

Simon Pryce Arboriculture

Report

Client: Interested Underwriters per GHG TPA/Beazley

Site: 24 Daleham Gardens, London, NW3 5DA

Instruction: Mr M Lacy, Graham High Group

Subject: Trees and other vegetation near the house and their effects on it.
Specification for necessary or appropriate work.

Inspection date: 28 March 2017

Report date: 5 June 2017

Reference: 17/022

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I Introduction

- 1.1 This report has been prepared on the instructions of Graham High Group (GHG) of Eastleigh on behalf of the buildings insurers of 24 Daleham Gardens, London, NW3 5DA. I have been asked to inspect trees growing nearby, to assess their condition and possible effects on the buildings and surroundings and to specify any necessary or appropriate work.
- 1.2 This report is based on supplied information and a site visit and inspection on 28 March 2017. The inspections were visual and made from ground level. Trees in other ownership were inspected as closely as possible from within the site or public areas.
- 1.3 General matters are discussed below and the attached schedule contains comments and recommendations for individual trees. Left and right are used as if facing the house from the front, unless noted otherwise.

2 Background

The site

- 2.1 No.24 Daleham Gardens dates from about 1890 and is a four storey detached house that has been converted into three flats. Cracking and signs of foundation movement have occurred and are being investigated by GHG, their reference L/2016/45834/S. Their report and those of the other specialists involved contain a full account of the investigation but some points are summarised below.

Damage and monitoring

- 2.2 The house was previously affected by subsidence, with repairs being completed in 2014 and there has been no recurrence of that damage.
- 2.3 The current damage was first noticed in late summer 2016 and consists of cracking and signs of movement in the two storey bay at the rear. The general pattern is consistent with downward movement relative to the rest of the building and is in Category 3 (moderate) according to BRE Digest 251 Assessment of Damage to Low Rise Buildings.
- 2.4 Three of the main cracks are being monitored, starting in December 2016. By the second reading in May 2017 all three had recovered (narrowed) by up to 2.83mm and by the third reading in May that had continued at a slower rate with some showing very minor increases.

Foundations

- 2.5 In December 2016 a trial pit was dug next to the bay, revealing a concrete strip footing 260mm thick with an overall depth of 620mm.

Ground conditions

- 2.6 The subsoil is a firm to stiff mid brown clay and a bore hole (BH1) sunk from the base of the pit showed that this continues down to at least 3m, becoming stiffer with depth and going off the scale of the shear vane (140kPa) from 2m down. A control bore hole (CBH) in the rear garden to the right of the affected area revealed similar clay which was not as stiff, reaching 140kPa at 3m.
- 2.7 Samples had plasticity indices between 37 and 52%, most being over 40%, indicating high shrinkage potential as classified by the National House Building Council.

- 2.8 Sample moisture contents dip at about 2m in both bore holes in in BHI the moisture content is less than 40% of the liquid limit from 1.5m downwards. It is also lower than 40% with some samples in the control bore hole, but not to such as degree except at 2m where the moisture content figure is exceptionally low. In both bore holes the soil suctions increase with depth, peaking at 2 - 2.5m. The peak in BHI is higher, at 888.1kPa compared with 643.32kPa. This suggest that the soil in BHI is desiccated, i.e. drier than would be anticipated under normal equilibrium conditions, compared with the control samples.

Roots

- 2.9 Roots were found down to 2m in BHI and samples identified as below. No roots were recorded in the control bore hole.

TP/BH	Depth m	Identification	Dia. mm	Starch
I	0.62m	<i>Tilia</i> (lime)	< 1mm	yes
	1.0m	<i>Tilia</i> (lime)	< 1mm	yes
	1.5m	<i>Tilia</i> (lime)	< 0.5mm	yes
	2.0m	<i>Tilia</i> (lime)	< 0.5mm	yes

Drains

- 2.10 The drains were repaired following the previous claim and there are no signs of raised moisture contents so they were not surveyed in detail on this occasion.

3 Observations - trees and other vegetation

- 3.1 There are assorted shrubs and climbing plants in the rear garden, including a wisteria growing on the bay. There are some small trees, most of them some way from the house. The most significant trees in the vicinity are in the rear garden of no.26 Daleham Gardens, to the left, and include a row of pollarded limes growing just beyond the boundary between the two gardens.
- 3.2 These are described individually in the schedule forming the second part of this report, with recommendations for work where necessary or appropriate. They are also shown on the attached site plan.

4 General comments

- 4.1 Tree roots grow with little force, but can cause significant soil drying. Most clay soils shrink when dried and swell as they rehydrate, so this combination can cause subsidence in nearby buildings if their foundations do not extend below the affected zone. This usually starts during dry summers and shows a seasonal cycle, with downward movement in summer followed by recovery through the winter when the weather is cooler and wetter and the vegetation inactive.
- 4.2 The size, age and vigour of an individual tree all influence its drying effect on the soil, but there is also considerable variation between species. Limes are regarded as moderate water demanders, but also grow well on clay and healthy vigorous ones can affect nearby buildings. Large shrubs and climbing plants can also cause significant soil drying and are frequently planted near buildings.

- 4.3 Pruning to reduce leaf area reduces water uptake, but most healthy trees respond by sprouting, so their water demand increases in proportion with the new growth, which is often vigorous. The small roots that absorb water die each winter, new ones develop in spring and grow according to the tree's needs, so pruning foliage regularly reduces the extent and water uptake of the root system over the long term. This is not always effective with large vigorous trees rooted close to buildings and can also harm the tree, although some species tolerate pruning better than others. Removing trees will eliminate any threat associated with them, provided there is not a potential for heave. It is sometimes possible to replace trees with other species that present a reduced risk without the need for intensive maintenance.
- 4.4 Frequently soil movements caused by trees are purely seasonal, so felling stabilises the building almost immediately if done during the dormant season and within one winter at most. However large vigorous trees, especially high water demanding species such as oaks, can cause a persistent moisture deficit at depth where the soil does not rehydrate fully in winter. If these die or are removed the consequent prolonged rehydration and swelling of the desiccated soil can lead to heave damage in buildings nearby, especially if they were built after the moisture deficit established. This movement can take several years if the desiccation is deep and severe, although it tends to start rapidly then tail off.

5 Discussion

Causation

- 5.1 Site investigation shows that the sub soil is a shrinkable clay that extends well below the foundations of the bay. There was evidence of soil desiccation and roots were present to about the same depth in BHI which, combined with the timing and pattern of the cracking, indicates that the damage is subsidence caused by the sub soil shrinking as it has been dried by the roots. Crack monitoring started in late 2016 and shows recovery through the winter and early spring, due to the soil rehydrating and swelling, as outlined at 4.1 above. This is highly characteristic of vegetation related subsidence and tends to rule out other possible factors, such as drains, which have recently been repaired. Unless the underlying cause is addressed, further downward movement will occur in future, especially during any extended dry periods.
- 5.2 All the identified roots were lime and, although there is a row of them along the boundary, the nearest tree, no.3 in this report is significantly larger than the next two, so it is clearly the main influence. The next two in the row might have contributed to overall soil drying, but their effect would be much less. Most of the other vegetation in the vicinity is much smaller than the row of trees, although group no.7 is rooted close to the bay foundations. Most of them are small growing and trimmed but the wisteria is a more substantial specimen and capable of growing much larger.

Remedies

- 5.3 Limes tolerate pruning better than many other species and the nearest tree could be reduced further. It is normal good arboricultural practice to reduce trees to former pruning points, but the only lower ones on tree 3 are the original ones at about 4m and cutting the tree down to them would create very large wounds. The tree would probably survive, but would be susceptible to major decay and would still need to be recut frequently in order to contain its water uptake. Therefore a better long term option would be to remove it completely. There are alternatives that would present a far lower risk without the need for intensive management. ?
- 5.4 Most of the other vegetation is managed actively by trimming regularly and is unlikely to cause problems as long as that continues, although it would be advisable to remove the wisteria next to the bay and to keep the rest to their current sizes or smaller.

5.5 Individual recommendations for work on the trees and other vegetation near the house are set out in the attached schedule. This is based on the results of the site investigation and the most suitable arboricultural management of the species concerned. It will reduce the drying effect on the sub soil under the affected bay significantly, although it might need to be reviewed in the light of further investigation or if the problems persist.

Heave

- 5.6 The presence of desiccation associated with mature trees can indicate a potential for heave. However the house is older than the nearest lime, which has been pruned regularly and the damage is recent, all of which suggests that felling is unlikely to cause problems. That could be investigated further if required but, as noted above, any reasonable form of pruning is not likely to be a viable option

Restrictions

- 5.7 Camden Council's web site shows that the houses are in the Fitzjohns Netherhall Conservation Area, so the council must be given six weeks notice of any proposed work on trees over 75mm diameter at 1.5m above ground level. They can allow that either by confirming that they do not object or by letting the six weeks lapse without making a tree preservation order (TPO) to prevent the work. In that event or trees are already subject to TPOs it is necessary to apply for consent to carry out work. If that is refused there is a right of appeal to the Secretary of State and in some cases it is possible to claim compensation.
- 5.8 Camden's decision allowing the recent reduction of the six limes at 26 is a notice that they do not object to work in a conservation area (Section 211 notice), their reference 2017 0338. However previous consents for work at no.26 have been TPO permissions for three of the limes. It is not clear which three trees that is, so this should be clarified before any work is undertaken.
- 5.9 Shrubs, trees and hedges are beyond the scope of this legislation.
- 5.10 The limes belong to a third party, so there is no direct control over them. However the available evidence, including root identification, indicates that the nearest one has affected the house and the others could do so in future if not managed appropriately.

Tree work

- 5.11 Any treework should be carried out in accordance with BS 3998: 2010, Recommendations for Treework. It is essential that the contractor doing the work has appropriate third party and public liability insurance. The Arboricultural Association has a list of approved contractors, published on their web site at www.trees.org.uk.
- 5.12 Where any trees or other woody plants are removed it is advisable to remove the stumps and main roots or to kill them with a suitable herbicide in order to prevent them sprouting and regrowing or sending up sucker shoots. Removing them also avoids colonisation by honey fungus, which can spread and infect other vegetation nearby, either killing plants or decaying structural roots and making them unstable.

cont...

6 Conclusions

- 6.1 Site investigation shows that the damage in the house is subsidence caused by the sub soil shrinking as it has been dried by roots from nearby vegetation.
- 6.2 The root identifications implicate the nearest lime in the row growing in the garden of no.26, to the left. It has been pollarded and reduced regularly, but is healthy and vigorous. The other limes are less likely to be involved and less of a threat although all of them are capable of growing larger. Most of the other vegetation is small and managed actively, although it would be advisable to remove the wisteria near the bay.
- 6.3 There is limited scope for reducing the nearest lime further without harming it and it would still need active management, so the only viable option is to remove it. Most of the other vegetation needs little work beyond continuing with the present management.
- 6.4 The recommended work will reduce the drying effect on the soil under the affected area significantly, but might need to be reviewed in the light of further investigation or if the problems continue.
- 6.5 Available information indicates that removing the lime is unlikely to cause heave.
- 6.6 The site is in a conservation area and it is possible that the limes concerned are subject to a tree preservation order.
- 6.7 The lime trees belong to another party, so there is no direct control over them.

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Tree no.	Species	Distance	Height	Trunk dia.	Est. age	Comments and recommendations
The trees and shrubs are described in sequence starting to the rear left of the house and going round clockwise. Asterisks in the first column denote those in other ownership, with house numbers in brackets or [c] denoting council owned trees. m/s = multiple stemmed.						
rear						
1	Sumac	2.5m	5m	m/s	10+	Healthy, but not a high risk species, nor very large growing and not implicated. <ul style="list-style-type: none"> No work needed beyond normal maintenance and trimming.
2	Assorted shrubs	3m min	2 - 3m	m/s	20+	Mixture including camellia, fatsia, forsythia and others, none very large and all trimmed regularly. <ul style="list-style-type: none"> No work needed beyond normal maintenance and trimming.
3 *	Lime	7.5m	13m	600mm	80+	Healthy established tree that has been pollarded early in its life at about 4m then left to grow larger before regular cutting resumed, with the most recent cut being since the end of the 2016 growing season. The pollarding will have contained its growth, but has not been sufficient to prevent it affecting the house. There is little scope for further reduction in size, other than cutting down to the original pollard points, which would create large harmful wounds. There are alternative species that would be less likely to cause problems. <ul style="list-style-type: none"> Remove.
4 *	Lime	12.5m	9m	400mm	80+	Also pollarded regularly like the others, similar in age, but smaller and less likely to be problematic as long as the cutting continues. <ul style="list-style-type: none"> Reduce back to the pollard points every 2 – 3 years.
5 *	Lime	15.5m	6m	300mm	80+	Has been managed the same way as the others, but is much smaller and less likely to have affected the house. <ul style="list-style-type: none"> Reduce back to the pollard points every 2 – 3 years.
6 *	Ash	20m	22m	900mm	120+	Large healthy specimen that has been reduced lightly in the last few years. The house is just within potential root range for a tree of this size, but it is not implicated and is mature, so any further growth will be slow. It appears to have a decay cavity in the trunk, but close inspection was not possible. <ul style="list-style-type: none"> Reduce back to former reduction points every 2 – 3 years.
7	Assorted shrubs	½ - 1.5m	2 - 3m	m/s	10+	Mixed group next to the bay including star magnolia, narrow leaved laurel, juniper, pittosporum and wisteria. Most of these are trimmed or pruned and are small growing species. <ul style="list-style-type: none"> Remove wisteria, keep the rest to their current sizes or smaller.

Tree no.	Species	Distance	Height	Trunk dia.	Est. age	Comments and recommendations
8	Wisteria	0m	4m	m/s	10+	Part of the group above. Rooted next to the bay and has a substantial leaf area, so is likely to have contributed to soil drying under it. <ul style="list-style-type: none"> Remove.
9	Assorted climbers	8 - 9m	2.5 - 3m	m/s	10+	Mixture of species trained over a pergola, trimmed regularly and are well away from the affected area, as are the two small apple trees between the pergola and fence. <ul style="list-style-type: none"> No work needed beyond normal maintenance and trimming.
10	Apple	12m	5m	220mm	40+	Larger than the other apples. Leans but is sound and healthy, pruned regularly and well away from the affected area. <ul style="list-style-type: none"> No work needed beyond normal maintenance and trimming.
11	Assorted shrubs	3 - 6m	1 - 1.5m	m/s	10+	Japanese maple, choisya and assorted other shrubs, healthy but most are small growing or trimmed regularly. <ul style="list-style-type: none"> No work needed beyond normal maintenance and trimming.
11	Ash leaf maple	6.5m	4m	100mm	10+	Capable of growing larger, but is pruned regularly. <ul style="list-style-type: none"> Continue current pruning regime.
13	Paper bark birch	11m	7m	210mm	10+	Leans quite heavily and has been reduced recently. Low water demanding species, not a threat to the house at this range. <ul style="list-style-type: none"> No work needed at present.
14	Flowering cherry	8m	4m	30mm	5+	Healthy young specimen, still on the planting stake. One of the smaller growing white flowered forms, not likely to cause problems in the foreseeable future. <ul style="list-style-type: none"> No work needed to safeguard the house, stake should be removed as soon as the root system is firm.
15	Assorted shrubs	3 - 6m	1 - 3m	m/s	10+	Mature small shrubs, all trimmed regularly and not a threat to the house. <ul style="list-style-type: none"> Continue current trimming regime.
16	Assorted shrubs	0m	2 - 3m	m/s	10+	Viburnum, Virginia creeper and wisteria, all rooted next to the wall, but not close to the affected bay and are trimmed regularly. <ul style="list-style-type: none"> Continue trimming annually to keep them to their current sizes or smaller.
front						
17	2 no. Lime	5.5m	3 + 3.5m	250mm	80+	Both pollarded at an early age and have been recut regularly, which was probably the original intention with trees 3 - 5m. Not implicated in the current problems and not a material threat. <ul style="list-style-type: none"> Continue annual pollarding

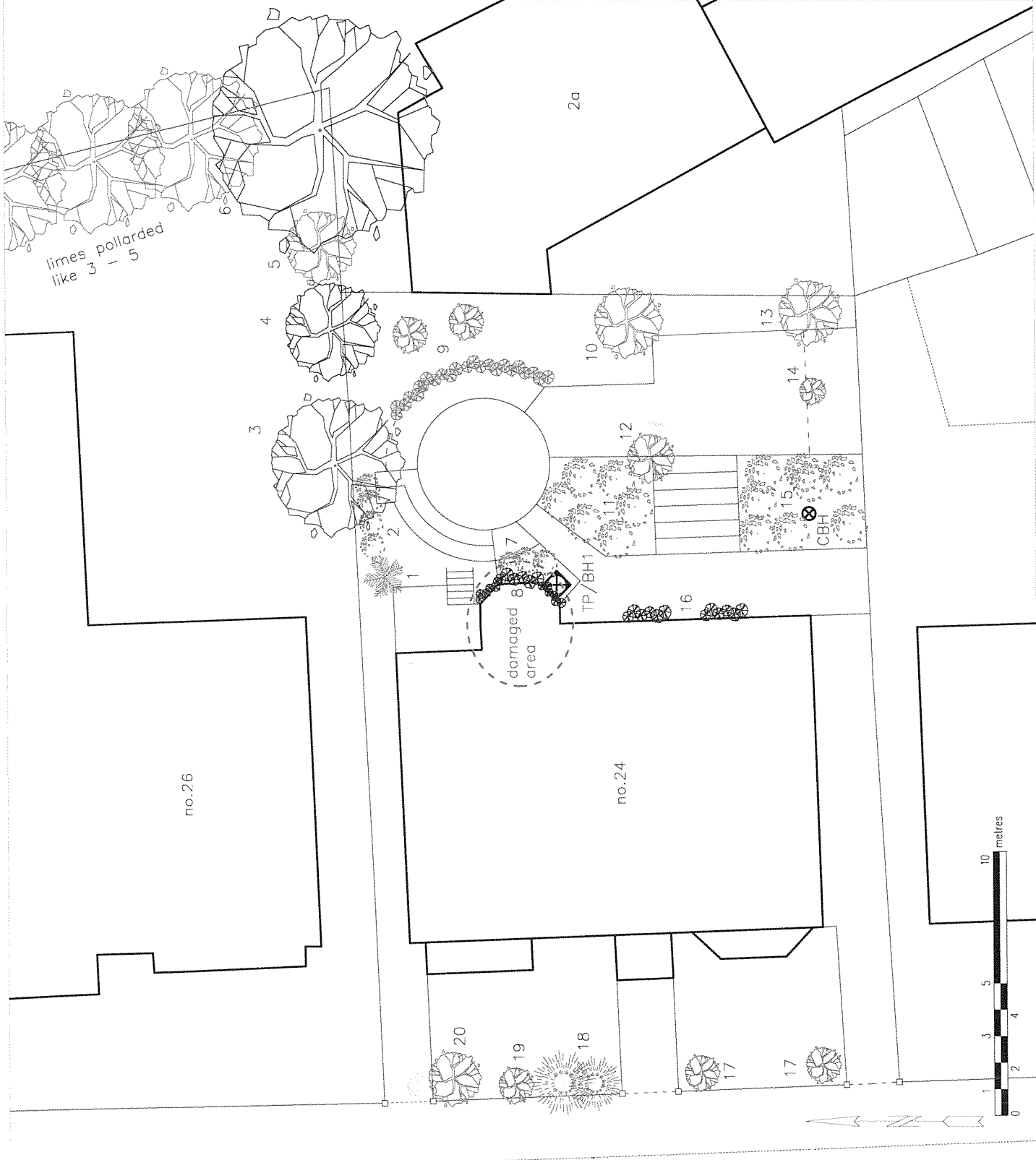
Trees inspected by Simon Pryce, 28 March 2017

Tree no.	Species	Distance	Height	Trunk dia.	Est. age	Comments and recommendations
18	Lawson cypresses	5.5m	5m	100+ 200mm	40+	Group of trees trimmed annually to create a topiary like effect. <ul style="list-style-type: none"> • <i>Continue trimming annually.</i>
19	Lime	5.5m	3m	200mm	80+	Virtually identical to the two limes to the right (16) <ul style="list-style-type: none"> • <i>Continue annual pollarding.</i>
20	Magnolia	5.5m	3.5m	250mm	40+	Low water demanding species, trimmed regularly. <ul style="list-style-type: none"> • <i>Continue regular pruning to keep it to this size.</i>

The planting beds in the front garden contain a mixture of small and medium sized shrubs and perennial plants all trimmed or pruned regularly and not likely to cause problems as long as that continues.

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Client:
GHG TPA/Beazley

Site:
24 Daleham Gardens, London,
NW3 5DA

Title:
Trees and subsidence claim

Date: 28 March 2017

Ref: 17/022

Scale: 1:200 at A4

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Original drawing:
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Trees are colour coded according to effects on the building and work needed:
Red - directly implicated or a significant risk, removal or intensive management needed
Blue - not conclusively implicated but active management and/or monitoring recommended
Green - no current effect found and low risk, no work beyond routine maintenance

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