Appendix 3

DAVID ARCHER ASSOCIATES
ARBORICULTURAL CONSULTANCY

AN ARBORICULTURAL ASSESSMENT

OF A WHEATLEY ELM AT

MONTPELIER CRESCENT, BRIGHTON

Client:- Brighton & Hove City Council

Report prepared by:- David Archer M.Arbor.A.

Date:- March 2013

Kingston Barn 15 St Julian's Lane Kingston Buci West Sussex BN43 6EH

Office:- 01273 597796 Mobile:- 07512 346919
E.Mail:- david@davidarcher.co.uk Web: www.daa-arboriculture.co.uk

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INSTRUCTIONS

I have been instructed by Mr R. Greenland, Arboricultural Manager for Brighton & Hove City Council, in an email of the 8th March 2013.

I am asked to report on a Wheatley Elm in Montpelier Crescent, Brighton and in particular I am asked to assess:-

a) The tree's visual amenity value to the local scene.

b) A visual assessment of age, health condition and defects, if any.

c) Estimated useful longevity.

d) Effect on highway infrastructure.

e) Effect on the fabric of adjacent residences/business accommodation.

f) Possible solutions for rectifying damage to the highway infrastructure.

THE SITE

I visited the site on the morning of 11th March 2013; weather at the time was cold and overcast with light snow showers. The tree was inspected from the ground only, it was not climbed and no internal investigations were carried out, thus no guarantee can be given as to its structural integrity. The site is immediately adjacent to Seven Dials, a busy roundabout/road junction with seven roads meeting there. The tree is situated in the pavement outside 38 Montpelier Crescent, an early to mid 19th- century four storey terraced property built of stucco in the Italianate style. The house lies within the Montpelier and Clifton Hill Conservation Area and is listed by English Heritage as a Grade 2 building. The house is fronted by a small basement forecourt with a low brick boundary wall topped by iron railings; access to the pavement is made through two iron gates, now hanging off their hinges.

The pavement is predominantly tarmac and edged with large granite kerbstones. At 9m to the south of the tree is a Pelican crossing; metal railings along the kerbline cover the approach to the crossing and come to 0.5m either side of the trunk.

THE TREE

The tree is a Jersey or Wheatley Elm (*Ulmus minor var. sarniensis*), it has a height of 19m and a trunk diameter at 1.5m high of 830mm, making this the tallest street tree in the local landscape. The average crown radius is 4.5m, although this is reduced to 3.0m on the east side; it has a crown clearance above the highway of 7m.

I did not find any significant visible structural defects in the tree other than a small area of bark damage to the base of the trunk on the north side. It has a form and structure typical for its species and age and has had its crown reduced all over within the last 2-3 years. On the trunk there is evidence of a number of old pruning wounds, which are now fully occluded. On the west side of the trunk extending from 3m to 4.5m high is a depressed area approx 60mm deep and 100mm wide. The cause of this is not evident and may be the result of an historic event. At the base of the trunk are a number of small girdling roots exhibiting surface damage and loss of bark from the passage of pedestrian traffic.

The measured gap between the trunk at 0.5m high and the wall of 38 Montpelier Crescent is 1.38m. Where the pavement abuts the base of the tree the tarmac has been cut away effectively reducing the usable pavement width to 0.95 m. At the time of inspection it was evident that this is sufficient for one way passage by pedestrians but not two way; pedestrians meeting at this point often have to give way to each other, particularly so for parents with push chairs

There is a small bird box attached to the trunk at 3.5m high on the north side, along with a large net and canvas structure chained to the centre of the crown. There are a large number of informal posters and cardboard notices attached by pins and string to the lower trunk.

Brighton & Hove City Council is the holder of the National Plant Collection for Elms with 66 national champions within the collection distributed throughout the city. This is not only a nationally important collection but of European and World importance as it holds the largest and most diverse collection of the genus '*Ulmus*' to be found in the Northern Hemisphere. The City is responsible for maintaining in excess of 19,000 Elms within its streets and parks; of these approx 1,400 are Wheatley Elms. (*Rob Greenland – Pers Comm.*)

ASSESSMENTS

A) To determine the visual amenity value of the tree to the local scene I carried out a TEMPO analysis. This is an accepted method within the arboricultural profession for assessing the amenity value of a tree and is widely used by many Local Authorities to determine the suitability of a tree for inclusion within a Tree Preservation Order (TPO). Copies of this methodology and of the scores applied to the tree under consideration in this case, are attached as Appendix 1 at the end of this report.

B) This analysis gives the tree a score of 17 points out of a possible maximum of 25 which means that the tree would definitely merit a TPO if it was in private ownership; however, as it is in public ownership then a TPO would not apply as the Secretary of State for Environment has ruled that trees within ownership of a Local Authority should not have a TPO placed upon them.

Applying the guidance and assessment methodology set out in the British Standard BS 5837 (2012) (*Trees in relation to demolition, design and construction*), I consider that this tree would warrant a 'Category A' rating if its suitability for retention were being considered in the context of a proposed development which might affect it. BS 5837 states that for trees to meet 'Category A' they should be "*Trees that are particularly good examples of their species, especially if rare or unusual ...*"; they should also have "*an estimated remaining life expectancy of at least 40 years*"

C) From my inspection it was evident that there are few if any serious visible structural defects in the tree; however, I am informed that a neighbouring tree felled within the last 3-4 years showed extensive internal decay within the base of the trunk (*Neil Brothers – Arboriculturist for BHCC – pers comm.*).

An accurate estimate of the tree's age is difficult to determine without carrying out invasive tests, but on the basis of its trunk diameter, appearance and assumed management history I estimate that it is approx 120 - 150 yrs old.

D) The tree's useful longevity is somewhat difficult to determine in these circumstances due to the potential for trees of this species to succumb suddenly to infection by Dutch Elm Disease (DED); however, if one discounts this possibility, then I would expect the tree to have at the very least a useful life expectancy in excess of 40 years.

E) The effect of the tree on the highway infrastructure is limited to one of root uplift and direct pressure from the buttresses of the trunk. The granite kerb stones immediately adjacent to the trunk are significantly uplifted, along with a small area of tarmac within the road edge. No other damage to the surface of the carriageway was observed.

Along the pavement either side of the tree are areas of tarmac uplift that extend for 3m to the north and 8m to the south. A small area of uplifted tarmac in the pavement immediately adjacent to the trunk has been cut away by the highway authorities. The pattern of damage in the pavement surface clearly shows that roots from this tree are the primary cause although the extent and size of the particular roots responsible can only be discerned by direct excavation. In my opinion, none of the observed uplifts within the pavement surface are serious enough to constitute a trip hazard.

F) I observed no damage to the adjoining boundary wall and structure of No 38 Montpelier Crescent that could be attributed to this tree, and I have not been informed of any claims made to the City Council to this effect.

DISCUSSION

It is evident that the integrity of the roadway edge and pavement structures is steadily failing and the potential for further damage and the creation of a trip hazard will increase with time and continuing growth of the tree. The recent crown reduction will slow the incremental growth in trunk diameter but this will steadily increase again as the crown regains its former size. If the present pruning regime is maintained there will be a periodic increase and diminishment in the rate of annual trunk increment in direct relation to the pruning cycle.

From an examination of other trees of the same species and of similar size in the surrounding streets, it is evident that this is a common problem for the City Council and has been dealt with in a number of ways. The most common is to make localised repairs to any pavement or kerb damage, and to make extensive use of tarmac to repair the failures in the existing pavements. Where roots have created significant uplift, tarmac is used to alter the levels in the approach to the area of uplift, or the roots responsible are excavated and completely removed. The pavement surface is re-instated with either the original paving slabs, or replaced with tarmac.

I am informed that in extreme cases the tree is felled and the stump removed with a replacement tree planted on or nearby the site (*Rob Greenland – Pers Comm.*). Given the high amenity value and prominent position of the Elm in Montpelier Crescent, and the limited extent of damage caused, I do not consider this to be an appropriate solution in this case; however, there may be other issues that could influence this decision but outside the remit of this report..

There are a number of solutions that take a similar approach to that already used by the City Council although these might not address the problem of the confined space between the Elm and wall of the adjoining property in this particular case. Drainage of storm water from the pavement and carriageway would also be a significant consideration in any design solution.

A solution often used in the USA is to construct a new section of engineered pavement or road surface elevated over the existing surface. This has the benefit of providing space for the tree and its root system allowing it to continue to develop and grow, whilst maintaining a suitable surface for pedestrians and traffic. However, this requires a reasonable amount of space to accommodate the changes in levels and support structures; this is not available at Montpelier Crescent.

An alternative method adopted by Councils elsewhere in Britain and the USA is to excavate the soil from around the surface root system of the tree; to prune those roots deemed to be the cause of the problem, and then backfill the voids with an engineered soil mix such as 'CU – Stuctural Soil$^{tm'}$ or use a modular, pre-engineered cell system, such as 'Silva-Cell$^{tm'}$ that has been designed specifically to meet the need of water

management, soil and tree roots. The benefit of this system is that it provides an alternative rooting environment for the tree thus reducing the need for roots to exploit the sub-soil/pavement interface and thereby causing further damage and uplift to the pavement surface. A primary requirement for this is the availability of sufficient rooting volume beneath the pavement surface which would need to be excavated to allow installation of the soil mix or cell system. Installation would require sufficient space between individual roots and beneath the existing root system; this could be problematic where, as in this case, there is an overriding imperative to retain as many of the existing roots as possible to ensure adequate moisture and nutrient uptake and for the tree's stability. The size of the rooting area capable of being treated in this way is limited by the availability of working space, the presence of underground services and the project budget.

A recent excavation for the contractor's compound at the end of Montpelier Crescent Park showed that the chalk sub-soil was very close to the surface there. Whether this is also the case around the Elm under consideration can only be positively determined by an exploratory excavation, but it would appear likely to be so, suggesting that available rooting volume may be limited by this factor.

A solution that is more widely adopted by many types of Council is to deal with the symptoms but not necessarily the cause by covering over the cracks and uplifts in the pavement surface by laying additional tarmac over the existing surface or re-laying paving slabs at a higher level. Again there is a requirement for sufficient space to allow for the changes in levels. There is also the drawback that this is often a short term fix, in that damage will often re-occur within a few years, depending on the health and vigour of the problem tree.

Root pruning or shaving of the upper root surfaces to reduce the levels of uplift is also widely used elsewhere in Britain. This has the advantage of being cost effective and deals with the immediate problem in a short period of time without the need for extensive excavations; however, the main disadvantage of this is that it creates wounds within the root system which may allow ingress of fungal pathogens with the potential for root decay, which over a period of some years, may cause death or structural failure leading to collapse. The ability of trees to respond well to this kind of treatment is very dependent on individual species; fortuitously Elm is a species that is recognised as having a high tolerance to this method of management but decay is still a significant issue.

With respect to the problem of the limited space between the boundary wall of No. 38 and the trunk of the Elm there is no clear solution. One possibility might be to demolish a section of the boundary wall and to rebuild it along a new alignment; however, as this is a listed building and its basement extends to the edge of the boundary wall, this seems unlikely to be feasible.

CONCLUSIONS

From my inspection it is evident that the Elm is an important tree within the local landscape and, highway issues aside, that it has the potential to make a significant contribution to the local amenity of Montpelier Terrace for many years to come.

From the number of posters and billboards attached to the trunk it is evident that there is considerable local interest in the fate of this tree. Thus it may be reasonably inferred that the local community may be willing to tolerate any solution to the evident problems even if they are either short term or do not fully meet the normal requirements of highway guidelines for road/pavement construction.

However; before any decision is reached it would be prudent to carry out a further investigation of the internal structure of the tree to determine the presence or otherwise of decay. It would be premature to embark on any expensive remedial programme only for the tree to fail in the near future due to unseen internal decay. This may be ascertained by using specialist decay detection techniques such as a Picus sonic tomography unit, or a Resistograph decay detecting drill. All the possible solutions considered above have their drawbacks when applied to this site, lack of space being the primary factor. Any agreed way of resolving the issues (short of removing the tree) will of necessity, be a relatively short term measure, in relation to the tree's potential longevity, and will require regular re-assessment/re-inspection and rectification of any new problems that arise.

A combination of the methods outlined above may be able to satisfactorily resolve the issues for the next few years, therefore I recommend the following:-

1) Undertake tests to ascertain presence /absence of internal decay.

2) Trial excavation to determine subsoil depth capacity.

3) Assuming satisfactory results from 1&2 excavate an additional rooting zone etc.

4) If results from 2 are not satisfactory then re-construct pavement by raising the levels and incorporating expansion voids around the major roots along with reinforcement of the paving material to accommodate further root expansion.

5) If 4 above is adopted then the carriageway could be modified around the base of the tree by setting in a semi circular group of small granite setts to delineate the vulnerable zone immediately adjacent to the trunk.

In either case roots, other than the girdling roots, should not be severed unless absolutely necessary and then only after careful consideration of the effect this may have on the structural stability of the tree.

An outline methodology for these treatments is set out in Appendix 2.

David Archer M.Arbor.A.

March 2013.

TREE EVALUATION METHOD FOR PRESERVATION ORDERS - TEMPO

SURVEY DATA SHEET & DECISION GUIDE

Date: 12TH MARCH 13 Surveyor: DAVID ARCHER

Tree details
TPO Ref (if applicable): N/A Tree/Group No: Species: WHEATLEY ELM
Owner (if known): BRIGHTON CITY COUNCIL Location: O/S 38 MONTPELIER TERRACE

REFER TO GUIDANCE NOTE FOR ALL DEFINITIONS

Part 1: Amenity assessment

a) Condition & suitability for TPO; where trees in good or fair condition have poor form, deduct 1 point

5) Good	Highly suitable
3) Fair	Suitable
1) Poor	Unlikely to be suitable
0) Dead/dying/dangerous*	Unsuitable

Score & Notes GOOD - 5 PAST PRUNING WOUND APPEAR TO HAVE BEEN A PRE-CAUTIONARY MEASURE.

** Relates to existing context and is intended to apply to severe irremediable defects only*

b) Retention span (in years) & suitability for TPO

5) 100+	Highly suitable
4) 40-100	Very suitable
2) 20-40	Suitable
1) 10-20	Just suitable
0) <10*	Unsuitable

Score & Notes SUITABLE - 2 DURING THIS PERIOD THE TREE WILL NEED RE-ASSESSING IN RESPECT OF ANY FURTHER INFRASTRUCTURE DAMAGE. I DECIDED TO DISCOUNT THE POTENTIAL FOR D.E.D. ON THE BASIS THAT BHCC CONTROL PROGRAM IS WORKING.

**Includes trees which are an existing or near future nuisance, including those clearly outgrowing their context, or which are significantly negating the potential of other trees of better quality*

c) Relative public visibility & suitability for TPO

Consider realistic potential for future visibility with changed land use

5) Very large trees with some visibility, or prominent large trees	Highly suitable
4) Large trees, or medium trees clearly visible to the public	Suitable
3) Medium trees, or large trees with limited view only	Suitable
2) Young, small, or medium/large trees visible only with difficulty	Barely suitable
1) Trees not visible to the public, regardless of size	Probably unsuitable

Score & Notes HIGHLY SUITABLE - 5 CLEARLY VISIBLE IN THE LOCAL LANDSCAPE.

d) Other factors

Trees must have accrued 7 or more points (with no zero score) to qualify

5) Principal components of arboricultural features, or veteran trees
4) Tree groups, or members of groups important for their cohesion
3) Trees with identifiable historic, commemorative or habitat importance
2) Trees of particularly good form, especially if rare or unusual
1) Trees with none of the above additional redeeming features (inc. those of indifferent form)

Score & Notes 2 - GIVEN ON THE BASIS OF IT'S SPECIES & BEING A COMPONANT OF THE NATIONAL ELM COLLECTION.

Part 2: Expediency assessment

Trees must have accrued 9 or more points to qualify

5) Immediate threat to tree
3) Foreseeable threat to tree
2) Perceived threat to tree
1) Precautionary only

Score & Notes 3 - FORESEEABLE THREAT TO TREE. PROPOSED WORKS TO 7 DIALS MAY PUT THIS TREE AT RISK.

Part 3: Decision guide

Any 0	Do not apply TPO
1-6	TPO indefensible
7-11	Does not merit TPO
12-15	TPO defensible
16+	Definitely merits TPO

Add Scores for Total: 17

Decision: POSITIVE RESULT FOR A T.P.O.

APPENDIX 2

OUTLINE METHODOLOGY FOR PAVEMENT RE-SURFACING.

a) Preliminary excavation and removal of the granite kerbstones and railings immediately adjacent to the trunk, including the small area of root uplift in the road surface;

b) Excavation of the pavement and subsoil around the root system in those areas where root uplift is evident; this should be carried out by hand with the assistance of an Air Spade where appropriate.

c) A qualified arboriculturalist should then carry out an inspection and assessment of the exposed root system and an evaluation of the rooting volume available within the sub-soil zone.

d) If required, remove the girdling roots and any roots responsible for tarmac uplift providing this does not compromise the structural integrity of the tree. Arboricultural advice and supervision should be sought before undertaking this procedure.

e) If root pruning is not possible without compromising the structural integrity of the tree then the excavation should be backfilled with a structural soil such as 'Amsterdam Tree Sand' or 'CU – Structural Soil [tm]' . The pavement surface may then be constructed at a higher level on top of this sub-base and graded out to minimise any sudden level changes; where possible major roots should be covered with a void forming compressible material to allow for future incremental growth. The pavement surface should be flexible enough to be lifted easily to enable any future root pruning or alteration of levels if required.

f) If it is found that there is the opportunity to create a new rooting zone beneath the pavement and roadway then this should be installed using a proprietary product such as 'Silva Cell', following their installation procedures. Surface treatments should be as in e) above.

g) In any event this tree should be carefully inspected every year for any developing defects that could compromise public safety and a record kept of the findings.

David Archer

March 2013