6	6	6	No obvious visual damage	Single stem. Vertical	Spreading. Scattered deadwood	Canopies read as one.	F	>40	B	5.4	
T29	Indian bean tree	<i>Catalpa bignonioides</i>	Y	7	1	125	2	3	3	3	3	No obvious visual damage	Single stem. Vertical	Spreading. Well balanced.	Memorial tree	F	>40	A	1.5	

T30	Cherry	<i>Prunus sp.</i>	SM	8	5	150 175 250 225 250	2	6	6	6	6	No obvious visual damage	Multi-stemmed from base	Spreading. Minor deadwood	Several branches removed. Stubs present	F	20-40	B	6.3	
T31	Plum	<i>Prunus Sp.</i>	SM	4	1	150	2	3	3	3	3	No obvious visual damage	Single stem. Vertical	Spreading. Well balanced.		F	>40	B	1.8	
TG32	Crack willow	<i>Salix fragilis</i>	M	12	M S	10 x 300	2	7	7	7	7	No obvious visual damage	Multi-stemmed from base Vertical	Crown lifted to 6 m, stubs present. Spreading. Occasional deadwood	Hazard beam present Low BRP	F	>40	C	6.6	

Table 2 – Key to Tree Schedule

Measurements	Age – Class	Overall Condition	BS 5837 2005 : Cascade Chart for Quality Assessment/Retention Category	Symbols:
MS – Multi-stemmed	Y - Young	G – Good	A – High	< = less than
Ht - Height in metres	SM – Semi-Mature	F – Fair	B – Moderate	~ = approximately
Stem – Stem Diameter at 1.5m in mm	EM – Early-mature	P – Poor	C – Low	> = greater than
Crown – Crown spread in metres	M – Mature	D – Dead	R – Trees for Removal	
TD - Trunk division (height in metres)	V - Veteran Est Yrs – estimate of years remaining (>40 years; 20 –40 years; <20 years)		Sub-categories: 1 = mainly arboricultural values 2 = mainly landscape values 3 = mainly cultural values.	
RPA = Root Protection Area (equivalent to a circle with a radius 12 x the stem diameter for single stem trees and 10 x the basal diameter for trees with more than one stem arising below 1.5m above ground level).				

5.0 Tree Management

5.1 Arboricultural Assessment

Adjacent to the northern, eastern and western boundaries of the Site are a number of tree groups and individual trees that could be impacted by the proposed works. It may be possible to retain and incorporate certain trees and tree groups currently present within the Site into the landscaping scheme of the proposals.

It appears limited management has taken place to the trees present on-Site. The older trees at the northern extent of the Site would benefit from selective thinning which should extend the viability and general health of the trees. To ensure that the root areas and canopy extremities of the individual trees and the tree groups that may be retained are not damaged, a Constraints Plan has been prepared to show the locations where protective fencing should be erected for any trees selected for retention (see Figure 4). Any tree surgery required is best carried out towards the conclusion of the development so that, if necessary, any known root damage can be corrected by the appropriate crown thinning to restore root /shoot balance.

TG32 was assessed as having low BRP due to the presence of a hazard beam that had split. None of the other trees were found to support potential features suitable for roosting bats.

It is considered that the Site would benefit from native deciduous tree planting along the western boundary to provide additional screening.

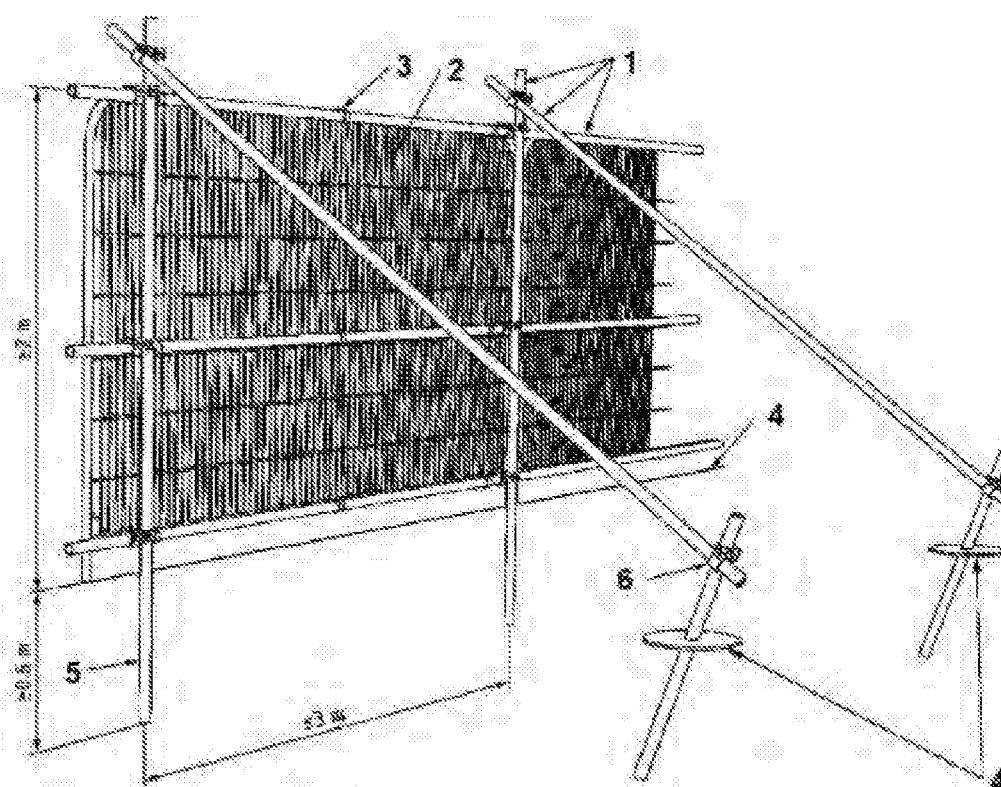
5.2 Recommendations

Recommendation 1 (Adequate Tree Protection)

Those trees identified within any development plan for retention will need to be adequately protected during any approved development works. As a general rule at this Site, measures to protect trees should follow the best practice principles set out in BS5837: Trees in Relation to Design, Development and Construction (2012). Prior to any construction or development work proceeding, the RPAs of individual trees to be retained should be marked out using the distances provided in Table 1. Marking out should be completed by a person with arboricultural or horticultural expertise as individual trees will have root zones that may be affected by local conditions and allowances would need to be made to accommodate this.

The best practice principles have been broadly summarised below:

- ⚡ All trees retained adjacent to the Site should be protected by barriers or ground protection around the calculated RPA and as indicated on any Tree Constraints Plan (TCP) that may be produced in association with the assessment;
- ⚡ Any fencing required should be erected prior to commencement of construction and before demolition including erection of any temporary structures. Once set up fences should not be removed or altered without prior consultation with the arboricultural advisor;
- ⚡ Arrangements should be made for an arboriculturist to supervise works and tree protection where trees are particularly vulnerable or sited close to access points;
- ⚡ Pre-development works may be undertaken prior to the installation of fencing with the agreement of the local planning authority;



1. Standard scaffold poles
2. Heavy Gauge 2m tall galvanised tube and weld mesh infill panels
3. Panels secured to uprights and cross members with wire ties
4. Ground Level
5. Uprights driven into ground until secure (up to 0.6m)
6. Standard scaffold clamps

- ⚡ All tree works should follow best practice procedures as set out in BS 3998 (2010). All trees should be maintained in good condition on-Site and be inspected annually (where overall condition requires) or every two years and after any major storm events, with safety a priority;
- ⚡ Fencing should be clearly visible and suitable for the location, type and proximity of construction activity;
- ⚡ It may be appropriate on some sites to use temporary site offices as components of the protection barriers;
- ⚡ Where it has been agreed and shown on a Tree Protection Plan, construction access may take place within the RPA if suitable ground protection measures are in place (e.g. existing surfaced car park areas). In other areas this may comprise single scaffold boards over a compressible layer laid onto geo-textile materials for pedestrian movements. Vehicular movements over the RPA will require the calculation of expected loading and may require the use of proprietary protection systems;
- ⚡ Once areas around trees have been protected by fencing, any works on the remaining Site area may be commenced providing activities do not impinge on protected areas. Notices should be placed on fencing to indicate that operations are not permitted within the fenced area;
- ⚡ Wide or tall loads etc should not come into contact with retained trees. Banksman should supervise transit of vehicles, jibs, booms etc where this is in close proximity to retained trees;
- ⚡ Oil, bitumen, cement or other material that is potentially injurious to trees should not be stacked or discharged within 10 m of a tree bole. No concrete mixing should be done within 10 m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree;

- ⚡ No fires should be lit where flames are anticipated to extend to within 5 m of tree foliage, branches or trunk, taking into consideration wind direction and size of fire;
- ⚡ Notice boards, telephone cables or other services should not be attached to any part of a retained tree;
- ⚡ Where it is deemed necessary to operate a wide or tall load, plant bearing booms, jibs and counterweights or other such equipment, as part of construction works, and such equipment would have potential to cause injurious contact with crown material i.e. low branches and limbs, of retained trees within the RPA fencing, it is best advised that appropriate, but limited, tree surgery be carried out beforehand to remove any obvious problem branches. This is classed as 'Facilitation Pruning' within BS 5837 (2012). Any such pruning should be undertaken in accordance with a specification prepared by an arboriculturist;
- ⚡ It is advised that a Pre-Commencement Site Meeting is held with contractors who are responsible for operating machinery, as described above, to firstly highlight the potential for damage occurring to tree crowns and to ensure that extra care is applied when manoeuvring machinery during such operations within close proximity to retained trees to avoid any contact;
- ⚡ In the event of having caused any such branch or limb damage to retained trees it is strongly recommended that suitable tree surgery be carried out, in accordance with BS 3998 (2010) Recommendations for Tree Work, to correct the damage, upon completion of development; and
- ⚡ All of the above precautionary measures should be applied to minimise the effect of any damage to long-term tree health and safety.

Recommendation 2 (Bats)

Low BRP Trees

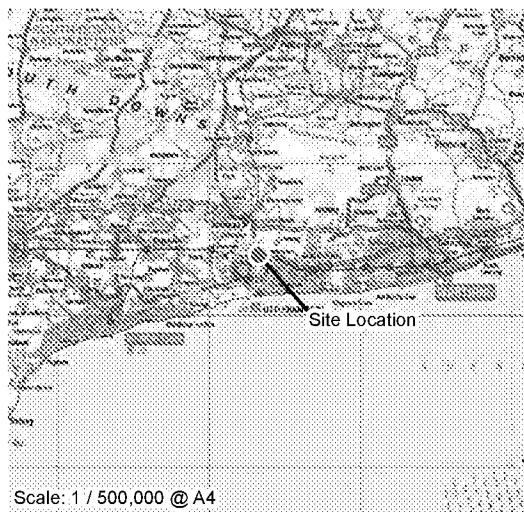
- ⚡ If any works are required on TG32 assessed as having low BRP these should be completed under a method statement which could include a single dawn survey completed during the active bat season (April-October, inclusive) on the morning prior to the works being undertaken; or
- ⚡ Alternatively, a licenced bat ecologist trained to use specialist tree climbing equipment could undertake a thorough inspection of the potential roost features immediately prior to works commencing.

6.0 Limitations of the Tree Survey

The recommendations contained in this Report represent Delta-Simons' professional opinions, based upon the information referred to in Section 1.0 of this Report, exercising the duty of care required of an experienced Environmental Consultant.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed as defined in Section 1.1 of this Report. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

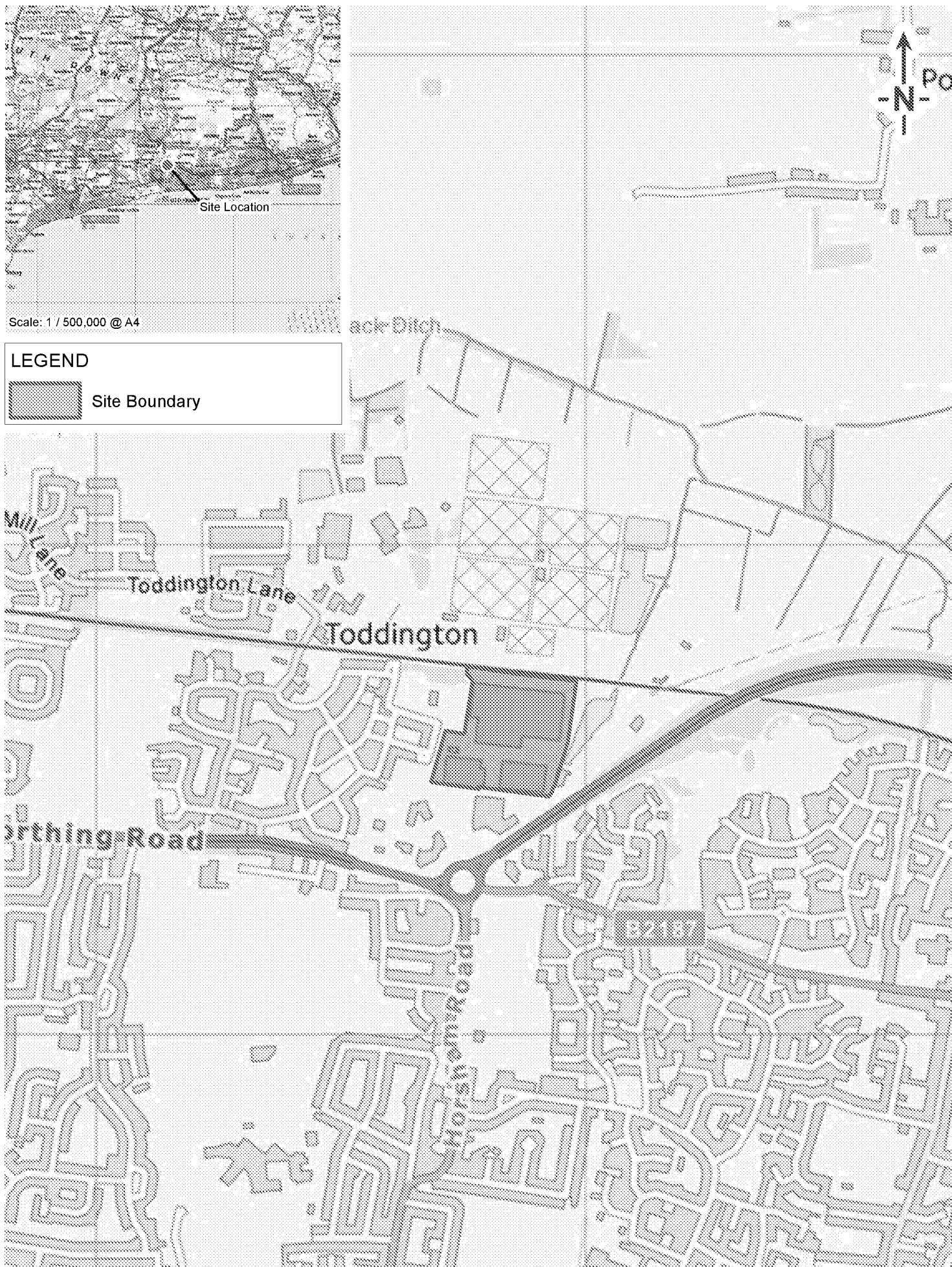
Figure 1 – Site Location Map



Scale: 1 / 500,000 @ A4

LEGEND

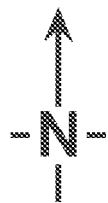
 Site Boundary



Scale: 1 / 10,000 @ A4

Service Layer Credits: Contains OS data © Crown Copyright and database right 2018

Figure 2 – Tree Survey



LEGEND

Site Boundary

Tx/TGx

Category A: High value retention most desirable

Tx/TGx

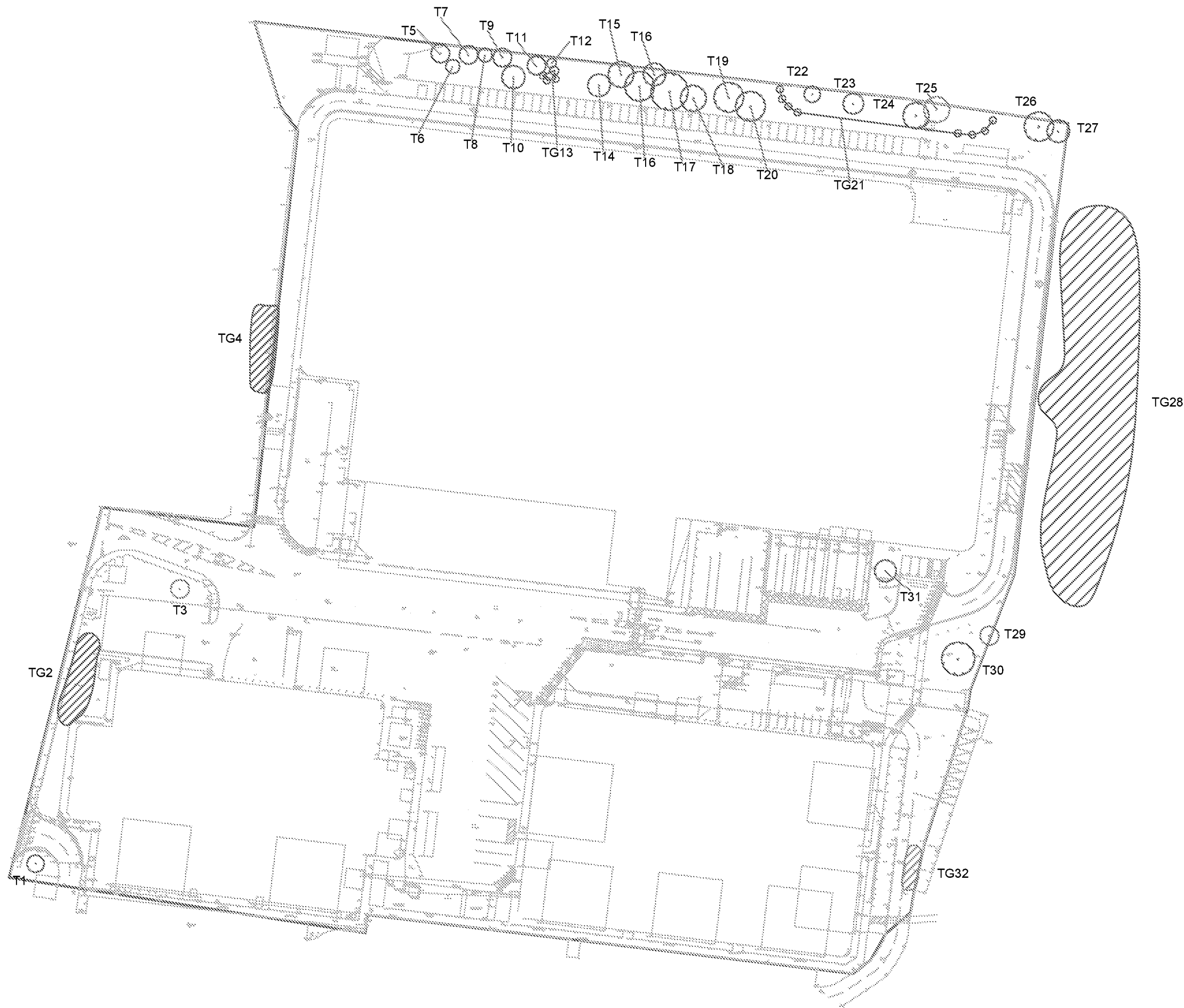
Category B: Moderate value retention desirable

Tx/TGx

Category C: Lower value could be retained

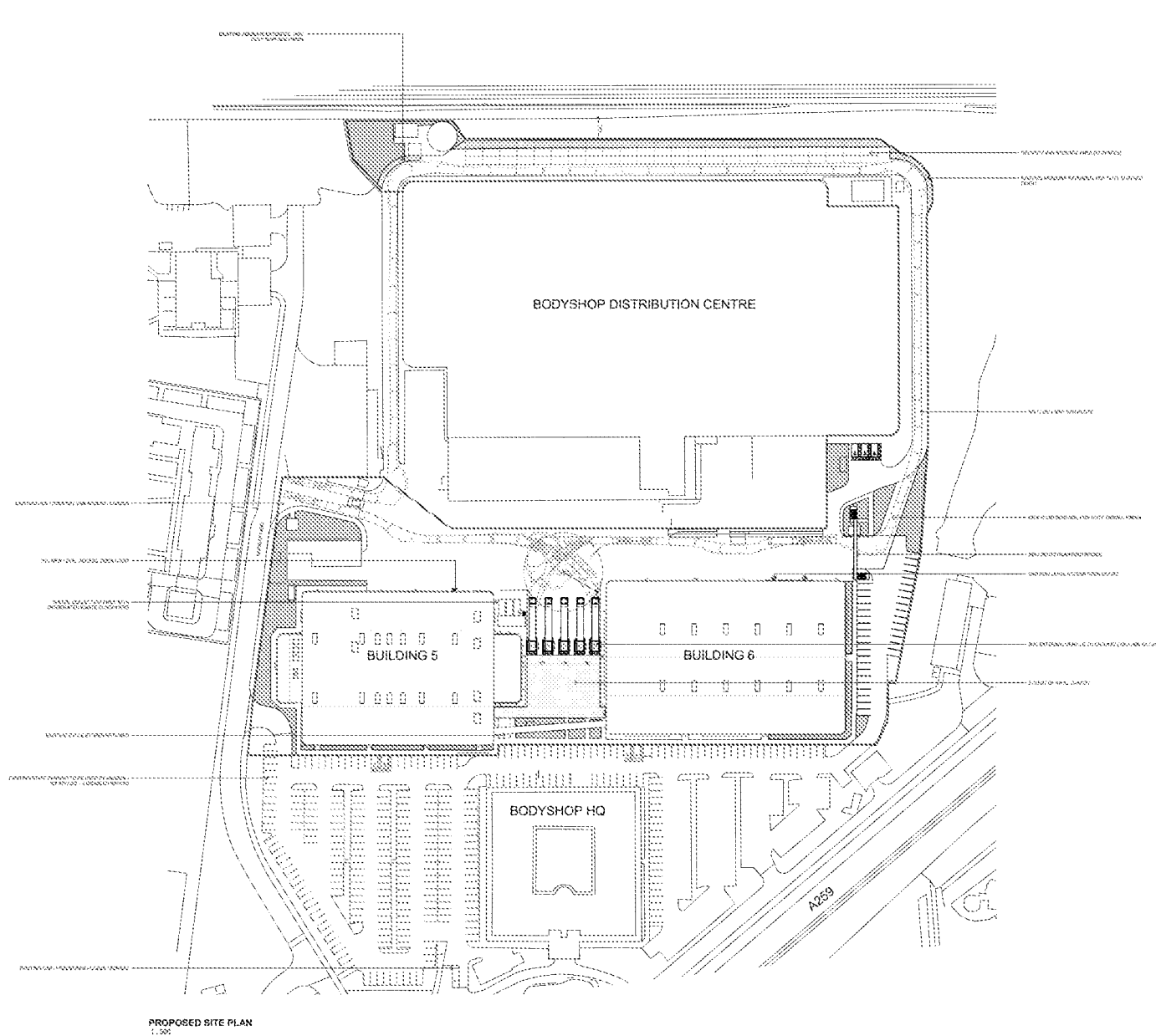
Tx/TGx

Category U: For removal



Site Plan Provided by Client

Figure 3 – Proposed Development Plan



16 small square photographs of architectural details and structures.

SMP

ARCHITECTS

SAN FRANCISCO

amazon

books

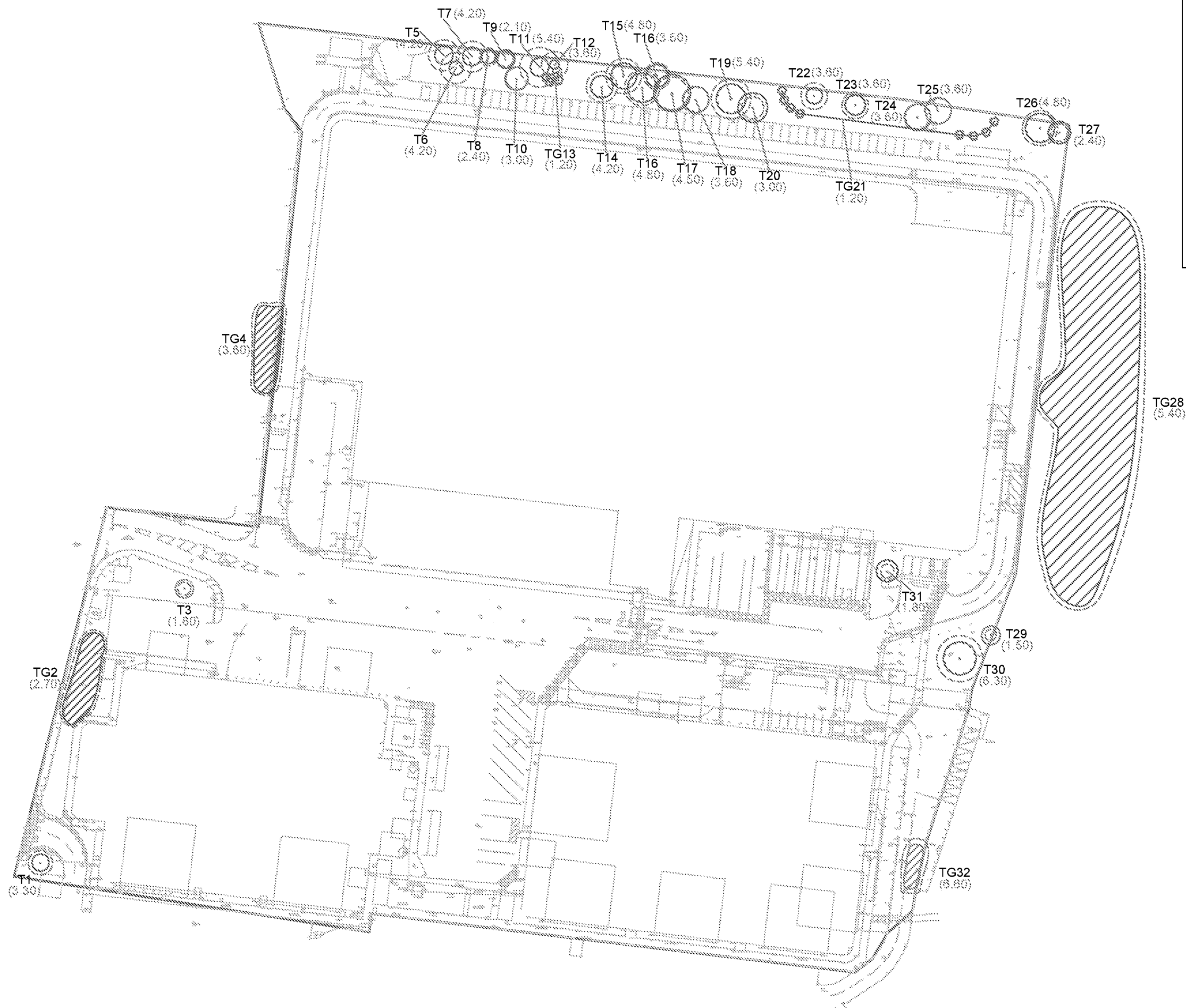
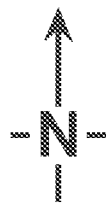


deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Proposed Development Plan
DBN3 Norway Lane
Littlehampton

DRAWN BY: EN		SCALE: Not to Scale	PROJECT NO: 19-0138.02
CHECKED BY: PM	REVISION: 1	FIGURE NO: 3	
DATE: 19 February 2019			

Figure 4 – Tree Constraints Plan



LEGEND	
	Site Boundary
	Category A: High value retention most desirable
	Category B: Moderate value retention desirable
	Category C: Lower value could be retained
	Category U: For removal
	RPA: Root Protection Area

Appendix A – References

References

BSI Publication BS 5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations.

BSI Publication BS 5837:2005 Trees in Relation to Construction - Recommendations.

Collins, J. (ed.) (2016) Bat surveys for Professional Ecologists: Good practice guidelines (3rd edition). The Bat Conservation Trust, London.

Stace, C. (2010). *New Flora of the British Isles 3rd edition*. University Press, Cambridge.

Appendix B – Guidance on Assessing the Potential Suitability of Development Sites to Support Bats

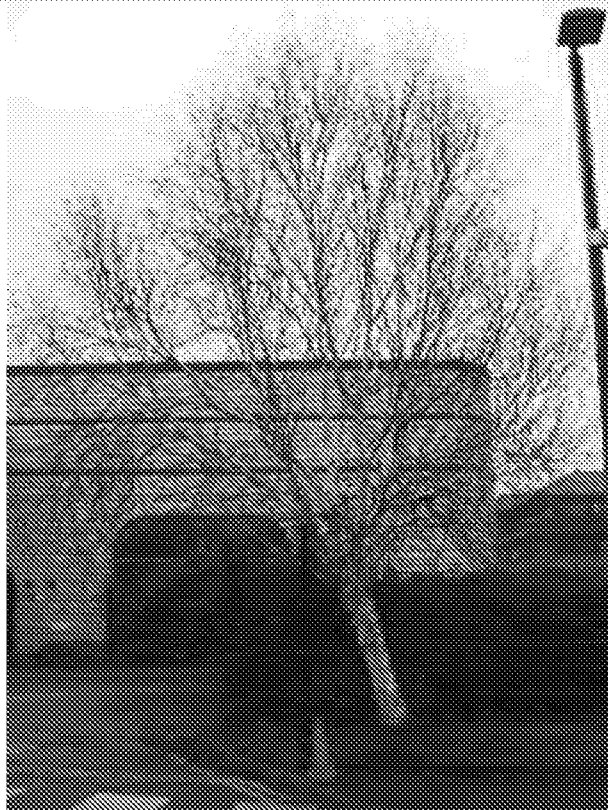
Guidance on Assessing the Potential Suitability of Development Sites to Support Bats

(adapted from Collins, J. (ed)).

Suitability	Description	
	Roosting	Commuting and Foraging
Negligible	An inspected structure or tree which is considered to have no features of importance for roosting bats. No further constraints apply to the method or timing of proposed works.	Negligible habitat features on-Site to support commuting or foraging bats
Low	A structure with at least one or more features suitable to support opportunistic individual bats. However, inadequate space, shelter, protection and conditions, and the low suitability of surrounding habitats means that it is unlikely to be used as a maternity or hibernation roost site. A tree of adequate age and stature to support potential roosting features, however, either no features, or only features of limited potential recorded from the ground.	Habitat with potential to support low numbers of commuting bats due to its quality and connectivity. For example, a gappy hedgerow or unvegetated stream that is isolated from the surrounding landscape. Alternatively, suitable but isolated habitats suitable to support low numbers of foraging bats such as a lone tree or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that are of adequate size, shelter and protection, with suitable conditions and surrounding habitat to support a bat roost not of high conservation status (with respect to roost type not individual species conservation status).	Linear habitat continuity connecting to the wider landscape offering potential to support commuting bats, such as rows of trees and scrub or linked back gardens. Habitat such as trees, scrub, grassland or a waterbody with connectivity to the wider landscape offering foraging opportunities for bats.
High	A structure or tree with one or more potential roost sites that are suitable for use by large numbers of bats on a regular basis and for long periods of time due to their size, shelter, protection, conditions and the surrounding habitat.	Continuous high-quality habitat with strong connectivity to the wider landscape that is likely to be used by commuting bats on a regular basis, such as flowing waterbodies, hedgerows, rows of trees and woodland edges. High quality habitat with strong connectivity to the wider landscape that is likely to be regularly used by foraging bats, such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to, and connected to, known roost sites

Appendix C – Site Photographs

Site Photographs



Photograph 1 – Tree (T)1



Photograph 2 – TG2



Photograph 3 – T3



Photograph 4 – TG4



Photograph 5 – T5



Photograph 6 – T6



Photograph 7 – T7



Photograph 8 – T8 & T9



Photograph 9 – T10



Photograph 10 – T11



Photograph 11 – T12



Photograph 12 – TG13



Photograph 13 – T14



Photograph 14 – T15



Photograph 15 – T16



Photograph 16 – TG17



Photograph 17 – T18



Photograph 18 – T19



Photograph 19 – T20



Photograph 20 – TG21



Photograph 21 – T22



Photograph 22 – T23



Photograph 23 – T24



Photograph 24 – T25



Photograph 25 – T26



Photograph 26 – T27



Photograph 27 – TG28



Photograph 28 – T29



Photograph 29 – T30



Photograph 30 – T31



Photograph 31 – TG32