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DOWNHAM CONCESSIONARY BRIDLEWAY

Tree report to identify tree related issues in relation to new construction, and proposed method statement for construction work

Aims and objectives

This report can be used initially as part of the viability study for the project, and as a tool to aid in design, planning and construction.

Route description

The route follows Downham Road on its north side, mainly through pasture fields and includes short section through woodland and on pavement. When exiting Chatburn walkers will use the bridge to cross the A59 then enter the bridleway and walk through 1 field to Greendale. From here they will use a pavement to reach a short section of field and small area of woodland, pass through 2 more fields, then cross Rimington Road and back into a short section of field avoiding a yard, to exit near Downham village.

There are 20 individual trees and one small woodland with 9 significant trees that have been identified that could be affected by the proposed bridleway route. These are trees that are located very close to the route. The woodland on the south side of Downham Road is unlikely to be affected by the bridleway.

Maps

All the trees are owned by the Downham Estate and are surveyed on an annual basis because they are close to a public highway. The maps used are adapted from the annual tree survey, and the number system has been retained to aid cross referencing. Not all trees are numbered in direct sequence.

Map 1: Trees on Downham Road, from Chatburn to Greendale



Map 2: Trees on Downham Road, from Greendale to Rimington Road junction



Map 3: Trees on Downham Road, Rimington Road junction and Downham Estate yard

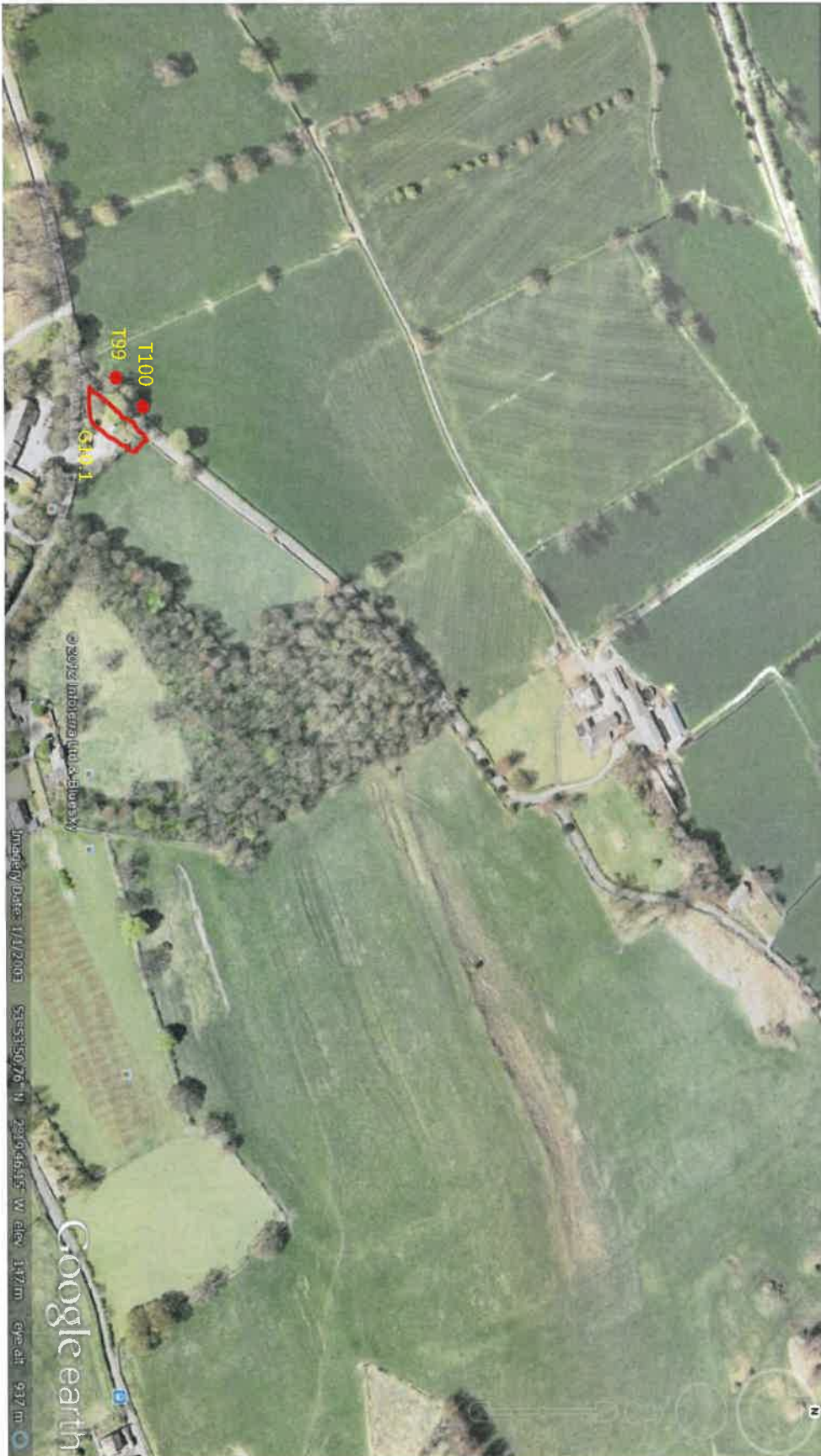


Table showing results from the 2018 Downham Estate tree survey

No	Species	Height m	Age class	Category BS5837	Comments
T44	Sycamore	25	Mature	A	Pruned over road 2014.
T45	Ash	18	Mature	A	
T46	Ash	20	Mature	C	Weighted over field.
T47	Lime	26	Over mature	C	Deadwood present in canopy that will fall into field. Low risk.
T50	Sycamore	24	Mature	C	Several dead branches to removed from above road.
T51	Elm	15	Young	B	
G2.4	12x Sycamore 1x Ash 1x Pine	- - -	Semi mature Mature Mature	B B B	1 sycamore has small basal cavity. Low risk. Saplings felled and mature trees pruned.
T52	Oak	16	Mature	B	
T53	Oak	18	Mature	B	Old <i>ganaderma</i> bracket at base. Consider felling.
T54	Oak	12	Mature	B	
T55	Oak	16	Mature	B	Deadwood over field
T56	Oak	16	Mature	B	
T99	Oak	20	Mature	B	
T100	Oak	18	Mature	C	
T101	Sycamore	20	Mature	B	
G10.1	2x Oak 1x Sycamore	- 20	Mature Mature	B B	Sever ivy to permit thorough tree inspection

The trees are generally good quality mature oak, ash and sycamore. They have received pruning in the last 5 years to maintain roadside safety. Most will required deadwood removal and some might require crown-lifting to allow the bridleway to access the desired route.

Root Protection Areas

As described in BS 5837:2005 a RPA is the minimum area around the base of the tree that contains enough rooting volume to ensure that a tree can survive and grow. If this area is compromised during construction work the trees anchored to the ground and health of the tree can be affected.

The RPA is a key tool in protecting trees when developing or building on a site as it sets out the minimum area within which existing soil conditions must remain undisturbed.

The radius (m) of the RPA for a single stemmed tree is calculated as follows:

- Stem diameter (m) measurement at 1.5m height (breast height) x 12
- Stem circumference (m) at 1.5m x 4 (similar result, varies slightly due to the difference when multiplying by π or 3, easier to check onsite)

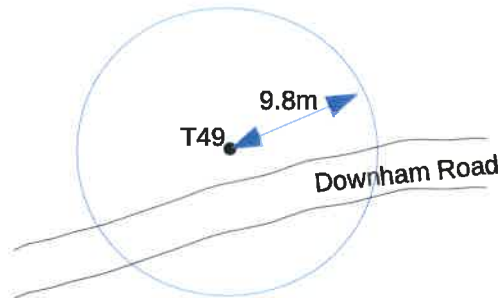
The radius (m) of the RPA for a multi-stemmed tree is calculated as follows:

- Diameter (m) measured at ground level x 10

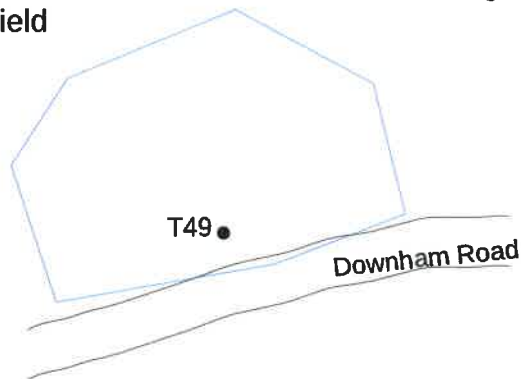
The idea behind imposing a root protection area is to reduce the 2 main causes of tree disturbance during construction; soil compaction and root damage.

In reality the actual Root Protection Area for most of the trees are unlikely to be a concentric circle from the stem, but a polygon with a bias to rooting in the field, as there is little for the tree to gain by growing an extended root system under a tarmac road.

Example of a conventional RPA: Roots unlikely to extend under road



Example of a polygon shaped RPA: must have the same volume of soil protected as above, biased to rooting in field



As the bridleway will undoubtedly infringe on the Root Protection Areas of each of these trees the concept of protection zones will need to be explored. The tree protection zone can be divided into 3 different zones: the prohibited zone (within 1 metre of the stem), the precautionary zone which extends to 4x the tree circumference, and the permitted zone which is outside the other two.

Number	Species	Stem circumference	Root Protection Radius
		m	m (4 x circumference)
T44	Sycamore	3.48	13.92
T45	Ash	2.7	10.8
	Hawthorn	Field tree, close to route, consider removing	
T46	Ash	2.45	9.8
T47	Lime	2.94	11.76
T49	Sycamore	0.23	0.92
T50	Elm	1.3	5.2
T51	Sycamore	2.18	8.72
G2.4	8 sycamore	Average 1.60	Average 6.4m per tree
	1 pine	1.58	6.32
T52	Oak	2.11	8.44
T53	Oak	2.49	9.96
T54	Oak	2.37	9.48
T55	Oak	2.81	11.24
T56	Oak	3.79	15.16
T99	Oak	2.9	11.6
T100	Oak	2.85	11.4
G10.1	Sycamore	2.8	11.2
	Ash	1.47	5.88
	Elder/Ivy	Blocking proposed route, remove	
	Sycamore	1.61	6.44
	Sycamore	1.9	7.6

Method Statement

Pre construction

Prior to any bridleway construction, hedge planting and fencing it is advisable to complete any major tree work required. This could involve felling poorer quality trees and pruning remaining trees to permit site access. Fencing off the root protection areas is not viable in the situation as the bridleway is planned to run through these areas, so engineering solution is required.

Construction methods

In areas of the site that do not have a root protection area conventional bridleway construction has been proposed. This is likely to include excavating the bridleway route to a suitable depth (300mm), backfilling with local quarry stone, compaction and top dressing.

In areas of the site where the route is proposed to infringe a root protection area excavation must be avoided. To simplify this concept for construction workers on site, many of the root protection areas are similar in size to the drip line of the canopies. By using a 'no dig' construction method explained below, root severance, soil compaction, along with disturbed drainage and changes in soil levels cannot effect the trees. Since designating a RPA prevents excavation for the sub base, the bridleway will need to be constructed on the existing ground surface. Interlocking plastic grids should be laid on top of the existing ground and held in place using pins, these then need to be filled with Type 1 sub base. The path then needs finishing with a base course and porous wearing course, and the edges landscaped. The three dimensional cellular confinement system distributes the vertical load on the sub soil and protects tree roots, by spreading any loading over a wide area. Only surface vegetation needs be removed, or sprayed beforehand. The finished surface allows trafficking by light vehicles.

CellWeb and Terram Geocell are the 2 most common brands available. Sadly these are both plastic products, so there environmental credentials have to be considered against retaining the mature trees. Long-term durability could also be an issue when compared to conventional construction.

Method of work

The method of work must be designed to minimise soil compaction. Storage yards for machinery and materials must be located to minimise driving over the tree roots excessively. Movements of machinery should be planned so that they are driving on a surfaced path or road wherever possible, so there load is spread evenly.

Tree aftercare

The trees are surveyed on an annual basis. Careful inspection to monitor the health of each tree after construction is needed, and remedial action taken if required (felling or pruning). Tree will probably

recover from root damage, however the damaged roots may put on additional growth, which could potentially crack the new surfaces in a short time period.

Recommendations

I recommend that T46 (poor quality Ash) is felled prior to construction, which will allow the route to be kept close to the wall. The lower section of bridleway from Chatburn to Greendale could then be constructed using conventional methods, with only 3 trees on the route requiring Geocells to be used over there RPA's.

The upper parts of the bridleway are likely to require a full 'no dig' approach, as the trees are closely spaced and there RPA's are likely to overlap in places.

With these recommendations I feel it would be viable for the scheme to go ahead in the interest of the public's safety, diverting pedestrians away from the main road.

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