



Eastern Command and Custody Facility, Wrexham

Police and Crime Commissioner of North Wales

BS5827:2012 Preliminary Tree Survey Report

22nd October 2015



Eastern Command and Custody Facility, Wrexham

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Document history and status

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Executive Summary

This report sets out the findings of an arboricultural survey of existing trees and associated vegetation for the proposed development of a new Police HQ (Eastern Command and Custody Facility, Wrexham). The survey covers the overall areas where construction and landscaping works could take place and will inform the design of the development proposals.

The survey includes all trees, within the boundaries specified, that may be lost to facilitate the proposed works and trees that could be retained subject to adequate protection of their rooting areas.

1. Introduction

1.1 Client Instruction

Jacobs UK Ltd was instructed by Police and Crime Commissioner of North Wales to undertake a tree survey of the proposed development site, in accordance with BS5837:2012 – Trees in Relation to Design, Demolition and Construction, and to provide a report. This report relates to trees within the proposed site boundaries of the proposed Eastern Command and Custody Facility, Wrexham.

The requirements of the tree survey were to:-

- Record information about the trees located within the 10 metre boundary as specified by the client..
- Provide a BS5837:2012 tree survey report with the information recorded.

1.2 Documents Provided

- An aerial photograph (taken from Google Earth) of the proposed development site for the new Police HQ.
- A schematic drawing (drawing number: **B1305210/LA/PO50.004-PL1**) showing the proposed development site.

1.3 Scope of Survey

The survey relates to trees with a stem diameter of 75mm and above (measured at 1.5m above ground level located within the areas highlighted on the aerial photographs and schematic drawing.

The tree survey data has been compiled independently of any specific proposals for development

1.4 Survey Method

Observations were conducted from ground level, using the 'Visual Tree Assessment' system found in 'The Body Language of Trees' (Mattheck and Breloer, 1994). No aerial inspections were carried out and no internal diagnostic equipment was used.

No internal investigations were carried out and no tissue samples taken from the surveyed trees or soil samples from the immediate surrounding area. Information was collected in accordance with the recommendations of BS5837:2012, subsections 4.4.2.5 and 4.4.2.6 (British Standards Institution, 2012), and included species, height, diameter, branch spread, crown clearance, age class, physiological and structural condition and estimated remaining contribution. Stem diameters (DBH) were taken using a rounded down diameter tape in millimetres at 1.5m above ground level. All other dimensions were estimated.

Tree species identification was based on a visual observation. The quality and value of the trees surveyed was categorised in accordance with BS5837's Cascade chart for tree quality assessment (a full copy extract can be seen in **Appendix A**).

The Root Protection Area (RPA) of each tree was determined using the calculation methods detailed in BS5837:2012 and are shown in **Appendix D**. In this report, the radius given was measured from the centre of the main stem for individual trees and from the edge of the crown canopies for woodlands and groups of trees.

1.5 Limitations

Trees are living organisms whose health and condition can change rapidly and all trees, even healthy ones, are at risk from unpredictable climatic and man-made events. The assessment of risk for any tree is based upon factors evident at the time of inspection and the interpretation of those factors by suitably qualified inspectors. The health, condition and safety of trees should be checked on a basis proportionate with the level of risk and preferably on an annual basis.

All trees have been plotted on the schematic drawing of the site by hand whilst on site. The locations of these trees are therefore approximated and Jacobs accepts no liability for the accuracy of the tree survey drawings.

A number of trees were located in inaccessible areas due to undergrowth and as such have not been fully assessed due to the access restrictions. Survey data that has been estimated is based on assessments from safe/suitable vantage points and this approximation has been noted (in bold) within the tree survey schedule of **Appendix C**.

2. Site Visit and Observations

2.1 Site Visit

The site survey was conducted by suitably qualified arboriculturists, on 13th October 2015, at the proposed development site within the 10 metre boundary area specified by the client.

2.2 Site Observations

The proposed development site is at the location of the former Sharp Precision Warehouse within Llay Industrial Estate (North) off Davy Way, Wrexham. Fully enclosed by fencing, the site approximately comprises of 1.65 hectares of previously developed land and 2.3ha of greenfield land.

The site has a mixture of trees of varying age, species and quality as listed in the tree survey schedule in **Appendix C**.

Information for G4, G6 and G7 was estimated due to their inaccessibility from overgrown conditions.

3. Tree Survey

3.1 Tree Survey and Constraints

The results of the tree survey are shown in **Appendix C** (Tree Survey Schedule and Plan) and **Appendix D** (Tree Protection Schedule and Preliminary Tree Protection Plan).

The survey identifies 2 'A' grade trees, 2 'B' grade trees, 4 'B' grade groups, 1 'C' grade tree and 1 'C' grade group. Details of the graded trees and their locations can be found in **Appendix C** (Tree Survey Schedule and Plan).

'A' grade trees are of high quality and value and should be retained. 'B' grade trees are of moderate quality and value and should be considered for retention where possible, although care should be taken to avoid misplaced retention. Any scheme should take into account the retention and protection of trees, but also the tree's future growth. The 'C' grade trees are of low quality and value and should not place a constraint on the proposals. From an arboricultural point of view, the 'U' grade trees cannot realistically be considered for retention as a living tree in the context of the current land use due to their low life expectancy of less than 10 years in their current poor condition.

The Root Protection Area (RPA) of each tree was determined using the calculation methods detailed in BS5837:2012 and plotted as a circle which is centred on the base of the stem.

Deviation in the RPA (BS5837:2012, sub-section 4.6.3) from the original would have to take into account the following factors whilst still providing adequate protection for the root system:

- Morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads).
- Topography and drainage.
- Soil type and structure.
- Likely tolerance of the tree to root disturbance or damage (based on factors such as species, age, condition and past management).

3.2 Legal Constraints

No information on Tree Preservation Orders (TPOs) or other legal constraints has been provided at this time.

4. Tree Protection Measures

4.1 General Tree Protection Measures

It is important that measures for protection are in place throughout the scheme and for as long as a risk of damage remains. Particular care and planning is necessary in the operation of excavators, lifting machinery and cranes to ensure all vehicle movements and lifting operations will not impact on retained trees.

Trees to be retained should be adequately protected by stout fencing, 'fit for purpose' and preferably as prescribed in BS5837:2012, section 6.2, in order to provide an adequate RPA that will allow its successful retention within the development.

The RPA should be regarded as sacrosanct and the fencing should be installed prior to construction works and plant and machinery arriving on site. The fencing should remain intact throughout the duration of the scheme and should only be removed upon completion. The position of the fencing around the trees should be shown on the tree protection plan (TPP) once the scheme layout has been finalised.

During construction, there should be no materials stored or dumped and no vehicular or plant movement within the RPA to minimise the risk to trees from soil compaction. Where compaction has occurred, advice should be sought from an arboriculturist and a structural engineer on decompaction methods. This is in accordance with BS5837:2012, section 12, paragraph 3.

All site storage areas, cement mixing, washing points for equipment, vehicles and fuel storage areas should be outside of RPA's unless otherwise agreed with the LPA. No discharge of potential contaminants should occur within the RPA of a retained tree stem or where there is a risk of run off into RPA.

Excavations within the root protection area should be avoided. If excavations are necessary however, works should be limited to the use of hand tools. Great care should be taken to preserve and work around roots greater than 25mm in diameter and clusters of smaller roots, avoiding damage to bark. Where it is necessary to sever roots greater than 25mm in diameter, advice must be sought from an arboriculturist. Where smaller roots must be severed, they should be cut back using secateurs or a sharp pruning saw.

Where construction working space or temporary construction access is justified within the RPA, this should be facilitated by a setback in the alignment of the tree protection barrier. Where the setback of the new tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site.

New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil. The ground protection might comprise of one of the following:

1. For pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100mm depth of woodchip), laid onto a geotextile membrane.
2. For pedestrian-operated plant up to a gross weight of 2t, proprietary, inter-linked ground protection boards, placed on top of a compression-resistant layer (e.g. 150mm depth of woodchip), laid onto a geotextile membrane.
3. For wheeled or tracked construction traffic exceeding 2t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

Wherever possible, underground utility services should be routed outside the RPA. Where underground apparatus is to pass within the RPA, detailed plans showing the proposed routing should be drawn up in conjunction with a competent arboriculturist.

5. Summary

5.1 Summary

It is recommended that once design proposals are known, an Arboricultural Impact Assessment is undertaken to assess the potential effects of the proposed works on the trees. Before any works start on site a method statement should be provided by the contractor specifying the methodology to be used if any works are required within the RPAs of trees to be retained, to ensure the safe protection and retention of these trees.

Adequate allowance for and the planning of site access arrangements and the provision of a compound and storage area should be made to avoid encroachment with the RPAs of, or prevent direct contact with, all retained trees on site.

Particular care should be given to positioning all underground apparatus outside the RPAs of all retained trees. If this is not possible, detailed plans showing the proposed routing will need to be provided for further assessment by a competent arboriculturist.

Access facilitation pruning may be required to the retained trees that overhang the proposed development footprint; however, this will need to be further assessed by a competent arboriculturist at the final design stage.

All tree works should be completed prior to the commencement of any development or construction vehicles/plant entering either site. It is recommended that all tree works are carried out in accordance with BS3998:2010: Tree Work - Recommendations.

Prior to undertaking any tree works recommended in this report, it is essential that the trees are assessed for the presence of nesting birds and protected species such as bats. The disturbance or destruction of nesting sites is an offence under the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way Act 2000. Further advice on bats can be obtained from the Bat Conservation Trust (tel: 0845 1300 2280 / www.bats.org.uk). Advice on nesting birds can be obtained from Natural England (tel: 08456003078 / www.naturalengland.org.uk) or The Royal Society for the Protection of Birds (tel: 01767 693690 / www.rspb.org.uk).

6. Recommendations

6.1 Recommendations

It is recommended that;

- (i) the contents and recommendations of this arboricultural report are incorporated within the final scheme proposals;
- (ii) an arboricultural impact assessment is undertaken to ensure that trees to be retained are adequately protected;
- (iii) a contractor method statement is prepared and approved before any works commence on site;
- (iv) the tree protection measures are observed and implemented by all site personnel and the contractors are supervised at key stages;
- (v) a copy of this report is kept on site and is part of site induction where applicable.

References

British Standards Institution. (2012) *BS 5837:2012 - Trees in Relation to Design, Demolition and Construction*. London: BSI.

Mattheck, C, and Breloer, H. (1994). *The Body Language of Trees*. London: H.M.S.O.

Appendix A. – Cascade Chart for Tree Quality Assessment

Category and definition Criteria (including subcategories where appropriate)

Trees unsuitable for retention (see note)

Category U

Trees in such a condition that they cannot realistically be retained as living trees in the context of the current use for longer than 10 years

Trees that have a serious, irreparable structural defect, such that their early loss is expected, and/or collapse, including those that will become unstable after removal of other Category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by planting)

Trees that are dead or are showing signs of significant, immediate and irreversible overall decline

Trees infected with pathogens of significance to health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality
NOTE: Category U trees can have existing or potential conservation value which it might be desirable to preserve

Trees to be considered for retention

1. Mainly arboricultural qualities

Category A

Trees of high quality with an estimated life expectancy of at least 40 years

Trees that are particularly good examples of their species, especially if rare or unusual, or those that are essential components of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees in an avenue)

2. Mainly landscape qualities

Trees, groups or woodlands of particular visual importance as stand out features/landscapes/features

3. Mainly cultural values including conservation

Trees, groups or woodlands of significant conservation, historical, archaeological or other value, or a veteran or semi-formal arboricultural trees or woodlands

Category B

Trees of moderate quality with an estimated life expectancy of at least 20 years

Trees that might be included in Category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and/or storm damage), such as they are unlikely to be suitable for retention for beyond 40 years, or trees lacking the special quality necessary to merit the Category A designation

Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals, or trees occurring as collectives but situated so as to make little visual contribution to the wider locality

Trees with material conservation or other cultural value

Category C

Trees of low quality with an estimated life expectancy of at least 10 years, or younger trees with a DBH diameter below 150mm

Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories

Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value, and/or trees offering low or only temporary transient landscape benefits

Trees with no material conservation or other cultural value

Appendix B. – Schedule Key

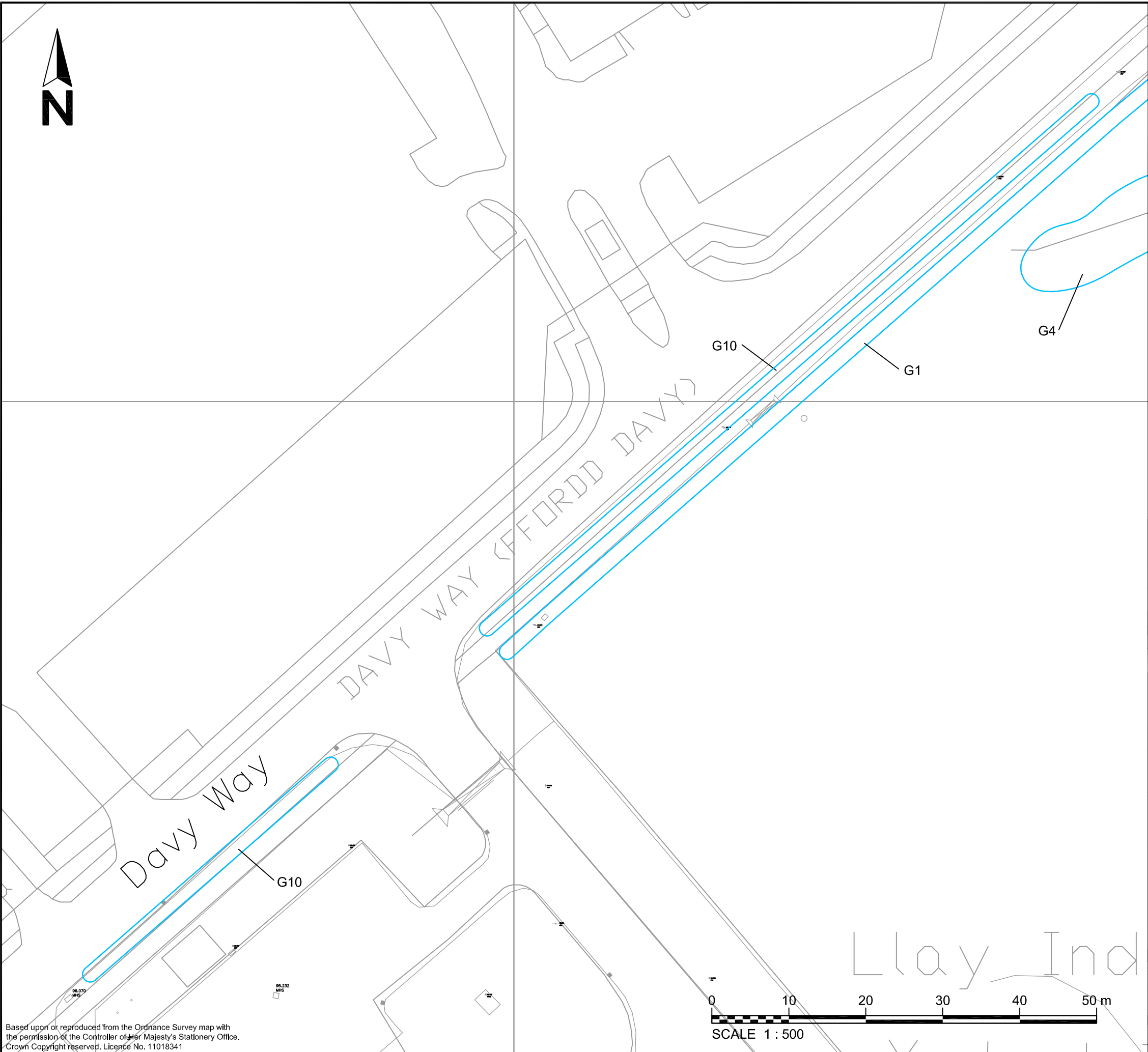
Age Class	
Young - A tree in the first quarter of its life span. Middle Aged - A tree which is well established but with some growth to make before reaching its potential maximum size in its second quarter of life. Mature - A tree at or near its potential maximum size which is still growing vigorously in its third quarter of life span. Over Mature - A tree in decline in its final quarter of life span. Veteran - A tree that by recognised criteria shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.	
Physiological Condition (P)	Structural Condition (S)
Good – Showing no adverse risk of failure/defects Fair – Showing minor signs of deterioration Poor – Unlikely to recover to a good condition Dead	Good – No signs of decay or structural weakness Fair – Minor defects not causing structural weakness Poor – severe decay in the main stem or branches/structurally weak
Estimated Remaining Contribution	Bat Roost Potential (if surveyed)
<10 - Less than 10 years of normal life expectancy remaining. 10+ - Between 10 and 20 years of normal life expectancy remaining. 20+ - Between 20 and 40 years of normal life expectancy remaining 40+ - Tree would normally expect to live for more than 40 more years	Negligible – Saplings or semi-mature trees with a small girth. No ivy cover, loose bark, cracks or fissures Moderate – Small or semi-mature trees. May have small amounts of ivy present, stems of small diameter. Trees may have some loose bark but no obvious cracks, fissures or holes. High – Trees with large crack, crevices or disused woodpecker holes that can provide refuge for bats. Trees may support dense ivy with multiple stems.

Appendix C. – Tree Survey Schedule and Plan

Tree ref No.	Species	Height (m)	Single Stem diameter (mm)	<=5 Stem diameter (mm)	>5 Stem diameter (mm)	Branch spread (m)				Height of crown clearance (m)	Age class	General Observations (Structural (S) and Physiological (P) Conditions, Comments and Management Recommendations).	Estimated remaining contribution (years)	Category grading	Bat roost potential
						N	E	S	W						
G1	Acer ssp., alder, with gorse and bramble understorey	up to 5m metres	up to 100	-	-	1	1	1	1	0	Middle Aged	(S) Fair. (P) Fair. Previously unmanaged line of mixed plantings interspersed with shrub elements. Tree elements are multi-stemmed with limited crown management.	20+	B2	Negligible
T2	Willow	6	200	-	-	3	3	3	3	0	Middle Aged	(S) Fair. (P) Fair. Multi-stemmed.	20+	B2	Negligible
T3	Ash	7	-	150, 80	-	2	2	2	2	1	Middle Aged	(S) Fair. (P) Fair. Multistemmed.	20+	B2	Negligible
G4	Ash, hawthorn, oak, with gorse and dog rose understorey	est. up to 4 metres	up to est.80	-	-	1	1	1	1	0	Young	(S) Good (P) Good. Abundant successional scrub. Inaccessible due to overgrown conditions.	20+	B2	Negligible
T5	Willow	8	-	90,90,140,110,130	-	3	3	3	3	0	Middle Aged	(S) Fair. (P) Fair. Multistemmed. Signs of weak unions.	10+	C2	Negligible

Tree ref No.	Species	Height (m)	Single Stem diameter (mm)	<=5 Stem diameter (mm)	>5 Stem diameter (mm)	Branch spread (m)				Height of crown clearance (m)	Age class	General Observations (Structural (S) and Physiological (P) Conditions, Comments and Management Recommendations).	Estimated remaining contribution (years)	Category grading	Bat roost potential
						N	E	S	W						
G6	Ash, hawthorn, oak, willow	est. up to 8 metres	up to est. 150	-	-	2	2	2	2	0	Middle Aged	(S) Fair (P) Fair. Abundant successional scrub. Inaccessible due to overgrown conditions and adjacent fenceline	20+	B2	Negligible
G7	Ash, hawthorn, oak, willow, Silver birch, elements of dog rose and bramble	est. up to 7 metres	up to est. 150	-	-	1	1	1	1	0	Middle Aged	(S) Fair (P) Fair. Abundant successional scrub. Inaccessible due to overgrown conditions.	10+	C2	Negligible
T8	Oak	15	800	-	-	9	7	9	7	4	Mature	(S) Fair (P) Good. Decurrent form. Evidences historic pruning and fused remains of lapsed fencing.	40+	A2	Moderate
T9	Oak	12	580	-	-	8	5	8	5	4	Mature	(S) Fair (P) Good. Decurrent form but outcompeted by T8. Evidences historic pruning and fused remains of lapsed fencing.	40+	A2	Moderate

Tree ref No.	Species	Height (m)	Single Stem diameter (mm)	<=5 Stem diameter (mm)	>5 Stem diameter (mm)	Branch spread (m)				Height of crown clearance (m)	Age class	General Observations (Structural (S) and Physiological (P) Conditions, Comments and Management Recommendations).	Estimated remaining contribution (years)	Category grading	Bat roost potential
						N	E	S	W						
G10	Cherry, Sorbus ssp.	4	up to 100	-	-	1	1	1	1	1	Young	(S) Fair. (P) Fair. Multi-stemmed roadside trees with limited crown management and epicormic growth.	20+	B2	Negligible



Drawing number

B1305210/ARB/001

Notes

Tree - category A

Tree - category B

Tree - category C

Group - category B

Group - category C

KEYPLAN

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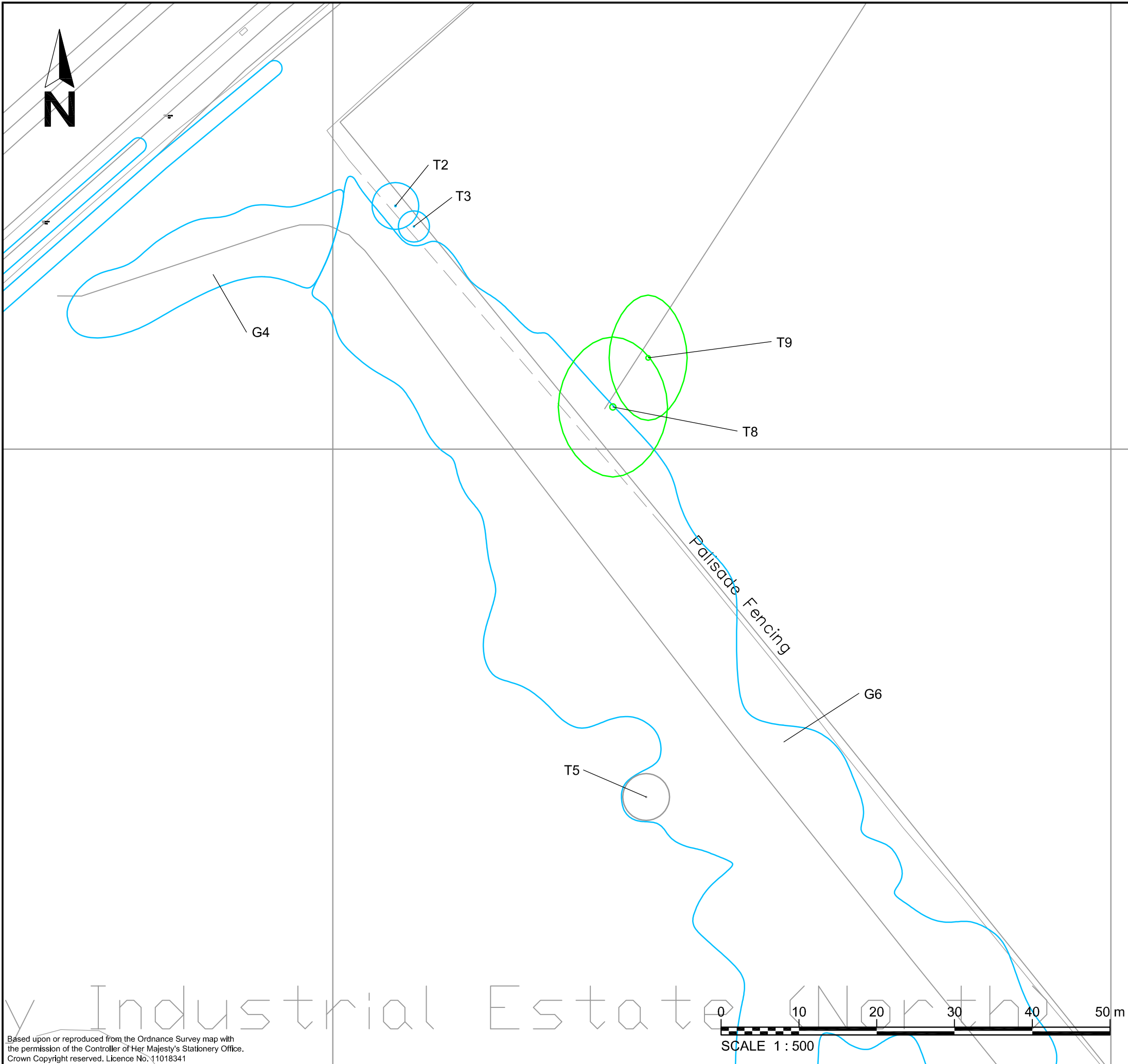
Tree Survey
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Notes

- Tree - category A
- Tree - category B
- Tree - category C
- Group - category B
- Group - category C

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Tree Survey Sheet 2 of 3

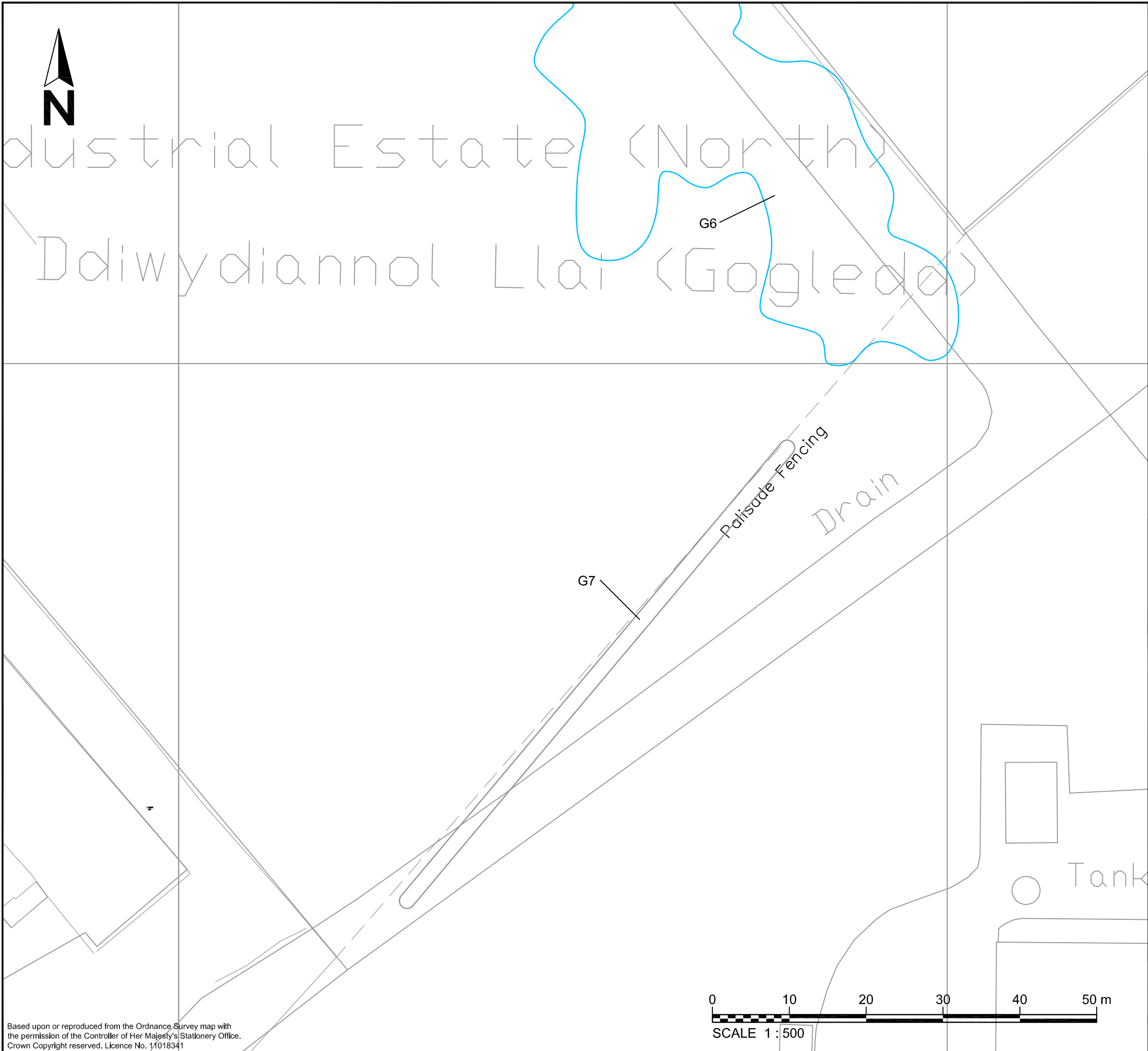
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Notes

Tree - category A

Tree - category B

Tree - category C

Group - category B

Group - category C

KEYPLAN

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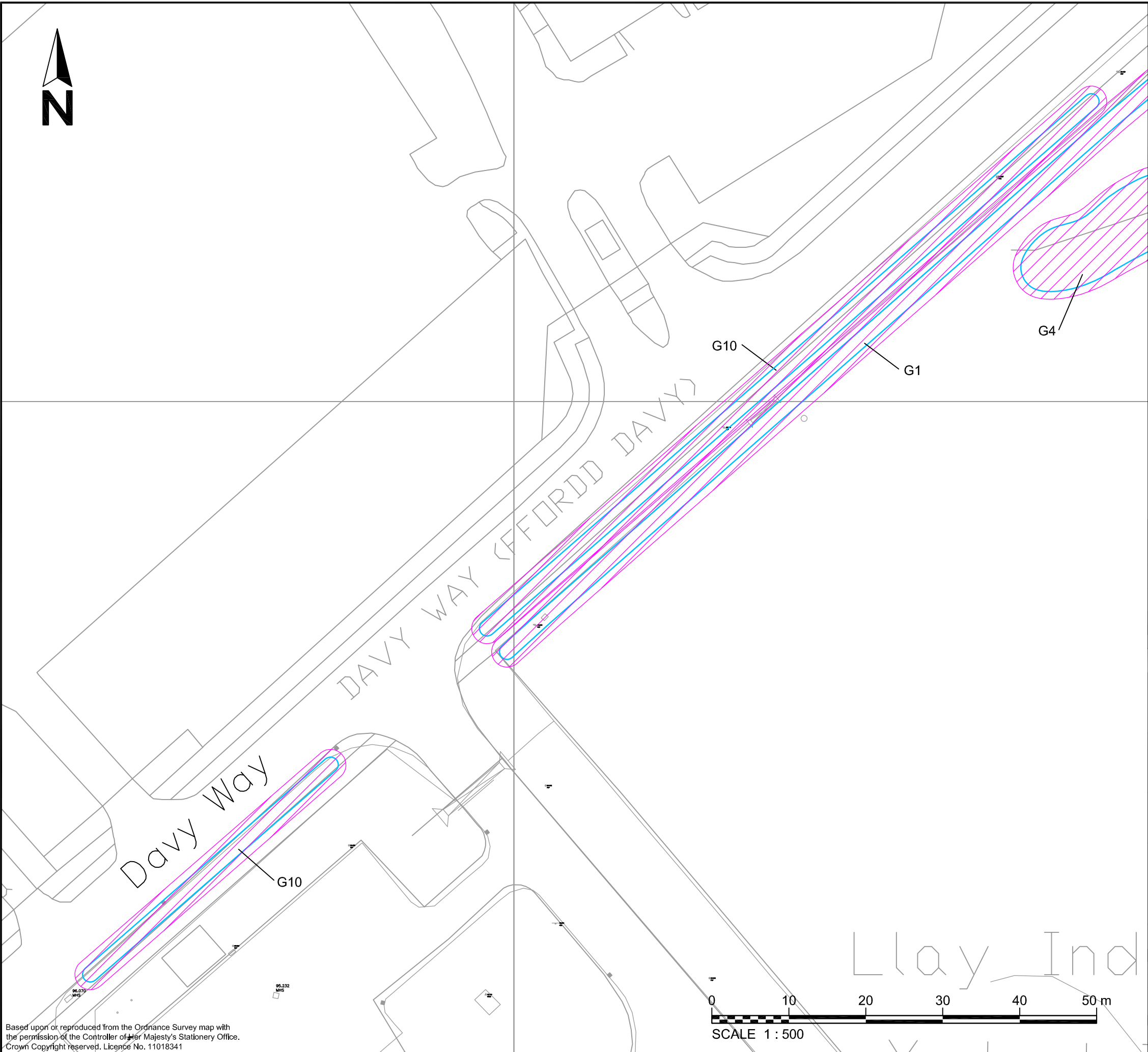
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Appendix D. – Tree Protection Schedule and Preliminary Tree Protections Plans

Tree ref no.	Species	Single Stem diameter (mm)	Stem diameter/5 (mm)	Stem diameter >5 (mm)	RPA radius (m)
G1	Acer ssp., alder, with gorse and bramble understorey	up to 100	-	-	1.2 from each stem
T2	Willow	200	-	-	2.4
T3	Ash	-	150, 80	-	2.0
G4	Ash, hawthorn, oak, with gorse and dog rose understorey	up to est.80	-	-	1.0 from each stem
T5	Willow	-	90,90,140,110,130	-	3.1
G6	Ash, hawthorn, oak, willow	up to est. 150	-	-	1.8 from each stem

Tree ref no.	Species	Single Stem diameter (mm)	Stem diameter/5 (mm)	Stem diameter >5 (mm)	RPA radius (m)
G7	Ash, hawthorn, oak, willow. Silver birch, elements of dog rose and bramble	up to est. 150	-	-	1.8 from each stem
T8	Oak	800	-	-	9.6
T9	Oak	580	-	-	7.0
G10	Cherry, Sorbus ssp.	up to 100	-	-	1.2 from each stem



Drawing number
B1305210/ARB/002

Notes

- Tree - category A
- Tree - category B
- Tree - category C
- Group - category B
- Group - category C
- Root protection area

KEYPLAN

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Tree Constraints
Sheet 1 of 3

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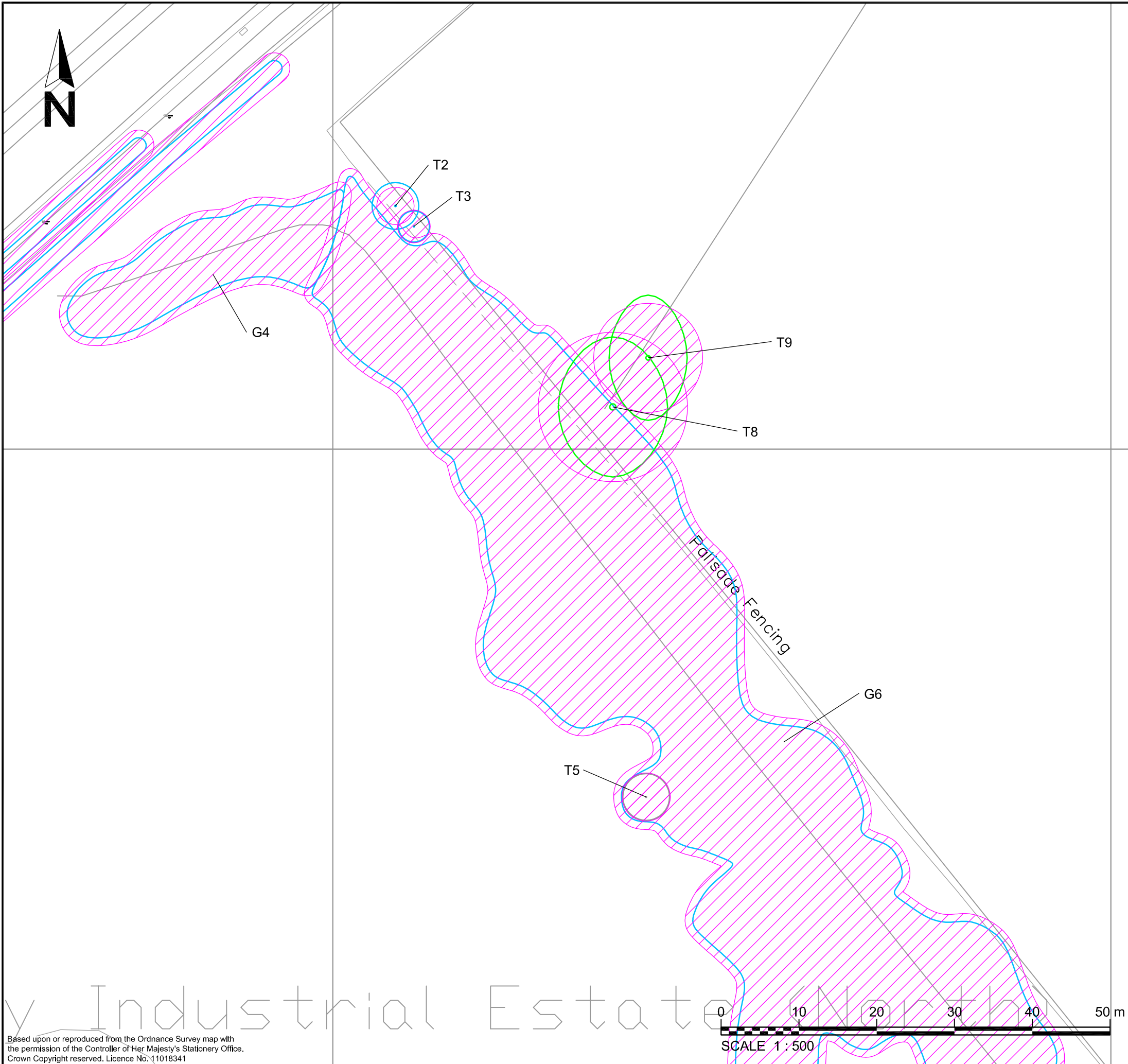
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Notes

- Tree - category A
- Tree - category B
- Tree - category C
- Group - category B
- Group - category C
- Root protection area

KEYPLAN

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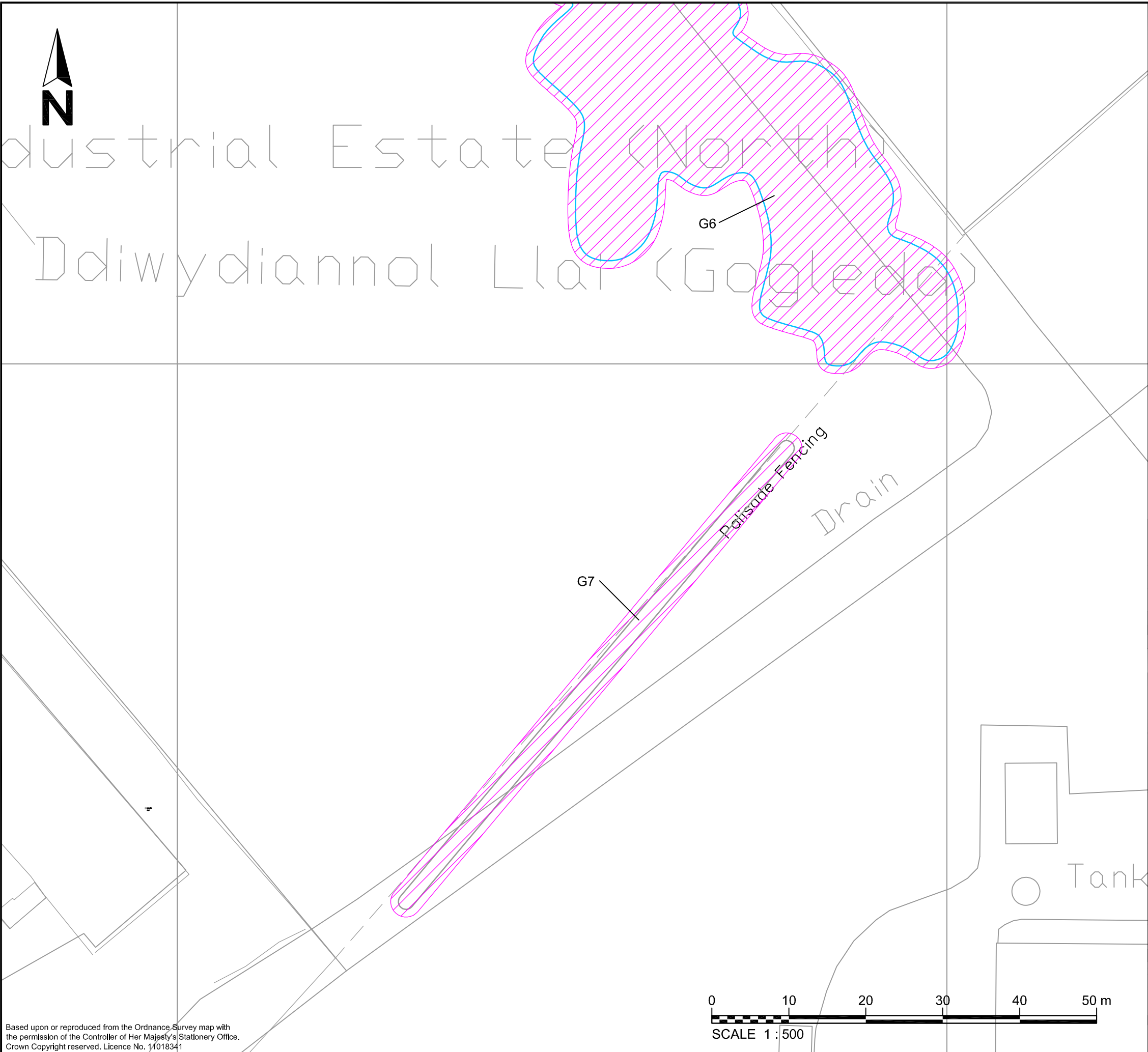
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B1305210/ARB/002

Notes

- Tree - category A
- Tree - category B
- Tree - category C
- Group - category B
- Group - category C
- Root protection area

KEYPLAN

1

2

3

N

0	19/10/15	ORIGINAL ISSUE	CN	HE	AR	AR
Rev	Revision Date	Purpose of revision	Drawn	Check'd	Revw'd	App'd

Client

Police and Crime Commissioner of North Wales

JACOBS

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Tel: 01622 666000 Fax: 01622 695085 www.jacobs.com

Project

Eastern Command and Custody Facility

Drawing title

Tree Constraints
Sheet 3 of 3

Drawing status

For Information

Scale	1:500 @ A3	Do not scale
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Drawing number	Rev
B1305210/ARB/002	0

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