

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

**BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant**



Client: Hampshire County Council

Date: December 2017

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	1 of 35

Contents

1.0	Introduction	Page 3
2.0	Scope	Page 3
3.0	Proposals	Page 4
4.0	Site & Additional Information	Page 4
5.0	Survey	Page 4
6.0	Significance of Trees	Page 5
7.0	Arboricultural Impact Assessment	Page 5 - 6
8.0	Arboricultural Method Statement	Page 6 - 7
9.0	Conclusion & Recommendations	Page 7
Appendix 1: SURVEY & ASSESSMENT		Page 8 - 22
DRAWING 1 – Site Plan		
FIGURE 1 & 2: Proposed Remedial Works		
Photographs of Surveyed Site		
Arboricultural Implications Assessment.		
Explanation of tree survey terms.		
Appendix 2: TREE PROTECTION DETAIL		Page 23 - 31
Arboricultural method statement & scheme of tree protection.		
DRAWING 2 – Tree Protection Plan.		
DRAWING 3: Recommended Tree Removal Plan.		
FIGURE 2 - Protective Barrier.		
Appendix 3: INFORMATION		Page 32 - 35
Poster: Construction and trees		
Poster: Common causes of tree death		
Sign: Root Protection Area		

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	2 of 35

BS 5837 Report on the Trees in Relation to Bosmere Junior School in Havant	
Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

1.0 INTRODUCTION

- 1.1 Bosmere School is a community junior school with 360 children. Outside the school buildings there are generous grounds which have multipurpose uses. Children have access, at playtimes, to a hard play area, a large field and an adventure play-ground. Additionally, they have an area dedicated to gardening, a wooded copse, and a range of quiet seating areas. A number of mature trees offer shade during the summer, allowing the grounds to become teaching areas when the weather allows.
- 1.2 The school wishes to replace a boundary wall which has been considered as unstable, with a new metal rail fence. Due to the school being within a Conservation Area and the copse a group TPO, special remedial works has been recommended. (See **Appendix 1**: Drawing 1: Site Plan).

2.0 SCOPE

- 2.1 The Local Planning Authority (LPA) require that the planning submission gives due consideration to trees which may be influenced / affected by the remedial works, together with information on which trees that should be retained and the means of protecting these trees during construction works. Ref BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'
- 2.2 Hampshire County Council (HCC) Property Services Team was instructed to undertake a BS 5837 report to satisfy item 2.1.
- 2.3 The purpose of the survey is to assess the landscape and visual amenity value of the existing vegetation and to identify the extent of Root Protection Area (RPA) to existing trees prior to any potential remedial works of the site. The assessment / evaluation of tree condition detailed in this report is solely intended for the purposes of trees in relation to the remedial works and is NOT intended nor should be relied upon as a survey / assessment of the health and safety of trees.
- 2.4 This report will provide a synopsis of the proposals, description of the site, assess the implication for the trees to be retained & recommend surgery / tree protection measures necessary for the implementation of works.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	3 of 35

BS 5837 Report on the Trees in Relation to Bosmere Junior School in Havant	
Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

3.0 PROPOSALS

- 3.1 Bosmere Junior School require some remedial works to their boundary wall which has become un-stable. Due to the school being within a Conservation Area the wall can not be re-built because of the existing trees in close vicinity to the structure. Therefore recommendations are to replace the wall with a metal rail fence, using the wall's original foundations.

4.0 SITE & ADDITIONAL INFORMATION

- 4.1 The school is situated within a residential area in the centre of Havant. To the north of the school is The Parchment, and to the east is South Street, the A27 is to the south, and Park Road South is to the west.
- 4.2 The site boundaries are mainly constructed of brick walls and metal fencing.
- 4.3 Vehicular access to Bosmere Junior School is achieved from South Street to the east of the site.
- 4.4 Havant Borough Council has confirmed that the school is located in the St. Faiths Conservation Area and the copse is designated as a group TPO number 0979.

5.0 SURVEY

- 5.1 A tree survey was conducted on Thursday 09/10/2015.
- 5.2 The survey was a visual inspection carried out from ground level, conducted in broad accordance with BS 5837 2012 to consider trees within the site which may be affected by any remedial works.
- 5.3 Please refer to **Appendix 1** for the following information;
Drawing 1 – Site Plan.
FIGURE 1 & 2: Proposed Remedial Works.
Photographs of Surveyed Site.
Arboricultural Implications Assessment.
Explanation of tree survey terms.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	4 of 35

BS 5837 Report on the Trees in Relation to Bosmere Junior School in Havant	
Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

6.0 SIGNIFICANCE OF THE TREES

- 6.1 The trees on the site are young to mature, and are mainly self set trees such as Sycamore (*Acer pseudoplatanus*), Lime (*Tilia vulgaris*), Yew (*Taxus baccata*) and Holly (*Ilex aquifolium*) that have naturally established within the school grounds over the years. In the main the trees appear to be in good/fair condition with good vigour.
- 6.2 The trees surveyed generally fall into one main area between the brick boundary wall and the school's security metal railing fence. This area is very dense with little light in summer and has become overgrown with plenty of undergrowth.
- 6.3 A total of 33 individual trees were surveyed, and of those trees, the following is a breakdown of the various numbers of trees in each BS category.

BS Category	Tree/Group No.	Sub Total
A	1, 13, 28	3
B	2, 4, 8, 9, 11, 15, 16, 17, 19, 20, 21, 22, 23, 24, 26, 27, 30, 31.	18
C	3, 5, 6, 7, 10, 12, 14, 18, 25, 29, 32, 33.	12
U	None.	0
TOTAL		33

7.0 ARBORICULTURAL IMPACT ASSESSMENT

- 7.1 For detail Arboricultural Implications Assessment & explanation of tree survey terms please refer to **Appendix 1**.
- 7.2 All of the trees surveyed that could be impacted by the remedial works were on-site within Bosmere Junior School (see **Appendix 1**: Site Plan).
- 7.3 Due to the school being within a Conservation Area and the copse a group TPO, rebuilding the wall would impact the protected trees too much, therefore a metal rail fence has been recommended. Residents from South Street have requested this type of fencing, so they can still see the trees opposite their properties.
- 7.4 Unfortunately, all works will be within the RPA's of the trees, and therefore some trees will be impacted. Support helical pile posts are required for the new railings

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	5 of 35

BS 5837 Report on the Trees in Relation to Bosmere Junior School in Havant	
Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

and post holes will be a maximum of 150mm in diameter and have a depth of no more than 2.0 metres, and will be spaced 2.4 metres apart.
(See **Appendix 1**: Proposed Remedial Works).

- 7.5 The supporting helical screw piles will be drilled into the ground within the RPA's of surrounding trees. They will only impact and potentially damage a very small area of the RPA's, and this should not affect the trees significantly. This plan was the best remedial solution found to cause the less possible impact to the surrounding trees RPA's.
- 7.6 Small self set trees T5, T10, and T12 are Yew (*Taxus baccata*) trees and together with an Elder T29 (*Sambucus nigra*) have grown within the dense undergrowth beneath the more developed trees. These have grown to a poor form with defects due to the suppressed light conditions caused from surrounding trees. It is recommended to remove these trees to create more developing space for the adjacent trees and also provide more suitable locations for the stabilisation equipment.
(See **Appendix 1**: Photographs of surveyed site).
(See **Appendix 2**: DRAWING 3: Recommended Tree Removal Plan).
- 7.7 Clearing approximately a 2m strip of the dense undergrowth and thick epicormic growth along the wall is necessary for the remedial works to proceed, but is also beneficial to the copse providing more light and growing space for it's trees and possibly increasing the bio-diversity of the area. No impact to remaining trees.
- 7.8 All remedial works are to be conducted by hand with hand machinery and tools, so no access for heavy equipment or vehicles is required.

8. ARBORICULTURAL METHOD STATEMENT & TREE PROTECTION SCHEME

- 8.1 In order for trees to receive appropriate protection it is necessary for remedial works to conform to a specific sequence of operations. This work sequence together with specification for temporary protection / special construction detail / methods are more detailed in the Arboricultural method statement and scheme of tree protection Ref **Appendix 2**.
- 8.2 Any removal of trees, branch removal, crown lifting, pruning etc to allow for remedial works must be to BS 3998 2010 standard.
See **Appendix 2**: TREE PROTECTION DETAIL: 10.2 TREE WORK.
- 8.3 Any excavation or ground surfaces altered within the RPA of retained trees needs to be conducted by hand.
See **Appendix 2**: TREE PROTECTION DETAIL: 10.4 EXCAVATION WITHIN THE RPA.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	6 of 35

BS 5837 Report on the Trees in Relation to Bosmere Junior School in Havant	
Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

- 8.4 Storage of materials or machinery etc to be accommodated outside all RPA's away from trees on areas of existing hard standing only.
See **Appendix 2: 10.8 STORAGE/ FIRES**
- 8.5 No protective fencing or ground protection is required due to all the works being contained inside a fenced area and conducted within the RPA's of the trees.

9. CONCLUSION & RECOMMENDATIONS

- 9.1 The purpose of this report is to quantify the trees most likely to be impacted upon by the proposed remedial works, and to show how potential damage to them is to be avoided. This survey provides the basic data on the trees implicated on these sites. It does not set out to put arguments for or against the remedial works. The primary purpose is for the Council and client to review the information provided as a condition of the planning consent.
- 9.2 Havant Borough Council has confirmed that the school is located in the St. Faiths Conservation Area and the copse is designated as a group TPO number 0979.
- 9.3 Remedial works are required to replace an unstable brick boundary wall which cannot be rebuilt due to being within a Conservation Area, and the damage a rebuild would cause to the trees within the adjacent copse. Recommendations have been suggested to replace the wall with metal railings, together with helical screw pile posts which will cause the minimum impact to the neighbouring trees.
- 9.4 Trees on-site in this survey are of mixed species and ranging in age from young to mature, with the majority of specimens of relatively good/ fair quality with good amenity value. Most specimens have been managed for amenity and screening and the remainder are self-set trees which have grown within this contained area.
- 3 Category A** Yew trees were identified due to their condition and usual long life span that should make a substantial contribution for 40 years plus.
- 9.5 Care has been taken to avoid as many trees as possible and to minimise the amount of trees that need removing for remedial works to proceed. Tree removal for the works has been recommended following the approval from the Local Planning Authority/ arboriculturalist.
- 9.6 Arboricultural supervision is recommended, with regular visits to monitor the site trees protection, and areas of work where the use of a 'no dig' and works by hand only principles/methods within the RPA's. Essential supervision is required when the helical operation is conducted.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	7 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Appendix 1: SURVEY & ASSESSMENT

Drawing 1 - Site Plan

FIGURE 1 & 2: Proposed Remedial Works

Photographs of Surveyed Site

Arboricultural Implications Assessment.

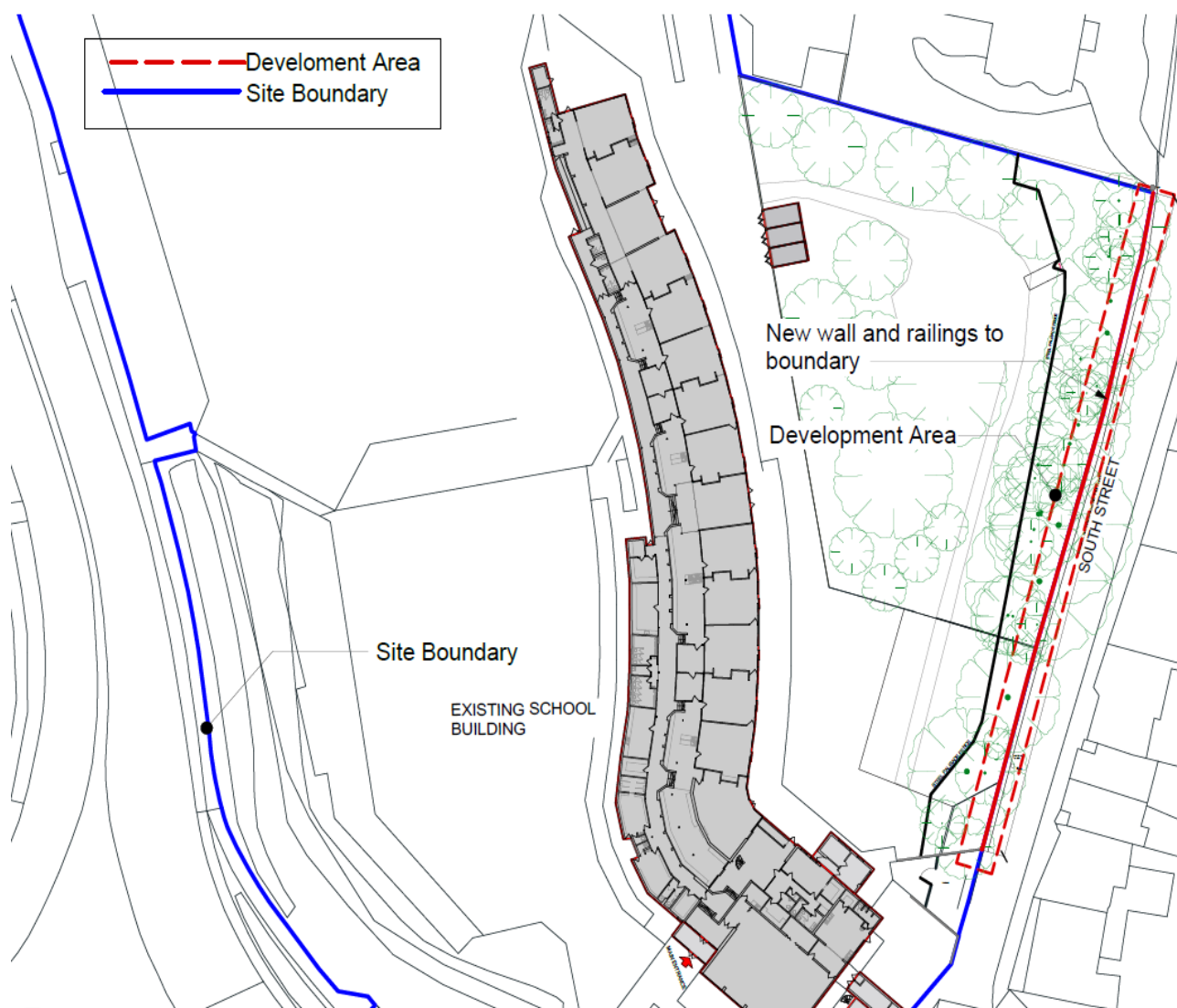
Explanation of tree survey terms.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	8 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Drawing 1: Site Plan



Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	9 of 35

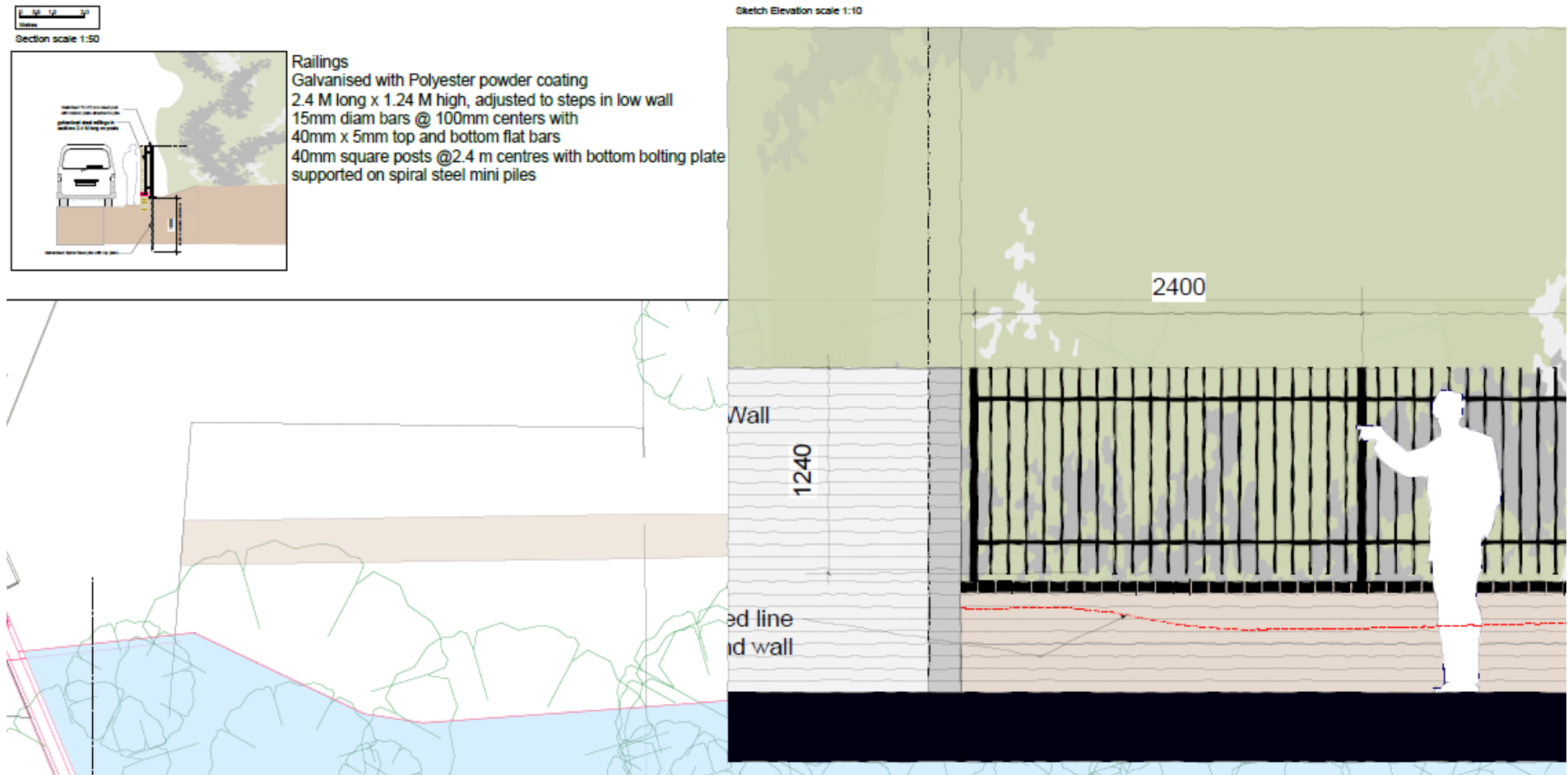
BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

FIGURE 1: Proposed Remedial Works



Revision:

2

Approved by:

Tim Rudwick, Alex Dirks, Edward Funnell

Page

Date Revised:

22/02/18

Authored by:

Laurence Johns, Arboriculturalist, BSc.

10 of 35

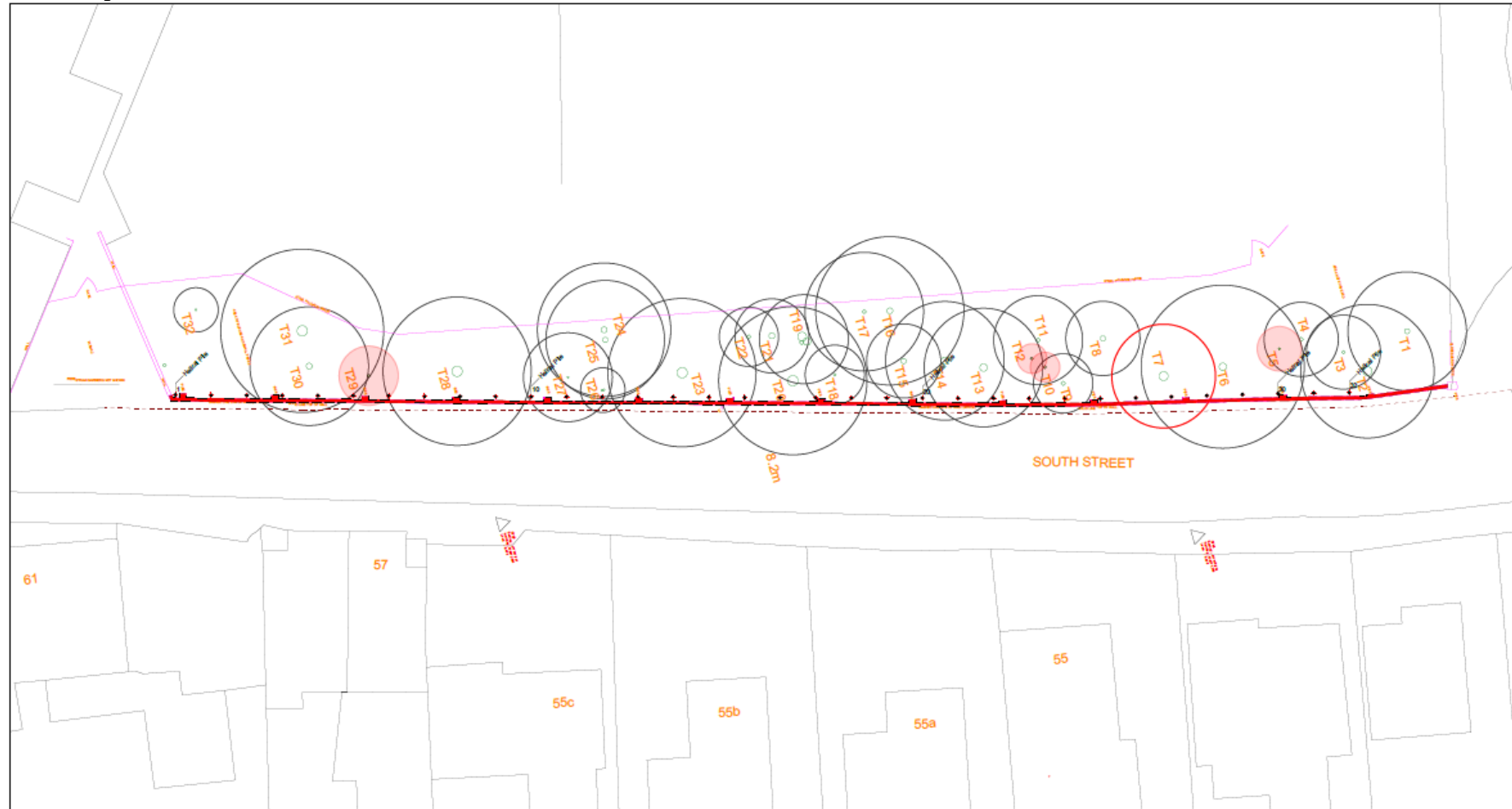
BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

FIGURE 2: Proposed Remedial Works



Revision:

2

Approved by:

Tim Rudwick, Alex Dirks, Edward Funnell

Page

Date Revised:

22/02/18

Authored by:

Laurence Johns, Arboriculturalist, BSc.

11 of 35

BS 5837 Report on the Trees in Relation to Bosmere Junior School in Havant	
Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Photographs of Surveyed Site



Looking north at unstable brick boundary wall with trees behind.



Looking south at unstable boundary wall along South Street.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	12 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Photographs of Surveyed Site



Looking north at widening gap between walls.



Looking west at a crack in boundary wall.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	13 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Photographs of Surveyed Site



Dense undergrowth between trees next to wall.



Small Yew with a cavity with decay on tree T10.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	14 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Arboricultural Implications Assessment

Site name / ref: Bosmere Junior School/Arb / Assessment

Date: 09/10/15

										Single Stemmed Tree		Multi-Stemmed Trees				COMMENTS
Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m ²)	20% offset Value for Open Grown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m ²)	20% offset Value for Open Grown Trees (linear m)	
T1	Yew	EM	A1	40+	450	0	10	8	2	5.40	91.61	1.08	0.00	0.00	0.00	Good condition, good vigour, suppressed south due to T2, covered in ivy.
T2	Lime	EM	B1	20 -40	500	0	19	9	2	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, old pruning wounds south, epicormic growth around base, base not visible.
T3	Yew	Y	C1	10-20	300	0	6	5	1.5	3.60	40.72	0.72	0.00	0.00	0.00	Fair condition, fair vigour, 10% deadwood, reduced light little foliage, suppressed due to T2 & T3.
T4	Yew	Y	B1	20 -40	330	0	11	5	3	3.96	49.27	0.79	0.00	0.00	0.00	Good condition, good vigour, etiolated, twin-stemmed at 2m AGL, covered in ivy.
T5	Yew	Y	C1	10-20	180	0	4	3	2	2.16	14.66	0.43	0.00	0.00	0.00	Fair condition, good vigour, poor example, covered in ivy, approx 30 degree lean south, poor future growth.
T6	Sycamore	MA	C1	10-20	600	0	9	11	5	7.20	162.86	1.44	0.00	0.00	0.00	Fair condition, good vigour, covered in ivy, 10% deadwood, weighted east over road, suppressed south due to T4.
T7	Lime	M	C1	10-20	1000	0	20	7	3	12.00	452.39	2.40	0.00	0.00	0.00	Fair condition, good vigour, 15% deadwood, suppressed south due to T8, die back in crown east, multi-stemmed tree (3 stems), thick epicormic growth around base.

Revision:

2

Approved by:

Tim Rudwick, Alex Dirks, Edward Funnell

Page

Date Revised:

22/02/18

Authored by:

Laurence Johns, Arboriculturalist, BSc.

15 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Arboricultural Implications Assessment

Site name / ref: Bosmere Junior School/Arb / Assessment

Date: 09/10/15

										Single Stemmed Tree			Multi-Stemmed Trees			COMMENTS
Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m ²)	20% offset Value for Open Grown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m ²)	20% offset Value for Open Grown Trees (linear m)	
T8	Sycamore	MA	B1	20 -40	400	0	16	5	8	4.80	72.38	0.96	0.00	0.00	0.00	Good condition, good vigour, covered in ivy, 5% deadwood, suppressed north & south due to T7 & T11.
T9	Sycamore	MA	B1	20 -40	300	0	10	4	5	3.60	40.72	0.72	0.00	0.00	0.00	Good condition, good vigour, etolated.
T10	Yew	Y	C1	10-20	150	0	6	2	2	1.80	10.18	0.36	0.00	0.00	0.00	Fair condition, fair vigour, poor example, suppressed by T9, encroaching T9, cavity with decay 1m AGL west.
T11	Sycamore	MA	B1	20 -40	400	0	15	6	7	4.80	72.38	0.96	0.00	0.00	0.00	Good condition, good vigour, 5% deadwood, suppressed north & south due to T8 & T13, etiolated, twin-stemmed at 0.5m AGL.
T12	Yew	Y	C1	10-20	180	0	5	2	2	2.16	14.66	0.43	0.00	0.00	0.00	Poor condition, fair vigour, split in stem with decay west, 20% deadwood.
T13	Yew	M	A1	40+	700	0	8	8	2	8.40	221.67	1.68	0.00	0.00	0.00	Good condition, good vigour, weighted over road east, multi-stemmed at 1m AGL (3 stems), 10% deadwood.
T14	Sycamore	M	C1	10-20	550	0	16	8	6	6.60	136.85	1.32	0.00	0.00	0.00	Fair condition, good vigour, snapped branch 6m AGL west, 10% deadwood, animal burrows under base east.

Revision:

2

Approved by:

Tim Rudwick, Alex Dirks, Edward Funnell

Page

Date Revised:

22/02/18

Authored by:

Laurence Johns, Arboriculturalist, BSc.

16 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

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BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

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Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m2)	20% offset Value for Open Grown Trees (linear m)	COMMENTS
T15	Holly	MA	B1	20 -40	300	0	8	5	4	3.60	40.72	0.72	0.00	0.00	0.00	Good condition, good vigour, epicormic growth around base.
T16	Sycamore	MA	B1	20 -40	450	0	14	10	6	5.40	91.61	1.08	0.00	0.00	0.00	Good condition, good vigour, base covered in ivy, close to railing fence.
T17	Sycamore	Y	B1	20-40	300	0	13	8	6	3.60	40.72	0.72	0.00	0.00	0.00	Good condition, good vigour, suppressed north by T16 & south by T19.
T18	Yew	Y	C1	10-20	250	0	5	4	3	3.00	28.27	0.60	0.00	0.00	0.00	Fair condition, good vigour, covered in ivy, approx 25 degree lean towards road east.
T19	Sycamore	M	B1	20-40	1000	0	20	6	8	12.00	452.39	2.40	0.00	0.00	0.00	Good condition, good vigour, base covered in ivy, etiolated, splits into 3 stems at base, co-dominant stem.
T20	Holm Oak	M	B1	20-40	1000	0	22	10	6	12.00	452.39	2.40	0.00	0.00	0.00	Good condition, good vigour, twin-stemmed from base, 10% deadwood, suppressed west due to T19, weighted towards road east, stems with split well occluded, lean of approx 10 degree east.
T21	Sycamore	MA	B1	20-40	400	0	20	5	9	4.80	72.38	0.96	0.00	0.00	0.00	Good condition, good vigour, covered in ivy, weighted towards road east, etiolated.

Revision:

2

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Tim Rudwick, Alex Dirks, Edward Funnell

Page

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22/02/18

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17 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

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T22	Sycamore	Y	B1	20-40	220	0	18	4	9	2.64	21.90	0.53	0.00	0.00	0.00	Good condition, good vigour, etiolated, covered in ivy.
T23	Horse Chestnut	M	B1	20-40	800	0	15	10	3	9.60	289.53	1.92	0.00	0.00	0.00	Good condition, good vigour, leaf miner problem, twin-stemmed at 1.8m AGL, covered in ivy.
T24	Sycamore	MA	B1	20-40	500	0	18	9	4	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, base within Holly, etiolated.
T25	Sycamore	MA	C1	10-20	300	0	16	8	3	3.60	40.72	0.72	0.00	0.00	0.00	Fair condition, good vigour, suppressed west due to T24, 5% deadwood.
T26	Lime	Y	B1	20-40	300	0	11	3	3	3.60	40.72	0.72	0.00	0.00	0.00	Good condition, good vigour, weighted and leaning over road east.
T27	Lime	Y	B1	20-40	200	0	12	6	4	2.40	18.10	0.48	0.00	0.00	0.00	Good condition, good vigour, weighted and leaning over road east.
T28	Yew	M	A1	40+	800	0	11	10	3	9.60	289.53	1.92	0.00	0.00	0.00	Good condition, good vigour, twin-stemmed at 1.6m AGL, base covered in ivy, old pruning wounds all around, cavity with hard decay ground to 0.5m AGL west.

Revision:

2

Approved by:

Tim Rudwick, Alex Dirks, Edward Funnell

Page

Date Revised:

22/02/18

Authored by:

Laurence Johns, Arboriculturalist, BSc.

18 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Arboricultural Implications Assessment

Site name / ref: Bosmere Junior School/Arb / Assessment

Date: 09/10/15

										Single Stemmed Tree		Multi-Stemmed Trees				COMMENTS
Tree ref.	Species	Age Class Y,MA,M,OM or V	BS Cat	Remaining contribution in years	Single stem trees. Dia @ 1.5m (mm)	Multi- Stem trees. Dia abv root flair (mm)	Est Height (m)	Crown Spread Dia (m)	Height of crown clearan ce (m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m ²)	20% offset Value for Open Grown Trees (linear m)	Min Root Protection Area Radius (m)	Min Root Protection Area (m ²)	20% offset Value for Open Grown Trees (linear m)	
T29	Elder	MA	C1	10-20	200	0	3	4	2	2.40	18.10	0.48	0.00	0.00	0.00	Fair condition, fair vigour, poor form, weighted towards road east, encroaching carrigeway.
T30	Holly	MA	B1	20-40	300	0	7	8	3	3.60	40.72	0.72	0.00	0.00	0.00	Good condition, good vigour, suppressed west due to T31, twin-stemmed at 1m AGL, epicormic growth around base.
T31	Sycamore	M	B1	20 -40	500	0	13	11	4	6.00	113.10	1.20	0.00	0.00	0.00	Good condition, good vigour, 50% covered in ivy.
T32	Sycamore	Y	C1	10-20	200	0	6	3	2	2.40	18.10	0.48	0.00	0.00	0.00	Fair condition, good vigour, suppressed north due to T31.
T33	Willow	Y	C1	10-20	350	0	7	7	4	4.20	55.42	0.84	0.00	0.00	0.00	Fair condition, good vigour, suppressed west due to T31, old pruning wounds east, close to boundary wall.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	19 of 35

EXPLANATION OF TREE SURVEY & ASSESSMENT TERMS

Tree survey:

Undertaken from ground level, in broad accordance with British Standard 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'
Please note - survey may include assessment of trees beyond the site boundary which are considered likely to be affected by development proposals.

Land or topographical survey:

Scale plan depicting key site features and the location of trees

Tag Number / Ref Number:

Unique number, identifying each tree on the accompanying plan and corresponding with tree tag numbers where use of tree tags is deemed necessary by the Hampshire County Council arboriculturalist. Where appropriate, individual trees / tree groups with the same or similar characteristics may be identified and numbered as a group and surveyed accordingly.

Species:

Tree species giving vernacular and full botanic name where applicable.

Stem Dia Single:

Stem Diameter Single stem trees: Tree trunk diameter measured at 1.5m above ground level (on sloping ground above highest ground level). Expressed in milli-metres.

Stem Dia Multi:

Stem Diameter multi stem trees: Tree trunk diameter measured immediately above the root flare. Expressed in millimetres.

Height:

Tree top height expressed in metres this is an estimated figure

Height to lowest tree part:

Estimate vertical distance between ground level and lowest part of tree canopy along the four principle points of the compass.

Spread:

Estimate dimensions of the tree canopy extent taken from centre of tree trunk to edge of general canopy line along the four principle points of the compass. Note this distance is to the general canopy line, in certain cases an exceptional or etiolated branch may extend beyond the stated figure.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	20 of 35

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Age:

Y: Young - within third of normal life expectancy.
MA: Middle Aged - within second third of normal life expectancy.
M: Mature - within final third of normal life expectancy.
OM: Over Mature – senescent & veteran trees nearing the end of anticipated life expectancy.

BS Category Tree quality assessment grading in broad accordance with BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'.
Table 1 - Cascade chart for tree quality assessment.

Summary of attributes Category A – Tree retention of High quality; trees of high quality and value likely to make a substantial contribution for 40 years plus.

Summary of attributes, Category B – Tree retention of moderate quality; trees of moderate quality and value likely to make a contribution for 20 years plus.

Summary of attributes, Category C – Tree retention of low quality; trees of low quality and value likely to make a contribution for 10 years plus; young trees with a stem diameter of less than 150mm dia.

Summary of attributes, Category U – Trees for removal; trees likely to be unviable within 10 years or trees to be removed on the grounds of sound arboricultural management

Remaining contribution in Yrs:

Estimation of safe useful life expectancy.

Comment / Recommendations

Summary detail where appropriate of tree position / characteristics / defects etc.

Min RPA.

Minimum root protection area that should remain undisturbed around each retained tree necessary to maintain the trees vitality and avoid damage to above ground tree parts. Calculated from Table D1 of BS 5837 2012 and may be adjusted in shape (but NOT decreased in area) by the arboriculturalist to take account of site specific features.

Radius m – minimum radius in meters from the centre of the tree to remain undisturbed.

Area m² – minimum total area around the tree to remain undisturbed.

RPA comment

Comment relating to the position or extent of the root protection area.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	21 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Key to abbreviations

AGL – above ground level.

BS – British Standard.

Dia – diameter.

Rqd – required.

VTA - Visual tree assessment.

RPA – Root Protection Area.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	22 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Appendix 2: TREE PROTECTION DETAIL

Arboricultural method statement & scheme of tree protection.

DRAWING 2 - Tree Protection Plan.

DRAWING 3: Recommended Tree Removal Plan.

FIGURE 2 - Protective barrier.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	23 of 35

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

10. ARBORICULTURAL METHOD STATEMENT & SCHEME OF TREE PROTECTION

Work sequence to be in accordance with points 8.1 inc and the following;

Appendix 2: DRAWING 2 - Tree Protection Plan.

Appendix 2: FIGURE 2 – Protective barrier.

10.1 PROCEDURE

Specification, work sequence and methodology to be approved by the Local Planning Authority (LPA)/ arboriculturalist prior to commencement. The site manager to be instructed to advise all site workers at their induction of the purpose and restrictions implied by the protective fencing. Site manager to be responsible for the day to day prevention / exclusion of all actions / operations in the vicinity of protected trees that are likely to cause damage to retained / protected trees. E.g. Fires, use of cranes and excavators, use of hot bitumen etc.

There will be no exclusion area as the work is between the trees.

10.2 TREE WORK

To be in accordance with BS 3998 2010 and subject to all necessary permissions. Tree work must be carried out in accordance with BCT guidance to comply with the legislation concerning the protection of bats and bat roosts. To follow legislation concerning nesting birds and protected species such as dormice, badgers and reptiles.

4 Trees (T5, T10, T12, T29) – Remove to ground level.

1 tree (T7) – Remove deadwood.

10.3 TEMPORARY PROTECTION FOR THE TREES

Erect temporary protective measures in accordance with approved plans and specifications agreed with the Local Planning Authority/ arboriculturalist: Temporary fencing (Ref FIGURE 2 – Protective barrier, or specification agreed with the LPA tree officer/arboriculturalist prior to commencement) will be required for all trees to be retained in this vicinity of work. Measures will be required to form effective Construction Exclusion Zones / Root Protection Areas (RPA) as detailed on drawing (or in positions agreed with the LPA tree officer/ arboriculturalist prior to commencement).

If access is required for work within the RPA (working room / scaffolding etc), temporary ground protection must be installed prior to commencement. In the case that plant / machinery access is required within the RPA specification for temporary ground protection to be appropriate for the intended loading and agreed with the Local Planning Authority Tree Officer/ arboriculturalist prior to commencement. No access whatsoever will be permitted within the fenced

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	24 of 35

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

area without prior written agreement from the Local Planning Authority (LPA) arboriculturalist.

Protective fencing and temporary ground protection must be maintained in good condition and retained for the duration of building works on site or until such time as agreed with the LPA/ arboriculturalist.

Protective fencing type to be - "Herras" type fencing secured to a scaffolding type frame as detailed in Figure 2 – protective barrier British Standard 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'. This will ensure that the protective zone is not eroded by the intentional / unintentional movement of the fencing.

Clear signage to be displayed to advise site workers of the purpose and restrictions implied by the protective fencing.

Ref to **Appendix 3: INFORMATION.**

There will be no exclusion area as the work is between the trees.

10.4 EXCAVATION WITHIN THE RPA.

Excavation should be undertaken carefully, using hand-held tools and preferably by compressed air soil displacement.

Roots, whilst exposed, should immediately be wrapped or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.

Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist; as such roots might be essential to the tree's health and stability.

Prior to backfilling, retained roots should be surrounded with topsoil or un-compacted sharp sand, or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

10.5 NOTICE TO THE LOCAL PLANNING AUTHORITY

Provide the Local Planning Authority with a minimum of 2 working days notice that protective fencing & ground protection has been and installed. No work to proceed on site until LPA/ arboriculturalist approval of the temporary protective fencing / ground protection has been granted or expiry of the 2 working day notice period.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	25 of 35

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

10.6 PLANNING OPERATIONS ON SITE

The planning and implementation of all operations will require due consideration of the limitations of clearance imposed by the presence of all trees on or adjacent to the site. All vehicle and crane operations will take appropriate action and care to ensure that trees are not damaged as part of their operations. No part of any tree must be used as a support or for anchorage. No fixings must be mounted on trees.

10.7 SITE ACCESS / EGRESS - CONSTRUCTION WORK

Access & egress only via areas not fenced, as to not compact RPA of retained trees.

10.8 STORAGE/ FIRES

Storage of materials / plant etc to be accommodated outside all RPA's / away from trees on areas of existing hard standing only. No fires permitted within 15m of any tree to be retained. Any area to be allocated for the mixing of concrete & cement / storage of diesel and other materials / storage of machinery in a location such that any spillage will be contained without risk of site contamination / damage to trees and or tree roots.

10.9 SITE WELFARE FACILITIES

To be accommodated if possible on existing hard standing areas / outside all RPA's and away from trees.

10.10 ARISINGS FROM ALL WORK

Arisings from excavation / construction work etc to be accommodated outside all RPA's, away from trees or removed from site on a daily basis.

10.11 UNDERGROUND SERVICES

Excavation / connection of underground services – to be routed outside of all RPA's / within previously compacted ground (existing hard standing) and in accordance with principals of; NJUG Volume 4 "Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees". (Documents may be downloaded from - www.njug.org.uk).

10.12 ABOVE GROUND SERVICES

To be routed away from trees and positioned to take account of likely growth potential of trees to avoid future conflict.

10.13 NOTICE TO THE LOCAL PLANNING AUTHORITY - REMOVAL OF TEMPORARY PROTECTIVE MEASURES

Following the completion of all works on site. Provide the Local Planning Authority with a minimum of 2 working days notice that tree protection measures / protective fencing is to be removed. All protective measures to

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	26 of 35

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

remain in situ until LPA/ arboriculturalist approval has been granted or expiry of the 2 working day notice period.

10.14 LANDSCAPE

Landscape for all areas within RPA's - to remain as existing. Where rein-statement is required ground levels to remain as existing with only soft land-scape work permitted. Proposals to be specified to avoid rotavation / deep cultivation which may risk tree root damage. For more information BS 4428: 1989 contains recommendations and guidance on general land-scape operations, including sections on preliminary investigations, drainage, grading and cultivation, tree planting, and woodland planting.

The general treatment of areas around newly planted and existing trees should allow for adequate infiltration of water and free gas exchange, reduction of water evaporation and the retention of an open soil structure to encourage root growth.

10.15 REMOVING HARD SURFACING - AREAS WITHIN THE RPA

The removal of old hard surfacing should be conducted with care, and preferably with hand tools, and the sub base should not be disturbed. This existing surfacing could be retained and used as a base for new surfacing. If roots are exposed, they should immediately be wrapped or covered to pre-vent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.

Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist; as such roots might be essential to the tree's health and stability.

Prior to backfilling, retained roots should be surrounded with topsoil or un-compacted sharp sand, or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

10.16 SUB-BASE AND FINISHING LAYERS

Recommended appropriate sub-base options for new hard surfacing include three-dimensional cellular confinement systems. Suitable surface finishes include washed gravel, permeable tarmac or block pavements set on a sand base. Where a permeable surface is to be used by vehicular traffic, a geotextile should be used at the base of construction to help prevent pollution contamination of the rooting area below. If the new surface is likely to be subject to de-icing salt application, an impermeable barrier should be

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	27 of 35

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

incorporated to prevent contamination of the rooting area and run-off should be directed away from the RPA. Alternatively, piles, pads or elevated beams can be used to support surfaces to bridge over the RPA. However, for lightly loaded surfacing or limited widths (<3m) such as pedestrian paths, pre-formed concrete slabs may be appropriate if the sub-base preparation is as set out above.

10.17 CONSTRUCTION OF NEW HARD SURFACING WITHIN RPA's

The design should not require excavation, including changes of soil levels other than the removal, of turf or other surface vegetation. The new hard surface must avoid localized compaction by evenly distributing the loading over the track width and wheelbase of any vehicles expected to use the access. New permanent hard surfacing should not exceed 20% of any existing unsurfaced ground within the RPA. Where there is a risk of water logging suitable land drainage must be incorporated. The new hard surface should be resistant to or tolerant of de-formation by tree roots, and should be set back from the stem of the tree and its above ground root buttressing by a minimum of 500 mm to allow for growth and movement.

10.18 SOIL COMPACTION AND REMEDIATION MEASURES

Compacted soil will adversely affect drainage, gas exchange, nutrient uptake and organic content, and will seriously impede or restrict root growth. The risk of soil compaction is greatest in soils with significant clay content and in wet conditions.

Soil compaction should be avoided around existing vegetation, including trees, and in areas where new planting or seeding is proposed.

Where soil compaction has occurred in the vicinity of existing trees, arboricultural advice should be taken before carrying out any remedial or other works within RPAs to mitigate risk of further damage to roots.

Remedial works may include sub-soil aeration using compressed air, and the addition of other materials, preferably of a bulky, organic nature (but excluding peat), to improve structure. Heavy mechanical cultivation such as ploughing or rotavation should not occur within the RPA.

Any cultivation operations should be undertaken carefully by hand in order to minimize damage to the tree, particularly the roots. Decompaction measures include forking, spiking, soil augering and tilted radial trenching. Care should be taken during such operations to minimize the risk of further damage to tree roots.

10.19 QUERIES

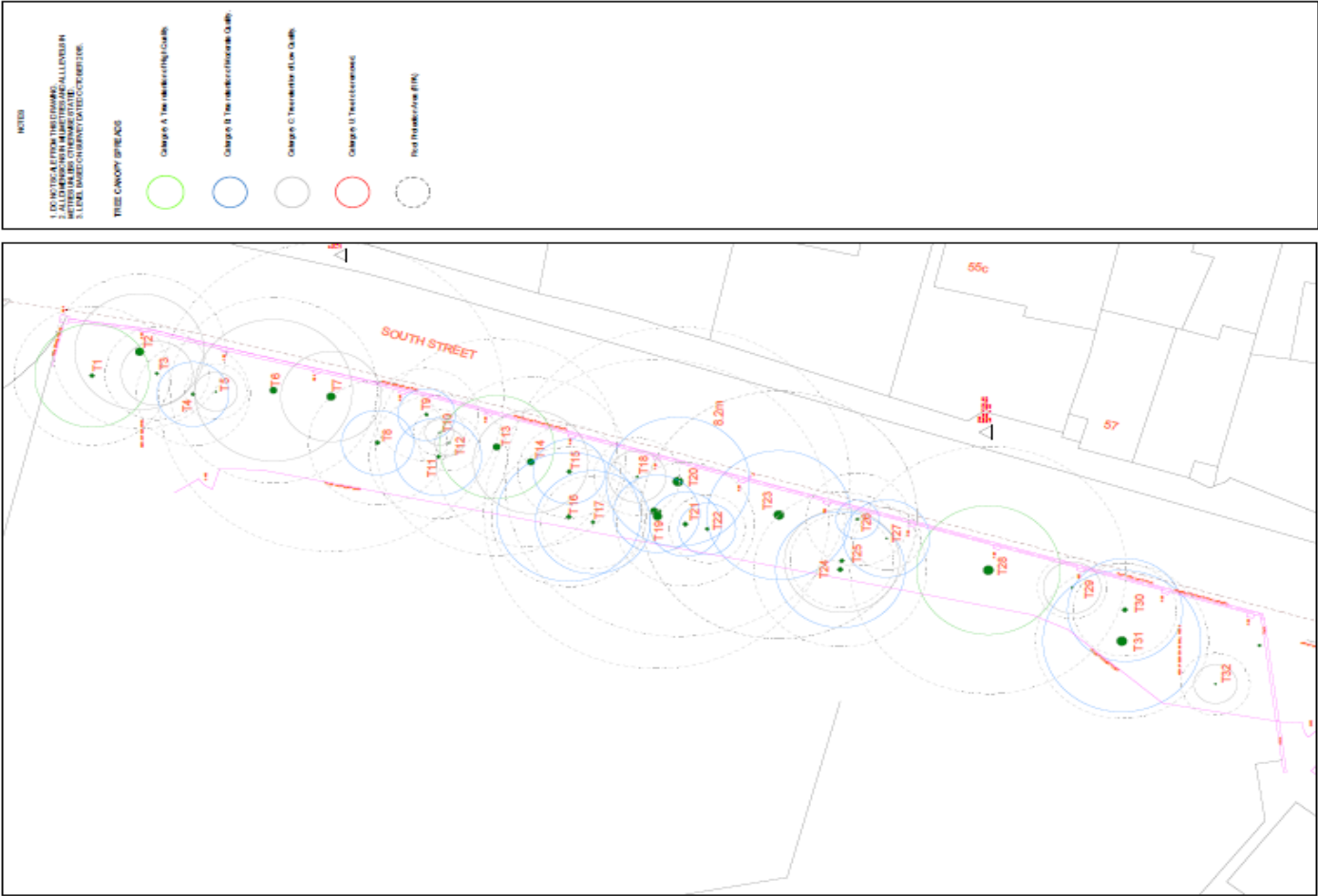
Any queries arising from the scheme of protection to be referred to the Local Planning Authority Arboriculturalist/ arboriculturalist (in writing and in a timely manner) to allow clarification of any issues arising.

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	28 of 35

BS 5837 Report on the Trees in Relation to Bosmere Junior School in Havant

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Drawing 2: Tree Protection Plan



Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	29 of 35

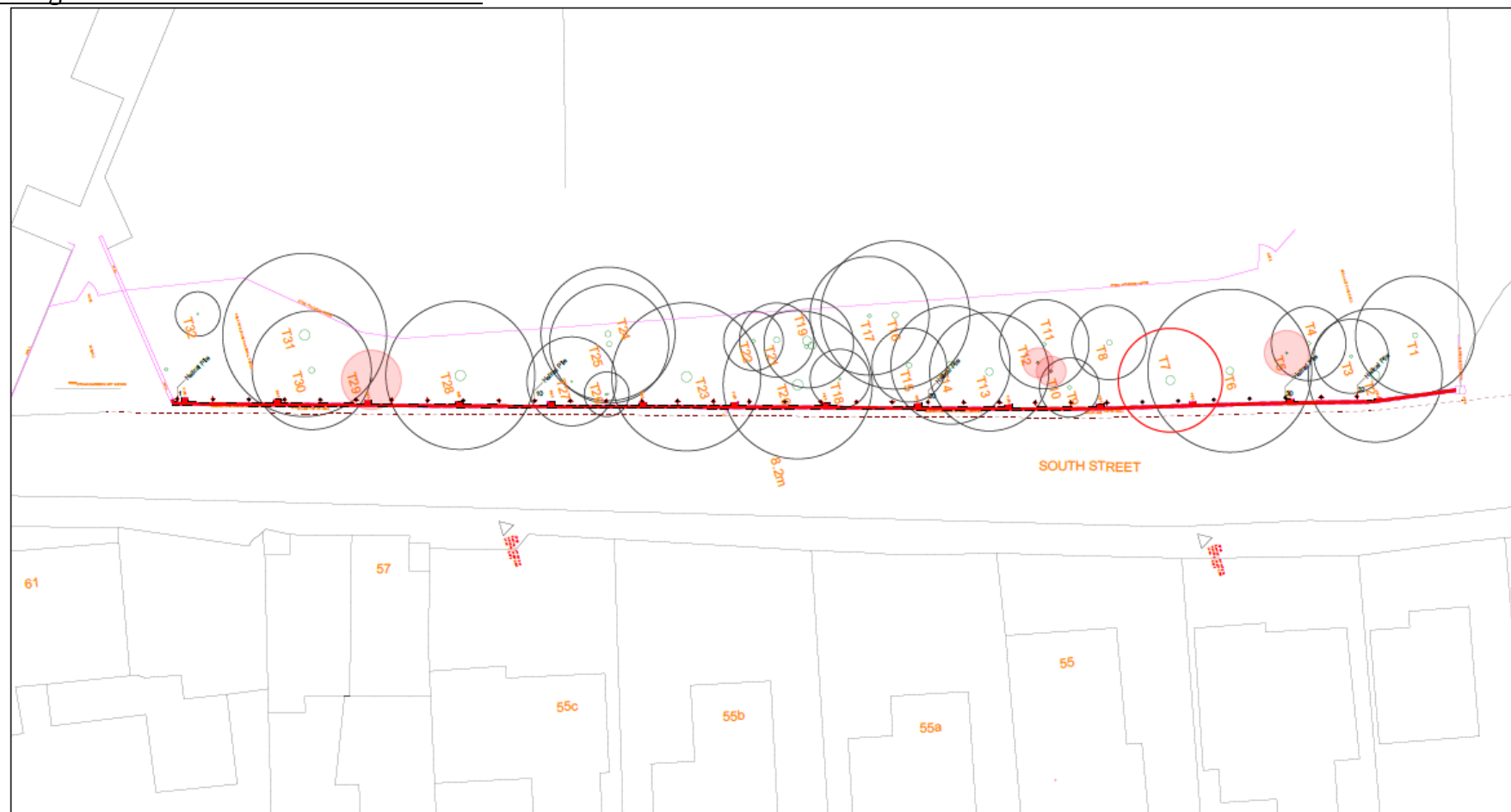
BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Drawing 3: Recommended Tree Removal Plan



Revision:

2

Approved by:

Tim Rudwick, Alex Dirks, Edward Funnell

Page

Date Revised:

22/02/18

Authored by:

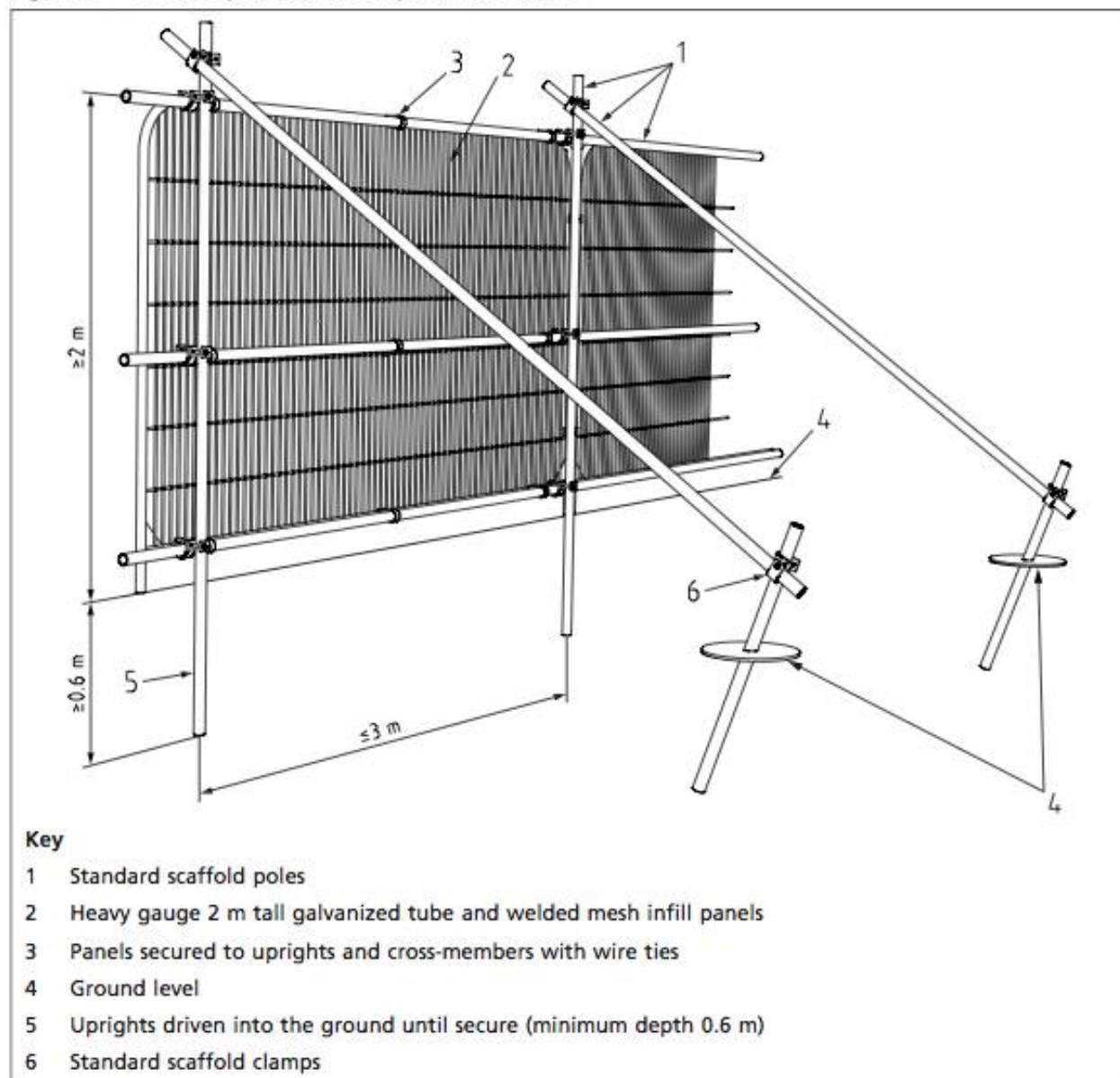
Laurence Johns, Arboriculturalist, BSc.

30 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Figure 2 Default specification for protective barrier



Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	31 of 35

BS 5837 Report on the Trees in Relation to
Bosmere Junior School in Havant

Document Reference:

Procedure / Process:

BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Appendix 3: INFORMATION

Poster: Construction and trees

Poster: Common causes of tree death

Sign: Root Protection Area

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	32 of 35

Construction and Trees



Why Is Fencing Erected Around Trees?

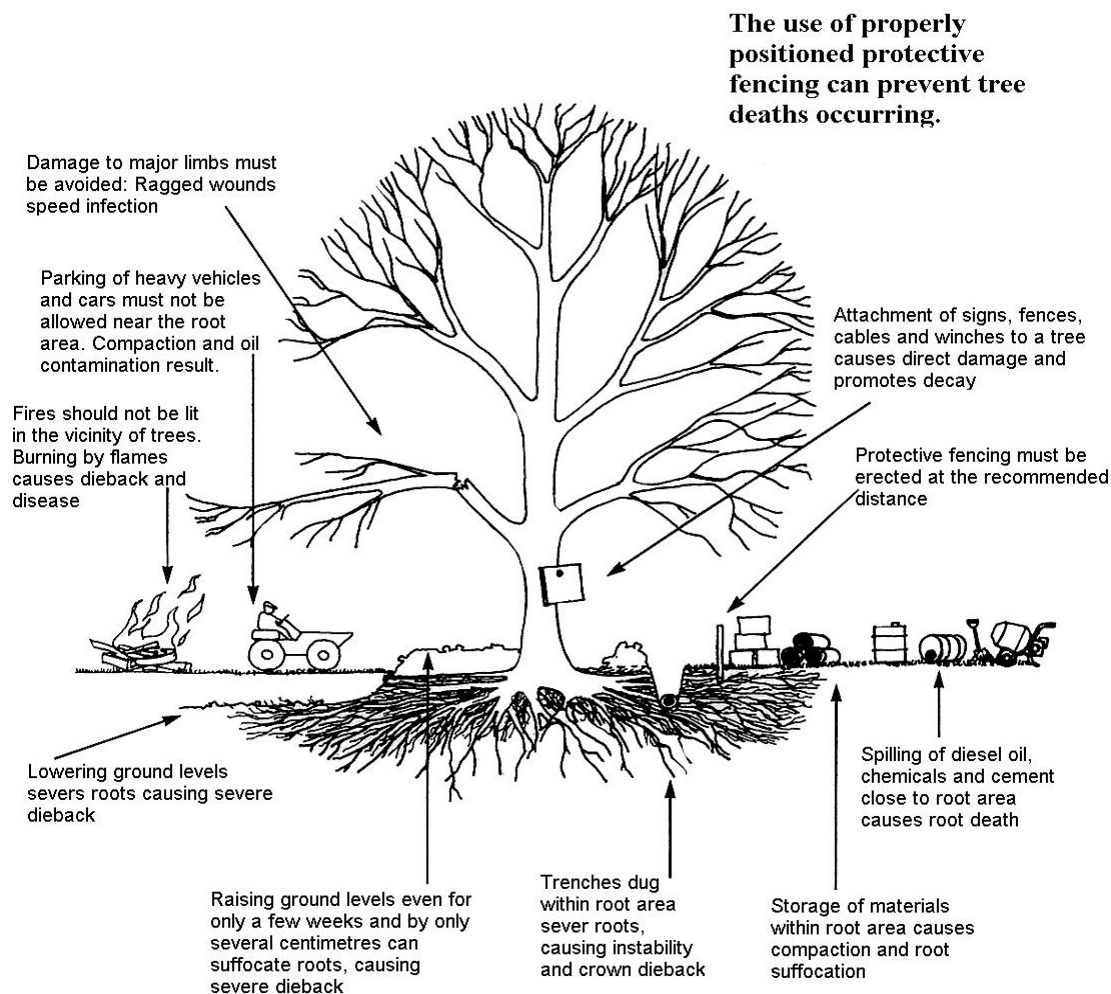
1. The major cause of damage to trees on construction sites is due to **soil compaction**.
2. Roots use the spaces between soil particles to obtain Oxygen, Water and Nutrients.
3. Heavy plant and machinery compresses (compacts) the soil, squashing out the air spaces and preventing root function.
4. A compacted soil structure will stay compacted.
5. Consequently the tree suffers and will show signs of branch die-back.
6. Symptoms such as die-back may take several years to appear.
7. Soil compaction over roots can be prevented by maintaining a fenced exclusion zone over the tree roots.
8. The exclusion zone distance is calculated using British Standard 5837.
9. Protective Fencing is installed at the calculated distance.
10. Protective Fencing is a condition of planning approval, if it is removed or repositioned the construction firm is in breach of a condition and may be subjected to legal action.

COURTESY OF ARBORICULTURAL INFORMATION EXCHANGE

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	33 of 35

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

Common causes of Tree Death



Please use copies of this as an on-site poster for personnel



COURTESY OF ARBORICULTURAL INFORMATION EXCHANGE

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	34 of 35

Document Reference:	
Procedure / Process:	BS 5837 'Trees in relation to design, demolition and construction – Recommendations 2012'

A3 laminate signs such as the example below must be erected on tree protective fencing every 5m at a height of 1.2m



COURTESY OF ARBORICULTURAL IINFORMATION EXCHANGE

Revision:	2	Approved by:	Tim Rudwick, Alex Dirks, Edward Funnell	Page
Date Revised:	22/02/18	Authored by:	Laurence Johns, Arboriculturalist, BSc.	35 of 35