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WINNHAM FARM, DOWNEND ROAD, PORCHESTER

FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

WINNHAM FARM, DOWNEND ROAD, PORCHESTER

FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY ON BEHALF OF MILLER HOMES

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Drawing No. 16-329/002

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1.0 INTRODUCTION

1.1 General

1.1.1 Odyssey has been commissioned by Miller Homes to undertake a Flood Risk Assessment (FRA), incorporating a surface water and foul water drainage strategy to be submitted in association with a planning application for proposed residential development at Winnham Farm, Downend Road, Portchester.

1.1.2 The development proposals for this 20.39 hectare (ha) site are for the demolition of existing agricultural buildings and the construction of new buildings providing up to 350 dwellings; the creation of new vehicular access with footways and cycleways; provision of landscaped communal amenity space, including children's play space; creation of public open space; together with associated highways, landscaping, drainage and utilities.

1.1.3 This report comprises of the following elements:

- Summary of relevant planning policy;
- Review of existing site conditions including the hydrology, geology and existing drainage regime of the site;
- Assessment of the existing flood risk to the site; and
- Proposed surface water and foul drainage strategy.

2.0 PLANNING POLICY

2.1 Flood and Water Management Act (2010)

2.1.1 The Flood and Water Management Act (FWMA) received royal assent on 8th April 2010. It was intended to implement Sir Michael Pitt's recommendations following the widespread summer 2007 floods. Guidance and information notes are published online by the Department for Environment, Food and Rural Affairs (Defra) to address a range of aspects concerning the act.

2.1.2 The FWMA encourages the use of Sustainable Drainage Systems (SuDS) on development sites by removing the automatic right to connect to sewers.

2.1.3 The development proposals for the site considered by this report should adhere to the FWMA through the provision of SuDS as a fundamental component of the surface water drainage scheme.

2.2 National Planning Policy Framework (2019)

2.2.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies, and how these policies should be applied. Planning Practice Guidance (PPG) is available online and provides additional guidance to the NPPF, as well as providing links to relevant current detail documents. Please refer to **Section 2.3** for further detail.

2.2.2 Paragraph 155 of the NPPF states that "*inappropriate development in areas at risk of flooding should be avoided by directing development away from areas of highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere*."

2.2.3 Paragraph 163 of the NPPF states *"when determining planning applications, Local Planning Authorities (LPAs) should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*

- *Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;*
- *The development is appropriately flood resistant and resilient;*
- *It incorporates Sustainable Drainage Systems, unless there is clear evidence that this would be inappropriate;*
- *Any residual risk can be safely managed; and*
- *Safe access and escape routes are included where appropriate, as part of an agreed emergency plan."*

2.2.4 In accordance with the NPPF, a site-specific FRA is required for sites within the following categories:

- In Flood Zone 1, all proposals involving:
  - sites of 1 hectare or more;

  - land which has been identified by the EA as having critical drainage problems;
  - land identified in a strategic flood risk assessment as being at increased flood risk in future;
  - land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use;
- All proposals for development in Flood Zones 2 or 3.

2.3 Planning Practice Guidance (2019)

2.3.1 The PPG for Flood Risk and Coastal Change provides additional direction to the NPPF, with details provided in each section of the document on how to conform to the NPPF.

2.3.2 All land in England is classified as falling into one of three main flood zones, with the zones referring to the probability of river or sea flooding, ignoring the existence of defences. Table 1 of the PPG identifies and describes the Environment Agency (EA) flood zones as:

- Flood Zone 1: Low probability, land assessed as having less than a 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- Flood Zone 2: Medium probability, land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% - 0.1%);
- Flood Zone 3: High probability, land assessed as having a 1 in 100 or greater annual probability of river flooding (≥1%), or a 1 in 200 or greater annual probability of sea flooding (≥0.5%);
- Flood Zone 3b: The Functional Floodplain, land where water has to flow or be stored in times of flood (as identified by the LPAs in the Strategic Flood Risk Assessments).

2.3.3 Paragraph 080 of the PPG sets out the following drainage hierarchy that the discharge of surface water runoff should adhere to:

- Into the ground (infiltration);
- To a surface water body;
- To a surface water sewer, highway drain, or another drainage system; and,
- To a combined sewer.

2.4 Non-Statutory Technical Standards for Sustainable Drainage Systems (2015)

2.4.1 The Non-Statutory Technical Standards for Sustainable Drainage Systems was published by Defra in March 2015. The standards are to be used to manage surface water runoff in accordance with Schedule 3 of the FWMA.

2.4.2 The Technical Standards document provides guidance on runoff destination, peak flow rate, volume and control of water quality and function.

2.4.3 The LPA may set local requirements for planning permission that have the effect of more stringent requirements than those of the standards referred to above.

2.5 Fareham Borough Council Core Strategy (2011)

2.5.1 The Fareham Borough Council Core Strategy (Local Plan 1) was adopted in August 2011, and the Core Strategy identifies the borough's development needs up to 2026 and how they will be met. The Strategy sets out the spatial vision for the area and identifies a series of objectives designed to achieve the vision, overarching key policy areas which provide focus and link the objectives to the spatial strategy, and core delivery policies. The Strategy additionally identifies an implementation and monitoring framework which sets out how the spatial strategy will be delivered.

2.5.2 Policy CS15 of the Core Strategy states that *"the Borough Council will promote and secure sustainable development, where there is a minimum negative impact on the environment or opportunities for environmental enhancement."* It is stated that this will be achieved by *"avoiding unacceptable levels of flood risk and proactively managing surface water through the promotion of sustainable drainage techniques."*

2.6 Fareham Borough Council Local Plan Part 2 – Development Sites and Policies (2015)

2.6.1 The Development Sites and Policies Plan forms 'Part 2' of the Fareham Borough Local Plan. These Plans identify the borough's policies to encourage growth and investment in housing and jobs, whilst providing protection to the natural environment.

2.6.2 Policy DSP2 of the Local Plan Part 2 states that *"development proposals should not, individually, or cumulatively, have a significant adverse impact, either on neighbouring development, adjoining land, or the wider environment, by reason of noise, heat, liquids, vibration, light or air pollution (including dust, smoke, fumes or odour)."* It is further stated that *"development should provide for the satisfactory disposal or surface and waste water, and should not be detrimental to the management and protection of water resources."*

3.0 EXISTING SITE CONDITIONS

3.1 Location

3.1.1 The site is located off Downend Road in Portchester, Hampshire, approximately 1.2 kilometres (km) north-west of the town centre. The Ordnance Survey (OS) grid reference for the centre of the site is 460450E, 106300N and the nearest postcode for the site is PO16 8NF. A site location plan is shown in **Appendix A**.

3.1.2 The site is currently used for agricultural purposes, and is bounded by agricultural fields and the M27 to the north, dwellings and Portchester Crematorium and memorial garden to the east, the Fareham to Portchester railway line to the south, and Downend Road and an open-air waste and composting facility to the west.

3.2 Topography

3.2.1 A topographical survey was completed in October 2016 by Encompass Surveys, which shows the existing levels across the site. The site slopes from north to south, with the highest point at approximately 43 metres Above Ordnance Datum (m AOD) along the northern boundary of the site, and the lowest being 14m AOD in the south-east of the site. The topographical survey is shown in **Appendix C**.

3.3 Hydrology

3.3.1 The nearest EA designated main river, the River Wallington, passes approximately 1.50 kilometres (km) to the west of the site. For EA records please see **Appendix D**. It is noted that there are no ordinary watercourses on site, or in the immediate vicinity of the site.

3.4 Geology and Hydrogeology

3.4.1 British Geological Survey (BGS) online maps (accessed July 2020) indicate that the site is underlain by a range of different bedrock types; Portsdown Chalk Formation in the north of the site, Tarrant Chalk Member in the east of the site, Spetisbury Chalk Member in the centre of the site, and Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation in the south of the site.

3.4.2 The BGS maps indicate that there are superficial deposits of clay, silt, sand and gravel on site. Refer to **Appendix E** for BGS records.

3.4.3 BGS hydrogeology mapping demonstrates that the site is located on the White Chalk Subgroup aquifer, described as a *"highly productive aquifer"*.

3.4.4 EA mapping indicates that the site is not situated in any of the EA's Groundwater Source Protection Zones (SPZs).

3.4.5 Intrusive ground investigations were undertaken by Geo-Environmental Services Ltd in December 2016 and February 2017, with further testing completed in July 2020. The ground investigation report for the most recent borehole testing sets out the ground conditions encountered at different depths below ground level (bgl). The findings are summarised in **Table 3.1**.

Table 3.1 Ground Investigation Findings

Top Depth (m bgl)	Base Depth (m bgl)	Description
0	0.1 – 0.2	TOPSOIL: Brown sandy gravelly clay with roots
0.1 – 0.2	0.1 – 5.0+	HEAD DEPOSITS: Brown sandy gravelly CLAY. Soft to vert stiff, generally stiff to very stiff consistency. Variable proportions of sand and flint gravel; Brown clayey flint GRAVEL; Yellow and orange-brown fine SAND with chalk gravel
0.7 – 5.0+	5.0+	CHALK: Structureless CHALK composed of off-white very weak to weak low density gravel sized chalk clasts and silt chalk matrix with occasional flint nodules. CIRIA Grade Dm, Dc and Dc-C.

3.4.6 Soakage testing was undertaken by Geo-Environmental Services Ltd in July 2020. The resulting infiltration rates are set out in **Table 3.2**.

Table 3.2: Summary of Soil Infiltration Testing Results

Location	Infiltration Rate (m/s)		
	Test Cycle 1	Test Cycle 2	Test Cycle 3
TP01	6.9×10^{-4}	3.2×10^{-4}	3.0×10^{-4}
TP02	4.4×10^{-6}	2.3×10^{-6}	2.3×10^{-6}

3.5 Existing Drainage Regime

3.5.1 The site is currently used for agricultural purposes. As such, the majority of the site is in a greenfield state. Considering the underlying soil characteristics, it is anticipated that surface water currently infiltrates into the ground, with any excess water discharged towards Portchester Crematorium, owing to the topography of the site.

3.5.2 According to Southern Water (SW) records, there is no public surface water sewer network on site, or in the immediate vicinity of the site. The absence of a surface water network at the site further supports the view that surface water currently infiltrates into the ground.

3.5.3 SW records show the foul sewer network in the immediate vicinity of the site. The nearest Point of Connection is located approximately 60m to the south of the site along Winnham Drive. SW records are shown in **Appendix G**.

3.5.4 The developable area for this site is less than 50ha, meaning that the Institute of Hydrology (IoH) Report 124 Flood Estimation for Smaller Catchments (1994) method is suitable to estimate greenfield peak flow rates (50ha is used in the formula and the flow rate value is linearly interpolated

based on the ratio of the development area). This methodology is approved in the EA's Rainfall Runoff Management for Developments Report; the parameters used are shown in **Table 3.3**.

Table 3.3: Interim Code of Practice SuDS Parameters

Parameter	Value	Unit
SAAR	791	mm
Soil Index	0.400	-
Region	7	-
Urban	0.000	-

3.5.5 **Table 3.4** summarises the estimated current greenfield discharge rates for the site. Calculations are provided in **Appendix H**.

Table 3.4: Existing Surface Water Discharge Rates

Return Period	Existing Greenfield Discharge Rates from Site (l/s)	Existing Greenfield Discharge Rates per Hectare (l/s/ha)
Q_{BAR}	79.6	3.9
Q_{30}	180.3	8.8
Q_{100}	253.8	12.4

4.0 DEVELOPMENT PROPOSALS

4.1 General

4.1.1 The development proposals for the site are for the demolition of existing agricultural buildings and the construction of new buildings providing up to 350 dwellings; the creation of new vehicular access with footways and cycleways; provision of landscaped communal amenity space, including children's play space; creation of public open space; together with associated highways, landscaping, drainage and utilities. A landscape parameter plan can be found in **Appendix B**.

5.0 SOURCES OF FLOOD RISK

5.1 Fluvial Flooding

5.1.1 Fluvial flooding is caused by flows in rivers or streams exceeding the capacity of the river channel and spilling into the floodplain. Fluvial flooding can also occur on designated floodplain land after a period of heavy rainfall.

5.1.2 The EA's Flood Map for Planning (accessed July 2020) shows that the site is entirely located in Flood Zone 1; land assessed as *"having a less than 1 in 1,000 annual probability of river or sea flooding"* (<0.1% Annual Exceedance Probability [AEP]). For EA data, refer to **Appendix E**.

5.1.3 The flood risk vulnerability classification of dwellings is deemed as *"more vulnerable."* In accordance with the PPG, development of this nature in Flood Zone 1 is acceptable.

5.1.4 There are no records of the site being affected by fluvial flooding in the Partnership for South Hampshire (PfSH) SFRA Update. The risk of flooding from fluvial sources is considered to be low.

5.2 Surface Water Flooding

5.2.1 Surface water (pluvial) flooding is caused by rainfall levels exceeding the natural infiltration properties of the surrounding soils. Flooding can occur where there is a lack of a formalised drainage system or as a result of a poorly designed or maintained sewer system. Flooding can also occur owing to the absence of a natural method of drainage such as watercourses or ditches, or where soil infiltration rates are low. Flooding often results in ponding of water at low points or when surface water flow routes are blocked by an obstruction.

5.2.2 The EA's Risk of Flooding from Surface Water (RoFSW) mapping (accessed July 2020) shows that in its current state, the entirety of the site is at *"very low (less than 0.1% AEP)"* risk of pluvial flooding.

5.2.3 The PfSH SFRA Update states that *"within Fareham Borough there are a number of areas which have a high to very high potential for generating flow"*. However, considering the underlying soil characteristics and the "very low" flooding risk of the site in accordance with RoFSW mapping, the site is not considered to be one of these areas. The risk of flooding from pluvial sources is considered to be low.

5.3 Groundwater Flooding

5.3.1 Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata. A groundwater flood event results from a rise in groundwater level sufficient for the water table to intersect the ground surface and inundate low lying land. Periods of prolonged rainfall may also be a cause of groundwater flooding, with aquifers and soils becoming saturated.

5.3.2 No groundwater was encountered on site during the ground investigation, whilst in the surrounding area of the site, groundwater was encountered at a level of 35.7m bgl. The risk of groundwater flooding is considered to be low.

5.4 Sewer Flooding

5.4.1 Sewer flooding can occur due to the failure of existing foul or surface water drainage infrastructure. If flows within the drainage system exceed the designed capacity, or if foreign matter causes blockages, overflow to the surface can occur, leading to flooding.

5.4.2 There is no historical data of the site being affected by sewer flooding. The risk of flooding from sewers is considered to be low.

6.0 SURFACE WATER DRAINAGE STRATEGY

6.1 Surface Water Drainage Strategy Requirements

6.1.1 Any surface water drainage strategy must demonstrate that the proposed development would be drained in a sustainable manner, commensurate with local and national policy. The NPPF requires that flood risk to land and property is not increased as a result of new development.

6.1.2 Drainage calculations for the proposed development have been carried out to ensure that any surface water discharged from the site would be at greenfield rates or lower.

6.2 Proposed Surface Water Drainage Strategy

6.2.1 The proposed surface water management strategy described below is outlined in Drawing 16-329/002 in **Appendix H**.

6.2.2 As set out in **Section 2.3**, the drainage hierarchy states that the first option for surface water discharge should be infiltration. The infiltration rates achieved at the site suggest that infiltration SuDS would be suitable at the site.

6.2.3 It is proposed that surface water generated by the proposed development would drain to four attenuation basins, located adjacent to the southern boundary of the site owing to the drainage catchments. On-parcel SuDS features such as permeable paving could also be utilised upstream.

6.2.4 The attenuation basins have been calculated to attenuate flows for all rainfall events up to a 1 in 100 year storm plus 40% to account for climate change. In adopting a conservative approach, the lowest infiltration rate achieved during the soakage tests has been used in the drainage calculations.

6.2.5 Urban creep would be accounted for in drainage calculations by incorporating an additional 10% of the roof area to the total impermeable area.

6.2.6 With regards to exceedance flows, it is anticipated that surface water would be conveyed to the topographical low points on site and routed away from proposed dwellings.

6.2.7 Network Rail has stipulated a distance of between 10m and 20m from any soakaway to the Network Rail boundary at the south of the site, to ensure the proposed SuDS features would not adversely affect the stability of their property.

6.2.8 The 20m buffer is for worst case areas associated with solution features. Intrusive ground investigations carried out on site at the locations of the proposed basins show the presence of sandy gravel mixed with clay. The presence of this bedrock indicates that this area is not at risk of developing solution features which could impact on nearby embankments.

6.2.9 The infiltration basins would spread the runoff evenly prior to infiltration, and as such a 15m buffer is considered acceptable. Any stability calculations and supporting geotechnical information would be provided at the detailed design stage.

6.3 Water Quality

6.3.1 Improving water quality is a key principle of a SuDS system. Steps would be taken to ensure that water quality on site and of any water leaving the site is not negatively impacted by the proposed development. **Table 6.1** details the Pollution Hazard Indices of the different land use classifications of the site, in accordance with the Construction Industry Research and Information Association (CIRIA) SuDS Manual 2015 (C753).

Table 6.1: Pollution Hazard Indices for Proposed Development

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul-de-sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. <300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7

6.3.2 The pollution hazard level for the proposed development would be “medium”. All surface water generated by the proposed development would be attenuated in one of the designed infiltration basins before discharging from the site. The SuDS mitigation indices have been calculated in **Table 6.2**, in accordance with the guidance contained in the CIRIA SuDS Manual. Groundwater was not encountered at the site, and on this basis the infiltration basins would have at least 1m groundwater clearance. Additional SuDS features such as permeable paving would provide an appropriate level of surface water runoff treatment, as shown in **Table 6.2**.

Table 6.2: SuDS Mitigation Indices for Proposed SuDS Features

Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Soil with good contaminant attenuation potential of at least 300mm depth	0.4 + (0.5 x (0.4 + 0.4)) = 0.8	0.3 + (0.5 x (0.3 + 0.3) = 0.6	0.3 + (0.5 x (0.3 + 0.3)) = 0.6
Permeable paving	0.7	0.6	0.7

6.4 SuDS Maintenance Requirements

6.4.1 Maintenance of the drainage system and of any implemented SuDS features would be carried out in accordance with the manufacturer guidance and through an approved maintenance management plan to minimise the residual flood risk of drainage system blockage.

6.4.2 Maintenance would be the responsibility of the developer to assign, however for clarity in this FRA, **Tables 6.3** and **6.4** set out the maintenance measures which would typically be undertaken for an infiltration basin and permeable paving. **Tables 6.3** and **6.4** are based on information extracted from the CIRIA SuDS Manual.

Table 6.3: Maintenance Requirements for an Infiltration Basin (continued overleaf)

Maintenance Category	Maintenance Activity	Frequency	Responsible Body
Routine Maintenance	Remove litter and debris	Monthly	Private maintenance contractor, as identified by developer
	Cut grass – for spillways and access routes and meadow grass in and around basin – and manage other vegetation and nuisance plants	Monthly (during growing season), or as required	Private maintenance contractor, as identified by developer
	Inspect inlets, outlets and overflows for blockages and silt accumulation. Clear if required	Monthly	Private maintenance contractor, as identified by developer
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly	Private maintenance contractor, as identified by developer
	Tidy all dead growth before start of growing season	Annually	Private maintenance contractor, as identified by developer
	Reseed areas of poor vegetation growth	As required	Private maintenance contractor, as identified by developer
Occasional Maintenance	Prune and trim any trees and remove cuttings	Every 2 years, or as required	Private maintenance contractor, as identified by developer
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal where upstream source control is provided)	Private maintenance contractor, as identified by developer
Remedial Actions	Repair erosion or other damage by reseeding or re-turfing	As required	Private maintenance contractor, as identified by developer

	Realignment or rip-rap	As required	Private maintenance contractor, as identified by developer
	Repair/rehabilitation of inlets, outlets and overflows, and relevelling of uneven surfaces and reinstating design levels	As required	Private maintenance contractor, as identified by developer

Table 6.4: Maintenance Requirements for Permeable Paving

Maintenance Category	Maintenance Activity	Comments	Frequency	Responsible Body
Routine Maintenance	Visual inspection of paving.	Ensure joints are kept fully filled.	Monthly (depending on local environment).	Private maintenance contractor, as identified by developer
	Paving should be agitated (e.g. brushed, vacuumed, etc.).	To ensure no vegetation of any sort is allowed to grow and develop in the joints.	Six monthly or as required (Spring and Autumn seasons).	Private maintenance contractor, as identified by developer
	Paving should be inspected after any heavy precipitations.	Ensure no displacement of any organic matter into the surface of the pavement.	As required.	Private maintenance contractor, as identified by developer
	Inspection of outfall should be undertaken.	Non-infiltration systems to have outfall checked for debris and blockages.	Six monthly or as required.	Private maintenance contractor, as identified by developer
Corrective Maintenance	Removal of weeds.	To ensure weeds are killed effectively they should be actively growing so that the glyphosate will go down to the roots. Glysophate based weed killers in Roundup and Tumbleweed.	As required.	Private maintenance contractor, as identified by developer
	Laying material may require cleaning and/or replacing.	Depending on the environment the permeable pavement has received and been exposed to.	25 to 30-year period.	Private maintenance contractor, as identified by developer

7.0 FOUL WATER DRAINAGE STRATEGY

7.1 General

7.1.1 Peak design discharges for dwellings would be calculated based on Sewers for Adoption 8th Edition which sets out the expected foul water flow as follows:

Residential domestic flow = 4000 litres/dwelling/day (peak)

7.1.2 There is no SW public foul sewer network in the immediate vicinity of the site. It is proposed that foul water from the development (16.2l/s) would be conveyed via gravity to a pumping station, situated at the topographically low point on site towards the south-eastern corner.

7.1.3 The pumping station would convey the foul water via a rising main to the proposed connection point with the existing SW public foul sewer network at manhole ref. SU60068301, located on Danes Road. Refer to **Appendix G** for SW records.

7.1.4 Subject to discussions with SW, a Section 106 connection would be made in accordance with the Water Industries Act to seek approval to connect to the public sewer.

7.1.5 A Level 1 sewer capacity check was undertaken by SW in November 2016, which confirmed sufficient capacity in the existing sewer network to accommodate the foul water from the proposed development. An updated sewer capacity check should be undertaken to confirm capacity still exists in the sewer network to accommodate flows from the development.

7.1.6 SW has a duty to improve its network to cater for proposed developments. This is funded via increased infrastructure charges to developers. Should there be a requirement for offsite improvement works, SW would programme these works with due regard to Miller Homes build programme.

8.0 SUMMARY AND CONCLUSIONS

8.1 General

8.1.1 Odyssey has been commissioned by Miller Homes to undertake a Flood Risk Assessment (FRA), incorporating a surface water and foul water drainage strategy to support the proposed development at Winnham Farm, Downend Road, Portchester.

8.1.2 Based on EA flood maps, the site is shown to be located within Flood Zone 1. The site lies in an area at 'very low' risk of surface water flooding.

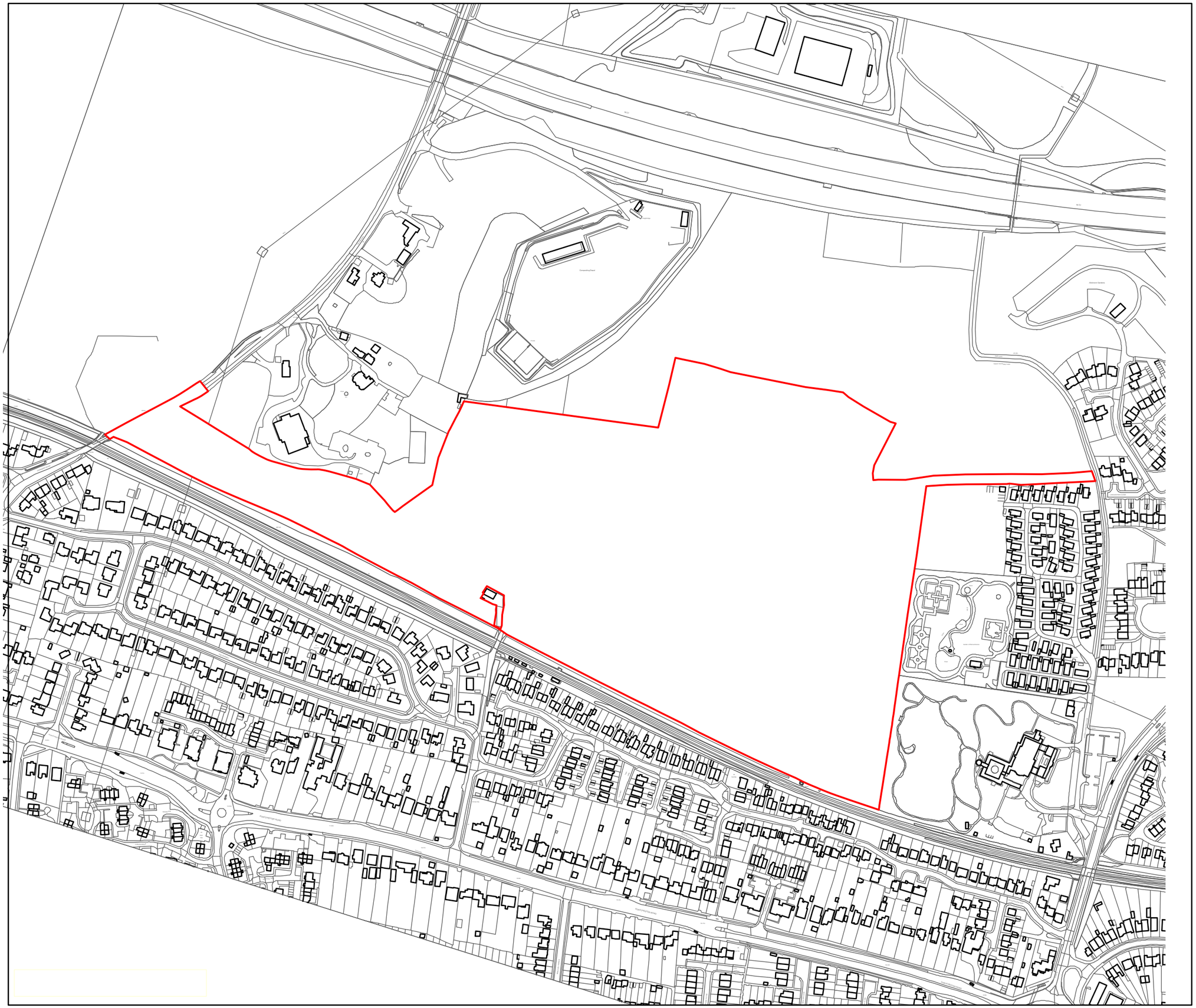
8.1.3 Intrusive ground investigation soakage testing results suggest that infiltration-based SuDS would be feasible at the site. It is proposed that surface water runoff would be attenuated on site within infiltration basins. Flows would then be discharged to the ground. The infiltration basins have been designed to accommodate flows from a 1 in 100 year storm event plus 40% to account for climate change.

8.1.4 Foul flows would drain to a pumping station on site, and be discharged to the existing SW public foul network. A previous Level 1 sewer capacity check confirmed there was sufficient capacity to accommodate the foul water from the proposed development and SW has a duty to cater for proposed development flows through its ongoing asset management improvement works.

8.1.5 This FRA demonstrates that the proposed development can be drained in a sustainable manner, commensurate with national and local policy.

APPENDIX A

Site Location Plan



Key

Notes/Revisions

Winnham Farm, Dowend Road, Portchester

Miller Homes

0m 50m 100m 150m

N

Site location plan

2495-01 /PP-002	Revision:
	Date issued: Aug 2017
1:3500 @ A3	Drawn by: SP / Checked by: IP

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APPENDIX B

Landscape Parameter Plan

Key

Red Line	20.39 ha
Informal Open Space including tree and shrub planting	6.04 ha
Formal Open space	1.08 ha
Children's Play	0.10 ha
Attenuation**	1.45 ha
Retained and enhanced historic hedgerow	
Existing trees retained	
Retained hedges	
Landscape corridor***	
Indicative cross-over points	

*(+/- 3m variance in alignment)

**(Dashed line indicates 3.5m maintenance strip)

***(Minimum 10m wide landscape corridor. Final position and alignment to a variance of +/- 20m. Final position and width to be confirmed at reserved matters stage)

Notes/Revisions

A	13/6/18	Landscape corridor increased to 10m in width along entire length

Winnham Farm, Dowend Road, Portchester

Miller Homes

N

0m 50m 100m 150m

Landscape Parameter Plan

2495-01 /PS-001	Revision: C
	Date issued: June 2018
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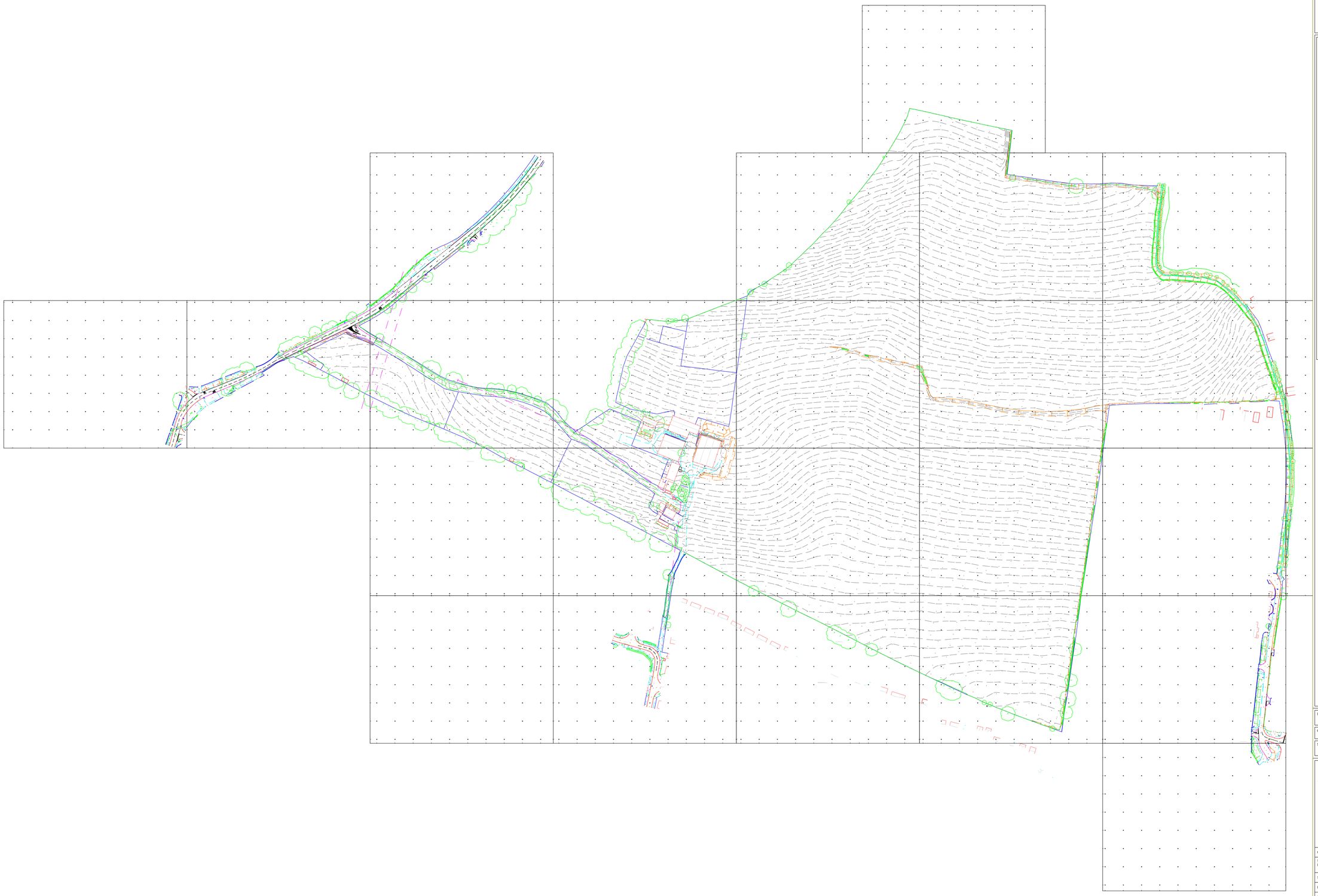
APPENDIX C

Topographical Survey



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LEGEND

TREE SPECIES INFORMATION

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BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PNS
FIR	FIR	RHODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SBI
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HBM	WALNUT	WNT
LABURNUM	LBM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Bole Size / No of Bole
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDR
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

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BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

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BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
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FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
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NAME PLATE	NP		

Level Datum:

Grid:

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Client:

Survey Location:

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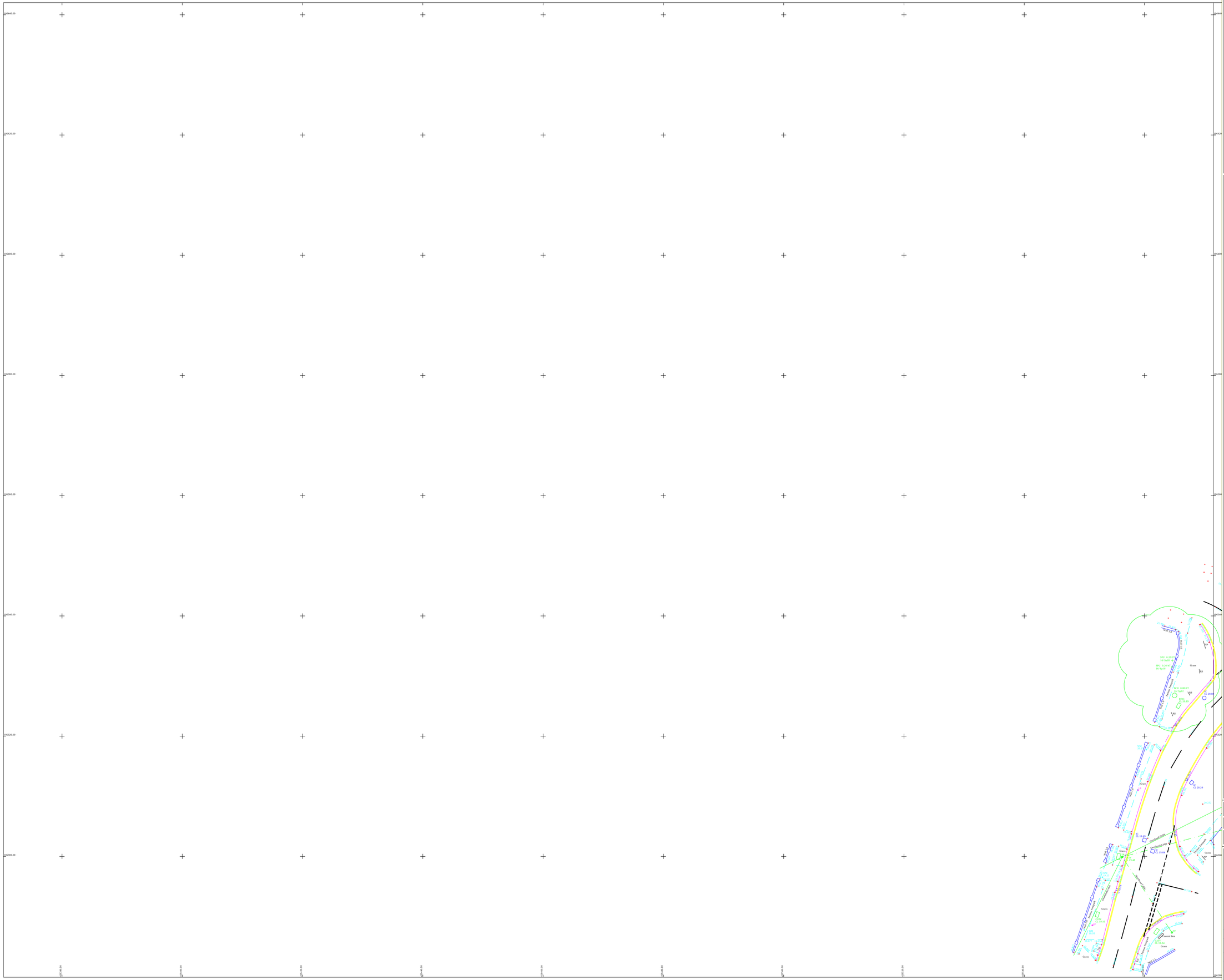

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THRESHOLD LEVEL	THL
POOL WATER	PW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

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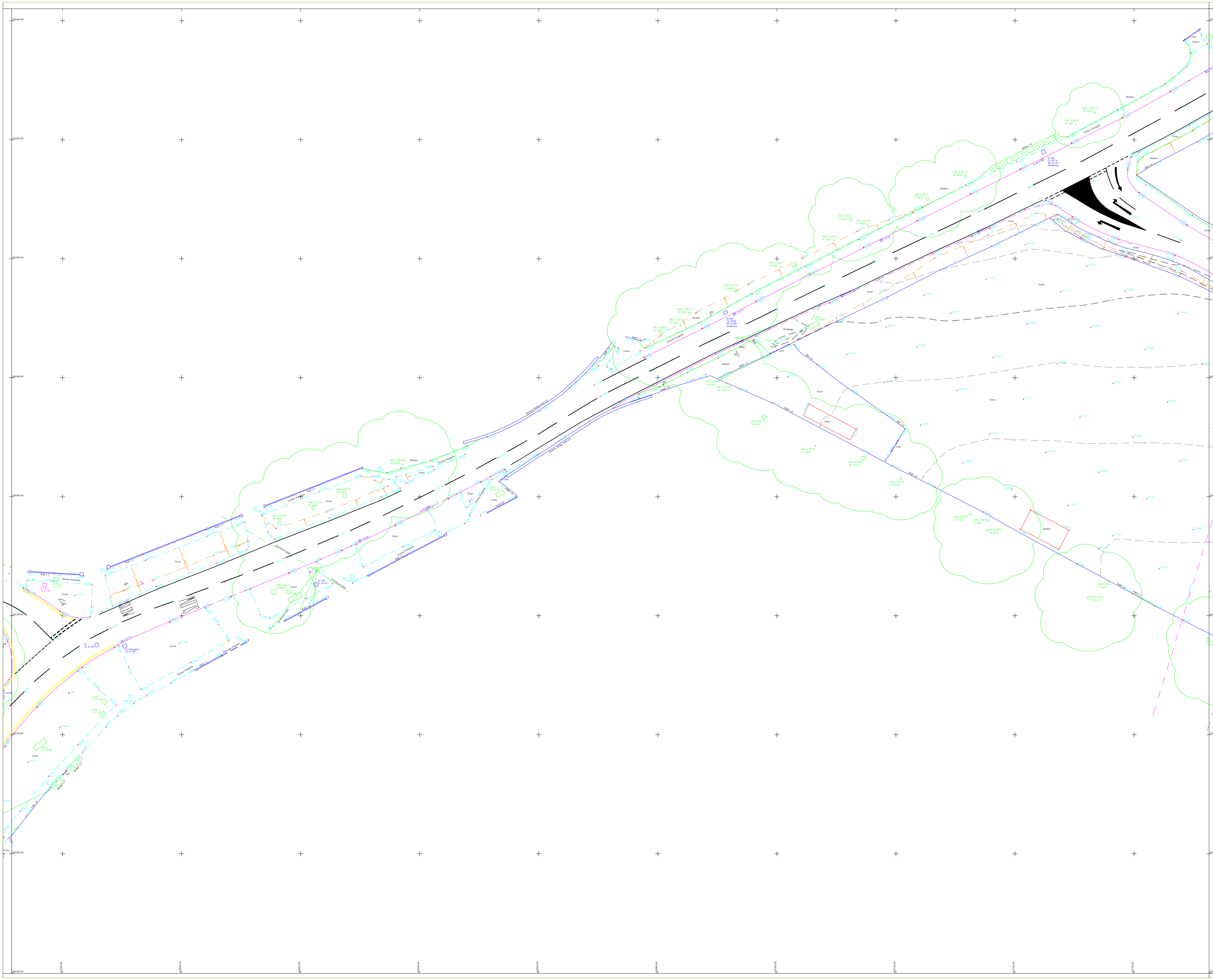

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WATER LEVEL	WL

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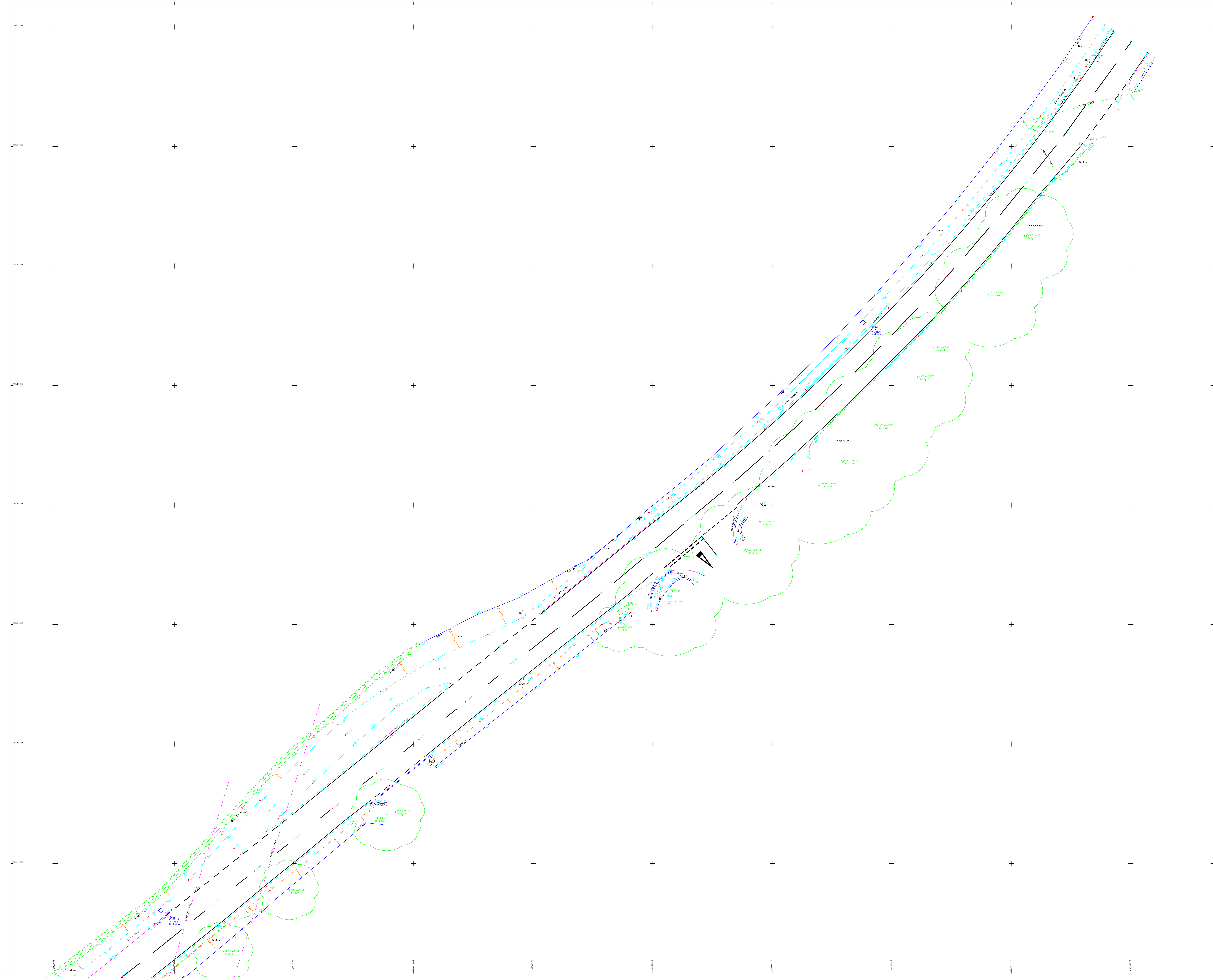

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OUTFALL LEVEL	OL
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FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

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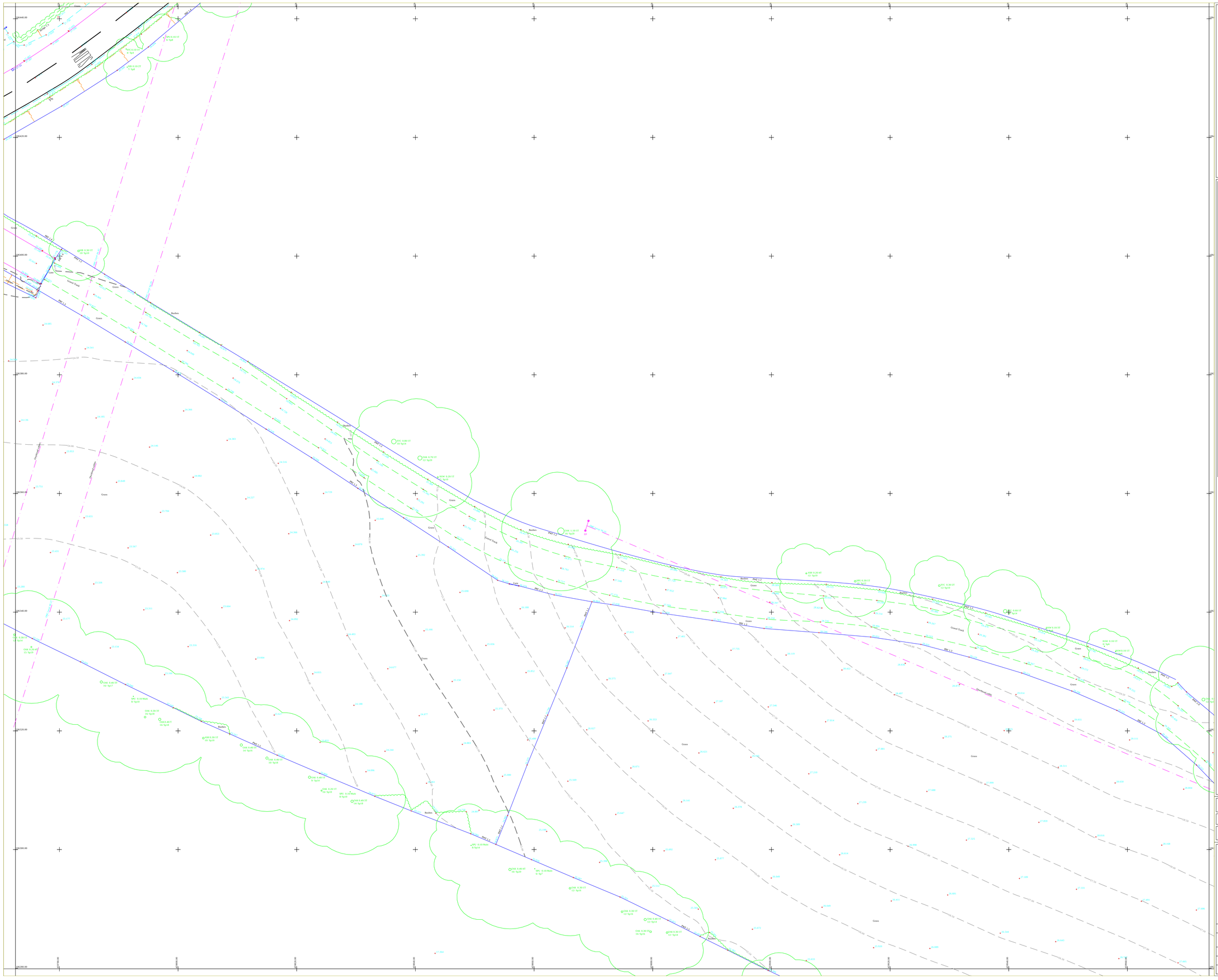

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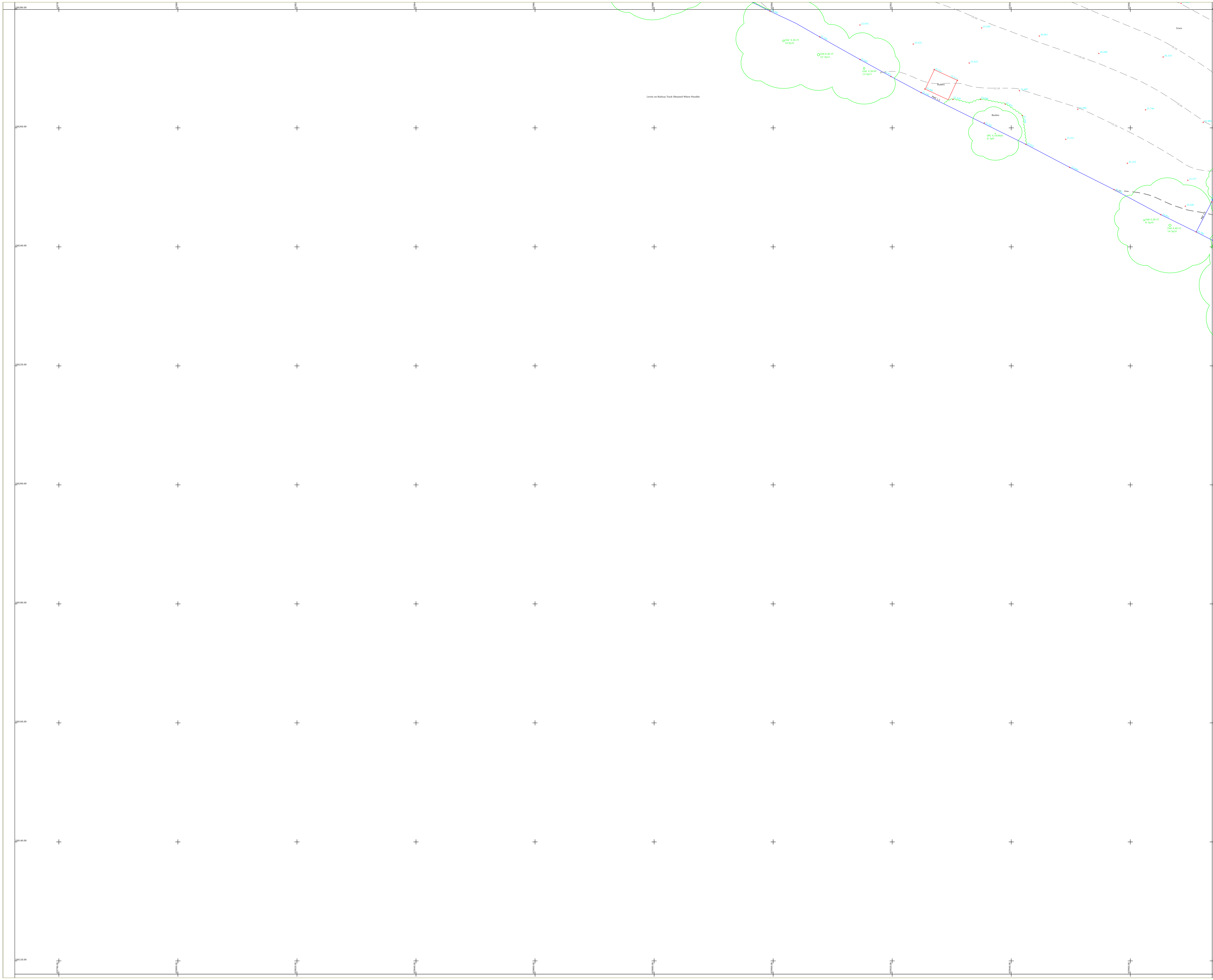

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LEGEND

TREE SPECIES INFORMATION

ALDER	ALD	LOCUST	LOC
ASH	ASH	LONDON PLANE	LPN
ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PNS
FIR	FIR	RHODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SIB
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HRM	WALNUT	WNT
LABURNUM	LRM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Boll Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDL
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

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BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
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EARTHING ROD	ER	SERVICE MARKER POST	SMP
ELECTRICITY CABLE PIT	ELCP	SOIL VENT PIPE	SVP
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NAME PLATE	NP		

Level Datum:

Grid:

Northpoint:

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LARCH	LAR	YEW	YEW
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TREE ANNOTATIONS: Tree Species / Tree Bol Size / No of Bolls
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PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
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FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

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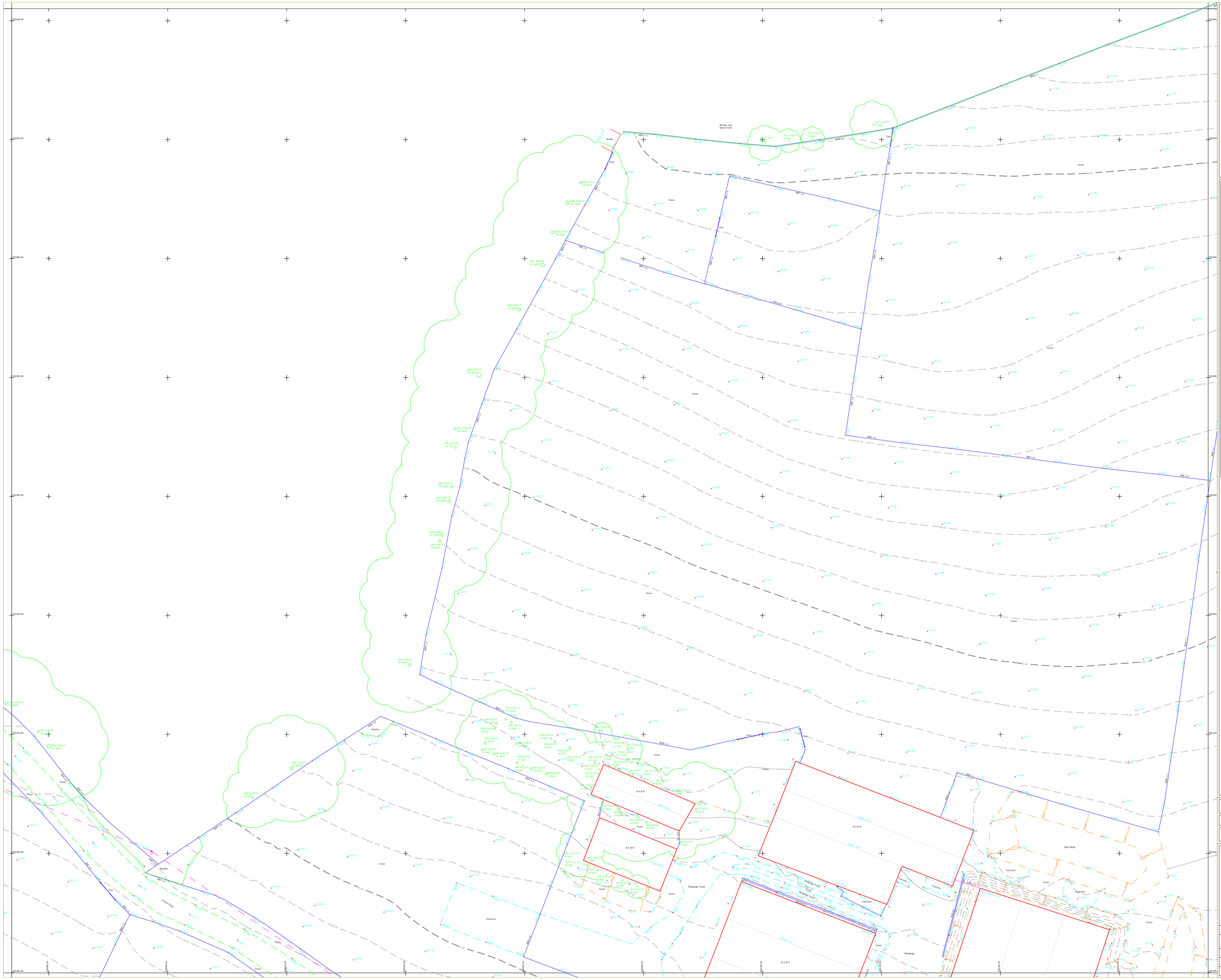

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FLOOR LEVEL	FL
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THRESHOLD LEVEL	THL
FOUL WATER	FW
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SURFACE INFORMATION

CONCRETE	Conc
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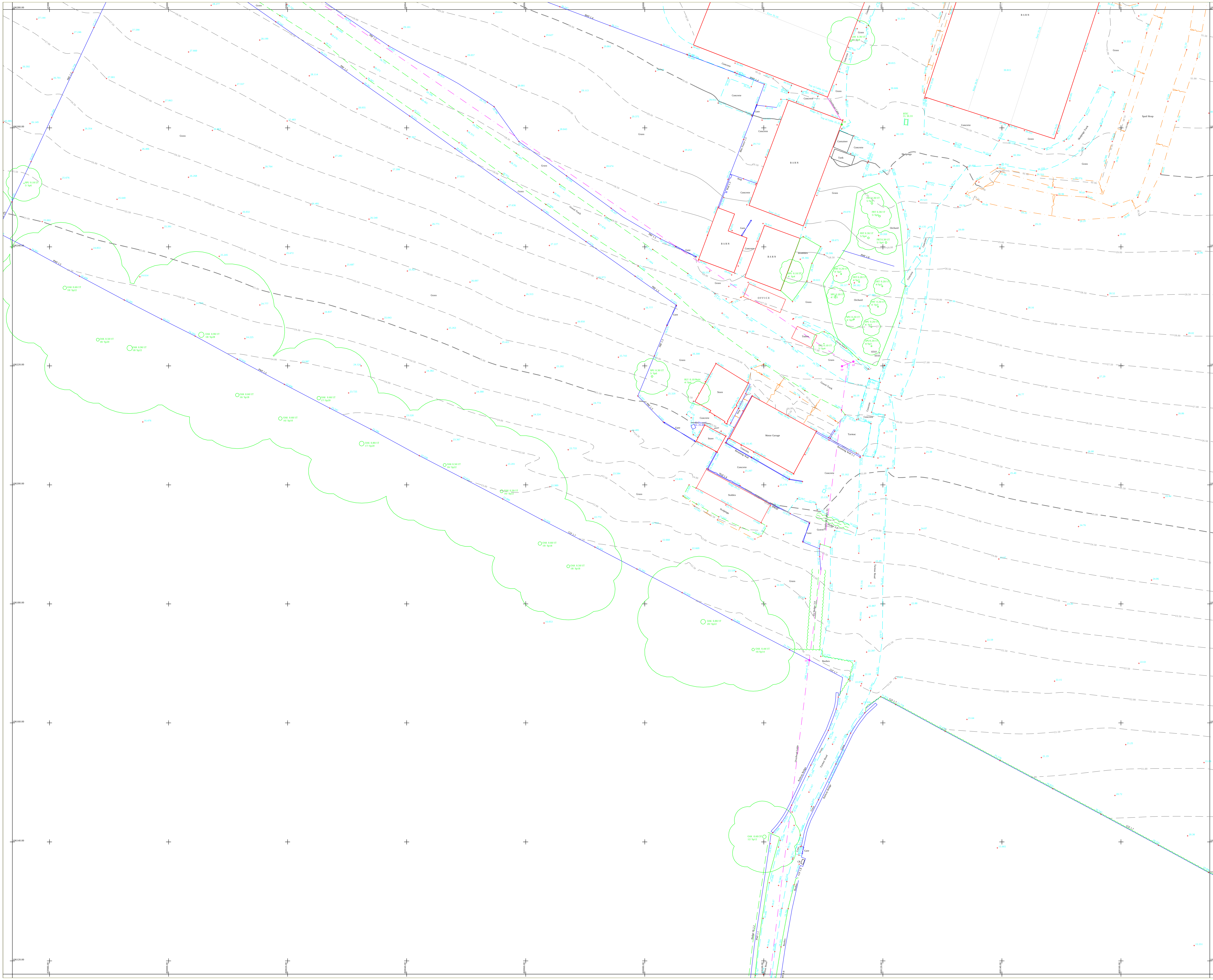

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Tree Height / Tree Canopy Spread

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CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDL
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PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

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BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
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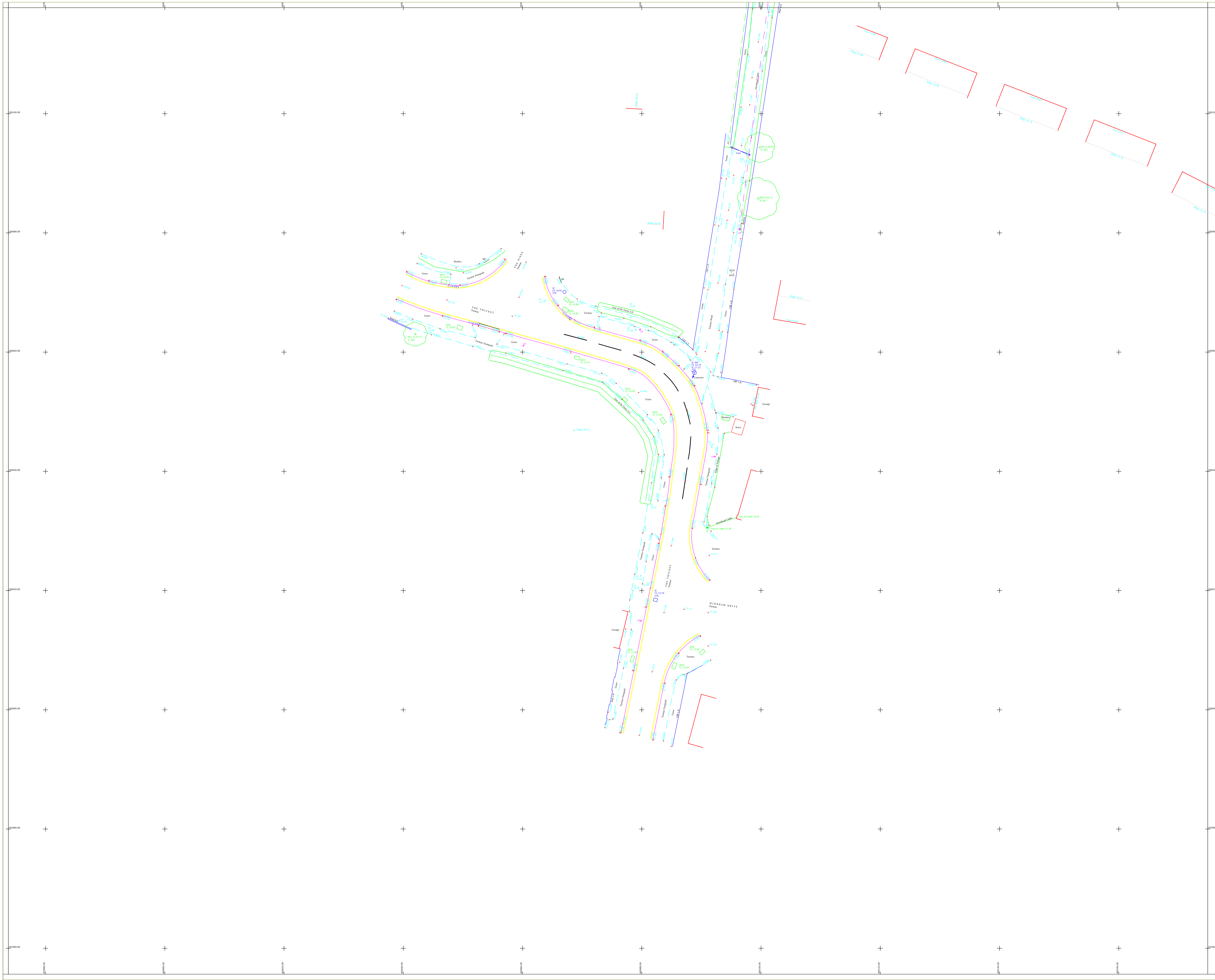

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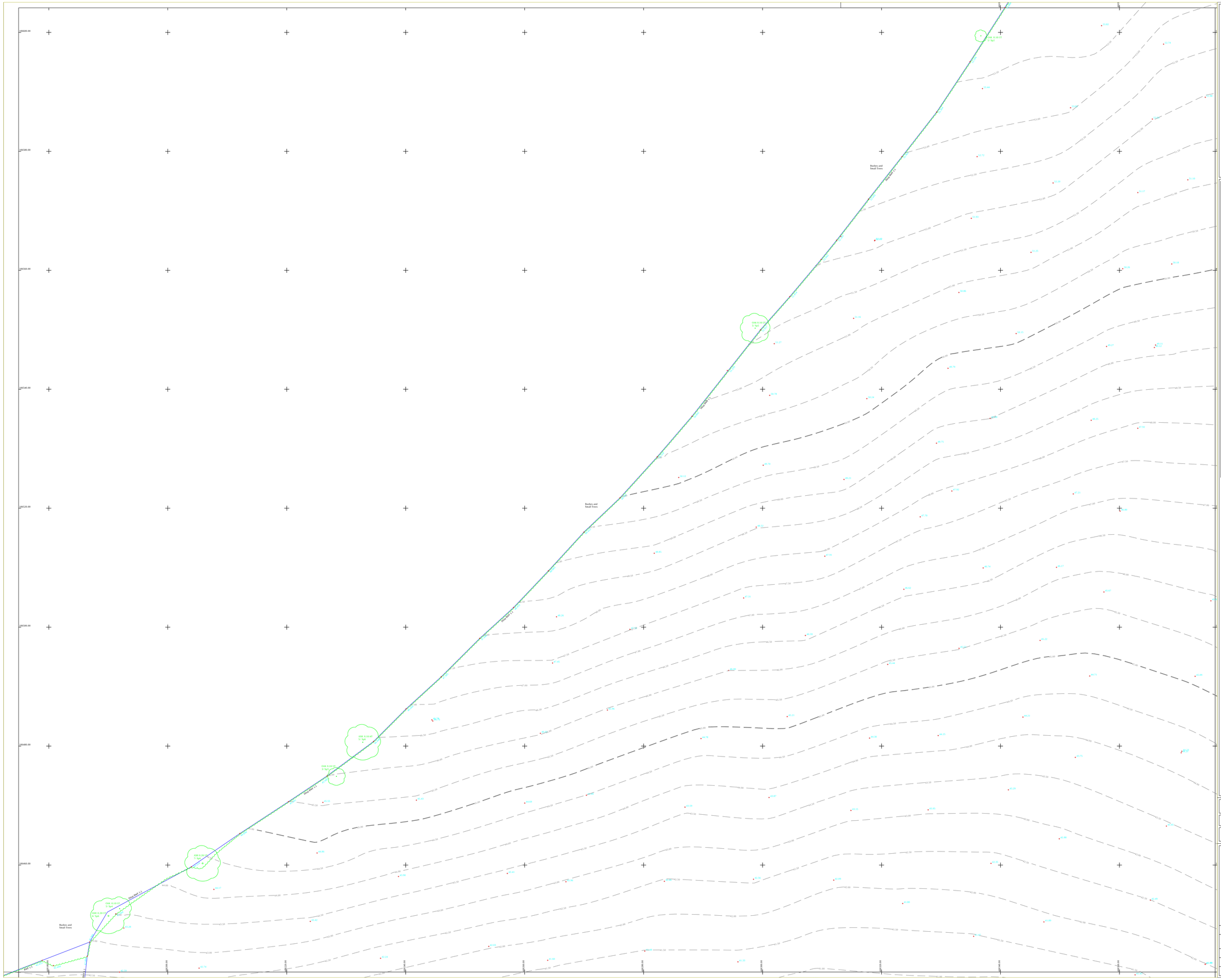

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LEGEND

TREE SPECIES INFORMATION

ALDER	ALD	LOCUST	LOC
ASH	ASH	LONDON PLANE	LPN
ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PNS
FIR	FIR	RHODODODNDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SBI
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HBM	WALNUT	WNT
LABURNUM	LBM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Bole Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDR
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWBIRED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWBIRED	RFB
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ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
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FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNALS IC	TSIC
LITTER BIN	BIN	WATER METER	WM
KERB OUTLET	KO	WATER TAP	Tap
NAME PLATE	NP		

Level Datum:

Grid:

Northpoint:

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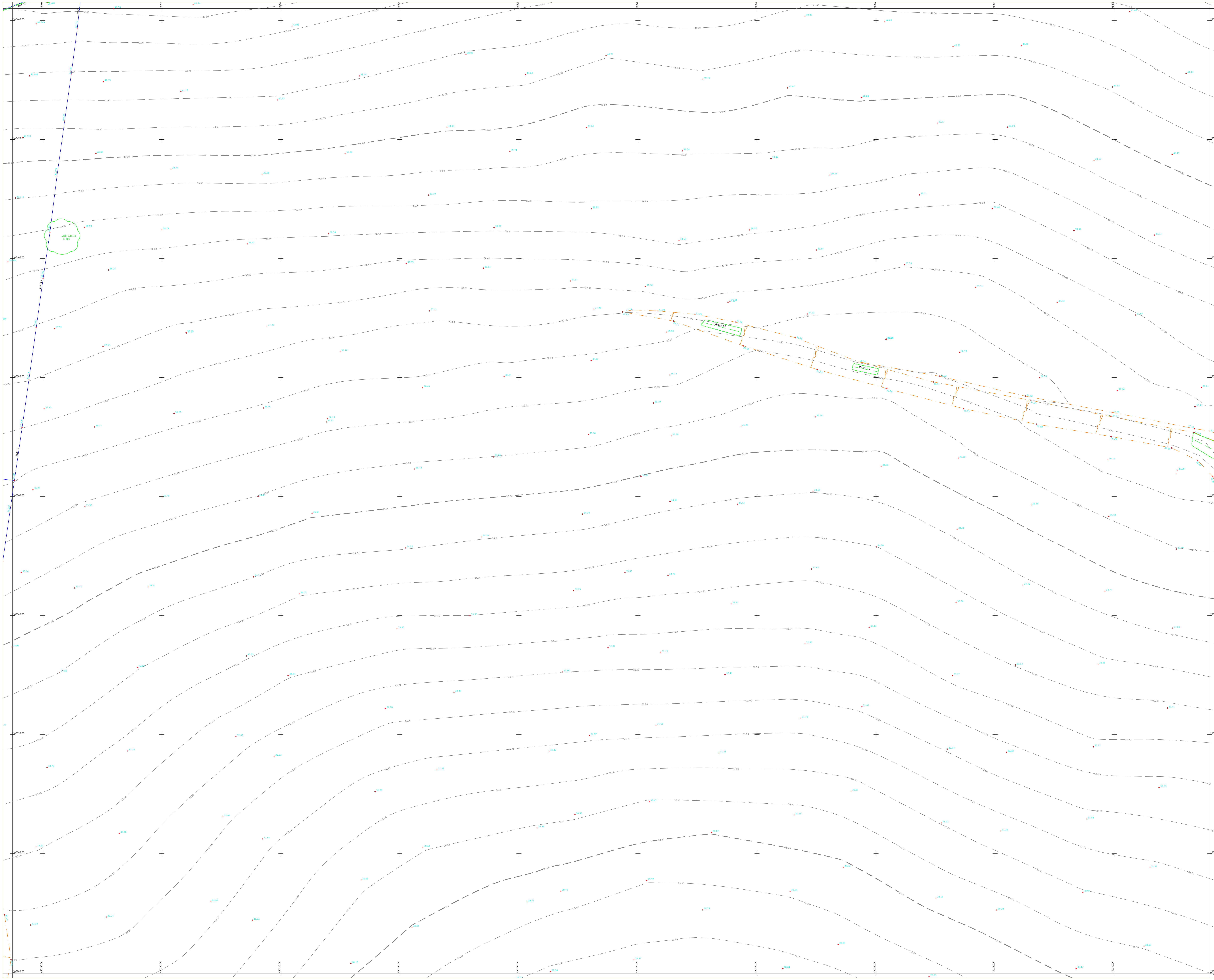

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HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HRM	WALNUT	WNT
LABURNUM	LRM	WILLOW	WLW
LARCH	LAR	YEW	YEW
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HANDRAIL	HDL
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LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

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FLOOR LEVEL	FL
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FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
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TACTILE PAVING	Tac

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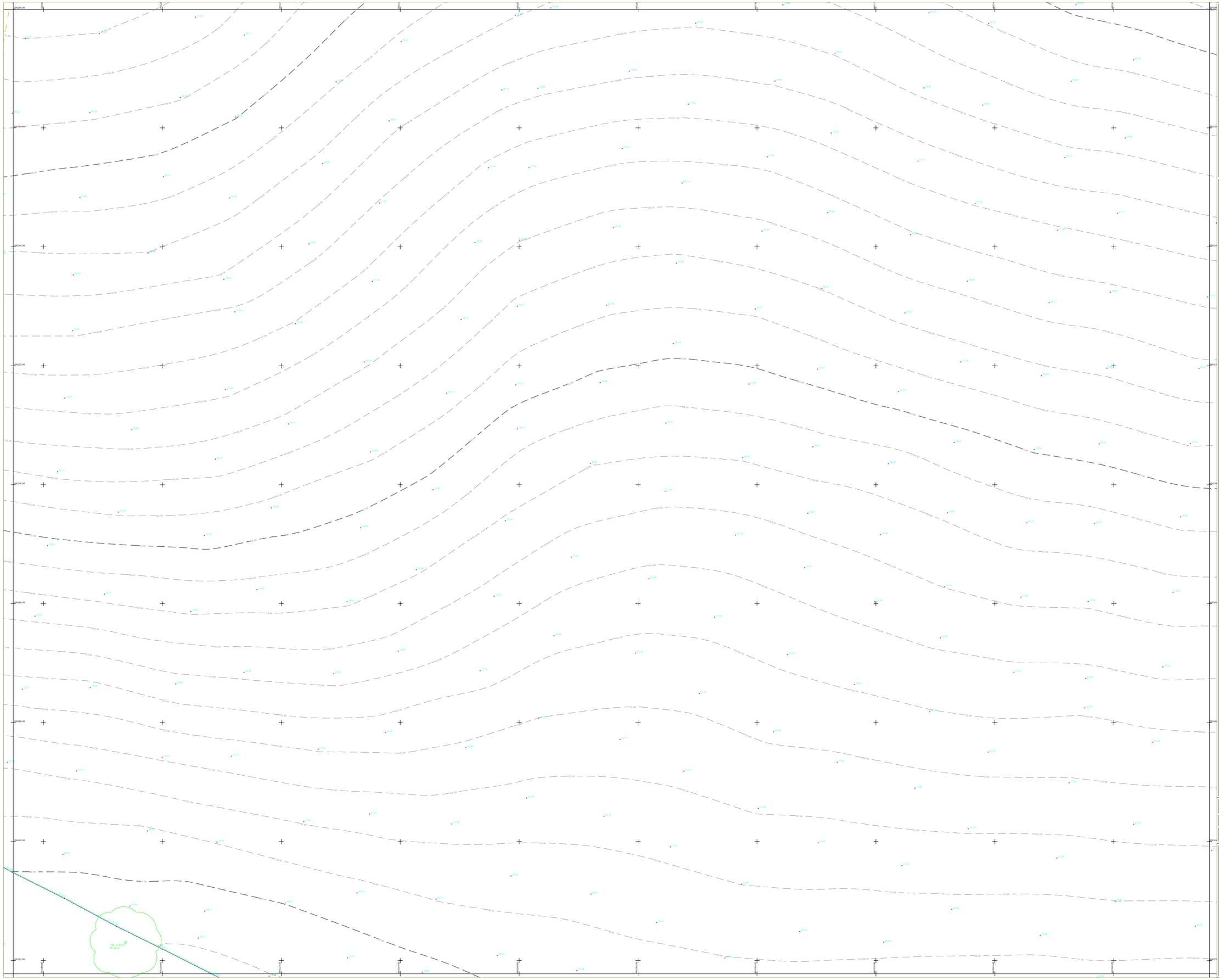

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FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

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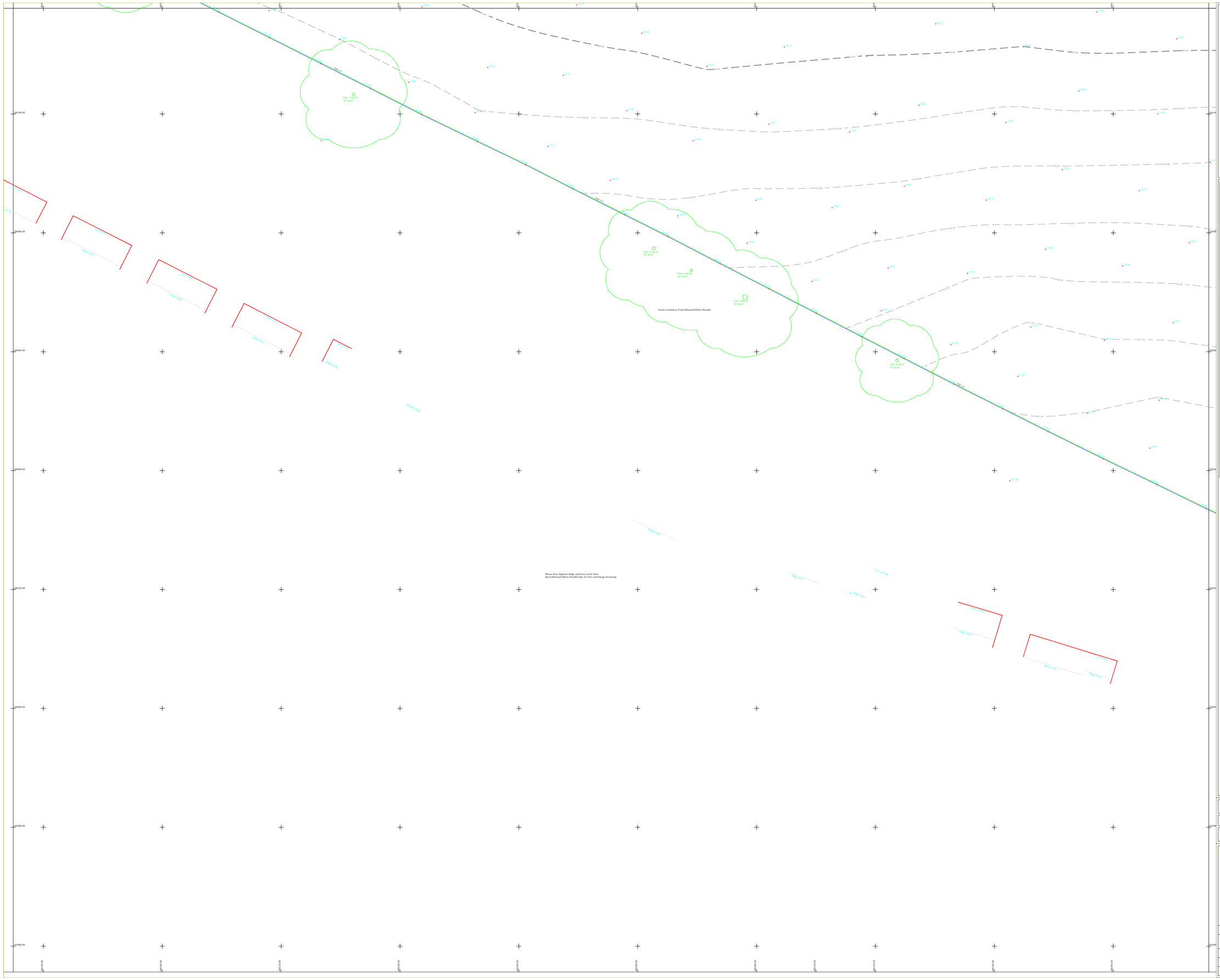

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TREE ANNOTATIONS: Tree Species / Tree Bole Size / No of Bole
Tree Height / Tree Canopy Spread

FENCE INFORMATION

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LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
POOL WATER	PW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

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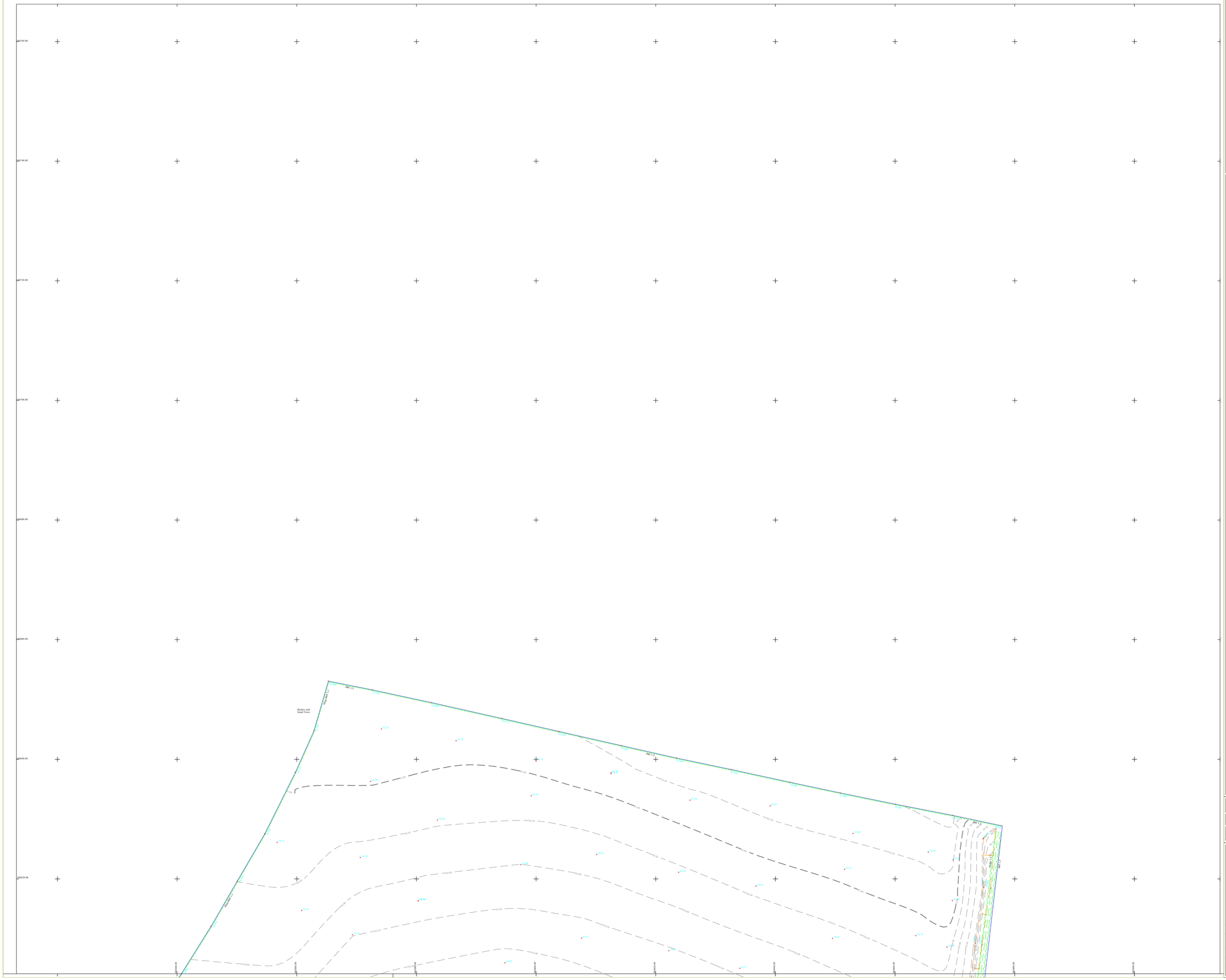

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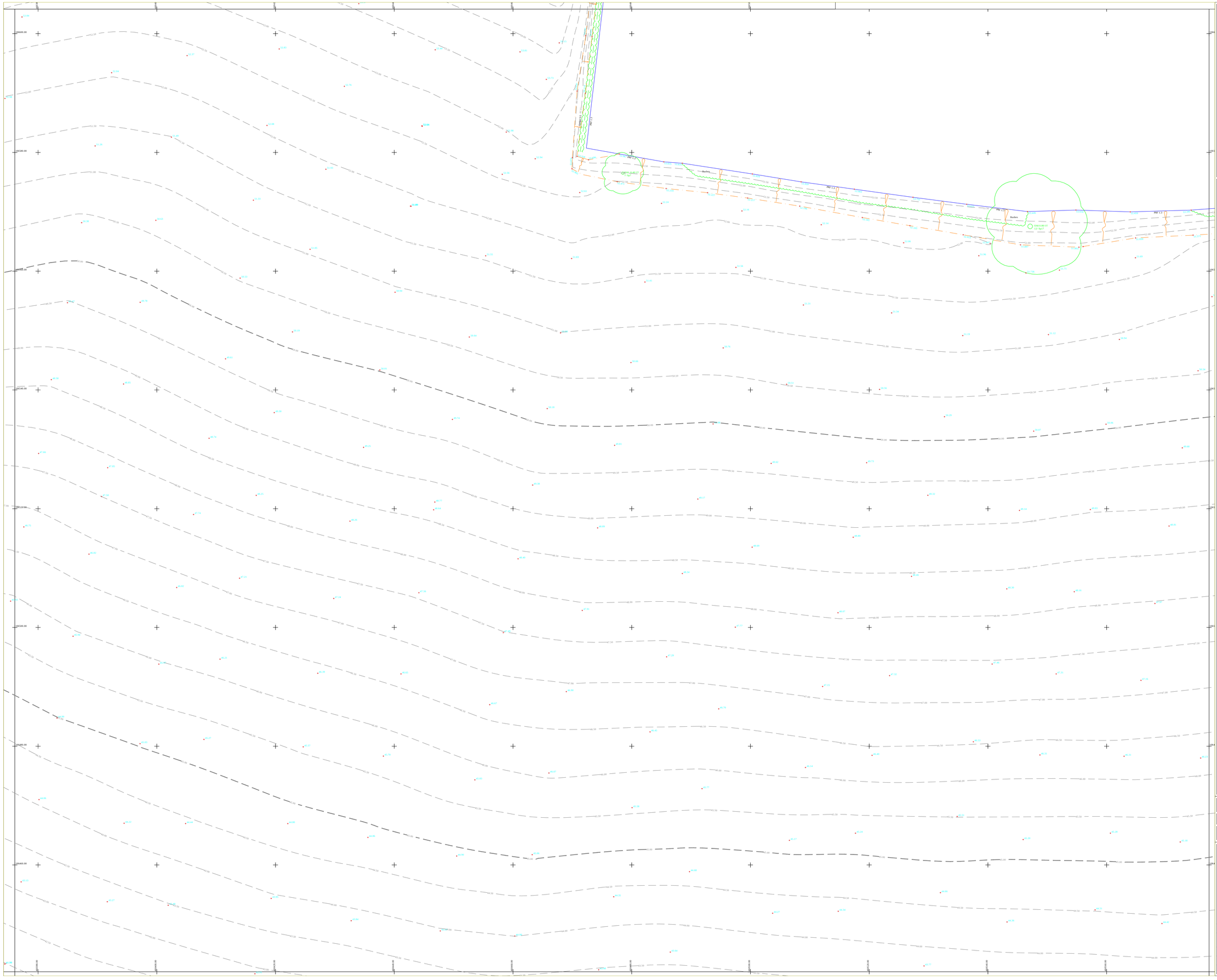

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FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SBI
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HBM	WALNUT	WNT
LABURNUM	LBM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Bol Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDR
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTHALL LEVEL	OL
THRESHOLD LEVEL	THL
POOL WATER	PW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWBIRED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATV	RODDING EYE	RE
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ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNAL IC	TSIC
LITTER BIN	BIN	WATER METER	WM
KERB OUTLET	KO	WATER TAP	Tap
NAME PLATE	NP		

Level Datum:

Grid:

Northpoint:

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Hampshire SO50 7PZ

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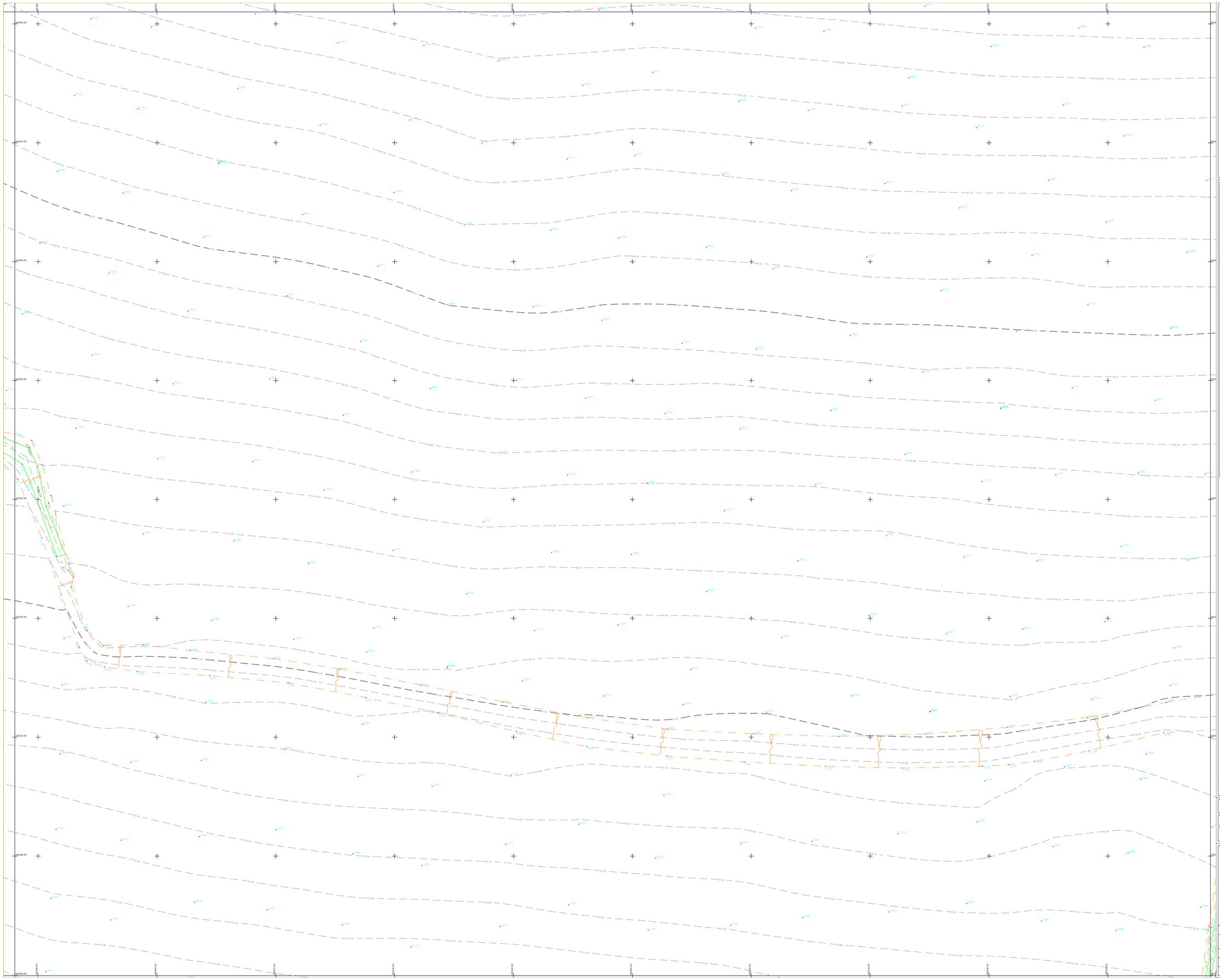
Fax: 023 80687125 Website: encompass-surveys.co.uk

Client:

Survey Location:

Survey type:	Scale:
Drawing ref:	Date:
Drawn/QA:	Plot No.



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LEGEND

TREE SPECIES INFORMATION

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ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PNS
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LARCH	LAR	YEW	YEW
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TREE ANNOTATIONS: Tree Species / Tree Bole Size / No of Boles
Tree Height / Tree Canopy Spread

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CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDR
IRON RAILINGS	IRF
LARGE LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
EAVES LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
POOL WATER	PW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWBIRED	FB
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RETAINING WALL	RWall
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ELECTRICITY POLE	EP	STOP VALVE	SV
FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNAL IC	TSIC
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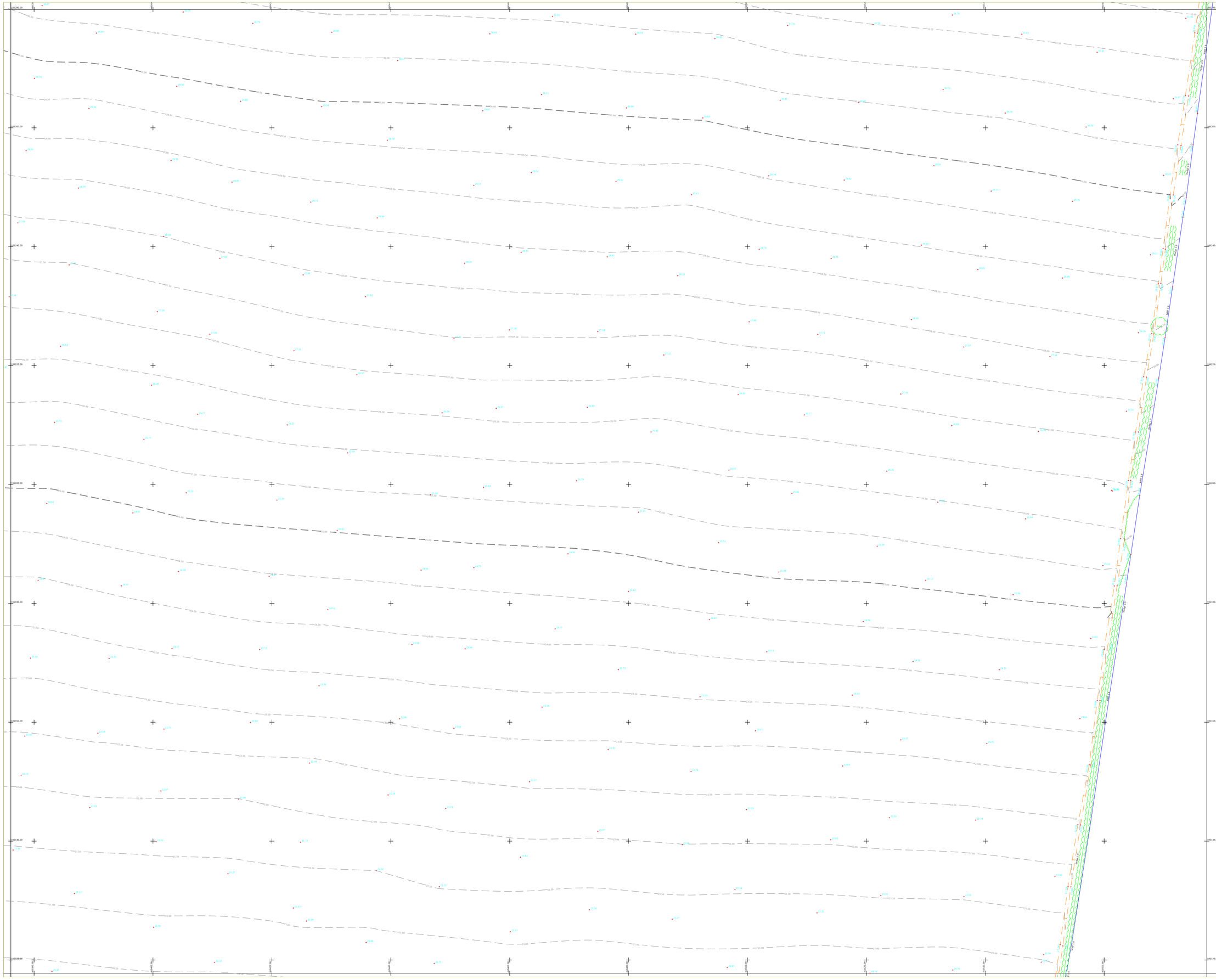
Drawn/QA:	Plot No.



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FENCE INFORMATION

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POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
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LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWBIRED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

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LETTER BOX	LB	TRAFFIC SIGNALS IC	TSIC
LITTER BIN	BIN	WATER METER	WM
KERB OUTLET	KO	WATER TAP	Tap
NAME PLATE	NP		

Level Datum:

Grid:

Northpoint:

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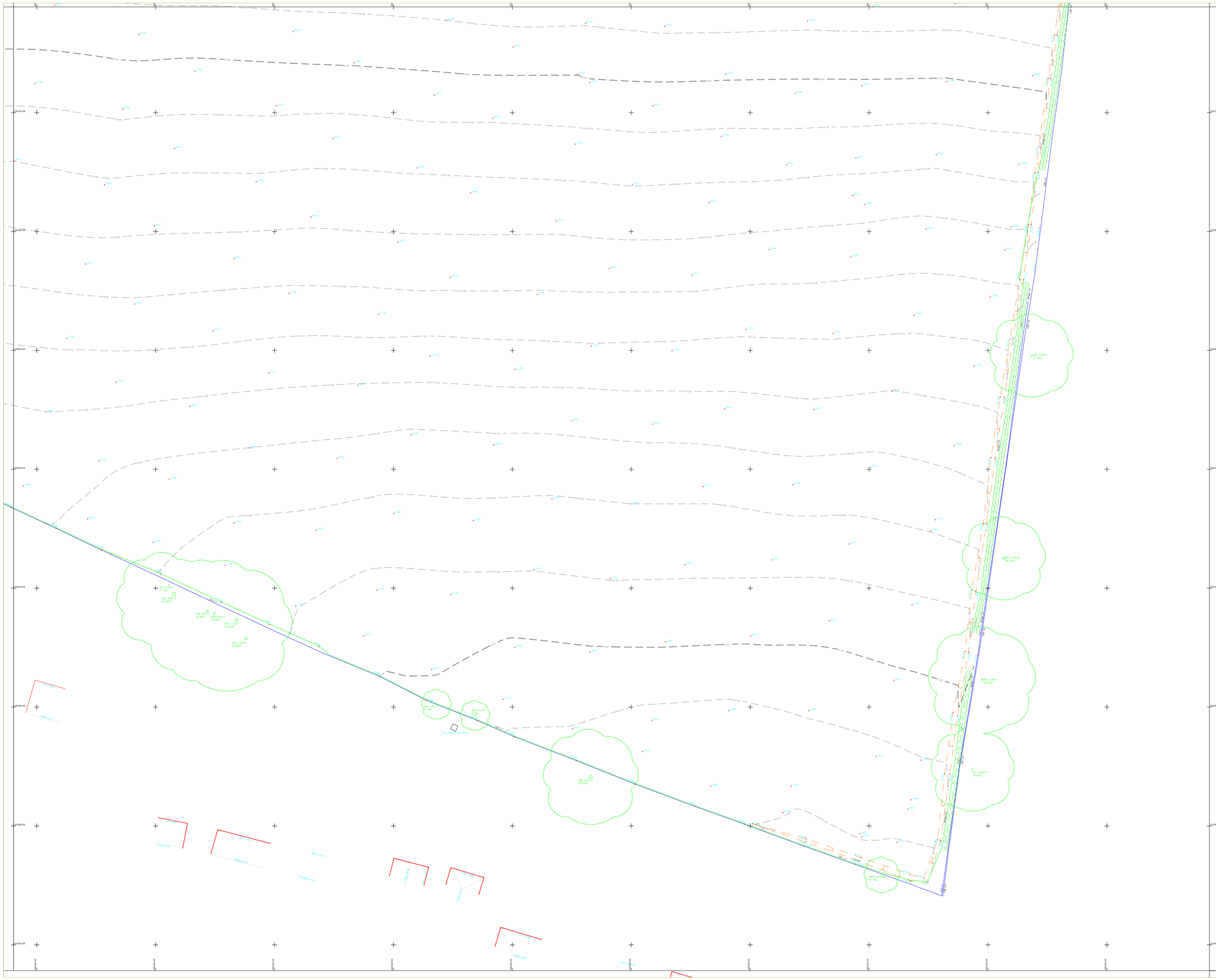

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LEGEND

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BEECH	BCH	MAPLE	MPL
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FRUIT	FRT	ROWAN	RWN
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LABURNUM	LBM	WILLOW	WLW
LARCH	LAR	YEW	YEW
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TREE ANNOTATIONS: Tree Species / Tree Bole Size / No of Boles
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDR
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
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PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
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STOCK WIRE FENCE	SWF
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LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTHALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
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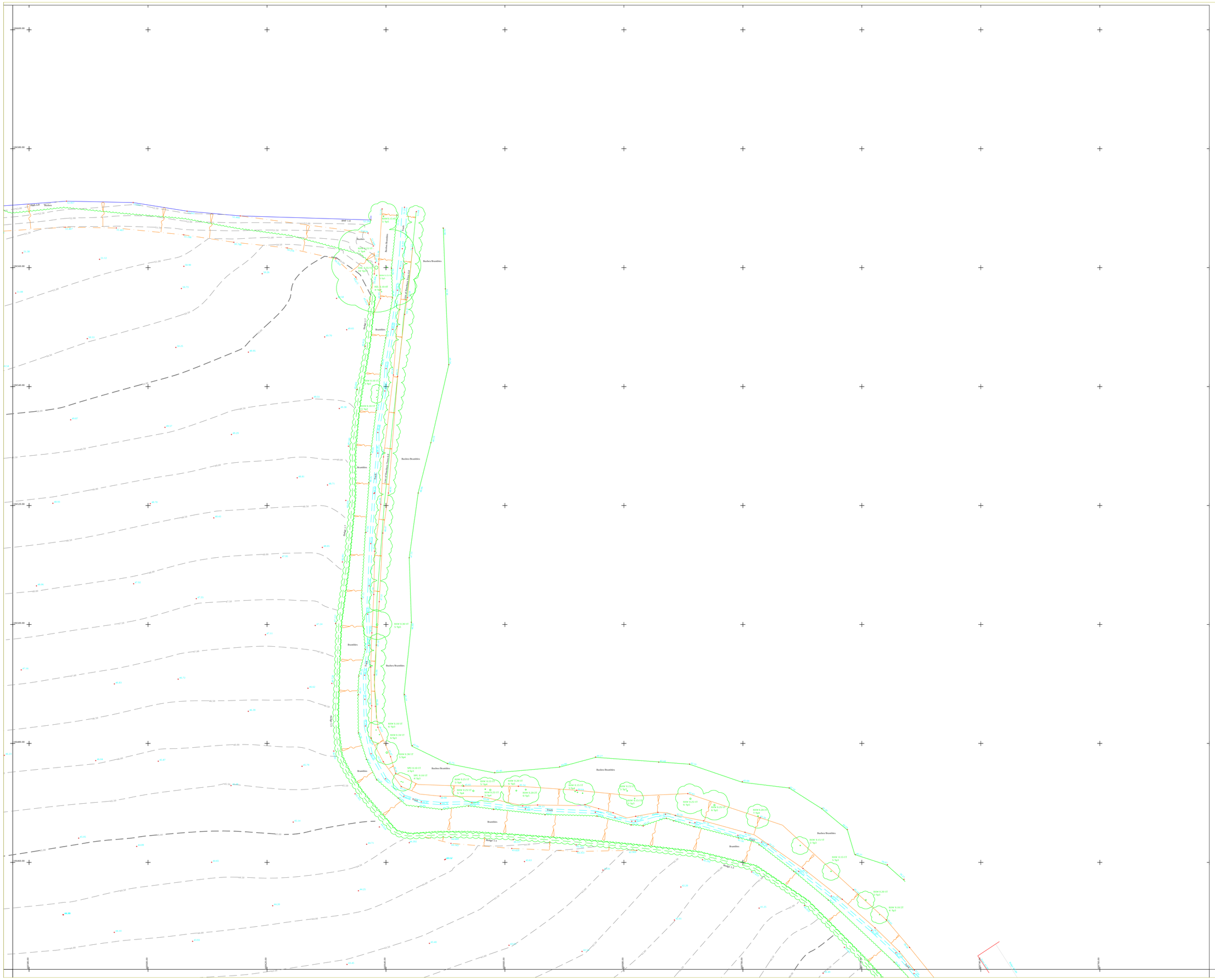

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THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

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FLOWERBED	FB
PAVING SLABS	PS
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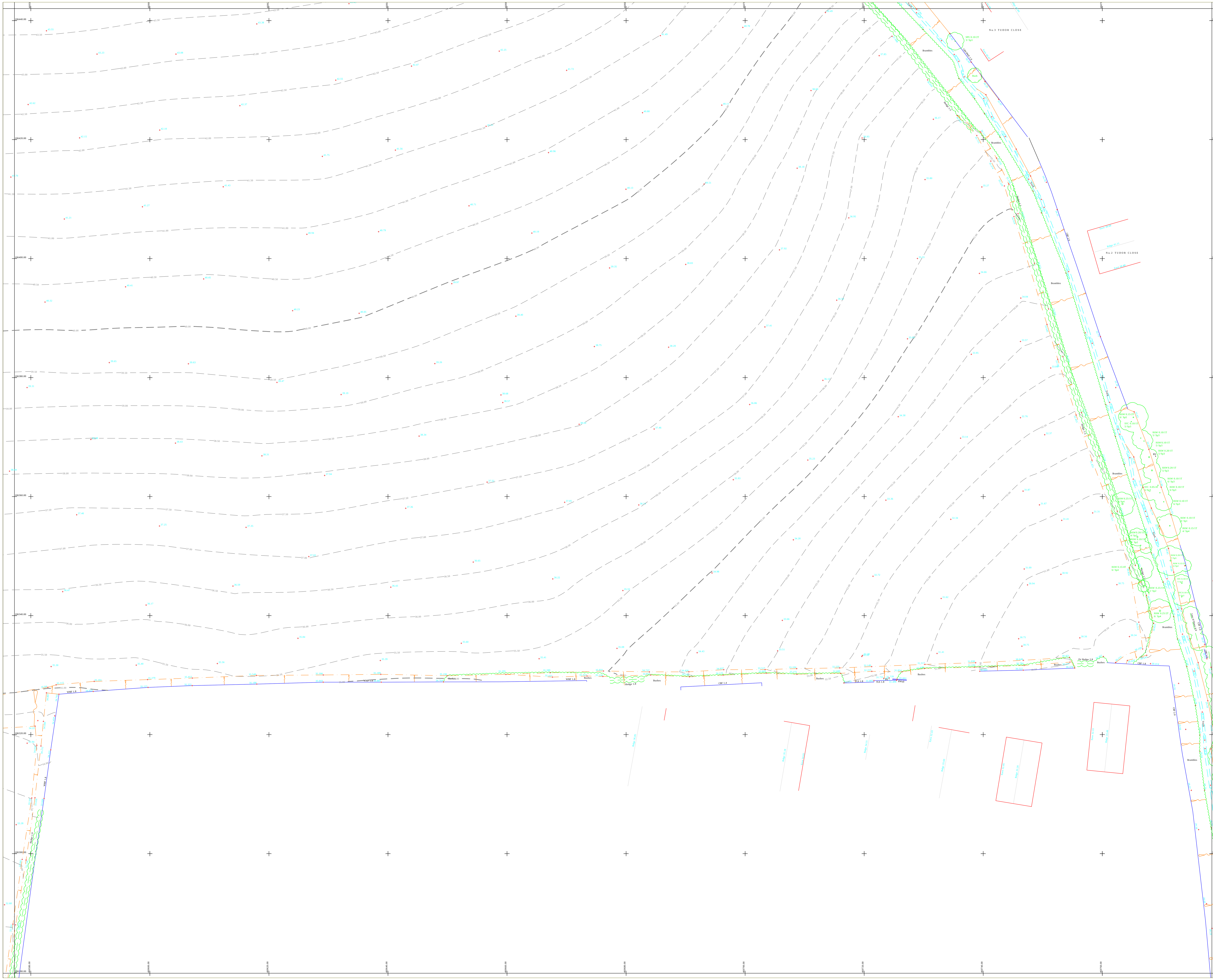

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HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HRM	WALNUT	WNT
LABURNUM	LRM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Boll Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDL
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATV	RODDING EYE	RE
EARTHING ROD	ER	SERVICE MARKER POST	SMP
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ELECTRICITY POLE	EP	STOP VALVE	SV
FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNALS IC	TSIC
LITTER BIN	BIN	WATER METER	WM
KERB OUTLET	KO	WATER TAP	Tap
NAME PLATE	NP		

Level Datum:

Grid:

Northpoint:

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Survey type:	Scale:
Drawing ref:	Date:
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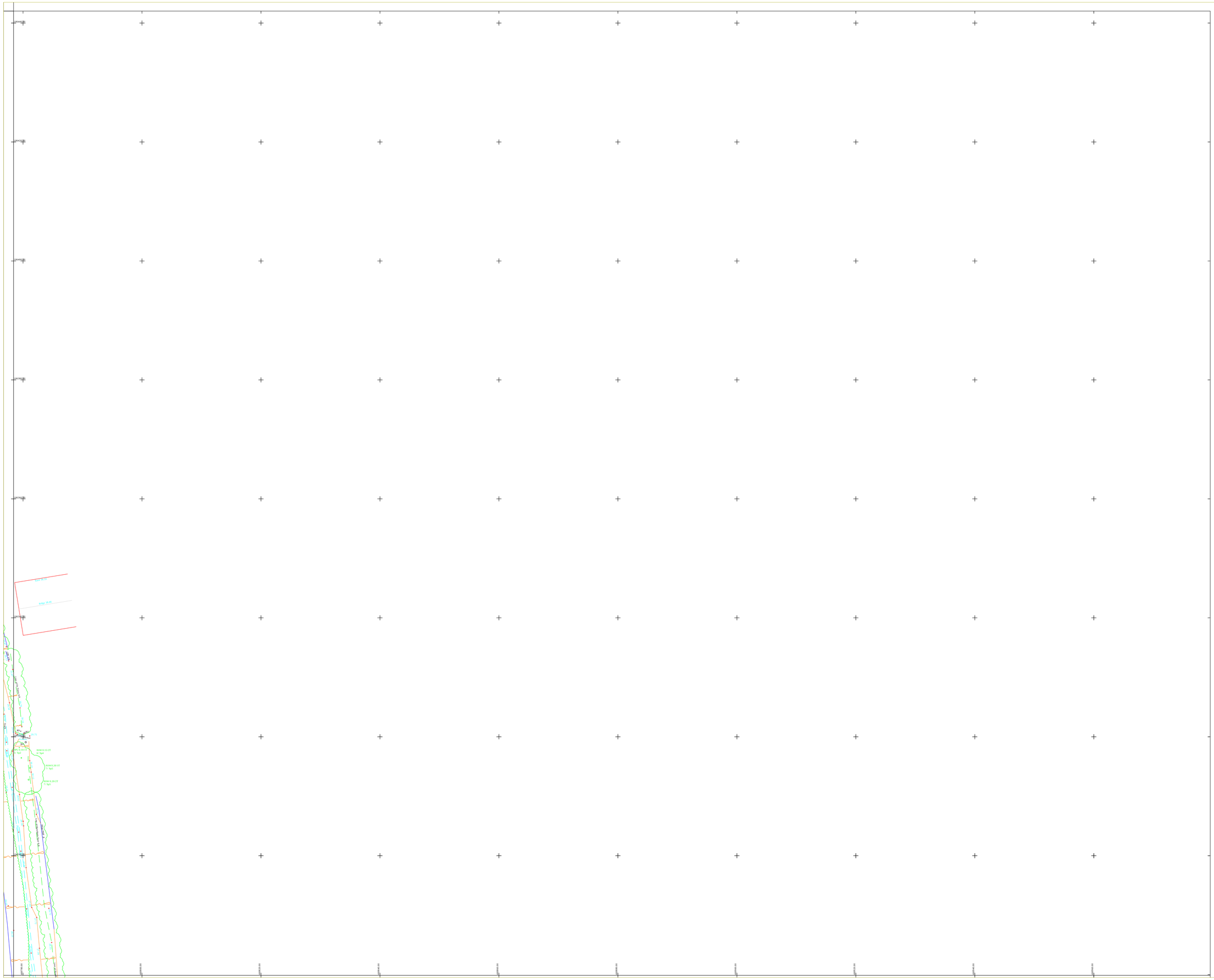

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LEGEND

TREE SPECIES INFORMATION

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BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PNS
FIR	FIR	RHODODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SBI
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HBM	WALNUT	WNT
LABURNUM	LBM	WILLOW	WLW
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TREE ANNOTATIONS: Tree Species / Tree Bol Size / No of Bolls
Tree Height / Tree Canopy Spread

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DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
POOL WATER	PW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWBIRED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

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Survey Location:

Survey type:	Scale:
Drawing ref:	Date:
Drawn/QA:	Plot No.

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BEECH	BCH	MAPLE	MPL
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HORNBEAM	HBM	WALNUT	WNT
LABURNUM	LBM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Bole Size / No of Boles
Tree Height / Tree Canopy Spread

FENCE INFORMATION

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LEVEL INFORMATION

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FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
POOL WATER	PW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
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LEGEND

TREE SPECIES INFORMATION

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ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
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LARCH	LAR	YEW	YEW
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		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Boll Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
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CLOSE BOARD FENCE	CBF
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CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDL
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
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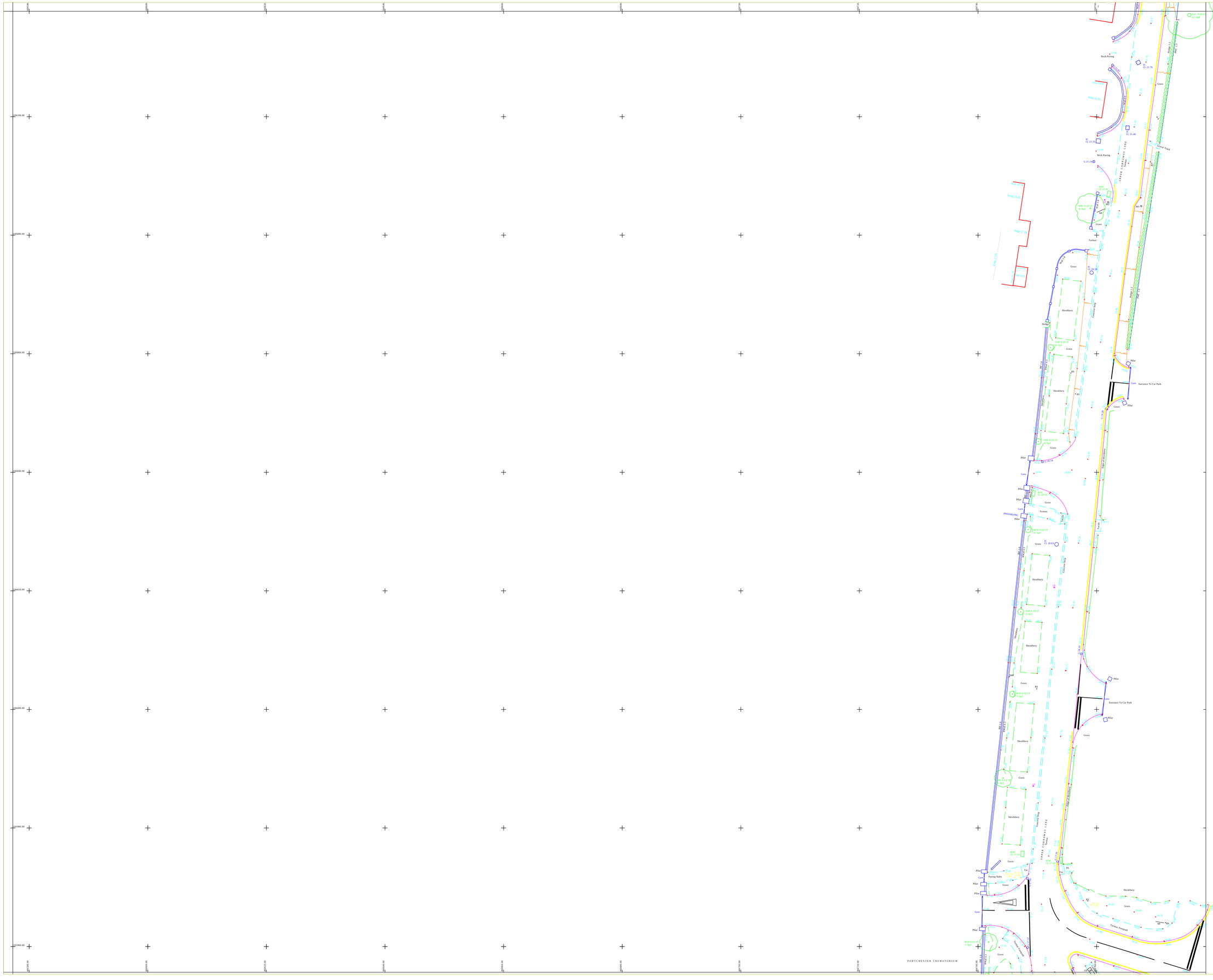

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PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
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LEVEL INFORMATION

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FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

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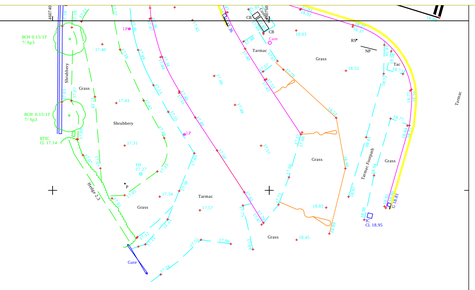

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SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATV	RODDING EYE	RE
EARTHING ROD	ER	SERVICE MARKER POST	SMP
ELECTRICITY CABLE PIT	ELCP	SOIL VENT PIPE	SVP
ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNAL IC	TSIC
LITTER BIN	BIN	WATER METER	WM
KERB OUTLET	KO	WATER TAP	Tap
NAME PLATE	NP		

Level Datum:

Grid:

Northpoint:

ENCOMPASS SURVEYS

Encompass Surveys Ltd
Unit 2CA
Deer Park Farm Industrial Estate
Knowle Lane
Fair Oak, Eastleigh
Hampshire SO50 7PZ

Tel: 023 80692002 Email: info@encompass-surveys.co.uk
Fax: 023 80697125 Website: encompass-surveys.co.uk

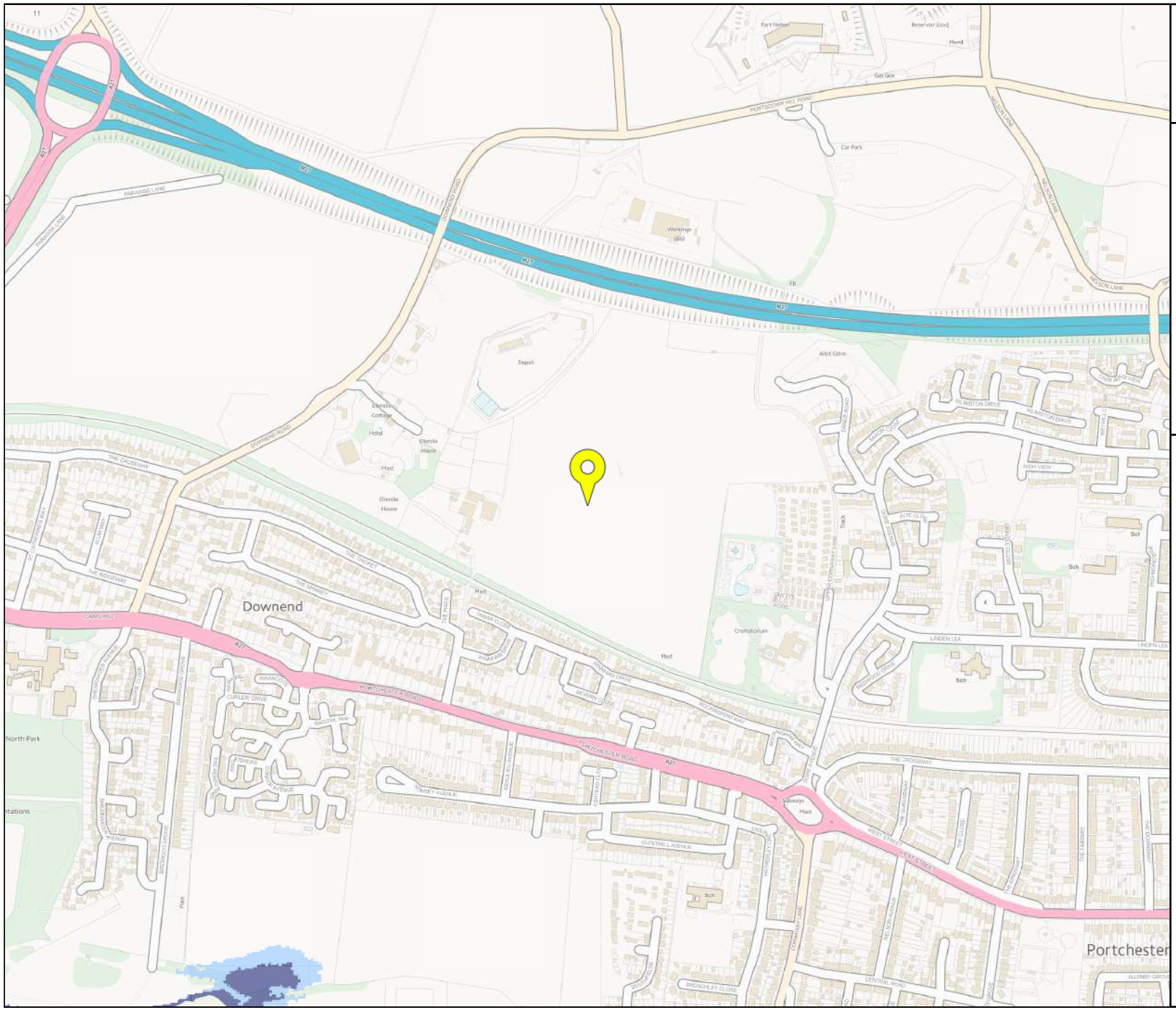
Client:

Survey Location:

Survey type:	Scale:
Drawing ref:	Date:
Drawn/QA:	Plot No.

APPENDIX D

Environment Agency Data



Environment Agency

Flood map for planning

Your reference
16-329

Location (easting/northing)
460325/106287

Scale
1:10000

Created
20 Jul 2020 16:25

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 100 200 300m

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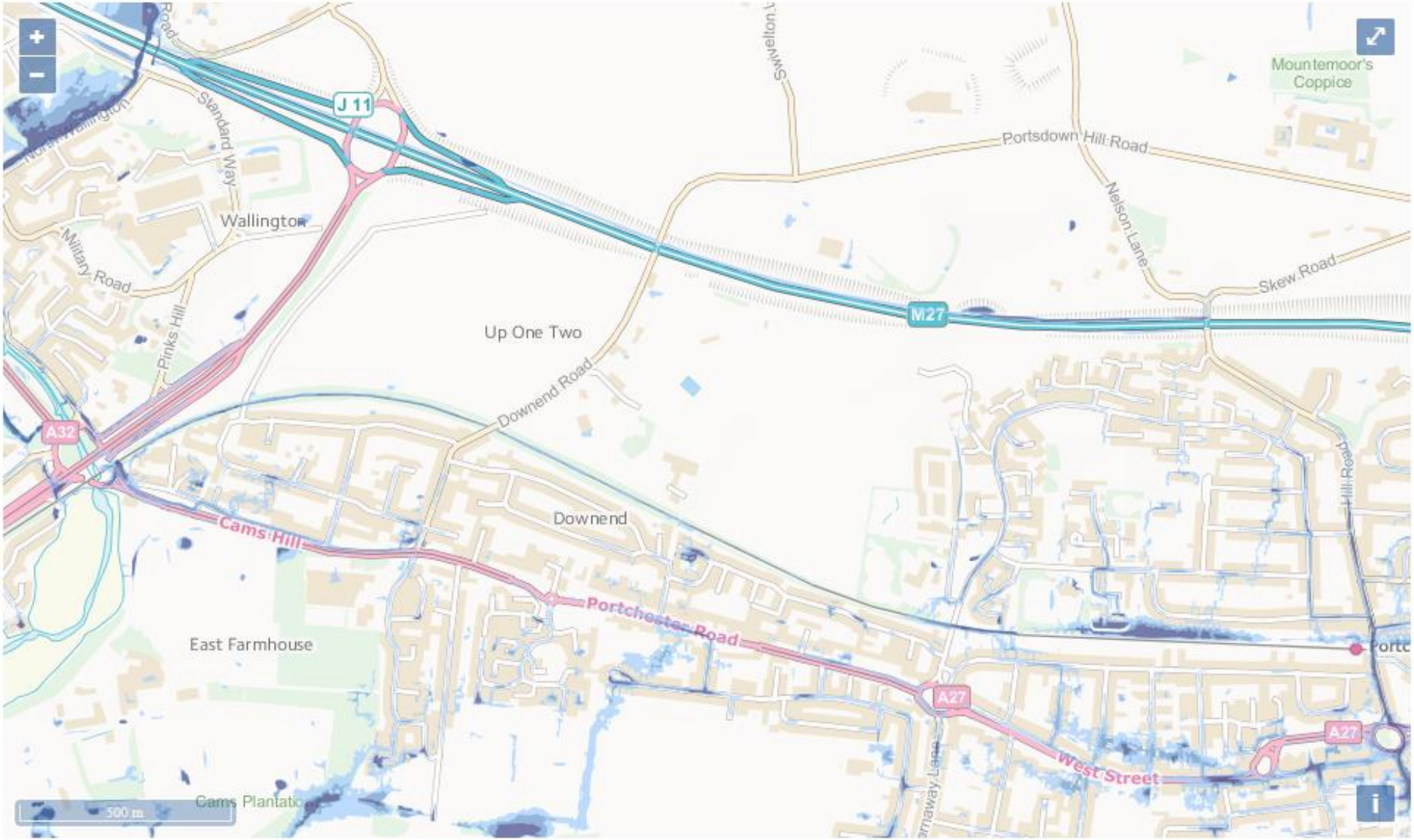


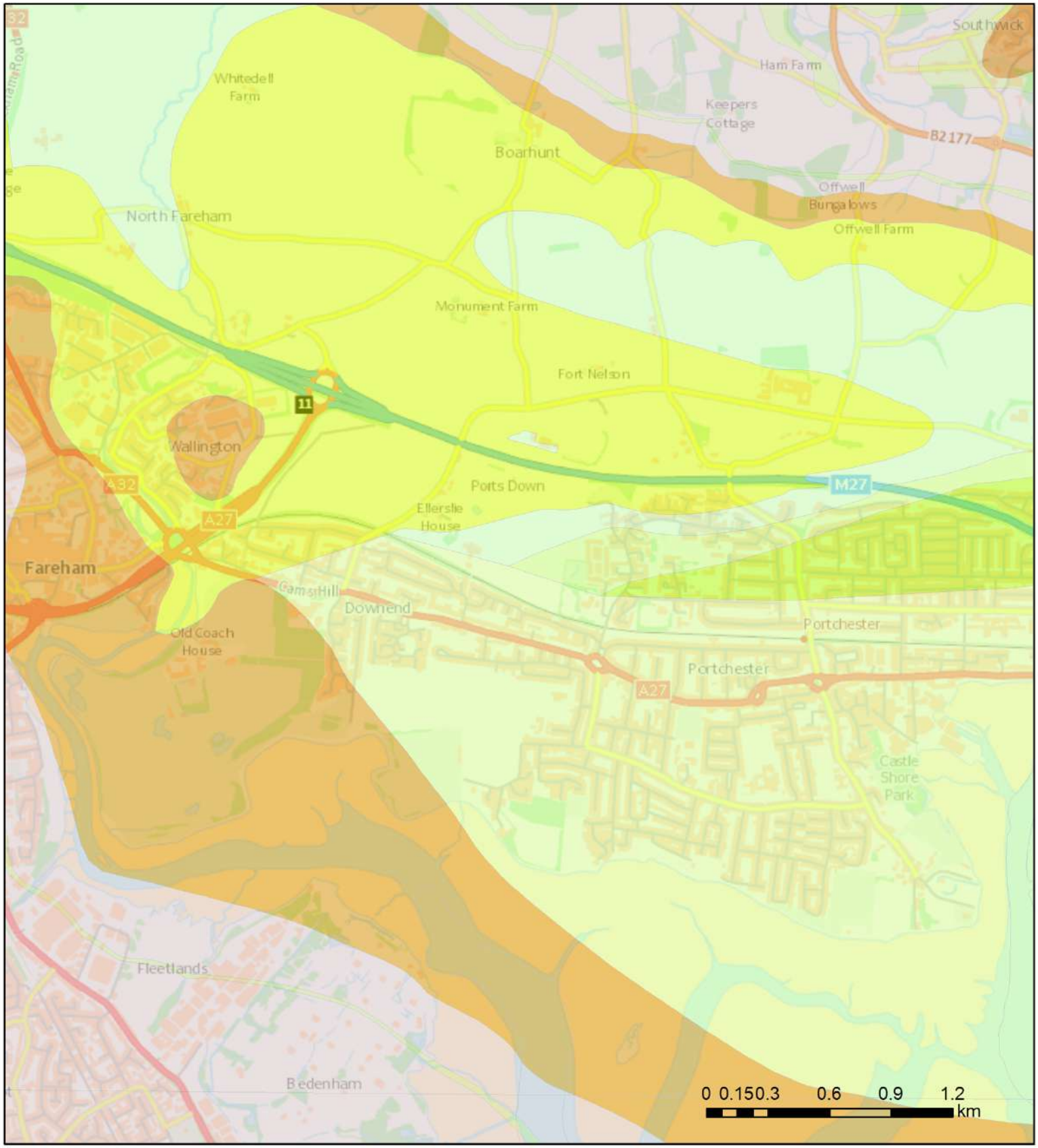
Extent of flooding from surface water

High Medium Low Very low

APPENDIX E

British Geological Survey Data

16-329 Bedrock Geology



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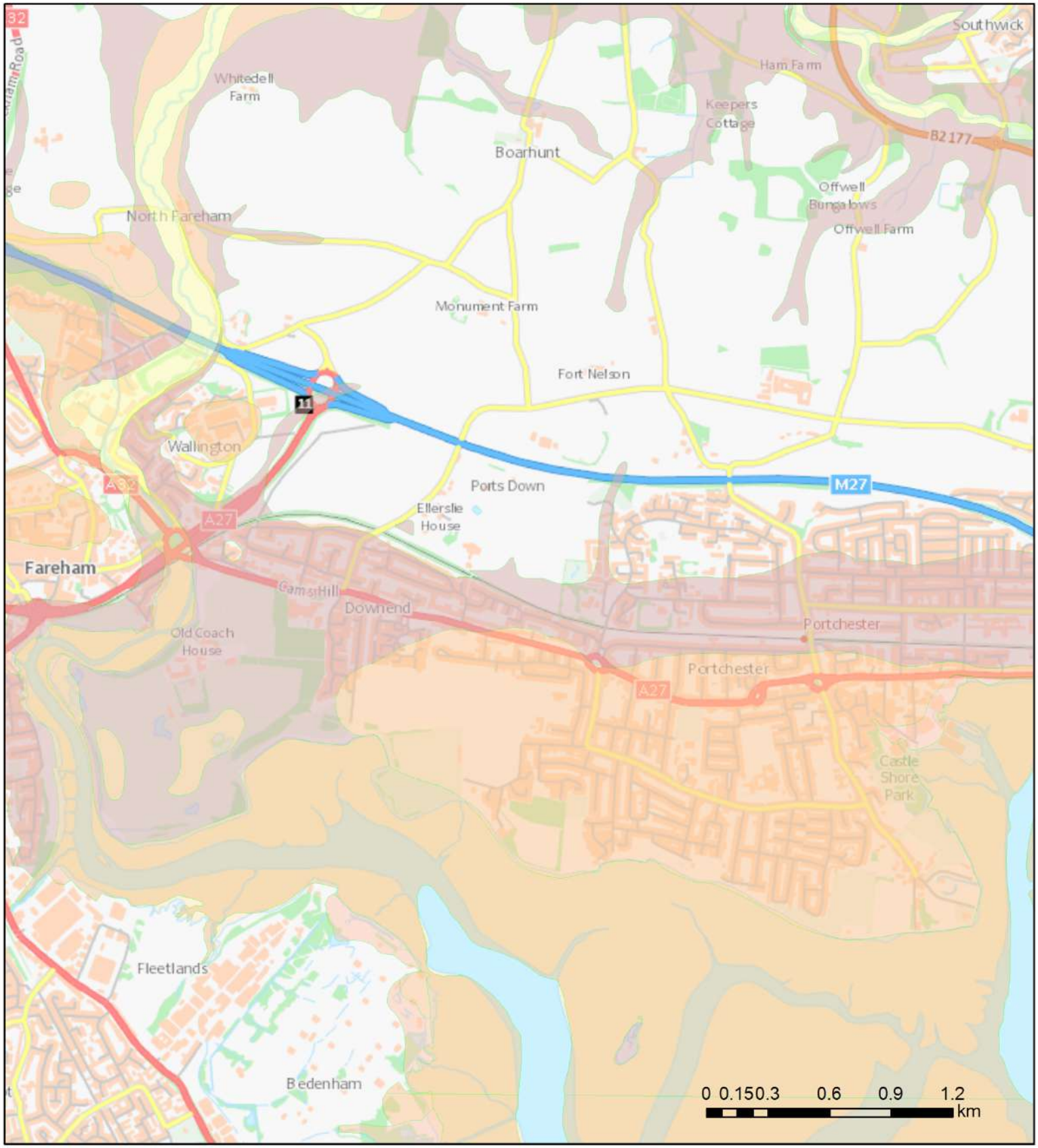
Geolndex Onshore Data Sources: NERC, Natural England, English Heritage and Ordnance Survey

Map Key

Bedrock geology 1:50,000 scale

- LONDON CLAY FORMATION - CLAY, SILT AND SAND
- SPETISBURY CHALK MEMBER - CHALK
- LEWES NODULAR CHALK FORMATION, SEAFORD CHALK FORMATION, NEWHAVEN CHALK FORMATION, CULVER CHALK FORMATION AND PORTSDOWN CHALK FORMATION (UNDIFFERENTIATED) - CHALK
- BOGNOR SAND MEMBER - SAND
- TARRANT CHALK MEMBER - CHALK
- WITTERING FORMATION - SAND
- PORTSDOWN CHALK FORMATION - CHALK
- LAMBETH GROUP - CLAY, SILT AND SAND
- WITTERING FORMATION - SAND, SILT AND CLAY
- NEWHAVEN CHALK FORMATION - CHALK

16-329 Superficial Deps



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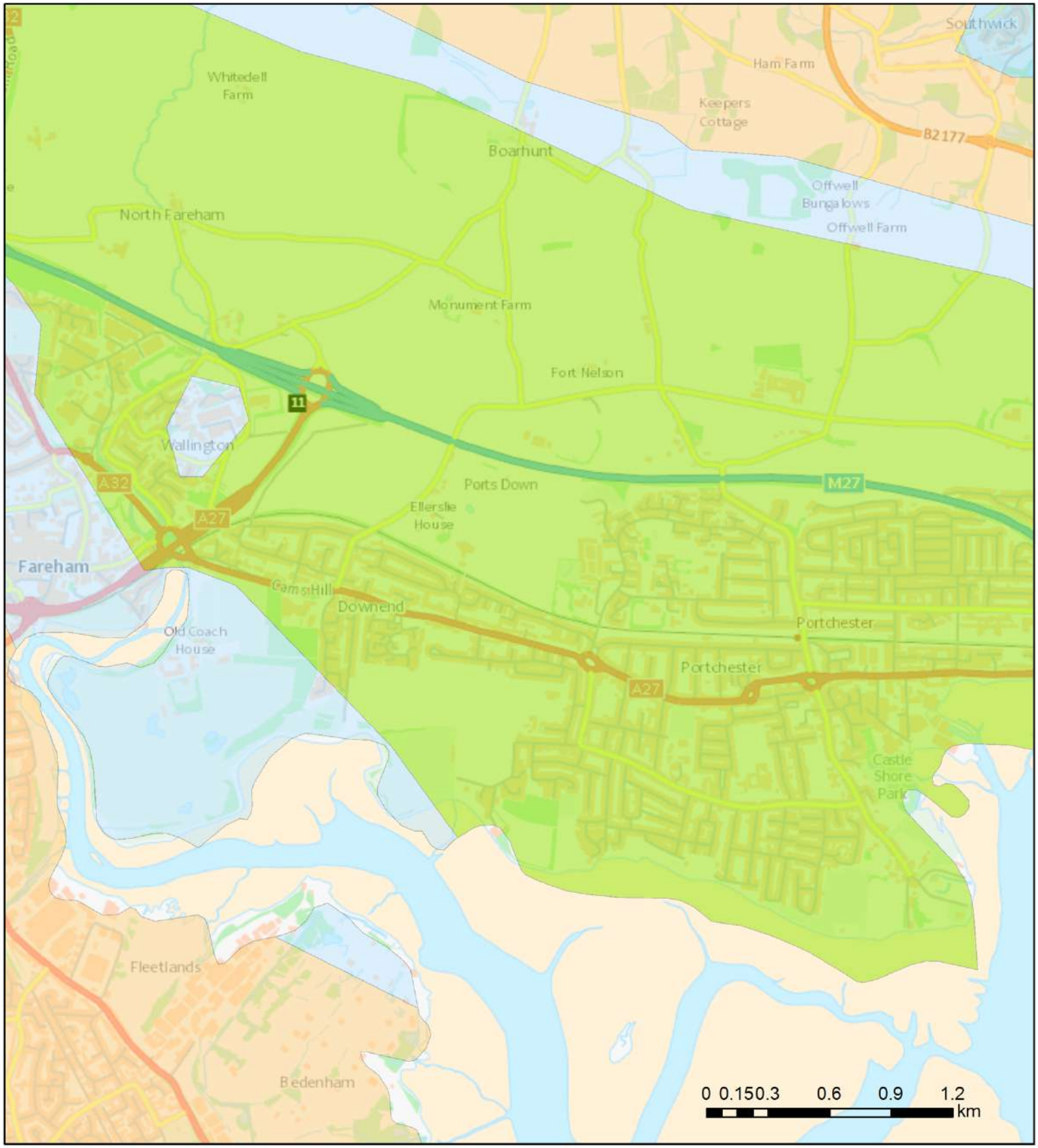
Geolndex Onshore Data Sources: NERC, Natural England, English Heritage and Ordnance Survey

Map Key

Superficial deposits 1:50,000 scale

- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- RAISED MARINE DEPOSITS - SAND AND GRAVEL
- HEAD - CLAY, SILT, SAND AND GRAVEL
- RIVER TERRACE DEPOSITS, 1 - SAND AND GRAVEL
- BEACH AND TIDAL FLAT DEPOSITS (UNDIFFERENTIATED) - CLAY, SILT, SAND AND GRAVEL

16-329 Hydrogeology



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Geolndex Onshore Data Sources: NERC, Natural England, English Heritage and Ordnance Survey

Map Key

Hydrogeology 1:625,000 scale

Aquifers with significant intergranular flow

- **Highly productive aquifer**
- **Moderately productive aquifer**
- **Low productivity aquifer**

Aquifers in which flow is virtually all through fractures and other discontinuities

- **Highly productive aquifer**
- **Moderately productive aquifer**
- **Low productivity aquifer**
- **Rocks with essentially no groundwater**

APPENDIX F

Ground Investigation Extracts

10th July 2020

Our ref: GE18989/GR03/200710

Russell Brewer
Miller Homes
Unit 3 Faraday Office Park
Rankine Road
Basingstoke
RG24 8QB

Dear Russell,

RE: Winnham Farm, Downend Road, Portchester

Further to your instruction, please find the preliminary findings presented below for the intrusive investigation undertaken on the western portion of this site as discussed and agreed with Miller Homes and the landowner.

Background

The site comprises farmland on chalk downland which falls towards the south and which is proposed to be developed for housing. The proposed development layout includes for the positioning of stormwater attenuation basins at four locations close to the site's southern boundary, this also comprising the crest of a cutting within which a main railway line is located.

The intrusive investigation undertaken on the western area included the following:

- Attendance of a specialist surveyor to undertake a buried utilities clearance survey using radiodetection and ground penetrating radar techniques. The survey would include capture of co-ordinates and levels of exploratory holes using GPS surveying.
- Attendance of a Geo-Environmental Engineer to supervise the intrusive investigation, undertake sampling, in-situ testing and logging of recovered soils from exploratory holes.
- Trial pitting for soakage testing, investigation of ground conditions in proximity to the railway cutting and along the approximate proposed access road alignment;
- Trial pit soakage tests (to BRE DG365) in the locations of the two westernmost attenuation basins;
- Dynamic sampler boreholes and super heavy dynamic in the vicinity of the proposed attenuation basins;
- Geotechnical testing to inform road design and geotechnical assessment.

Ground Conditions

The ground conditions encountered were generally as anticipated form published mapping and previous phases of investigation on this site and comprised a mantle of Topsoil overlying Head Deposits, with the underlying Chalk proven in some exploratory holes.

The depth to and condition of the Chalk was variable, as encountered during previous phases of investigation over the wider site.

A summary of ground conditions is presented in table 1 below, but given that the conditions varied between the exploratory holes, reference should be made to the individual exploratory hole logs for further information.

Top (m bgl)	Base (m bgl)	Description
0	0.1 – 0.2	TOPSOIL: Brown sandy gravelly clay with roots
0.1 – 0.2	0.1 – 5.0+	HEAD DEPOSITS: Brown sandy gravelly CLAY. Soft to vert stiff, generally stiff to very stiff consistency. Variable proportions of sand and flint gravel; Brown clayey flint GRAVEL; Yellow and orange-brown fine SAND with chalk gravel
0.7 – 5.0+	5.0+	CHALK: Structureless CHALK composed of off-white very weak to weak low density gravel sized chalk clasts and silt chalk matrix with occasional flint nodules. CIRIA Grade Dm, Dc and Dc-C.

Table 1 Summary of ground conditions encountered in exploratory holes

Dynamic probing was undertaken adjacent to each of the dynamic sampler boreholes. Whilst the blow counts varied with depth in each location, this variation was considered likely to reflect the variation in soil composition rather than indicate the presence of loose or voided ground which might be associated with solution features in the Chalk.

Copies of the exploratory hole logs are enclosed, together with site plans.

Groundwater Conditions

Groundwater was not encountered within the exploratory holes during the course of the intrusive investigation.

Groundwater levels can vary over time such as in response to heavy rainfall, during winter months or the like. As such, perched water and/or groundwater could be present at different times.

Trial Pit Soakage Testing

Soakage testing was undertaken in trial pits TP01 and TP02 in accordance with BRE DG365. The infiltration rates derived from the testing are presented in Table 2.

Location	Infiltration rate (m/s)		
	Test cycle 1	Test cycle 2	Test cycle 3
TP01	6.9×10^{-4}	3.2×10^{-4}	3.0×10^{-4}
TP02	4.4×10^{-6}	2.3×10^{-6}	2.3×10^{-6}

Table 2 Summary of infiltration rates from soakage testing

The testing in TP02 was much slower than TP01, such that whilst test cycle 2 ran overnight to a fully drained state in TP02, test cycles 1 and 3 required extrapolation of the 75% drained (25% full time). The extrapolation utilised the full test plot from test cycle 2, the final data point for which was the pit being dry and thus using this as a reference point is considered a conservative approach. In addition, estimating the infiltration rate from the measured test range for test cycles 1 and 3, as permitted under DG365, derived better rates thus further supporting that the approach used to extrapolate provides a conservative method of estimating the infiltration rate from TP02.

It should be noted that whilst infiltration may be achievable at these locations, the implications for stability of the adjacent railway cutting are still to be determined and thus the drainage strategy may be subject to revision depending on the outcome of the stability assessment and any response from Network Rail.

Geotechnical testing

Geotechnical laboratory testing is currently underway and results will be presented in due course.

Closure

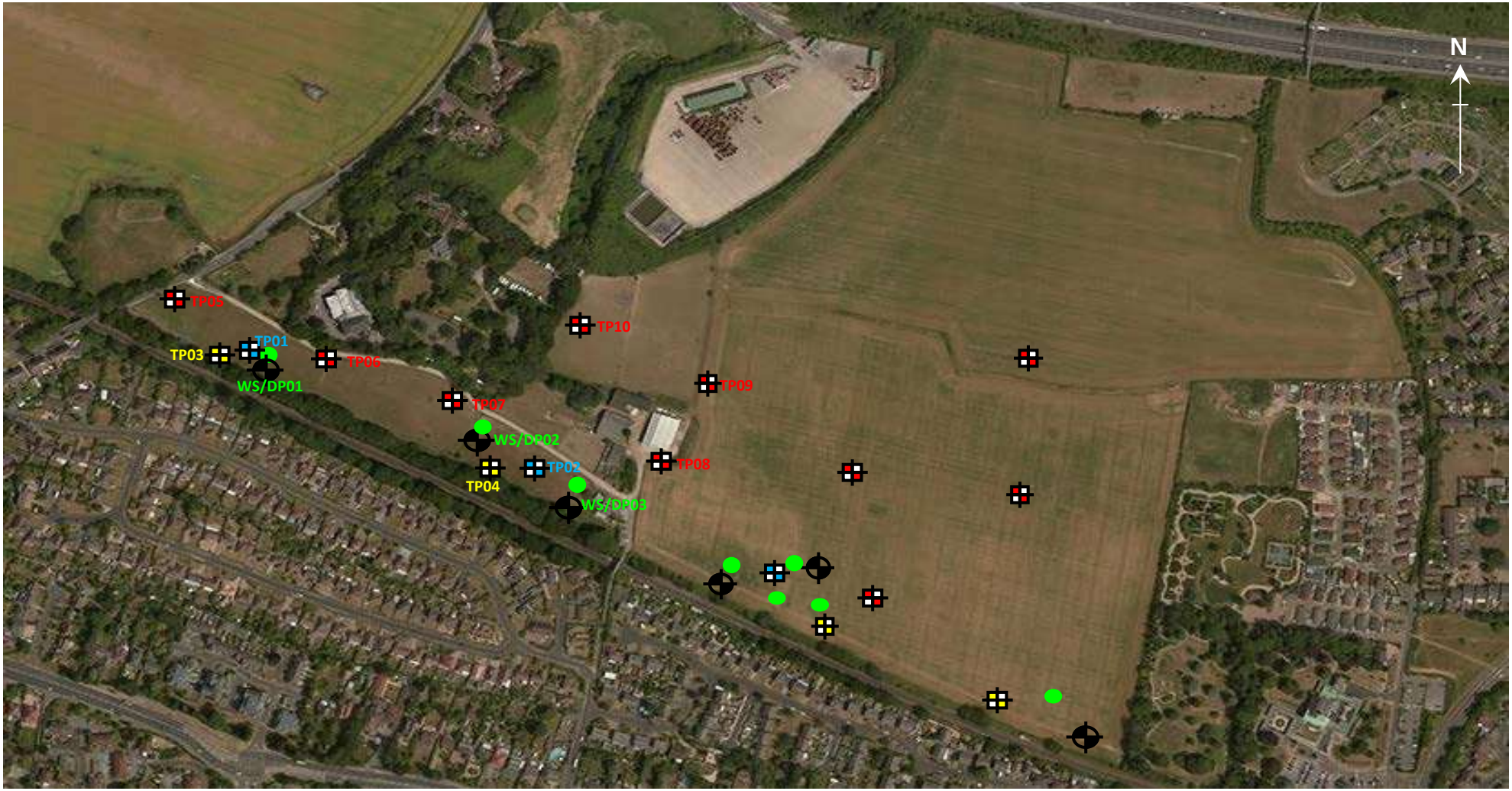
We trust we have interpreted your request correctly and provided sufficient information for your current requirements.

Should you have any queries please do not hesitate to contact us.

Yours sincerely
For and on Behalf of Geo-Environmental

GAVIN ROBERTS CGeol, BEng (Hons), MSc, FGS
Technical Director
gavin.roberts@gesl.net

Enc Figure 1 Site Location Plan
Figure 2 Exploratory Hole Location Plan
Exploratory hole logs
Soakage test results



Trial pit for soakage testing (assumed max c. 2m deep, 1-2m long, 0.6m wide)

Trial pit for geotechnical sampling (c.1-3m deep, 2m long, 0.6m wide)

Trial pit to inform geotechnical stability assessment (max c.3m deep, 2m long, 0.6m wide)

Small diameter (<100mm) borehole (max. 5m) deep)

Dynamic probe position (5m deep, <25mm diameter)

Project:	Land off Downend Road, Portchester PO16 8PX	**Title**	Exploratory Hole Location Plan
Client:	Miller Homes		
Ref No:	GE18989	**Version:**	2
Drawn:	GR/WH	**Date:**	06/07/2020
Figure:	2	**Scale:**	Not To Scale

Geo-Environmental Services Ltd

Unit 7 Danworth Farm, Cuckfield Road

Hurstpierpoint, West Sussex BN6 9GL

+44(0)1273 832972 www.gesl.net

Geo-Environmental

Geo-Environmental

Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL
www.gesl.net

Trial Pit Log

TrialPit No
TP01
Sheet 1 of 1

Project Name: Winnham Farm, Portchester	Project No. GE18989	Co-ords: 459821.87 - 106333.94 Level: 24.08	Date 02/07/2020
Location: Off Downend Road, Portchester		Dimensions (m):	Scale 1:25
Client: Miller Homes		Depth 2.00	Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15	23.93		Turf over stiff brown slightly sandy slightly gravelly clay with abundant rootlets. Gravel is sub-angular to rounded flint
	0.50 0.50	B PP	PP=3.5kg/cm2	0.73	23.35		Very stiff brown slightly sandy gravelly CLAY with frequent rootlets. Gravel is sub-rounded to rounded flint. Single brick fragment
	1.00	D		1.35	22.73		Structureless CHALK composed of off-white gravelly SILT. Gravel is sub-rounded to sub-angular weak low density chalk with rare sub-angular flint. Mixed locally with orangish brown clay. CIRIA Grade Dm
	1.50 1.60 1.80	D B D		2.00	22.08		Structureless CHALK composed of off-white gravelly SILT. Gravel is sub-rounded to sub-angular weak low density chalk with rare sub-angular flint gravel and cobbles. CIRIA Grade Dm, possibly grading to Dc
	2.00	D					End of Pit at 2.00m

1
2
3
4
5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental

Unit 7, Danworth Farm
Hurstpierpoint
BN6 9GL
www.gesl.net

Trial Pit Log

TrialPit No
TP02
Sheet 1 of 1

Project Name: Winnham Farm, Portchester	Project No. GE18989	Co-ords: 460040.08 - 106237.63 Level: 26.02	Date 02/07/2020
Location: Off Downend Road, Portchester		Dimensions (m):	Scale 1:25
Client: Miller Homes		Depth 2.00	Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	25.92		Turf over stiff brown slightly sandy gravelly clay with abundant rootlets. Gravel is rounded flint
							Stiff brown very gravelly CLAY with frequent rootlets. Gravel is rounded flint
	0.50 0.50	B PP	PP=2.7kg/cm2	0.48	25.54		Stiff orangish brown slightly sandy very gravelly CLAY with occasional rootlets. Gravel is sub-rounded to rounded flint
	1.00	D					
	1.50 1.50	D PP	PP=2.9kg/cm2	1.46	24.56		Stiff to firm brownish orange sandy gravelly CLAY. Gravel is sub-rounded to rounded flint
				1.60	24.42		Firm brownish orange slightly sandy slightly gravelly CLAY with occasional black specks. Gravel is rounded flint
	2.00 2.00	D PP	PP=0.9kg/cm2	2.00	24.02		End of Pit at 2.00m

1
2
3
4
5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Trial Pit Log	TrialPit No TP03 Sheet 1 of 1
Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords: 459796.45 - 106335.36 Level: 23.20	Date 02/07/2020
Location:	Off Downend Road, Portchester	Dimensions (m):	Scale 1:25
Client:	Miller Homes	Depth 3.00	Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.12	23.08		Turf over stiff brown slightly sandy gravelly clay with abundant rootlets. Gravel is sub-rounded to rounded flint
				0.37	22.83		Very stiff brown slightly sandy slightly gravelly CLAY with abundant rootlets and frequent roots (10mm). Gravel is rounded flint
	0.50 0.50	D PP	PP=3.5kg/cm2				Soft orangish brown slightly gravelly sandy CLAY with frequent rootlets. Gravel is rounded flint
	1.00	B		0.90	22.30		Brown clayey GRAVEL with frequent cobbles. Clasts are sub-rounded to rounded flint
	1.70	B		1.40	21.80		Firm whitish brown slightly sandy gravelly CLAY. Gravel is rounded flint with frequent weak sub-angular to sub-rounded chalk. Rare roots (5mm)
	2.00	D					
	2.50	D		2.30	20.90		Structureless CHALK composed of off-white slightly gravelly SILT. Gravel is sub-rounded to sub-angular weak low density chalk with occasional orange staining and rare black specks. Occasional sub-rounded flint gravel. CIRIA Grade Dm
	2.80	D					
	3.00	B		3.00	20.20		End of Pit at 3.00m

1 2 3 4 5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Trial Pit Log	TrialPit No TP04 Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords: 460011.39 - 106234.66 Level: 24.98	Date 02/07/2020
Location:	Off Downend Road, Portchester		Dimensions (m): Depth 3.00	Scale 1:25
Client:	Miller Homes			Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.12	24.86		Turf over stiff brown slightly sandy gravelly clay with abundant rootlets. Gravel is rounded flint
				0.26	24.72		Stiff brown very gravelly CLAY with frequent rootlets and occasional cobbles. Clasts are rounded flint
	0.50	B					Stiff orangish brown very gravelly CLAY with occasional rootlets. Gravel is rounded flint
	0.75	B		0.80	24.18		
	1.00 1.00	D PP	PP=3.2kg/cm2				Very stiff brownish orange sandy gravelly CLAY with occasional rootlets and a single root (25mm diameter). Occasional black specks. Gravel is rounded flint
	1.50 1.50	D PP	PP=3.7kg/cm2				
				1.70	23.28		Stiff becoming very stiff brownish orange slightly gravelly sandy CLAY with occasional rootlets and black specks. Gravel is rounded flint
	2.00 2.00	D PP	PP=2.9kg/cm2				
	2.50 2.60	D PP	PP=3.6kg/cm2	2.50	22.48		Very stiff brownish orange sandy CLAY with rare gravel. Gravel is rounded flint
	3.00 3.00	D PP	PP=3kg/cm2	3.00	21.98		End of Pit at 3.00m

Depth (m): 1, 2, 3, 4, 5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Trial Pit Log	TrialPit No TP05 Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords: 459728.31 - 106389.01 Level: 24.91	Date 02/07/2020
Location:	Off Downend Road, Portchester		Dimensions (m): Depth 1.00	Scale 1:25
Client:	Miller Homes			Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.13	24.78		Turf over very stiff brown slightly sandy slightly gravelly clay with abundant rootlets. Gravel is rounded flint
	0.50 0.50	B PP	PP=4kg/cm2				Very stiff brown slightly sandy gravelly CLAY with frequent rootlets. Gravel is rounded flint
				0.80	24.11		Very stiff whitish brown slightly sandy gravelly CLAY. Gravel is rounded flint with frequent sub-angular weak chalk
	1.00	D		1.00	23.91		End of Pit at 1.00m

1
2
3
4
5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Trial Pit Log	TrialPit No TP06 Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords: 459872.67 - 106335.51 Level: 26.81	Date 02/07/2020
Location:	Off Downend Road, Portchester		Dimensions (m): Depth 1.00	Scale 1:25
Client:	Miller Homes			Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	26.70		Turf over very stiff brown slightly sandy slightly gravelly clay with abundant rootlets. Gravel is rounded flint
	0.30	D					Very stiff brown desiccated slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is rounded flint
	0.50 0.50	B D		0.48	26.32		Structureless CHALK composed of off-white gravelly SILT of chalk. Gravel sized clasts of weak low density chalk with frequent orange staining and occasional rounded flint. CIRIA Grade Dm/Dc
	1.00	D		1.00	25.80		End of Pit at 1.00m

1
2
3
4
5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Trial Pit Log	TrialPit No TP07 Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords: 459956.08 - 106312.51 Level: 28.64	Date 02/07/2020
Location:	Off Downend Road, Portchester		Dimensions (m): Depth 1.20	Scale 1:25
Client:	Miller Homes			Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.12	28.52		Turf over very brown very stiff gravelly clay with abundant rootlets. Gravel is sub-rounded to rounded flint
				0.42	28.22		Stiff brown slightly sandy gravelly CLAY with frequent rootlets. Gravel is rounded flint
	0.40	D					Very stiff brownish orange slightly sandy very gravelly CLAY with frequent rootlets and occasional black specks
	0.50	B					
	1.00	D					
	1.00	PP	PP=3kg/cm2				
				1.20	27.44		End of Pit at 1.20m

1
2
3
4
5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Trial Pit Log	TrialPit No TP08 Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords: 460134.19 - 106246.55 Level: 29.37	Date 02/07/2020
Location:	Off Downend Road, Portchester		Dimensions (m): Depth 1.00	Scale 1:25
Client:	Miller Homes			Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	29.17		Crop over very stiff brown slightly sandy slightly gravelly clay with frequent rootlets. Gravel is sub-rounded to sub-angular flint
	0.50	B					Firm orangish brown slightly sandy gravelly CLAY. Gravel is rounded flint
	0.75	PP	PP=1.2kg/cm2				
	1.00	D		1.00	28.37		End of Pit at 1.00m

1
2
3
4
5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Trial Pit Log	TrialPit No TP09 Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords: 460175.35 - 106318.38 Level: 33.80	Date 02/07/2020
Location:	Off Downend Road, Portchester		Dimensions (m): Depth 1.00	Scale 1:25
Client:	Miller Homes			Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.18	33.62		Crop over stiff brown slightly sandy gravelly CLAY with abundant rootlets. Gravel is rounded flint
	0.50 0.50	B PP	PP=0.7kg/cm2				Firm orangish brown sandy gravelly CLAY with frequent rootlets. Gravel is rounded flint with occasional cobbles
	1.00 1.00	D PP	PP=0.9kg/cm2	1.00	32.80		End of Pit at 1.00m

1
2
3
4
5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Trial Pit Log	TrialPit No TP10 Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords: 460064.73 - 106363.67 Level: 35.25	Date 02/07/2020
Location:	Off Downend Road, Portchester		Dimensions (m): Depth 1.00	Scale 1:25
Client:	Miller Homes			Logged WH

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.13	35.12		Turf over stiff brown slightly gravelly sandy clay with abundant rootlets. Gravel is rounded flint
				0.39	34.86		Stiff brown slightly sandy gravelly CLAY with frequent rootlets. Gravel is rounded flint
	0.50	B					Firm orangish brown sandy gravelly CLAY with rare rootlets. Gravel is rounded flint with occasional cobbles
	1.00 1.00	D PP	PP=2.5kg/cm2	1.00	34.25		End of Pit at 1.00m

1
2
3
4
5

Water Strikes	
Depth Strike	Rose to (mbgl)

Remarks Dry

Stability

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Borehole Log	Borehole No. **WS01** Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords:	459829E - 106320N	Hole Type WLS
Location:	Off Downend Road, Portchester		Level:	24.07	Scale 1:25
Client:	Miller Homes		Dates:	02/07/2020	Logged By TM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05	24.02		Turf topped brownish silty fine SAND. Some coarse - fine gravel flint. Frequent rootlets Brownish silty fine SAND. Frequent medium - coarse gravel flints. Rare plastic fragments.
					0.50	23.56		Stiff brownish slightly silty CLAY. Occasional coarse sand - fine gravel flint.
		0.75	PP	4.5kg/cm2	0.80	23.26		Structureless CHALK coposed of a light brown silty chalk matrix with abundant very weak fine gravel clasts of chalk. Abundant coarse gravel flint. CIRIA Grade Dc
					2.10	21.96		White CHALK with brown staining on joint faces. Rare medium gravel flint at 2.5m. Possibly CIRIA Grade Dc to C
					3.20	20.86		White CHALK with brown staining on joint faces. Rare flint at 4.5m and 5.0m. Possibly CIRIA Grade Dc to C
					5.00	19.07		End of Borehole at 5.00m

1 2 3 4 5

Casing		Water Strikes (mbgl)		Chiselling (mbgl)	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to

Remarks

Dry

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	Borehole Log	Borehole No. **WS02** Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords:	459986E - 106265N	Hole Type WLS
Location:	Off Downend Road, Portchester		Level:	26.63	Scale 1:25
Client:	Miller Homes		Dates:	02/07/2020	Logged By TM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05	26.58		Turf topped light grey brown silty sandy clay with frequent rootlets 1mm dia. (Grass).
								Brown very silty SAND with some gravel of sub-angular to sub-rounded flint with rare medium-coarse iron nodules.
					0.40	26.23		Stiff dark brown clayey SILT
		0.50	PP	4.0kg/cm2				
					1.10	25.53		Stiff light orangish brown clayey SILT with coarse sand - fine gravel of chalk
		1.20	PP	4.2kg/cm2				
					1.30	25.33		Stiff orange-brown CLAY with frequent iron staining
		1.50	PP	4.0kg/cm2				
					1.70	24.93		Dark orangish brown clayey coarse flint GRAVEL
					2.00	24.63		Stiff orange-brown CLAY
		2.10	PP	4.0kg/cm2				
					2.20	24.43		Yellow to orangish brown slightly clayey fine SAND
					2.50	24.13		Light yellowish fine SAND with coarse gravel of very weak chalk. Weathered chalk soil.
					2.90	23.73		Yellowish brown silty sandy gravel of CHALK
					3.30	23.33		Structureless CHALK composed of a light brown silty matrix and abundant gravel clasts of very weak chalk and abundant flint of gravel size. CIRIA Grade Dc
					4.10	22.53		White CHALK. Partial loss of structure due to sampling technique but some joint faces visible and locally stainiend orange-brown or black flecked. Possible CIRIA Grade C
					5.00	21.63		End of Borehole at 5.00m

1 2 3 4 5

Casing		Water Strikes (mbgl)		Chiselling (mbgl)	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to

Remarks

Dry

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	# Borehole Log	Borehole No. **WS03** Sheet 1 of 1

Project Name:	Winnham Farm, Portchester	Project No. GE18989	Co-ords:	460069E - 106206N	Hole Type WLS
Location:	Off Downend Road, Portchester		Level:	23.73	Scale 1:25
Client:	Miller Homes		Dates:	02/07/2020	Logged By TM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05	23.68		Grass over light grey brown clayey SILT with frequent rootlets.
								Stiff rown very silty CLAY with fine to coarse sub angular flint gravel.
		0.50	D					
		1.50	D					
					1.80	21.93		Stiff orangish brown silty CLAY with occasional flint gravel. Some localised iron staining.
		2.10	PP	3.5kg/cm2				
		2.50	D					
		2.80	PP	3.5kg/cm2				
					3.30	20.43		Brown clayey flint GRAVEL
		3.50	D					
					3.60	20.13		Very stiff orangish brown silty CLAY with occasional flint gravel. Some localised iron staining.
		4.00	PP	3.5kg/cm2				
		4.50	D					
		4.50	PP	4.5kg/cm2				
		4.90	PP	3.2kg/cm2				
					5.00	18.73		End of Borehole at 5.00m

1 2 3 4 5

Casing		Water Strikes (mbgl)		Chiselling (mbgl)	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to

Remarks

Dry

AGS

Geo-Environmental	Soakaway Test Results (after BRE Digest 365)	Geo-EnvironmentalServices Limited Unit 7 Danworth Farm, Cuckfield Road, Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net

Project Name :	Winnham Farm, Portchester	**Job No. :**	GE18989
Client :	Miller Homes	**Date :**	02/07/2020

Pit reference	**TP01**
Pit depth (m)	2.05
Pit width (m)	0.50
Pit length (m)	1.60
Depth to standing water (m)	

Test 1

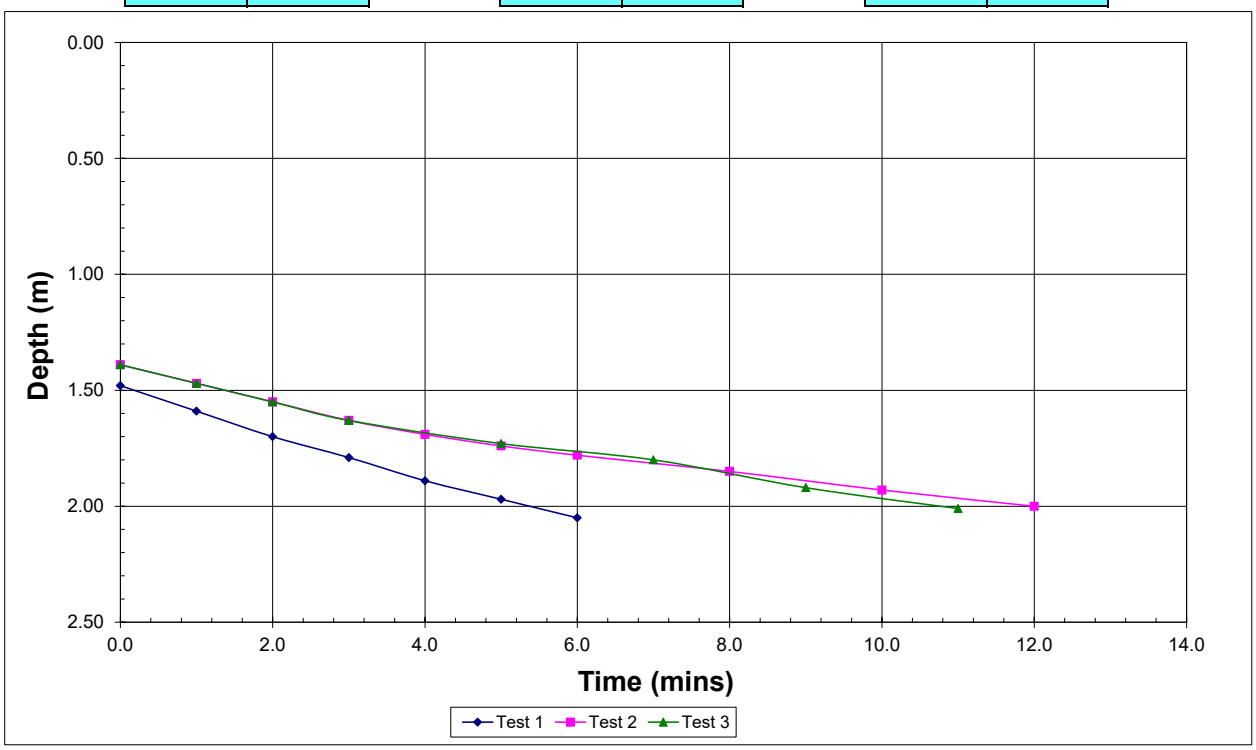
Time (min)	Depth (m)
0.0	1.48
1.0	1.59
2.0	1.70
3.0	1.79
4.0	1.89
5.0	1.97
6.0	2.05

Test 2

Time (min)	Depth (m)
0.0	1.39
1.0	1.47
2.0	1.55
3.0	1.63
4.0	1.69
5.0	1.74
6.0	1.78
8.0	1.85
10.0	1.93
12.0	2.00

Test 3

Time (min)	Depth (m)
0.0	1.39
1.0	1.47
2.0	1.55
3.0	1.63
5.0	1.73
7.0	1.80
9.0	1.92
11.0	2.01



Max. depth (m)	2.05	2.05	2.05
Effective depth (m)	0.57	0.66	0.66
75% effective depth (m)	1.62	1.56	1.56
50% effective depth (m)	1.77	1.72	1.72
25% effective depth (m)	1.91	1.89	1.89
t75 (min)	1.50	2.20	2.20
t50 (min)	2.80	4.90	4.90
t25 (min)	4.25	8.50	9.00
Vp 75-25	0.23	0.26	0.26
ap 50	1.997	2.186	2.186
tp 75-25	2.75	6.30	6.80

Soil infiltration rate (m/s)	**6.9E-04**	**3.2E-04**	**3.0E-04**
Soil infiltration rate (mm/hr)	**2.49E+03**	**1.15E+03**	**1.07E+03**

Geo-Environmental	Soakaway Test Results (after BRE Digest 365)	Geo-EnvironmentalServices Limited Unit 7 Danworth Farm, Cuckfield Road, Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net

Project Name :	Winnham Farm, Portchester	**Job No. :**	GE18989
Client :	Miller Homes	**Date :**	02/07/2020

Pit reference	**TP02**
Pit depth (m)	2.00
Pit width (m)	0.50
Pit length (m)	1.60
Depth to standing water (m)	

Test 1

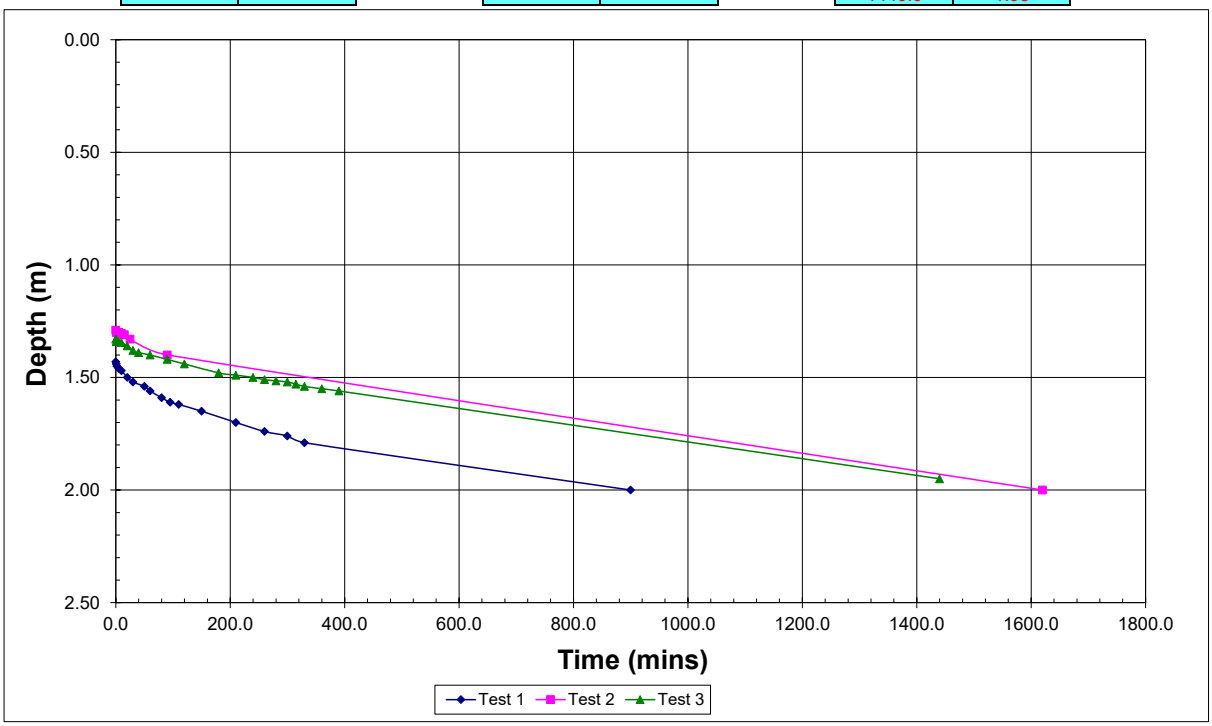
Time (min)	Depth (m)
0.0	1.43
1.0	1.44
2.0	1.45
5.0	1.46
10.0	1.47
20.0	1.50
30.0	1.52
50.0	1.54
60.0	1.56
80.0	1.59
95.0	1.61
110.0	1.62
150.0	1.65
210.0	1.70
260.0	1.74
300.0	1.76
330.0	1.79
900.0	2.00

Test 2

Time (min)	Depth (m)
0.0	1.29
1.0	1.30
2.0	1.30
5.0	1.30
10.0	1.31
15.0	1.31
25.0	1.33
90.0	1.40
1620.0	2.00

Test 3

Time (min)	Depth (m)
0.0	1.33
1.0	1.34
2.0	1.34
5.0	1.34
10.0	1.35
20.0	1.36
30.0	1.38
40.0	1.39
60.0	1.40
90.0	1.42
120.0	1.44
180.0	1.48
210.0	1.49
240.0	1.50
260.0	1.51
280.0	1.52
300.0	1.52
315.0	1.53
330.0	1.54
360.0	1.55
390.0	1.56
1440.0	1.95



	Test 1	Test 2	Test 3
Max. depth (m)	2.00	2.00	2.00
Effective depth (m)	0.57	0.71	0.67
75% effective depth (m)	1.57	1.47	1.50
50% effective depth (m)	1.72	1.65	1.67
25% effective depth (m)	1.86	1.82	1.83
t75 (min)	66.00	260.00	340.00
t50 (min)	240.00	800.00	800.00
t25 (min)	500.00	1160.00	1220.00
Vp 75-25	0.23	0.28	0.27
ap 50	1.997	2.291	2.207
tp 75-25	434.00	900.00	880.00

Soil infiltration rate (m/s)	**4.4E-06**	**2.3E-06**	**2.3E-06**
Soil infiltration rate (mm/hr)	**1.58E+01**	**8.26E+00**	**8.28E+00**

APPENDIX G

Southern Water Records