CampbellReith
consulting engineers

Alderholt Meadows, Fordingbridge

Flood Risk Assessment & Drainage Strategy

ALDERHOLT MEADOWS

For

Dudsbury Homes (Southern)

Project Number: 13577

November 2022

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EXECUTIVE SUMMARY

The Site located off Ringwood Road, Alderholt is being promoted through the Dorset Council Local Plan (the Local Plan). The outline application is for a mixed use development of up to 1700 dwellings including affordable housing and care provision; 10,000sqm of employment space in the form of a business park; village centre with associated retail, commercial, community and health facilities; open space including the provision of Suitable Alternative Natural Greenspace (SANG); biodiversity enhancements; solar array; and new roads, access arrangements and associated infrastructure. (All matters reserved apart from access off Hillbury Road). CampbellReith was appointed to produce a Drainage Strategy and Flood Risk Assessment (FRA) to assess the risk of flooding both to and from The Site in support of an outline planning application.

The total site boundary is approximately 122ha in area, however only approximately 54.2ha is shown as developable area within the masterplan. The Site currently comprises predominantly fields and green space.

There are multiple watercourses located on or within close proximity to The Site, as well as multiple lakes/ponds. Within The Site, there are several drains that flow to two ponds south of The Site. These ponds then flow to Hammer Brook which eventually flows to the River Avon (an Environment Agency main river), south east of The Site. Sleep Brook flows from north to south on the east of The Site and also runs into Hammer Brook.

In accordance with the National Planning Policy Framework (NPPF), residential development is classified as 'More Vulnerable'. The Environment Agency (EA) Flood Maps show The Site to be in Flood Zone 1 but that Sleep Brook to the west of The Site is susceptible to flooding (associated with Flood Zones 2 and 3). However, the extents of Flood Zone 2 and 3 remain within a localised area along the watercourse corridor and the masterplan is not envisaging any development in this part of The Site.

The geology of The Site indicates that it is likely to have a bedrock geology of Parkstone Sand Member (sand) with superficial river terrace deposits (sand and gravel). Areas to the west of The Site associated with the brook are likely to have a bedrock geology of Broadstone Clay Member (clay, silty) with superficial clay and silt head deposits.

Due to the size of The Site and based on the existing topography, the developable area has been split into four surface water catchments, each with individual discharge rate restrictions (to greenfield runoff rate) and outfall locations. The surface water runoff within each catchment will discharge into attenuation structures via swales located around The Site. The attenuation structure volumes and areas are based on a 1.9m deep pond with a 1.5m water level (with 400mm freeboard) and 1 in 3 batters to store water up to and including the 1 in 100 year + 40% climate change event.

Features such as linear storage and swales will also attenuate additional runoff and further measures likely to form part of the more detailed iterations of the drainage strategy for The Site in due course including pervious pavements, rainwater harvesting and green roofs to potentially reduce the overall attenuation requirements. However at this stage, specific SuDS components to be used are yet to be determined. This outline planning stage caters for the 1 in 100 year plus climate change and urban creep event without the benefit of these additional possible SuDS measures that could be introduced at detailed design.

1.0 INTRODUCTION

1.1. Brief

1.1.1. CampbellReith has been commissioned by Intelligent Land to prepare a Flood Risk Assessment (FRA) in accordance with the National Planning Policy Framework (NPPF), to inform the residential-led development with commercial, residential and educational end uses at the land off Ringwood Road, Alderholt, herein referred to as 'The Site'. The Site location is contained in Appendix A.

1.1.2. This assessment is a qualitative report that has been based on readily available information and is supported by a site walkover undertaken by CampbellReith on 4th May 2022.

1.1.3. The FRA has been prepared in support of an outline planning application for the above Proposed Development.

1.2. Project Overview

1.2.1. The Site is located off Ringwood Road, Alderholt. The outline application is for a mixed use development of up to 1700 dwellings including affordable housing and care provision; 10,000sqm of employment space in the form of a business park; village centre with associated retail, commercial, community and health facilities; open space including the provision of Suitable Alternative Natural Greenspace (SANG); biodiversity enhancements; solar array; and new roads, access arrangements and associated infrastructure. (All matters reserved apart from access off Hillbury Road).

1.3. Aims and Objectives

1.3.1. This report has been prepared in accordance with the NPPF[1] and the accompanying Planning Practice Guidance (PPG)[2].

1.3.2. This FRA aims to identify the sources of flooding related to The Site whilst demonstrating the feasibility of residential-led development with commercial, residential and educational end uses and how residual risks, if any, could be managed.

1.3.1. The objectives of this FRA are to:

- Establish whether The Site is likely to be affected by current or future flooding from any source;
- Establish whether proposed future development will increase flood risk elsewhere;
- Establish whether the measures proposed to deal with these effects and risks are appropriate;
- Ensure the evidence to satisfy the Local Planning Authority's (LPA) (if necessary) Sequential Test, and;
- Establish whether the Lead Local Flood Authority (LLFA) has records of flood risk on The Site and within the surrounding area;

[1] Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework. Ref: ISBN 978-1-5286-1033-9, CP 48.
[2] Department for Environment, Food & Rural Affairs and Environment Agency (2021) Planning Practice Guidance: Flooding and Coastal Change

- Present the findings of the assessment through a site constraints plan (if applicable)
- Demonstrate surface water can be managed on site by preparing a Preliminary Drainage strategy.

2.0 PLANNING POLICY

2.1. National Planning Policy Framework

2.1.1. The NPPF as updated in July 2021 sets out the government's national planning policies to protect people and property from flooding from either now or in the future which all Local Planning Authorities (LPAs) are expected to follow. There are three main steps which should be followed to ensure that the risk of flooding from development is minimised; assess the flood risk, avoid flood risk and manage and mitigate the flood risk.

2.1.2. The NPPF recommends that new development adopts a sequential, flood risk-based approach to the location of development, taking into account climate change and its impact to or by current or future flood risk. Subject to the type of development proposed and the relative flood zone (Zone 1 being the least risk and Zone 3b the greatest risk) in which the development site is located, there can be a requirement for a sequential test and an exception test.

2.1.3. The aim of the sequential test is to steer development to areas considered to be at the lowest risk from sources of flooding. If this is not possible then the exception test would be required demonstrating that the development would provide wider sustainability benefits to the community that would outweigh the flood risk and that the development would be safe for its lifetime taking into account the vulnerability of the users without increasing flood risk elsewhere and where possible reducing the current risk of flooding.

2.1.4. The NPPF also states that major developments should incorporate sustainable drainage systems (SuDS) unless there is clear evidence that this would be inappropriate.

2.2. Flood Risk and Coastal Change Planning Practice Guidance (PPG)

2.2.1. A FRA is required when developments are:

- Located within a Flood Zone 2 or 3 including minor development and change of use;
- More than 1 hectare (ha) in a Flood Zone 1;
- Less than 1 ha in a Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and sea (for example surface water, reservoirs); or
- In an area within a Flood Zone 1 which has critical drainage problems as notified by the Environment Agency (EA).

2.2.2. Annex 3 of NPPF defines the various flood risk vulnerability classifications and identifies the different types of development within each category. Table 2.1 on the following page summarises the flood risk vulnerability and incompatibility as extracted from Paragraph 079 (Table 2) of the PPG in relation to the above flood zones.

Table 2.1: Flood Vulnerability and Flood Zone 'Incompatibility' Table

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a†	Exception Test required†	×	Exception Test Required	✓	✓
Zone 3b*	Exception Test required*	×	×	×	✓*

Key ✓Development is appropriate.

× Development should not be permitted.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

2.3. Roles and Responsibilities

2.3.1. The EA is a statutory consultee for planning applications and is responsible for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea.

2.3.2. The roles of the LLFAs were established following the Flood Risk Regulations (2009) and the Flood and Water Management Act (2010). They are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses.

2.4. Climate Change[3]

2.4.1. The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. The EA provides guidance on the climate change allowances which should be considered when assessing the future risk of flooding.

2.4.2. EA has produced a range of climate change allowances to be applied to the peak river flow based upon the river basin management catchment. Management catchments are sub-catchments of river basin districts. The Site is located in the Avon Hampshire Management Catchment within the South West River Basin District. Table 2.2 shows the anticipated changes to peak flow, which should be considered for the area.

[3] EA Climate Change Allowances: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

2.4.3. The range of allowances is based upon a statistical analysis above the 50th percentile which is regarded as being the central category. The higher central is based upon the 70th percentile and the upper end is based on the 95th percentile.

Table 2.2: Peak River flow allowances by Avon Hampshire Management Catchment within the South West river basin district (use 1961 to 1990 baseline)

Allowance Category	Total Potential Change Anticipated For The '2020s' (2015 to 2039)	Total Potential Change Anticipated For The '2050s' (2040 to 2069)	Total Potential Change Anticipated For The "2080s" (2070 to 2115)
Upper end	33%	52%	102%
Higher central	19%	27%	56%
Central	12%	16%	38%

2.4.4. Climate change allowances should be applied to the peak rainfall intensities. The EA has produced updated rainfall allowances for both 1% and 3.3% annual exceedance rainfall events for each Management Catchment. Table 2.3 and Table 2.4 show the anticipated change in extreme rainfall intensity in small and urban catchments. The upper end allowances for both the 1% and 3.3% annual exceedance probability events should be applied for Flood Risk Assessments to assess the range of impact.

Table 2.3: EA Peak Rainfall Intensities (3.3% annual exceedance probability)

	Total Potential Change Anticipated For The '2050s' (2040 to 2069)	Total Potential Change Anticipated For The "2080s" (2070 to 2115)
Central	20%	25%
Upper end	35%	40%

Table 2.4: EA Peak Rainfall Intensities (1% annual exceedance probability)

	Total Potential Change Anticipated For The '2050s' (2040 to 2069)	Total Potential Change Anticipated For The "2080s" (2070 to 2115)
Central	25%	25%
Upper end	40%	45%

3.0 LOCAL POLICIES AND GUIDANCE

3.1.1. The following documents have been reviewed to inform this assessment:

- [Christchurch and East Dorset Councils] [April 2014] Christchurch and East Dorset Local Plan Part 1: Core Strategy
- [East Dorset District Council] [June 2014] Status of Policies in the East Dorset Local Plan (2002)
- Wessex Water Sewer Records
- [Halcrow Group Limited] [February 2008] Bournemouth, Christchurch, East Dorset, North Dorset and Salisbury Strategic Flood Risk Assessment (Level 1)
- [Dorset County Council] [August 2014] Local Flood Risk Management Strategy for Dorset
- [Dorset County Council] [July 2011] Preliminary Flood Risk Assessment
- [East Dorset District Council] [September 2005] Flood Risk, Groundwater and Sustainable Drainage Supplementary Planning Guidance

3.2. Local Flood Risk Policy

3.2.1. It is noted that the planning authority boundaries have changed and the new Local Plan will be under Dorset Council. However, the Dorset Council Local Plan at the time of writing this report is not yet available. This Local Plan is due to be adopted in winter 2023. Whilst work is being progressed on the new local plan for Dorset, existing adopted Development Plan Documents (DPDs) will continue to apply.

Christchurch and East Dorset Local Plan

3.2.2. The Christchurch and East Dorset Local Plan was adopted in April 2014 and sets out the Council's policies on development of the area.

3.2.3. The following policies should be considered when assessing flood risk and surface water management of The Site:

- Policy ME 3: 'Sustainable Development Standards for New Development'
- Policy ME 6: 'Flood Management, Mitigation, and Defence'
- Policy ME 7: 'Protection of Groundwater'

3.2.4. It is also recommended as part of the planning application process the following detail must be satisfied:

- The proposals are appropriate in relation to flood risk and pollution control;
- There are clear arrangements in place for ongoing maintenance;
- Where surface water management plans require a connection to drains or sewers in the highway, our consent is needed as well as consent from the owner of the drain or sewer pipes.

3.3. Strategic Flood Risk Assessment

3.3.1. A Level 1 SFRA was prepared by Halcrow Group Limited for Bournemouth, Christchurch, East Dorset, North Dorset and Salisbury Councils in February 2008. The following sources of flood risk were identified within the study area:

- Fluvial
- Surface Water
- Groundwater
- Sewer
- Artificial Sources

3.3.2. Applicable maps and extracts are included in Appendix B.

4.0 SITE CONTEXT

4.1. Site Location

4.1.1. The Site is located at the land off Ringwood Road, Alderholt**,** as illustrated in Figure 4.1 below. The nearest postcode for The Site is SP6 3DF and the National Grid Reference for the approximate centre of The Site is SU 12228 11913.

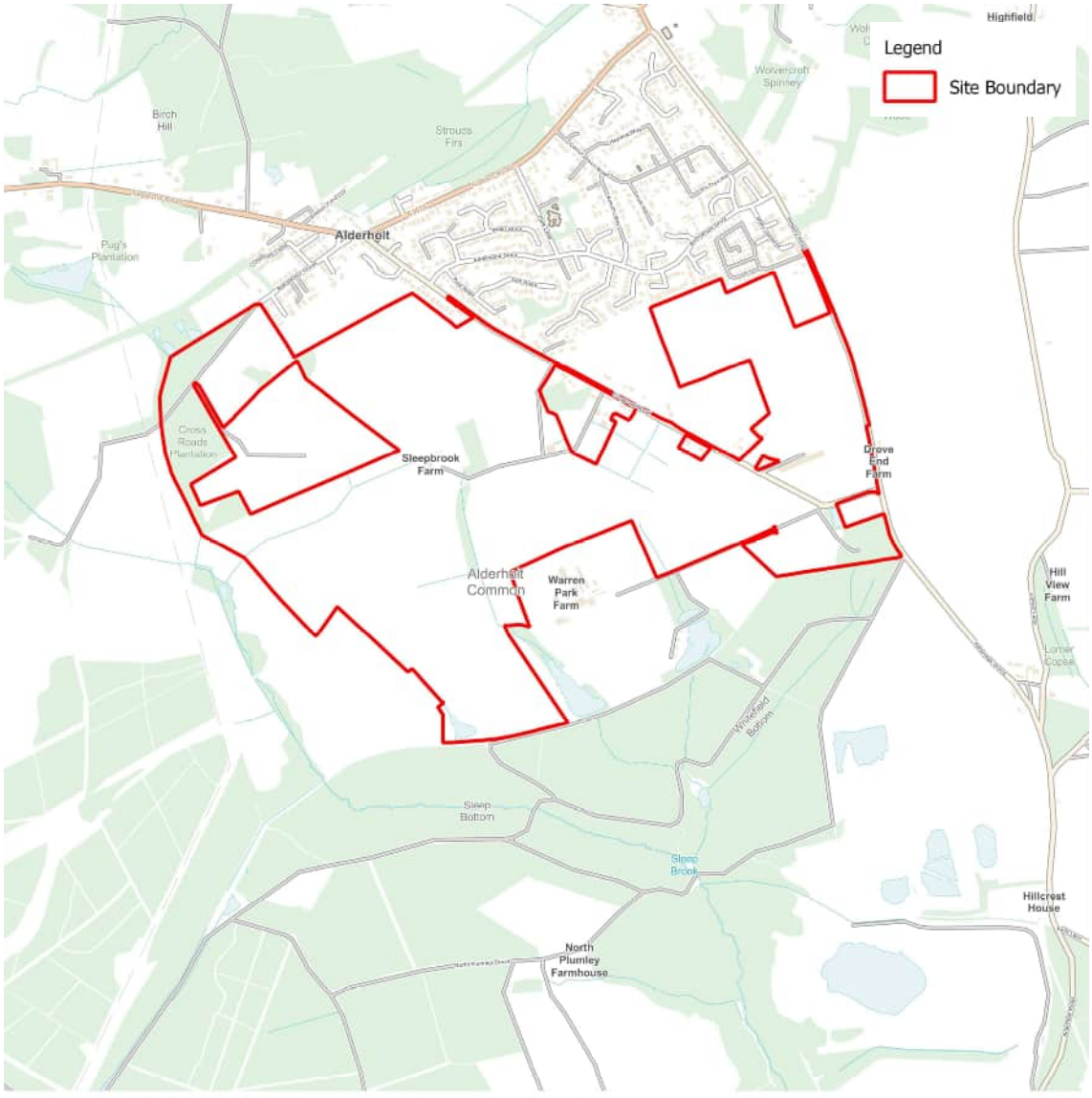


Figure 4.1: Site Boundary (not to scale)

4.1.2. Dorset Council is the Local Planning Authority (LPA) for The Site and also acts as the LLFA for the area.

4.1.3. The Site is predominantly greenfield. The Site is bound by greenfield land to the west, south and east and by residential areas to the north. Vehicular access is primarily available off Ringwood Road which bisects The Site to the north east and off Hillbury Road to the east of The Site.

4.1.4. The surrounding area predominantly consists of agricultural land and wooded areas. There is also a solar farm to the north west.

4.2. Site History

4.2.1. Information relating to The Site history has been obtained by reference to the Groundsure Report and CRH Desktop Study (13577-CRH-XX-XX-RP-LQ-0001_DTS). The Site history is open land in the south of The Site area dating back to 1870, in addition to trees and woods in the centre and to the west. Sleep Brook and a pond are present from 1886 in the south west and west. Marshland is present across The Site from 1889. Several farms are noted from 1972 and the south west site area is labelled as Alderholt Common from 1994.

4.3. Topography

4.3.1. Lidar data has been obtained as part of this assessment and is shown in Figure 4.2 below.

4.3.2. Due to The Site's predominant current use as agricultural land, it is expected that the existing ground cover would be undulating. The Site has a high point to the north, near The Site boundary, falling in all directions towards the outer boundary of The Site. Ground levels are typically shown to range from approximately 62m AOD at the high point to the north of The Site to approximately 42m AOD on the south western boundary and approximately 48m AOD to the southern boundaries. The eastern boundary also falls from approximately 62m AOD to 50m AOD in a southerly direction.

4.3.3. A topographical survey was undertaken by D G Yeatman Surveying & Engineering Ltd in February 2021 [ref: Alderholt-0221] and is contained in Appendix C.

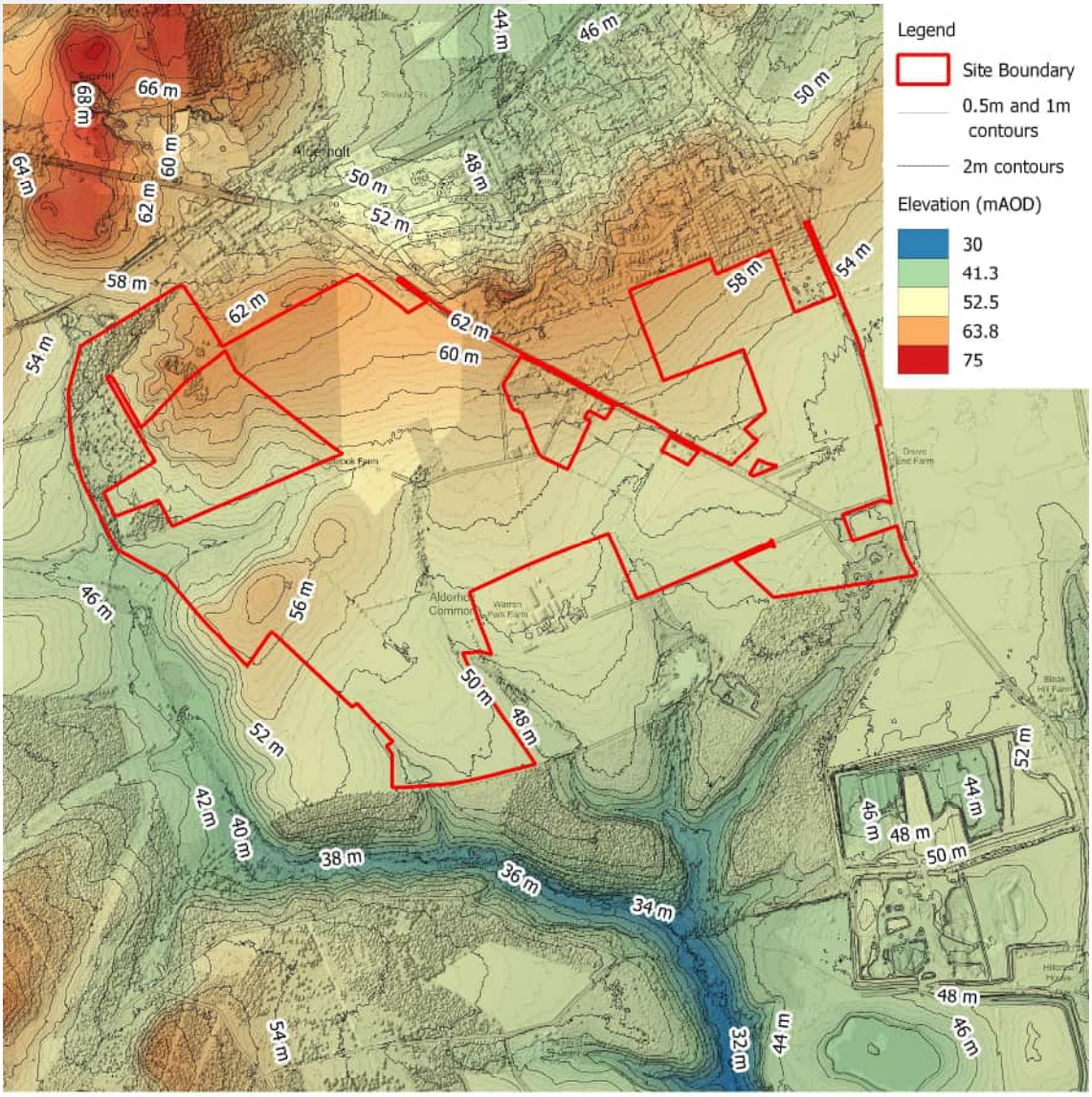


Figure 4.2: Lidar Data

4.4. Geology

4.4.1. British Geological Survey maps[4] indicate that The Site is likely to have a bedrock geology of Parkstone Sand Member (sand) with superficial river terrace deposits (sand and gravel). Areas to the west of The Site associated with the brook are likely to have a bedrock geology of Broadstone Clay Member (clay, silty) with superficial clay and silt head deposits. In addition, the Landis Soilscapes Map[5], shows ground conditions at The Site to be mostly "*Naturally wet very acid sandy and loamy soils*" with a high water table, but to the east it has areas of "*Slightly acid loamy and clayey soils with impeded drainage*" and "*Freely draining very acid sandy and loamy soils*".

4.4.2. Further ground investigations are required as part of future detailed design to confirm the on-site geology. The potential for infiltration is very varied across The Site and as such detailed

[4] https://www.bgs.ac.uk/
[5] http://www.landis.org.uk/soilscapes/#

infiltration testing will be required prior to the commencement of development to determine if areas of infiltration are feasible. For the purposes of this FRA, it has been assumed that infiltration is not feasible.

4.5. Hydrology

4.5.1. A desk-study review of Ordnance Survey mapping notes several land drains across The Site and a small pond in the south. Sleep Brook, an ordinary watercourse, is located to the far west of The Site and flows towards Hammer Brook, south of The Site boundary. Hammer Brook then flows into the River Avon, an EA main river, approximately 1.9 km to the east of The Site boundary. The site walkover on 4th May 2022 confirmed the presence of several on-site drainage ditches across The Site.

4.5.2. Figure 4.3 displays the watercourses on and adjacent to The Site.

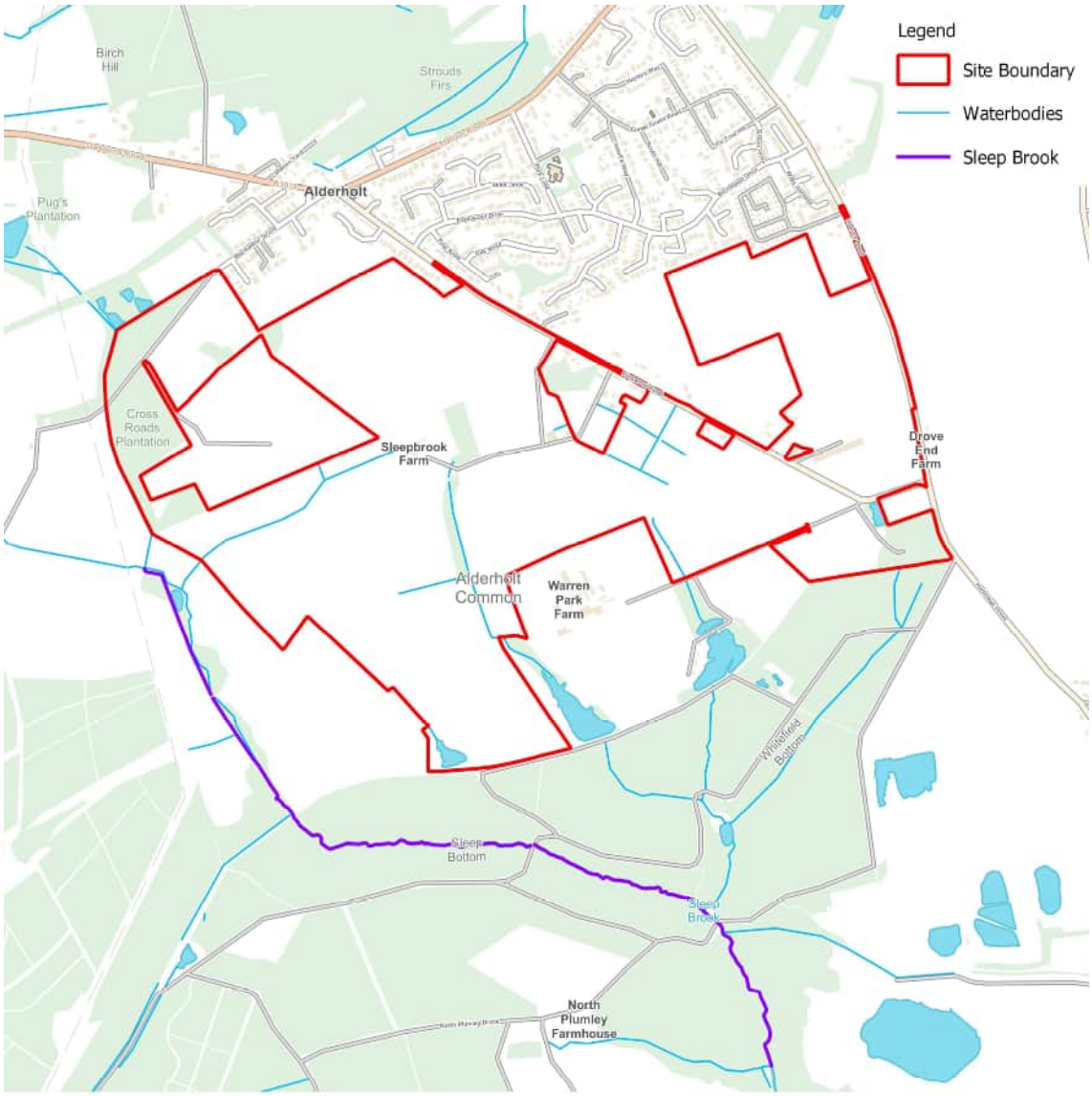


Figure 4.3: Onsite watercourses

4.6. Hydrogeology

4.6.1. The Site is not located on a Source Protection Zone (SPZ).

4.6.2. The Site is situated above a Secondary A aquifer. The superficial deposits are classified as a Secondary A aquifer. The groundwater vulnerability for The Site is medium to high.

4.6.3. The groundwater levels beneath The Site are currently unknown and are subject to confirmation from further winter groundwater monitoring prior to the detailed design stage.

4.7. Existing Site Drainage

4.7.1. Wessex Water is the incumbent sewerage utility provider for the area. A review of the Wessex Water's Records confirms there is no on site drainage; the closest public drainage system is to the north of Yhe Site serving the existing Alderholt village.

4.7.2. There is an existing Wessex Water Sewage Pumping Station on Sandleheath Road approximately 850m north of the northern site boundary. This existing pumping station discharges to Fordingbridge Sewage Works on Frog Lane (approximately 1.8km north east of The Site) via a rising main and existing sewer.

4.7.3. There are multiple watercourses located on or within close proximity to The Site, as well as multiple lakes/ponds. Within The Site, there are several drains that flow to two ponds south of The Site. These ponds then flow to Hammer Brook which eventually flows to the River Avon (an EA main river), south east of Yhe Site. Sleep Brook flows from north to south on the east of The Site and also runs into Hammer Brook.

4.7.4. The natural surface water flow paths have been devised from reviewing the available Lidar data and is shown on Figure 4.4 below.

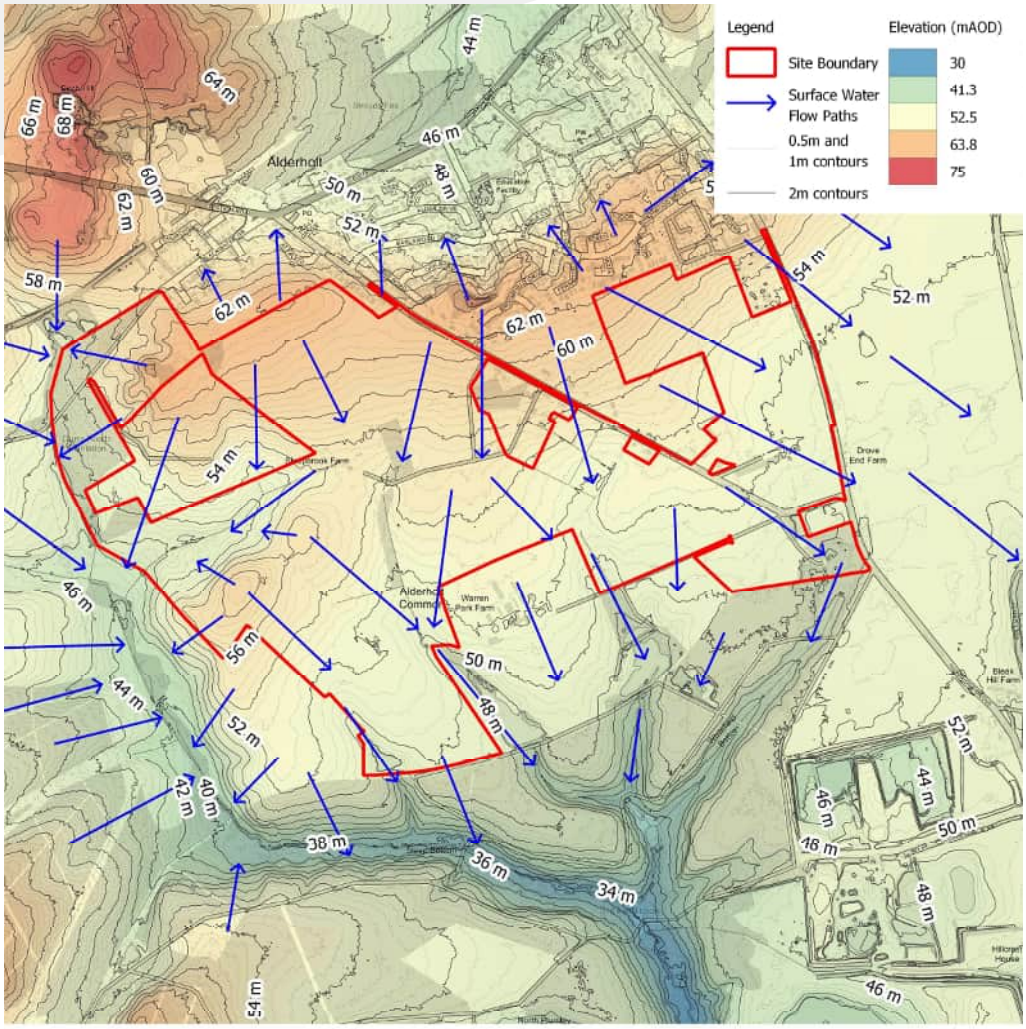


Figure 4.4: Surface Water Flow Paths

4.7.5. Due to the size of The Site and based on the existing topography, the developable area has been split into four surface water catchments each with individual discharge rate restrictions. The greenfield runoff rates for each of the four surface water catchments on The Site were calculated using the FEH method and are summarised in Table 4.1. The catchments are displayed in Figure 4.5.

Table 4.1: Greenfield runoff rates

Catchment	Greenfield Runoff Rate (litres/sec)			
	Qbar	1 in 1 year	1 in 30 year	1 in 100 year
1	139.6	118.7	321.1	445.4
2	114	96.9	262.2	363.6
3	137.2	116.6	315.5	437.6
4	107.6	91.5	247.5	343.2
Total Qbar (l/s)	498.4			

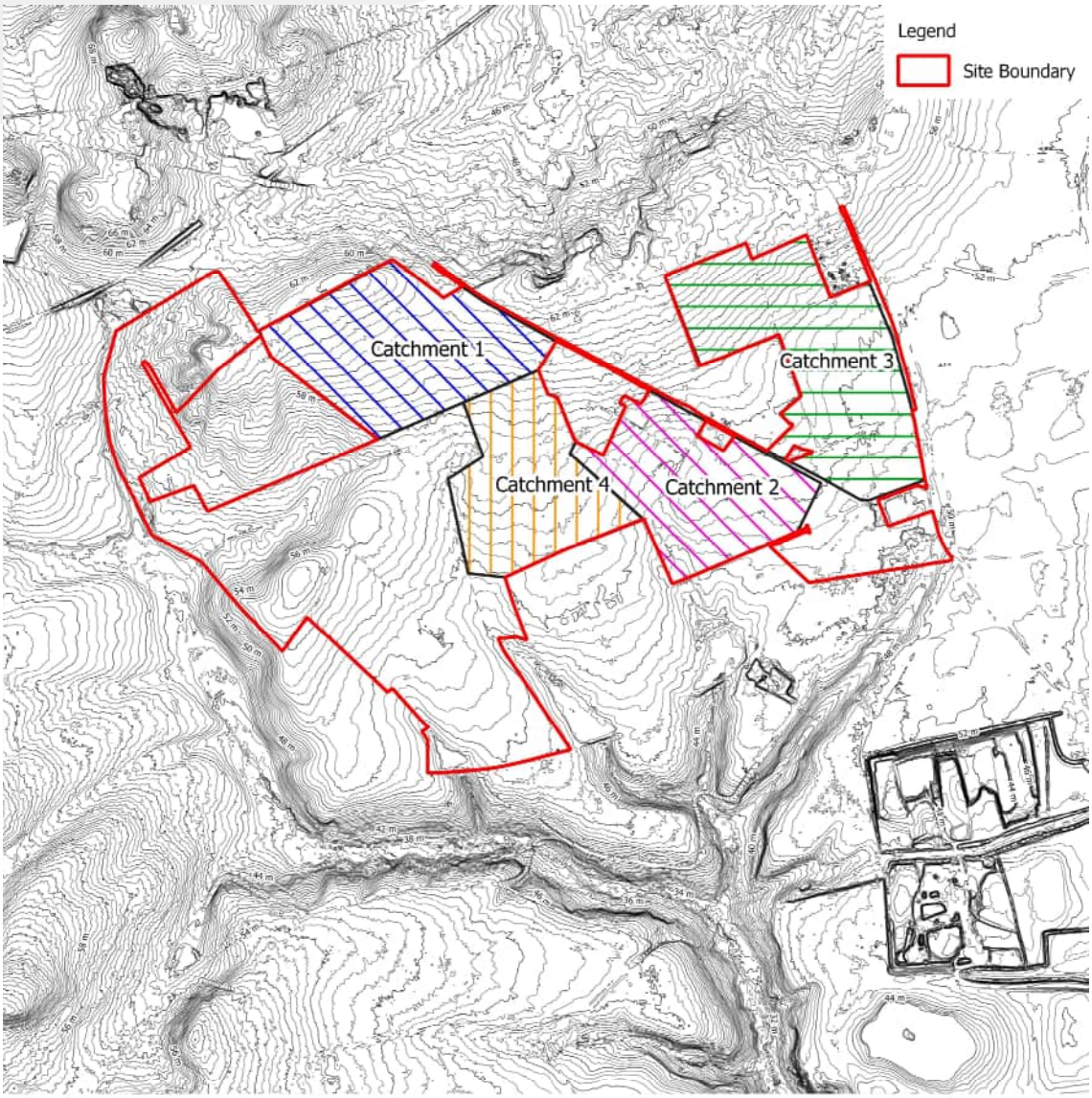


Figure 4.5: Surface Water Catchment Areas

5.0 EXISTING FLOOD RISK TO THE SITE

5.1. Fluvial Flood Risk

5.1.1. The EA Flood Zone Map shows The Site is primarily located within Flood Zone 1, with small sections located in Flood Zone 2 and 3, associated with Sleep Brook as shown in Figure 5.1. This area is a woodland and also within the Dorset Heathland Consultation Zone, as such the masterplan is not envisaging any development in this part of The Site. The EA defines Flood Zones from rivers or the sea in Paragraph 078 (Table 1) of the PPG, as follows:

- Flood Zone 1 (Low Probability): Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3).
- Flood Zone 2 (Medium Probability): Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map).
- Flood Zone 3a (High Probability): Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map).
- Flood Zone 3b (The Functional Floodplain): This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise:
    - land having a 1 in 30 annual or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or
    - land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 1 in 1,000 annual probability of flooding).

5.1.2. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

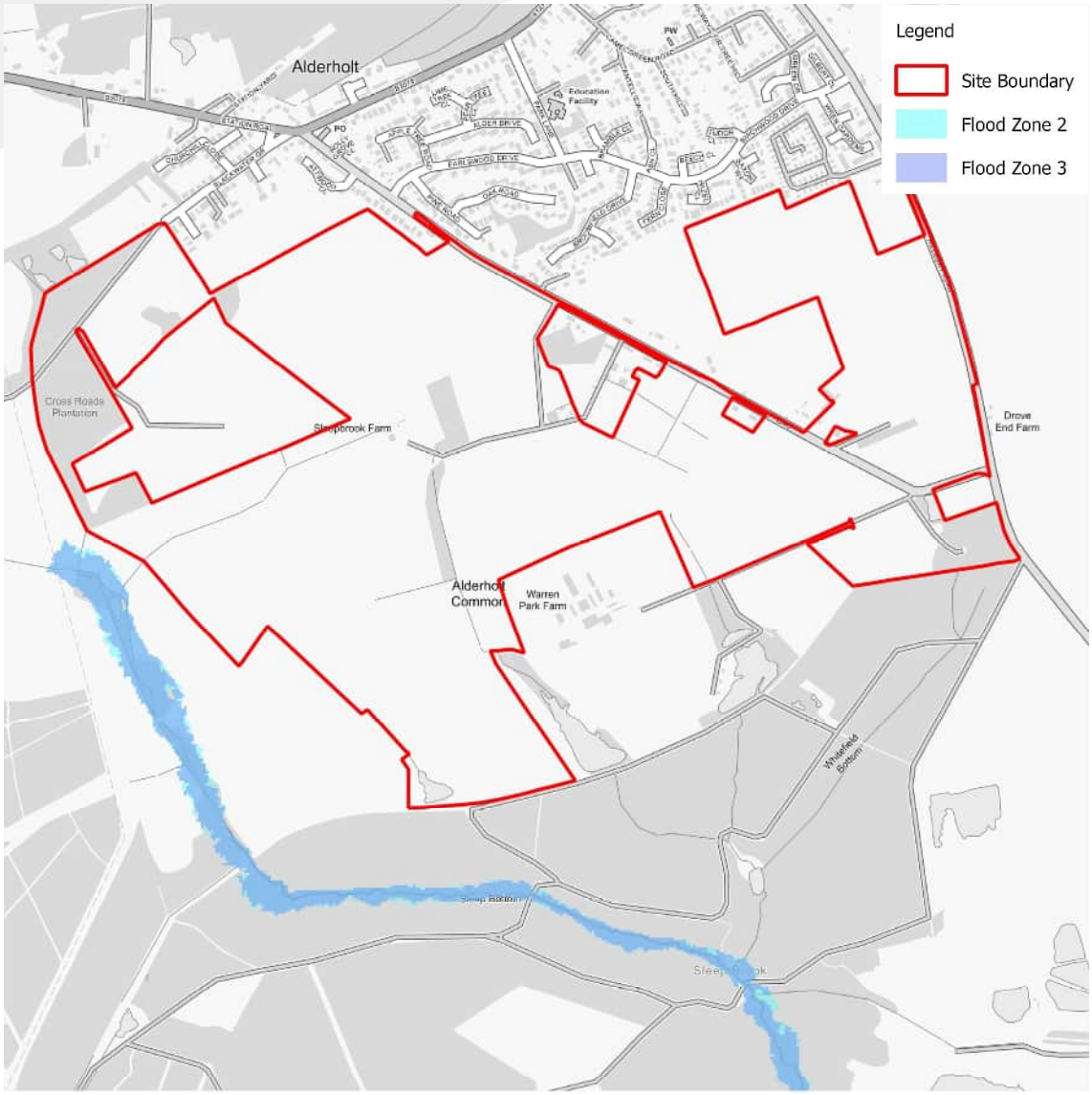


Figure 5.1: EA Updated Flood Zone map

5.1.3. According to the EA response for Product 4 data, no detailed fluvial flood risk modelling has been carried out in this location. The fluvial flood map in this area was produced using the National Generalised Model (JFLOW). The JFLOW Depth Map for the 100 year and 1000 year events and the Product 4 request response are contained in Appendix D.

5.1.4. The Dorset County Council Preliminary Flood Risk Assessment shows approximately 40-60 historic flood events in the parish where Alderholt is located.

5.1.5. The Bournemouth, Christchurch, East Dorset, North Dorset and Salisbury Strategic Flood Risk Assessment map displays a point of localised flooding located at Charing Cross, adjacent to The Site. This map is contained in Appendix B.

5.1.6. The Dorset County Council Local Flood Risk Management Strategy for Dorset states that Alderholt is at greatest risk of flooding from 'unknown sources', but has only three reports of internal property flooding.

5.1.7. However, since all the developable area of The Site is within flood zone 1, the risk of fluvial flooding is deemed as low.

5.2. Tidal Flood Risk

5.2.1. The Site is not at risk of tidal flooding.

5.3. Flood Alert Area

5.3.1. The Site does not fall within a flood alert or flood warning area.

5.4. Surface Water Flood Risk

5.4.1. The EA classifies surface water flood risk as follows:

- VERY LOW – the area has a chance of surface water flooding of less than 0.1%
- LOW – the area has a chance of surface water flooding of between 0.1% and 1%
- MEDIUM – the area has a chance of surface water flooding of between 1% and 3.3%
- HIGH - the area has a chance of surface water flooding of greater than 3.3%

5.4.2. The EA's Risk of Flooding from Surface Water (RoFSW) map is presented in Figure 5.2.

5.4.3. This shows The Site to be predominantly at very low to low risk of surface water flooding. However, medium to high risk surface water flooding is shown for small areas across the whole of The Site.

5.4.4. Alderholt is listed in the Local Flood Risk Management Strategy (LFRMS) as a community amongst the greatest number of records for highway flooding between October 2013 and February 2014, within the range of 5-9, compared to the maximum range in some parishes of 20+.

5.4.5. To prevent an increase in the risk of flooding to The Site or elsewhere, existing overland flow routes should not be obstructed but can either be maintained or diverted through The Site. The Preliminary Drainage Strategy discussed later within this report has been prepared to ensure that no surface water flooding/overland flow occurs during the 1 in 30 year and 1 in 100 year events. Surface water in excess of agreed runoff rates would need to be attenuated on site up to the 1 in 100 year plus 40% climate change and 10% urban creep.

5.4.6. By incorporating appropriate mitigation measures and designing the drainage strategy to ensure that no surface water flooding occurs, the risk of flooding from overland flow is considered to be low.

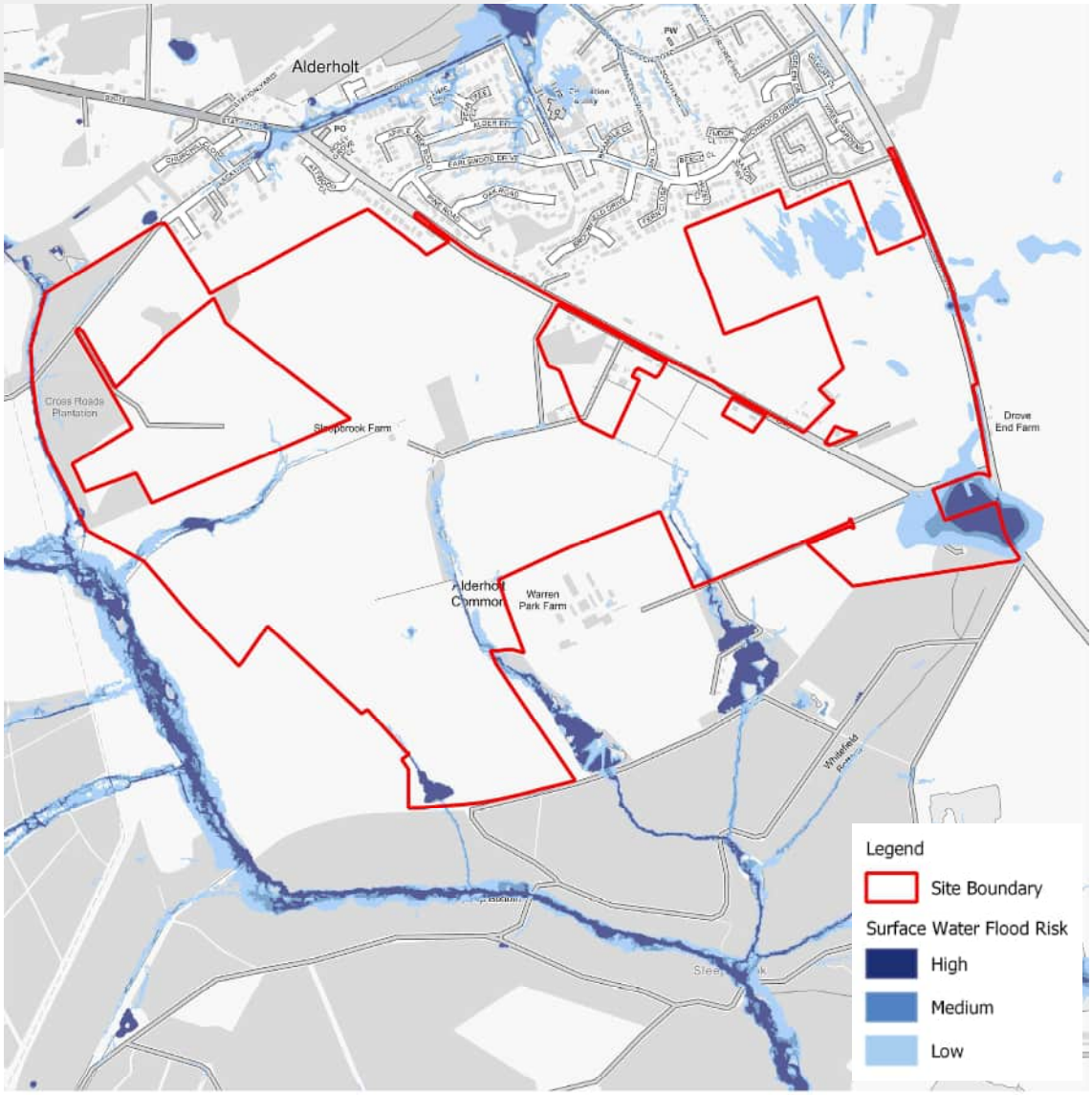


Figure 5.2: EA Updated Flood Map for Surface Water

5.5. Groundwater Flood Risk

5.5.1. A review of the SFRA confirms there have been groundwater flooding events within East Dorset.

5.5.2. However, the PFRA Areas Susceptible to Groundwater Flooding map shows The Site to be in an area of approximately 0-25% risk.

5.5.3. Further ground investigations and winter monitoring will be undertaken prior to detailed design to confirm the groundwater level beneath The Site.

5.5.4. The risk of groundwater flooding is low.

5.6. Sewer Flood Risk

5.6.1. Since The Site is wholly greenfield at present, the current risk of sewer flooding for the Proposed Development is very low.

5.7. Artificial Flood Risk

5.7.1. The EA's long term reservoir flood risk map shows that The Site is not in an area at risk of flooding from reservoir failure.

5.7.2. Based upon this information, it is considered that the risk of inundation from reservoirs to the Proposed Development is very low.

5.8. Flood Risk Summary

Table 5.1: Summary of existing flood risk

Flood Risk	Level of Risk
Fluvial	Low
Tidal	N/A
Surface Water	Low
Groundwater	Low
Sewer	Very Low
Artificial	Very Low

5.9. Climate Change Impact

5.9.1. Climate change must be considered as an integral part of any site-specific FRA in order to minimise the impact of future flooding and allow adequate consideration for resilience to alleviate the burden on potential future users of the Proposed Development.

5.9.2. As The Site is at low risk to fluvial and surface water flooding the impact of any future climate change is considered negligible.

6.0 DEVELOPMENT PROPOSALS

6.1. Proposed Development Description

6.1.1. The Site is being promoted through the Dorset Council Local Plan (the Local Plan). The outline application is for a mixed use development of up to 1700 dwellings including affordable housing and care provision; 10,000sqm of employment space in the form of a business park; village centre with associated retail, commercial, community and health facilities; open space including the provision of Suitable Alternative Natural Greenspace (SANG); biodiversity enhancements; solar array; and new roads, access arrangements and associated infrastructure. (All matters reserved apart from access off Hillbury Road).

6.1.2. The Proposed Development masterplan is contained in Appendix E.

6.1.3. The expected lifetime of the Proposed Development for the purposes of this FRA and guidance in the PPG is 100 years.

6.2. Vulnerability of Development

6.2.1. Paragraph 66 of the PPG defines the different categories of development in terms of flood risk vulnerability. Residential development is classified as More Vulnerable in terms of flood risk.

6.2.2. The majority of The Site (and all developable area) is in Flood Zone 1 and so it is considered sustainable in terms of Flood Risk. The section of The Site area that is in Flood Zone 2 and 3 is adjacent to the watercourse and no development is proposed in this area on the masterplan.

6.3. Urban Creep Allowance

6.3.1. New developments should factor in the effect of urban creep. This is the increase in impermeable area on developments due to conservatories/extensions/driveways etc.

6.3.2. For new housing, an additional increase of 10% to the proposed impermeable areas is considered the minimum allowance for urban creep.

6.3.3. For this drainage strategy, 70% of the developable area has been assumed to be impermeable area, which includes the allowance for urban creep.

7.0 SURFACE WATER MANAGEMENT

7.1. Overview

7.1.1. The surface water drainage system has been designed in accordance with the NPPF and the accompanying Guidance and Technical Standards for SuDS. It also complies with the prevailing requirements under Building Regulations Part H.

7.1.2. In line with the SuDS hierarchy under paragraph 80 of the PPG, surface water should be managed (in order of preference) by:

1.) Infiltration to the maximum extent that is practical – where it is safe and acceptable to do so

2.) Discharge to watercourses

3.) Discharge to surface water sewer, highway drain or another drainage system

4.) Discharge to combined sewers (last resort)

7.1.3. As the true potential of infiltration as a means of surface water disposal is currently unknown it has been discounted at this stage and the strategy is proceeding on the basis of discharge to watercourses. The watercourses are in close vicinity and this option is next in line in accordance with the hierarchy.

7.2. Site Constraints

7.2.1. A review of The Site characteristics has informed the following site constraints:

- Existing Land Drains across The Site
- An area of Flood Zone 2 and 3 to the west of The Site (outside of the developable area)

7.3. Existing and Proposed Impermeable and Permeable Areas

7.3.1. The red line boundary of The Site is wholly greenfield, but only approximately 54.2Ha is shown as developable area within the masterplan. The existing and proposed impermeable and permeable areas are presented in Table 7.1. The proposed impermeable area is based on 70% of the developable area.

Table 7.1: Existing and Proposed Impermeable and Permeable Areas

	Permeable (ha)	Impermeable (ha)
Existing	122	0
Proposed	84.1	37.9

7.4. Proposed Surface Water Runoff Rates

7.4.1. As previously mentioned, four surface water catchment areas have been analysed and the Greenfield runoff rate (Qbar) calculated for each as tabulated in Table 7.2.

7.5. Surface Water Drainage Strategy

7.5.1. The proposed drainage strategy layout presented in Appendix F, illustrates the SuDS features proposed to manage the surface water runoff from The Site.

7.5.2. The surface water drainage strategy aims to control runoff from impermeable areas at source and attenuate through SuDS features.

7.5.3. The following SuDS features have been considered within the proposed surface water drainage strategy:

- Swales
- Attenuation Structures

7.5.4. The surface water runoff within each catchment will discharge into the associated attenuation structures via swales.

7.5.5. Table 7.2 summarises the required attenuation volumes and plan areas for each of the catchments, based on a 1.5m deep basin plus a 400mm freeboard, with 1 in 3 side batters.

Table 7.2: Required attenuation per catchment

Catchment	Developable Area (ha)	Qbar (l/s)	Attenuation volume (m^3)	Attenuation Plan Area (m^2)
1	16	139.6	7430	5850
2	12.8	114	5830	4680
3	12.3	137.2	5190	4210
4	13.1	107.6	6150	4920

7.5.6. The proposed surface water drainage system can effectively control all runoff generated within The Site and maintain pre-development greenfield runoff, without increasing flood risk elsewhere. The proposed surface water drainage strategy is contained in Appendix F.

7.5.7. The maintenance of SuDS is vital ensuring that they work as efficiently as they set out to do and is discussed in Chapter 9.

7.6. Surface Water Quality

7.6.1. The SuDS components within the surface water drainage strategy have been designed in accordance with the guidance set-out in the SuDS Manual.

7.6.2. Treatment within SuDS components is essential for frequent low intensity and duration rainfall events, where urban contaminants are being mobilised and washed off urban surfaces and the aggregated contribution to the total pollutant load to the receiving surface water body is potentially high. For rainfall events greater than the 1 in 1 return period, the pollutants become diluted and the environmental risks will be reduced which means that the SuDS treatment process becomes less crucial. Treatment effectiveness is strongly linked to the hydraulic control of runoff, in particular velocity control and retention time.

7.6.3. Table 26.2 of the CIRIA SuDS Manual provides the pollution hazard indices for different land use classifications as shown in the table below.

Table 7.3: CIRIA Pollution hazard indices for different land use classifications

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Residential Roofs	Very Low	0.2	0.2	0.05
Commercial/Industrial Roofs	Low	0.3	0.2	0.05
Individual property driveways, residential car parks, low traffic roads, car parks with infrequent change	Low	0.5	0.4	0.4

7.6.4. The level of pollution associated with the Proposed Development is low.

7.6.5. Table 7.4 below summarises the treatment efficiency of different SuDS components discharging to surface waters as detailed in Chapter 26 of the SuDS Manual. As this report is in support of an outline planning application, numerous features are considered to be feasible on The Site at this stage and the main ones that are anticipated to be used have been listed in Table 7.3. Specific SuDS components to be used are yet to be determined.

Table 7.4: CIRIA Indicative SuDS Mitigation Indices for Discharges to surface water

	Mitigation Indices		
Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention System	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

7.6.6. Where multiple drainage features are used, the efficiency of the secondary system to treat water is reduced. The attenuation structures on site are anticipated to be a combination of detention basins and ponds. For the purpose of this mitigation assessment, the lowest value (detention basin) have been used as a worst case scenario. By using a swale discharging into a detention basin the combined mitigation indices is as follows:

Table 7.5: Mitigation Indices for Proposed Combined Drainage System

	Mitigation Indices	Total Mitigation
TSS	0.5 + 0.5(0.5)	0.75
Metals	0.6 + 0.5(0.5)	0.85
Hydrocarbons	0.6 + 0.5(0.6)	0.90

7.7. Foul Water Strategy

7.7.1. The foul strategy includes a proposed on-site pumping station at a low point of The Site in the south east, which will then discharge water towards the existing Sewage Pumping Station on Sandleheath Road (10588 SPS), approximately 2km north of The Site.

7.7.2. The current proposal, based on an initial assessment, is that this route from the proposed pumping station to the existing SPS would consist of a 250mm diameter rising main approximately 1km in length to a high point in Hillbury Road. At this high point, it is then proposed there would be a break chamber, from where a gravity sewer would be required to direct the flows to the existing SPS. This gravity sewer would need to be approximately 1km in length and 300mm in diameter (with the final 79m leading to the existing SPS at 600mm diameter). This could potentially make use of the existing sewer via upgrading or a new sewer would be constructed as required, dependant on further assessment and subject to change.

7.7.3. The proposed Drainage strategy drawing is presented in Appendix F.

7.7.4. To enable these proposals, further upgrades would be required on the existing drainage infrastructure downstream of the existing SPS. These upgrades would involve upsizing the outgoing sewers from the existing SPS as a result of the additional inflow.

7.7.5. Wessex Water has performed an assessment on their existing 10588 SPS and have determined that this strategy is feasible. They are supportive of the application and will continue to be involved in further assessments and decisions. Their Development Flow calculations and Proposed Development SPS calculations are presented in Table 7.6 and 7.7 respectively.

Table 7.6: Development Flow Calculations

Development Element	Calculations	Sewer Size Required	Calculation Source
1700 dwellings	17000 dwellings @ 4000 l/dwelling/day =6,800,000l/d =78.7l/s	450mm	SSG Section B3.1.1
60 bed care home	60 beds @ 200 l/dwelling/day =12,000l/d =0.14l/s	450mm	DS500 Appendix 1 "2015/16 Wessex Water Analysis of measured flows"
Employment use	0.964 ha @ 300 l/day/100m^2 =0.34l/s	450mm	DS500 Appendix 1 "2015/16 Wessex Water Analysis of measured flows"
Local centre	0.674 ha @ 150 l/day/100m^2 =0.12l/s	450mm	DS500 Appendix 1 "2015/16 Wessex Water Analysis of measured flows"
Development Total	78.7l/s + 0.14l/s + 0.34l/s + 0.12l/s = **79.3l/s**	**450mm**	**SSG Section B3**

Table 7.7: Proposed Development SPS Calculations

Development SPS Specifications	Calculations	Calculation Source
Development total flow	= 79.3 l/s	SSG Section B3
Development pump rate	= 79.3 l/s @ 50% = ~39 l/s	SSG Section D5.6.1
Rising main size required	SDR17 250mm external (221mm internal)	SSG Section D6.3.1
1700 dwellings	1700 dwellings @ 160 l/dwelling = 272,000 l/1000 = 272m^3	SSG Section D5.5.3
60 bed car home	0.14 l/s peak flow *60 sec* 60 min = 504 l/1000 = 0.5m^3	SSG Section D5.5.3
Land offered for employment use	0.34 l/s peak flow *60 sec* 60 min = 1,224 l/1000 = 1.2m^3	SSG Section D5.5.3
Local centre	0.12 l/s peak flow *60 sec* 60 min = 432 l/1000 = 0.4m^3	SSG Section D5.5.3
Development Total	272m^3 + 0.5m^3 + 1.2m^3 + 0.4m^3 = **274m^3**	**SSG Section D5.5.3**

8.0 FLOOD RISK FROM THE PROPOSED DEVELOPMENT

8.1. Fluvial Flood Risk

8.1.1. All developable areas within The Site are located outside of Flood Zones 2 and 3. Surface water runoff from the Proposed Development is to be controlled to no more than QBar in all storm events up to and including the 1 in 100 year plus climate change and urban creep. Therefore, the Proposed Development is unlikely to increase the fluvial flood risk on or off The Site.

8.2. Tidal Flood Risk

8.2.1. The Proposed Development will not increase the tidal flood risk on or off The Site.

8.3. Surface Water Flood Risk

8.3.1. The majority of The Site is in an area currently at very low to low risk from surface water flooding, with the exception of the areas associated with the land drains, brook and other existing drainage features.

8.3.2. The drainage strategy has been devised to best mimic natural flow paths across The Site and to suit the existing topography. Surface water from the Proposed Development will be managed in a dedicated SuDS network and is to be restricted to no more than QBar in all storm events up to and including the 1 in 100 year plus climate change.

8.3.3. Therefore the Proposed Development is not considered likely to increase the surface water flood risk on or off Yhe Site.

8.4. Groundwater Flood Risk

8.4.1. The Proposed Development is residential-led which would have little to no impact to natural groundwater movements.

8.4.2. The Proposed Development is unlikely to increase the groundwater flood risk to The Site.

8.5. Sewer Flood Risk

8.5.1. The Proposed Development will not increase the sewer flood risk on or off The Site.

8.6. Artificial Flood Risk

8.6.1. The Proposed Development is will not increase the artificial flood risk on or off The Site.

8.7. Climate Change Impact

8.7.1. The impact of climate change has been appropriately factored into the proposed drainage design in line with all current best practice and guidance.

9.0 SCHEDULE OF MAINTENANCE

9.1. Introduction

9.1.1. The maintenance of SuDS features is vital ensuring that they work as efficiently as they set out to do. Maintenance activities can be broadly defined as:

- Regular maintenance – basic tasks carried out regularly;
- Occasional maintenance – tasks that are required periodically but on a much less frequent basis; and
- Remedial maintenance – tasks required when a fault needs rectifying and often includes unforeseen events.

9.1.2. As this report is in support of an outline planning application, numerous features are considered to be feasible on The Site at this stage and the main ones that are anticipated to be used have been considered in these maintenance requirements. However, specific SuDS components to be used are yet to be determined.

9.1.3. Maintenance requirements for each potential SuDS feature has been outlined below.

9.2. Filter Drains

Construction

9.2.1. During construction it is important to prevent muddy water from flowing into the system. Where possible, construction should be undertaken during dry periods. The filter drains should be constructed with adequate fall to ensure the area drains efficiently. During construction the contractor must ensure the designed width and depth are correct and the geotextile has the specified porosity.

Maintenance Schedule

9.2.2. The table below shows the operation and maintenance requirements for filter drains, taken from the CIRIA C753 SuDS Manual.

Table 9.1: Operation and maintenance requirements for filter drains (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots when they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	Clear perforate pipework or blockages	As required

9.3. Swales

Construction

9.3.1. Construction vehicles and equipment not directly involved in the construction of the rills and swales should be kept away from these areas. Excavations for the swales should aim to be undertaken in times of dry weather, when possible, to prevent mobilisation of sediments from exposed surfaces. Exposed surfaces after rill or swale excavations should be stabilised as soon as possible with grass seed and straw mulch. Perimeter controls should be installed prior to construction to protect watercourses.

Maintenance Schedule

9.3.2. The table below shows the operation and maintenance requirements for the swale, taken from the CIRIA C753 SuDS Manual.

Table 9.2: Operation and maintenance requirements for swales (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass - to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Inspect check dams for blockages and failure.	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

9.4. Permeable Paving

Construction

9.4.1. Construction vehicles and equipment not directly involved in the construction of the pervious pavements will be kept away from these areas. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate, to manage the risks associated with, and to intercept the discharge of sediment laden runoff. Landscaping activities will be carefully designed and carried out to prevent deposition of topsoil, turf and other materials on the surface of the pavement. Infiltration surfaces will not be compacted and will be protected at all times. Excavations for the pervious pavement installation should aim to be undertaken in times of dry weather, when possible, to prevent mobilisation of sediments from exposed surfaces during rainfall events. Surfaces exposed as part of the pervious paving installation works should be stabilised as soon as possible. Perimeter controls should be installed prior to construction to protect watercourses.

Maintenance Schedule

9.4.2. The table below shows the operation and maintenance requirements for the pervious pavements which are in accordance with the CIRIA C753 SuDS Manual.

Table 9.3: Operation and maintenance requirements for pervious pavements (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations - pay particular attention to areas where water runs onto pervious surfaces from adjacent impervious areas as these areas are most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using Glyphosate applied directly onto the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three-monthly, 48 hrs after large storms in first six months
	Assess silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

9.5. Soakaways

Construction

9.5.1. Construction vehicles and equipment not directly involved in the construction of the soakaways will be kept away from these areas. The construction activities should not clog the infiltration system or compact the underlying soils. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate, to manage the risks associated with, and to intercept the discharge of sediment laden runoff from discharging into the soakaway.

9.5.2. Excavations for the pervious pavement installation should aim to be undertaken in times of dry weather, when possible, to prevent mobilisation of sediments from exposed surfaces during rainfall events.

Maintenance Schedule

9.5.3. The table below shows the operation and maintenance requirements for the detention basins, taken from the CIRIA C753 SuDS Manual.

Table 9.4: Operation and maintenance requirements for soakaways

Maintenance Schedule	Required Action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial Action	Reconstruct soakaway and/ or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

9.6. Detention Basins

Construction

9.6.1. Construction vehicles and equipment not directly involved in the construction of the detention basin will be kept away from these areas. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate, to manage the risks associated with, and to intercept the discharge of, sediment laden runoff prior to its discharge to nearby watercourses. Excavations for the detention basin should aim to be undertaken in times of dry weather when possible, to prevent mobilisation of sediments, during rainfall events. Surfaces exposed as part of the detention basin construction should be stabilised as soon as possible, by the use of hydroseeding or an alternative approved approach. Perimeter controls should be installed prior to construction to protect watercourses. Perimeter controls should be installed prior to construction to protect watercourses.

Maintenance Schedule

9.6.2. The table below shows the operation and maintenance requirements for the detention basins, taken from the CIRIA C753 SuDS Manual.

Table 9.5: Operation and maintenance requirements for detention basins (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass - public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, and autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc. for evidence of blockage and/or physical damage	Monthly
	Inspect silt accumulation rates in the detention basin and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices, e.g. penstocks	Half yearly
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay.	Every 1-5 years, or as required
	Remove sediment and planting from one quadrant of the main body of detention basins without sediment forebays.	Every 5 years, or as required
Occasional maintenance	Remove sediment from the main body of big detention basins when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. every 25-50 years
Remedial actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate detention basin when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate inlets, outlets and overflows.	As required

9.7. Bio-retention areas, Rain Gardens and Tree Pits

Construction

9.7.1. Construction vehicles and equipment not directly involved in the construction of the tree pits will be kept away from these areas. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate,

to manage the risks associated with, and to intercept the discharge of, sediment laden runoff prior to its discharge to the drainage network. Excavations for the tree pits should aim to be undertaken in times of dry weather when possible, to prevent mobilisation of sediments, during rainfall events. Surfaces exposed as part of the tree pit construction should be stabilised as soon as possible. Perimeter controls should be installed prior to construction. Root protection measures should be undertaken if working in proximity to existing trees.

Maintenance Schedule

9.7.2. The table below shows the operation and maintenance requirements for rain gardens and tree pits, taken from the CIRIA C753 SuDS Manual.

Table 9.6: Operation and maintenance requirements for tree pits (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass - public areas	Monthly (during growing season)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc. for evidence of blockage and/or physical damage	Monthly
	Inspect silt accumulation rates in the rain garden/tree pit and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices	Half yearly
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay.	Every 1-5 years, or as required
Occasional maintenance	Remove sediment from the main body of the tree pits when water volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. every 25-50 years
	Check edging and kerbing plus any inlets to rain garden/tree pit and repair/replace if required	As required
Remedial actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate tree pit when signs of eutrophication are detected	As required
	Repair/rehabilitate inlets, outlets and overflows.	As required

9.8. Green Roof

9.8.1. Maintenance frequency varies pertaining to the complexity of the green roof; intensive green roofs require regular inspection and action, this may include weekly mowing of grassed areas and weeding of plant beds. On the other hand, extensive green roofs will be managed with a more subtle approach, biannual visits to remove litter, invasive plants species as well as checking fire breaks and drains.

9.8.2. Maintenance responsibility for green roof systems should be placed with a responsible organisation with specialist training in green roof care, all maintenance actions must comply with appropriate health and safety regulations, especially as this encompasses regulations for working at height (e.g. operators require safety fastenings to work at roof level). Training and guidance information for operating and maintenance the roof is to be distributed to all property owners and tenants.

9.8.3. Roof access points should be designed with safety and mobile convenience at foremost, providing secure points for harness attachments where approach of the roof edges is required. CDM 2015 requires designers to ensure that all maintenance risks have been identified, eliminated, reduced and/or controlled where appropriate. This information will be required as part of the health and safety file.

9.8.4. The table below provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive and some actions may not always be required.

9.8.5. Maintenance Plans and schedules should be developed during the design phase, and will be specific to the type of roof that is adopted. Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements.

Table 9.7: Maintenance and Operation of Green Roofs (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth.	Biannually
	During establishment (ie year one), replace dead plants as required	Monthly (usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where >5% loss of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Biannually or as required
	Remove nuisance and invasive vegetation, including weeds	Biannually or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Biannually or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required
Monitoring	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance of roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms

9.9. Attenuation Tanks

Construction

9.9.1. Construction vehicles and equipment not directly involved in the construction of the attenuation tank will be kept away from these areas. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate, to manage the risks associated with, and to intercept the discharge of, sediment laden runoff prior to its discharge to nearby watercourses. Excavations for the attenuation tank should aim to be undertaken in times of dry weather when possible, to prevent mobilisation of sediments during rainfall events. Perimeter controls should be installed prior to construction to protect watercourses.

Maintenance Schedule

9.9.2. The table below shows the operation and maintenance requirements for the Attenuation tanks, taken from the CIRIA C753 SuDS Manual.

Table 9.8: Operation and maintenance requirements for attenuation storage tanks (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	Remove sediment from catchpits/ gullies/ sumps.	Annually, or as required
Occasional Maintenance	Removal of sediment from tank via vacuum pumping (if appropriate)	As required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

9.10. Proprietary Treatment Systems

9.10.1. The proprietary treatment systems include conventional pipework, gullies, catchpits, manholes, channels and headwalls.

Construction

9.10.2. During construction the principal contractor must ensure that preventative measures have been put in place as to not allow the construction runoff drain into the system. Measures must be taken to ensure debris from the construction site does not block the components. Routine inspections should be undertaken ensuring that the drainage is functioning properly. Outfalls must be constructed to the correct level and all joints must be correctly sealed. During construction backfill should be correctly installed as specified as per the manufactures' recommendations.

Maintenance Schedule

9.10.3. The maintenance schedule for the aforementioned SuDS has been adopted from the SuDS Manual C753 and are summarised in the table below.

Table 9.9: Maintenance and Operation of Proprietary Treatment Systems (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Monitoring	Inspect monthly
Occasional maintenance	Sediment management	Annually or as required
Remedial maintenance	Structure rehabilitation/repair	As required

10.0 CONCLUSION

10.1.1. CampbellReith has been commissioned to prepare a Flood Risk Assessment and Drainage Strategy in accordance with the National Planning Policy Framework in support of the outline planning application for the Proposed Development located at the land off Ringwood Road, Alderholt.

10.1.2. There are multiple watercourses located on or within close proximity to The Site, as well as multiple lakes/ponds. Within The Site, there are several drains that flow to two ponds south of The Site. These ponds then flow to Hammer Brook which eventually flows to the River Avon (an EA main river), south east of The Site. Sleep Brook flows from north to south on the east of The Site and also runs into Hammer Brook.

10.1.3. The geology of The Site indicates that it is likely to have a bedrock geology of Parkstone Sand Member (sand) with superficial river terrace deposits (sand and gravel). Areas to the west of The Site associated with the brook is likely to have a bedrock geology of Broadstone Clay Member (clay, silty) with superficial clay and silt head deposits.

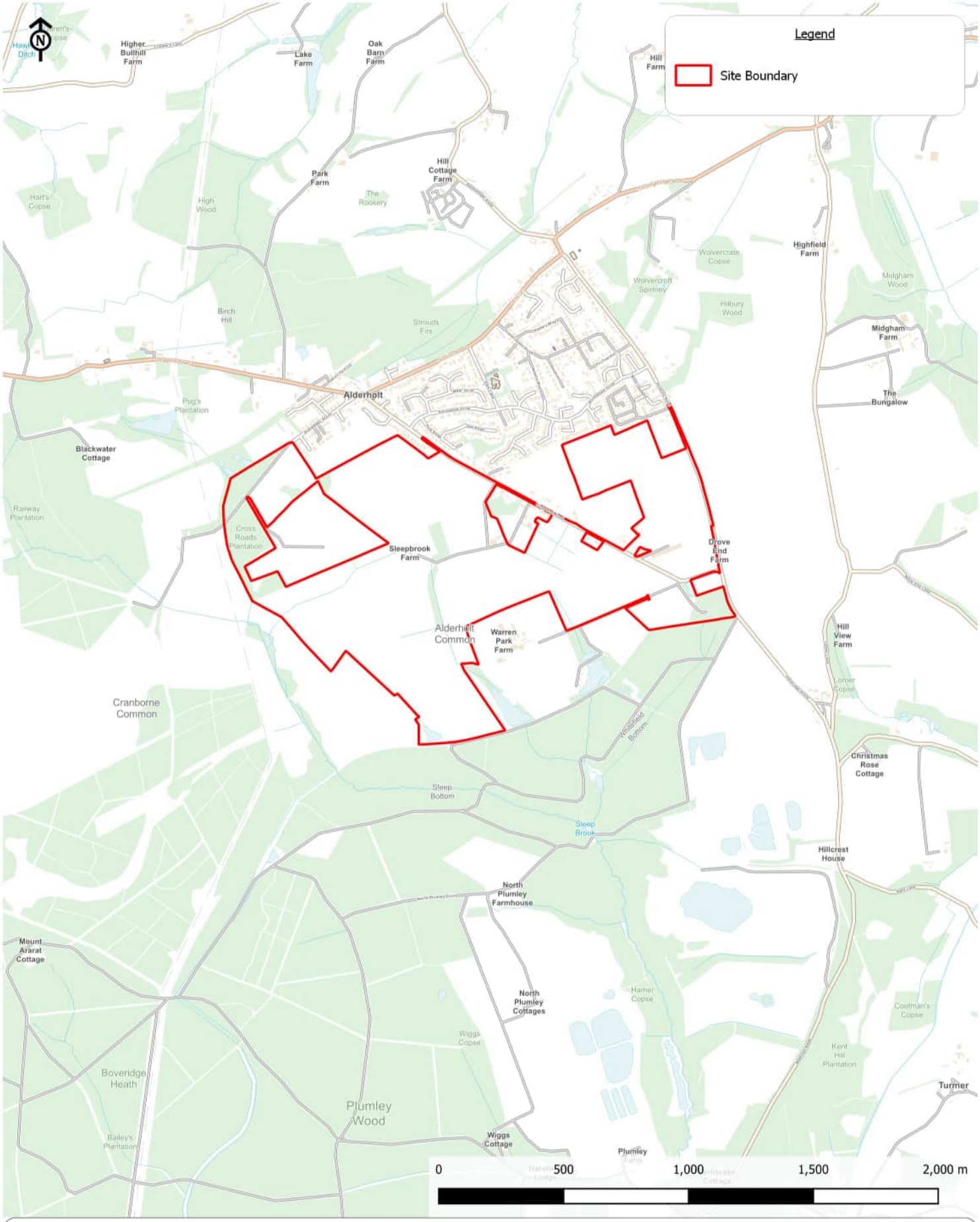
10.1.4. The proposed SuDS strategy involves the use of swales and attenuation structures from four catchments across The Site to convey and store surface water up to and including the 1 in 100 year + 40% climate change event.

10.1.5. The foul strategy includes a proposed pumping station and off-site works to connect into the existing SPS north of The Site.

10.1.6. The maintenance of SuDS is vital to ensuring that they work as efficiently as they are intended to.

10.1.7. The proposed drainage strategy will not increase flood risk from any source on or off The Site and is considered appropriate for the Proposed Development in its current location.

Appendix A: Site Location



Land South and West of Alderholt

Client: Dudsbury Homes

Figure 1:
Site Location

Scale:	1:20000@A4
CampbellReith OS Copyright:	© Crown copyright. All rights reserved. Licence number 100020027
Contains Ordnance Survey data	© Crown copyright and database right 2022.
Job Number:	13577
Drawn by - Checked by:	RLF/RP - DS/RF
Drg No - Status/Revision:	13577-CRH-XX-XX-FG-G-7000 - P4
File location:	\\red-data1\gis-data\13500 - 13749\13577 R - Land South and West of Alderholt\Project_Workspaces (pdf in Outputs)
Date (Revision History):	29/11/2022 (P1, First Issue, 07/12/20, RLF; P2, Boundary Update, 12/02/21, RP; P3, Boundary Update, 12/05/22, RLF; P4, Site Boundary,

CampbellReith
consulting engineers
LONDON 020 7340 1700 ☐ ☐ MANCHESTER 0161 819 3060
REDHILL 01737 784 500 ☒ ☐ BIRMINGHAM 01675 467 484
BRISTOL 0117 916 1066 ☐ ☐ DUBAI 00 971 4453 4735
www.campbellreith.com

Appendix B: SFRA Map Extracts

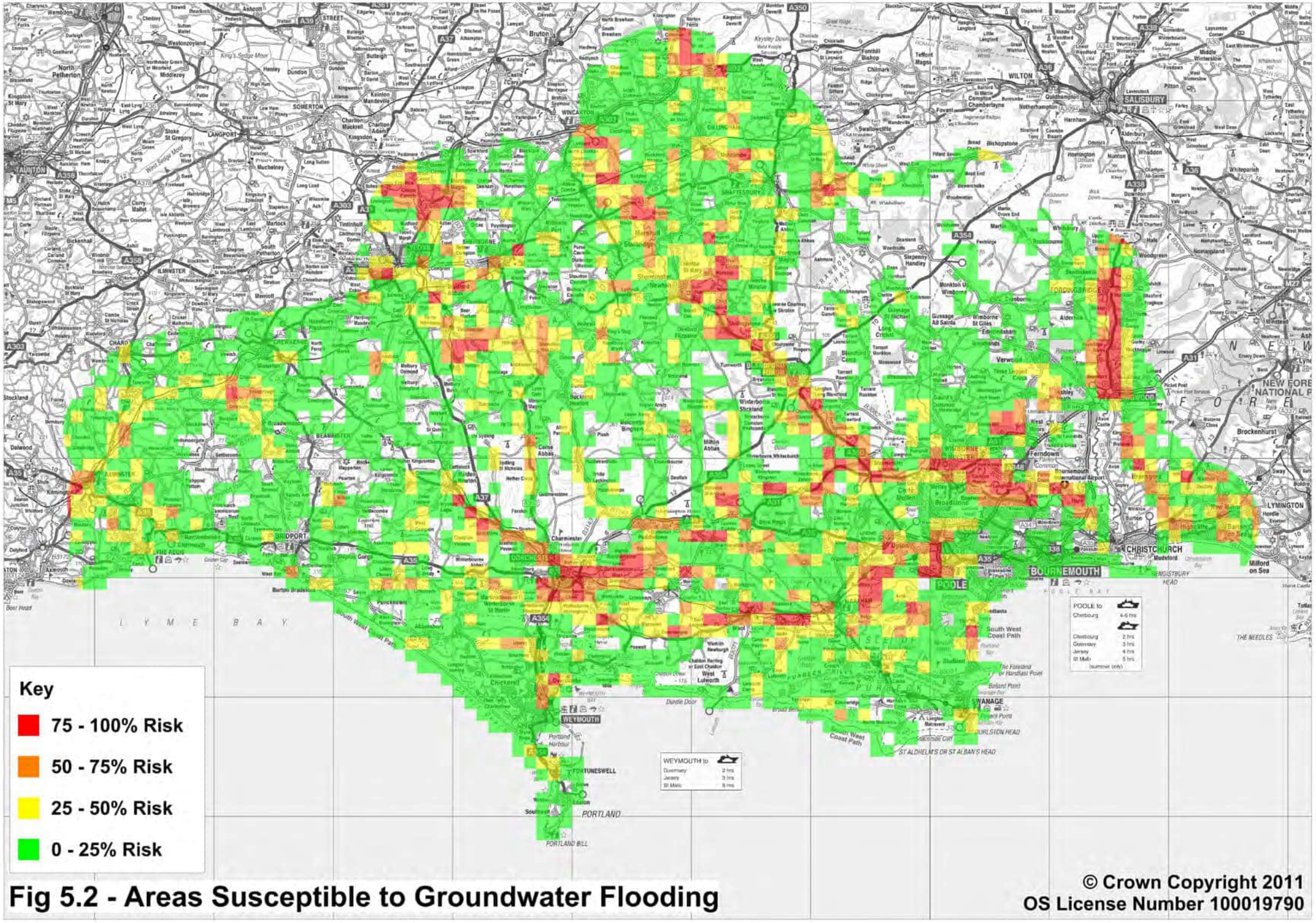


Fig 5.2 - Areas Susceptible to Groundwater Flooding

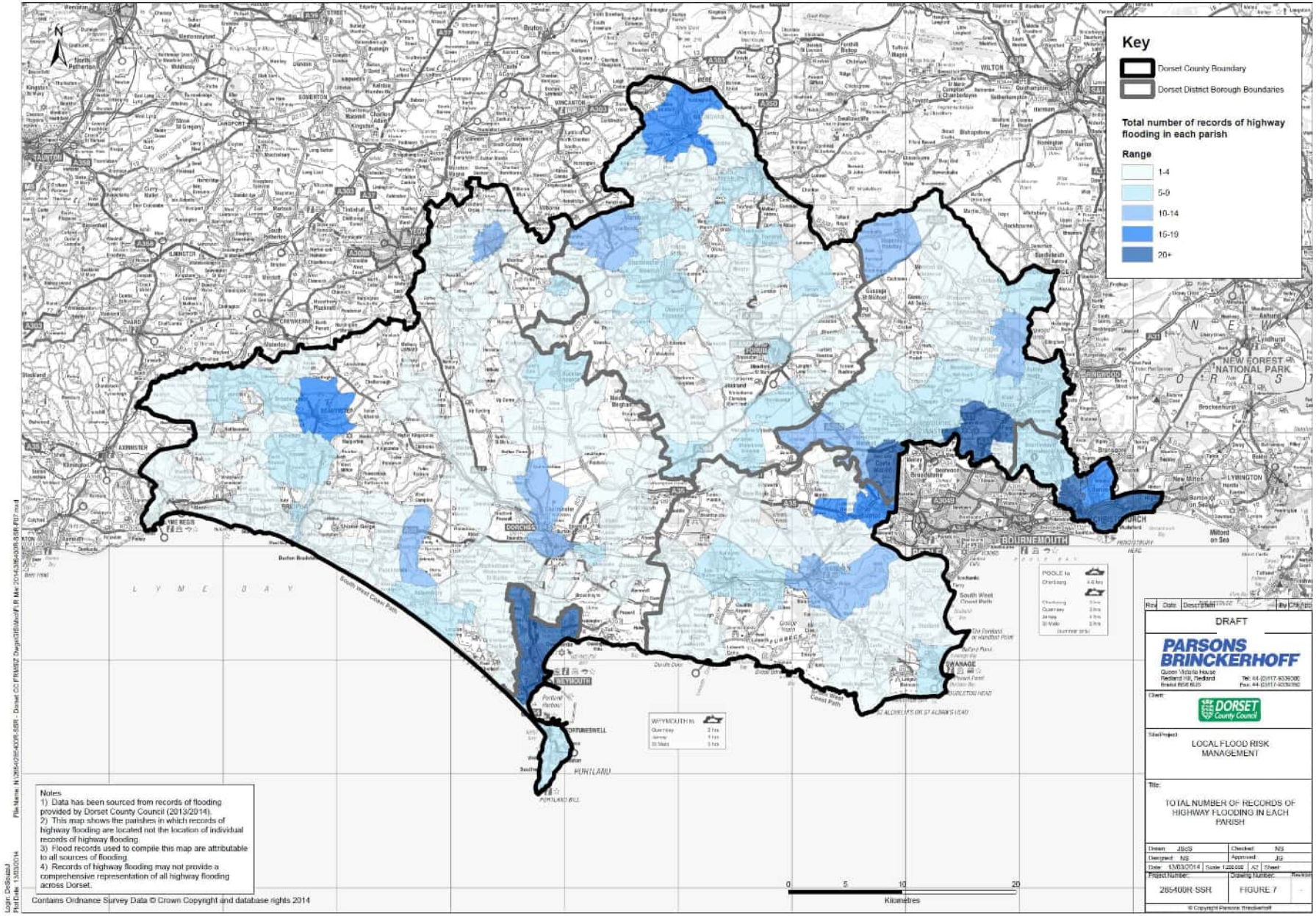
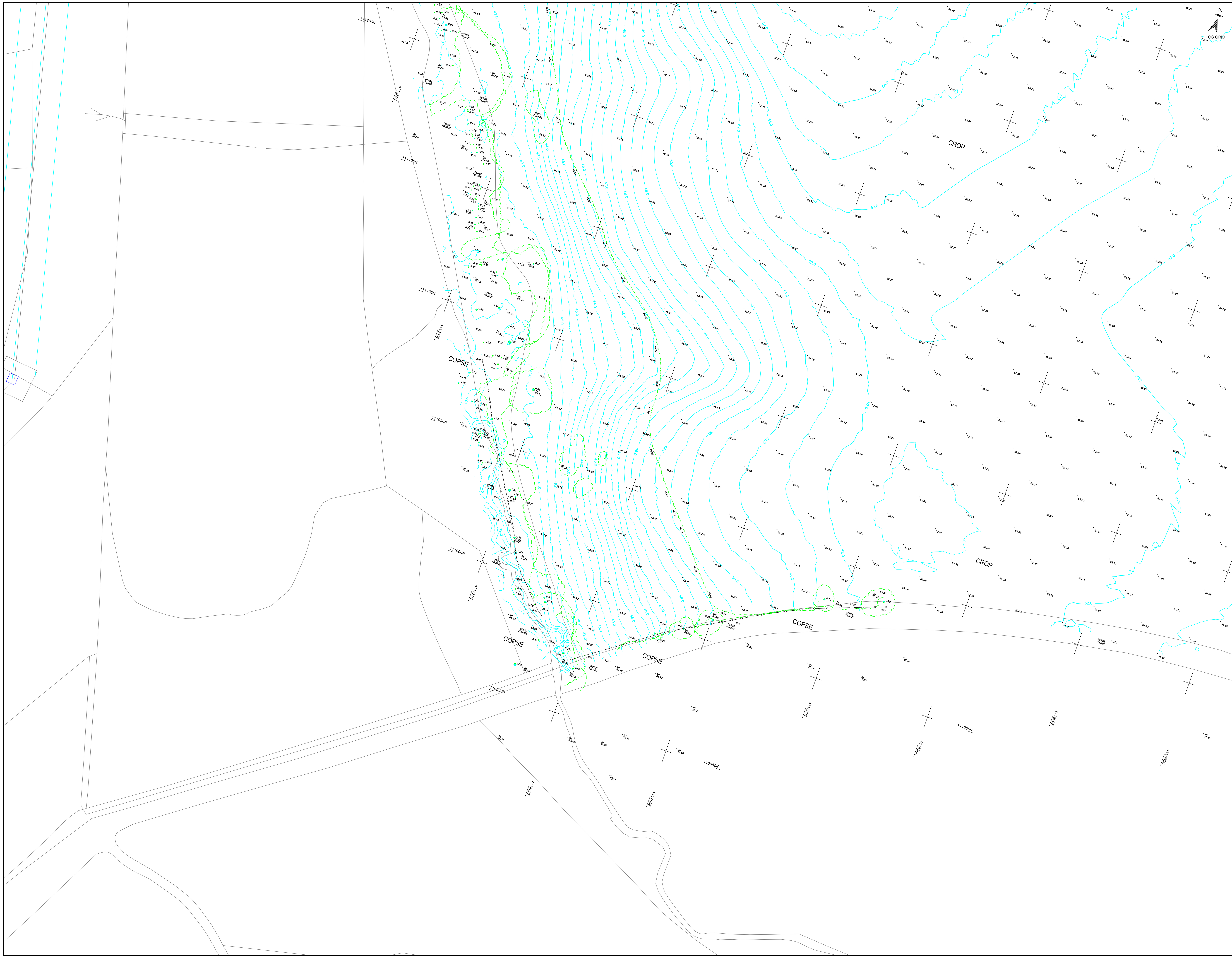


Figure 6: Number of records of highway flooding in each community

Appendix C: Topographical Survey



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DY2	412390.29	111540.05	50.10	PEG
DY3	411728.37	111746.04	55.36	SURVEY NAIL

DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

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TREES

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CED	CEDAR
CHY	CHERRY
CON	CONIFER
CYP	CYPRESS
FRT	FRUIT
HAW	HAWTHORN
HLY	HOLLY
HCH	HORSE CHESTNUT
LAB	LABURNAM
LAR	LARCH
LIM	LIME
MPL	MAPLE
PNE	PINE
POP	POPLAR
RWN	ROWAN
SIB	SILVER BIRCH
SPR	SPRUCE
SCH	SWEET CHESTNUT
SYC	SYCAMORE
WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown)
(Dia of bole) / (No. of bole)
Approx. Height (if shown)
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LEANING TRUNK — OAK 0.2/2T 6

CANOPY LINE
FOLIAGE LINE
HEDGE LINE
WALL (Widths drawn to scale) — 1.20H BW

FENCE

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GATE	
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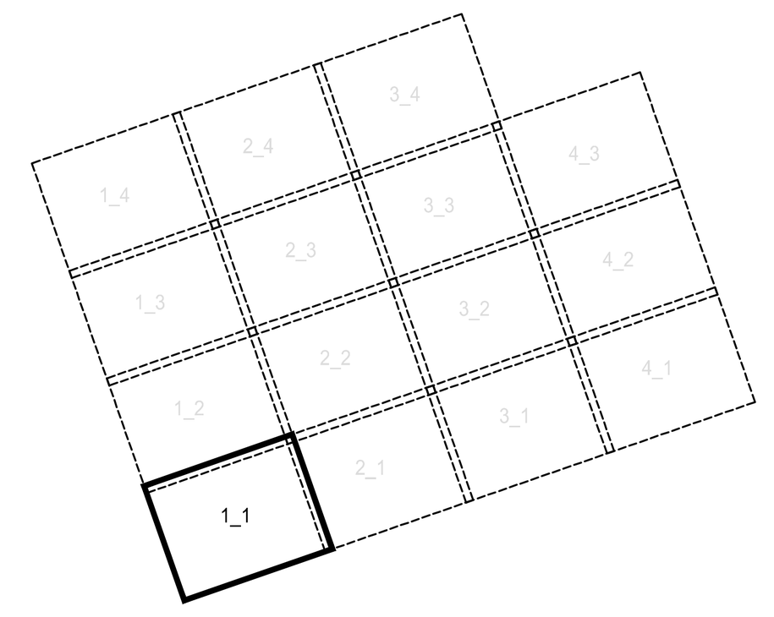

Rev	By	Chkd	Apprvd	Date	Description

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Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 1_1

Surveyed by: D.G.Y \ S.J.Y	Date: 02.21
Drawn by: D.G.Y	Date: 03.21
Checked by:	Date:

Drawing No.: ALDERHOLT-0221
Revision:

Drawing Scale: 1:500 @ A0

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1:500

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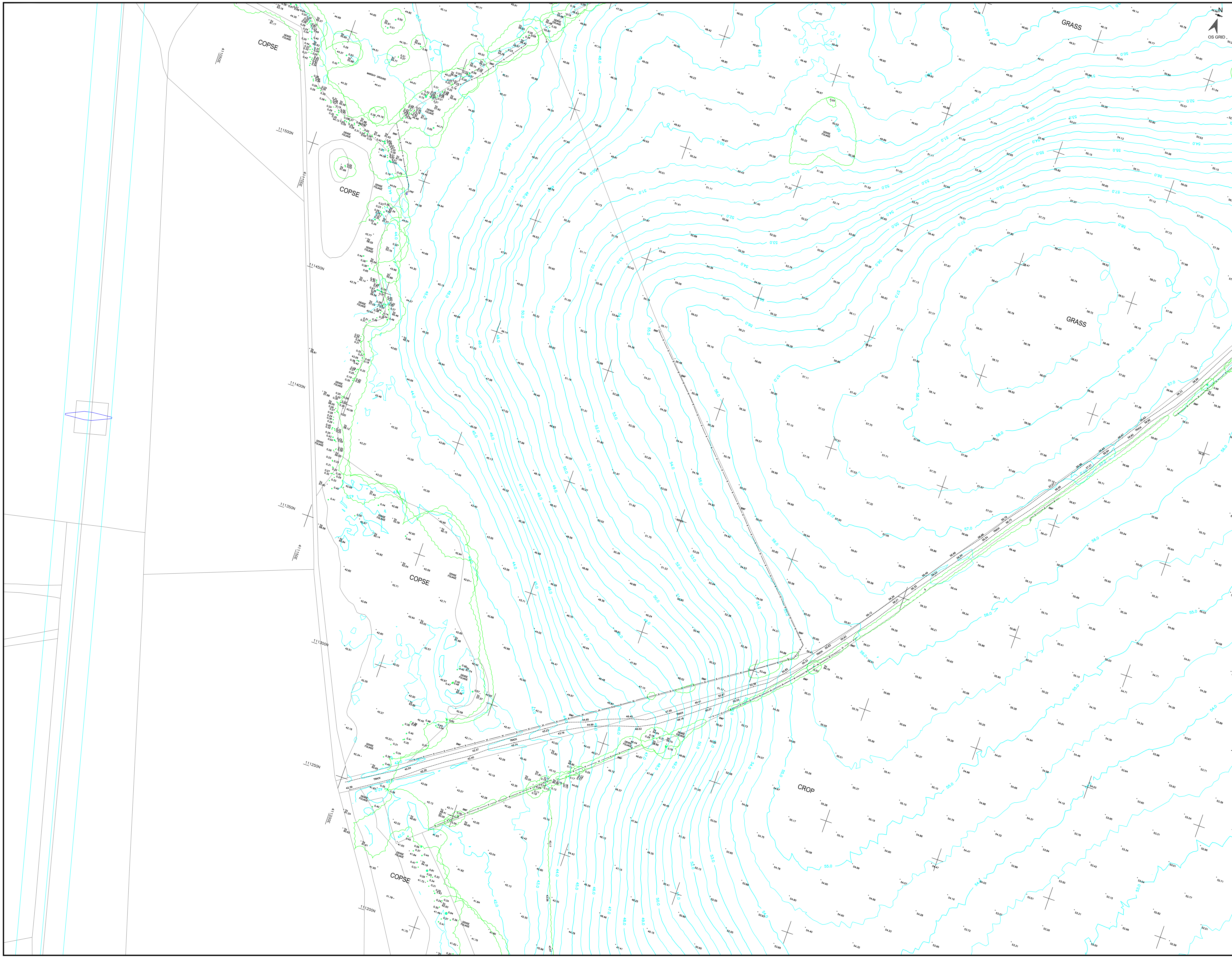

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0.2/2T
6

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0.2/2T
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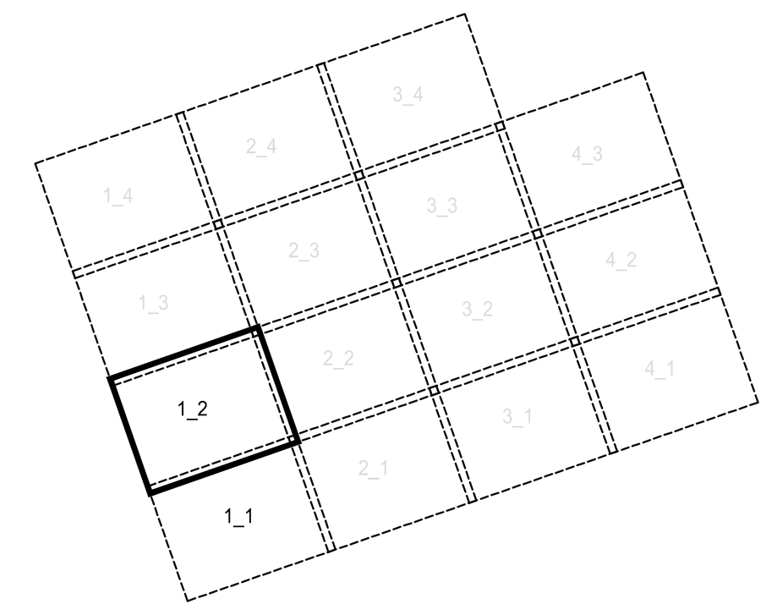

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Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 1_2

Surveyed by: D.G.Y \ S.J.Y	Date: 02.21
Drawn by: D.G.Y	Date: 03.21
Checked by:	Date:

Drawing No.: ALDERHOLT-0221

Revision:

Drawing Scale: 1:500 @ A0

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1:500

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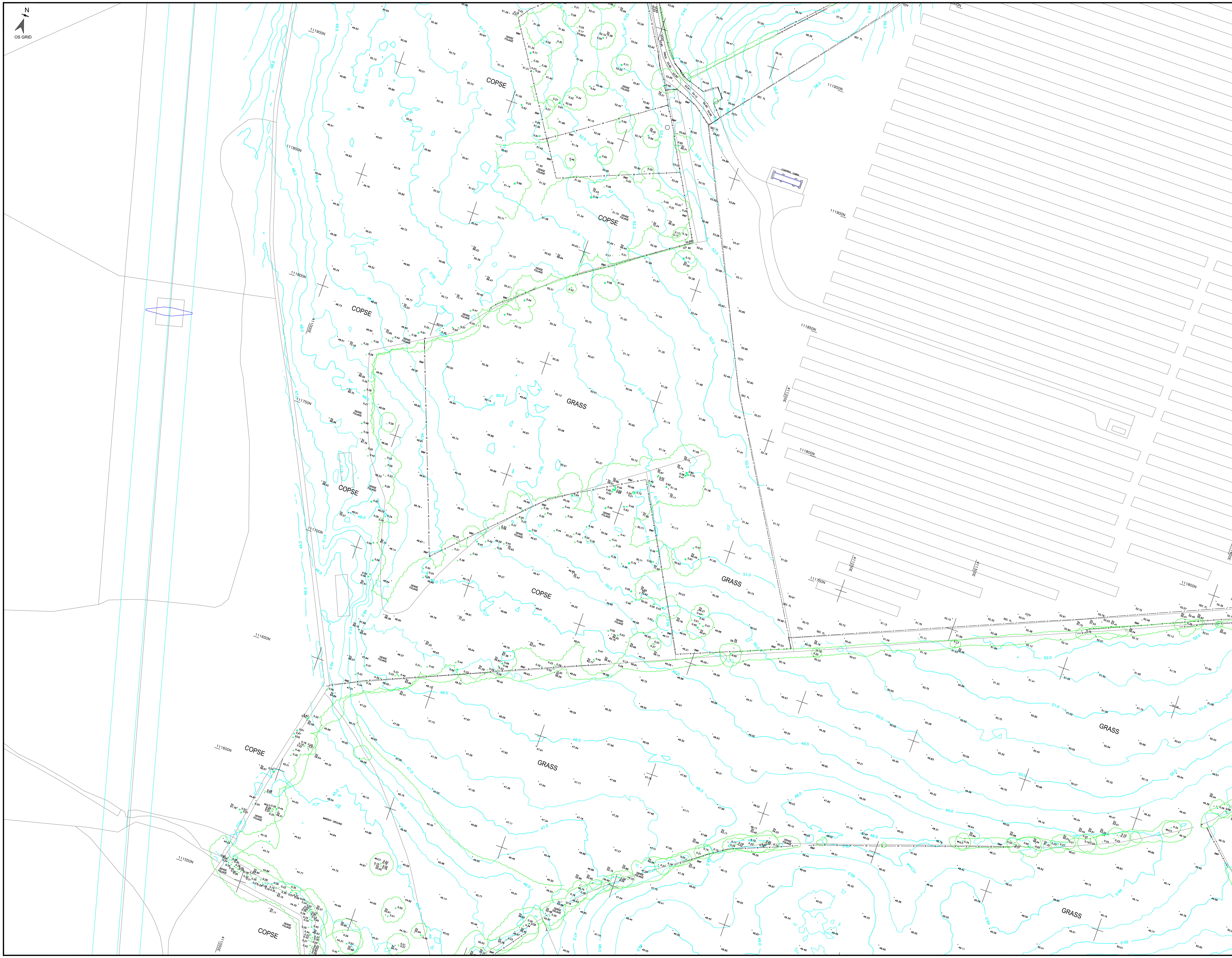

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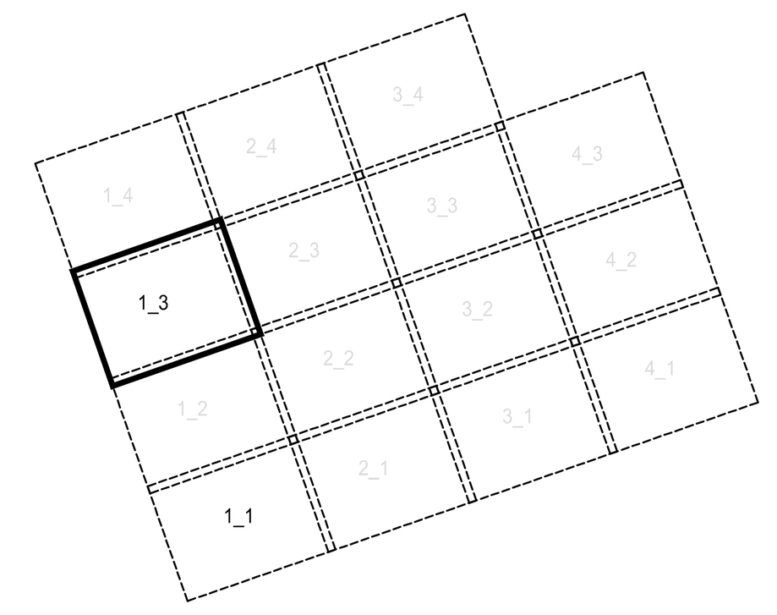

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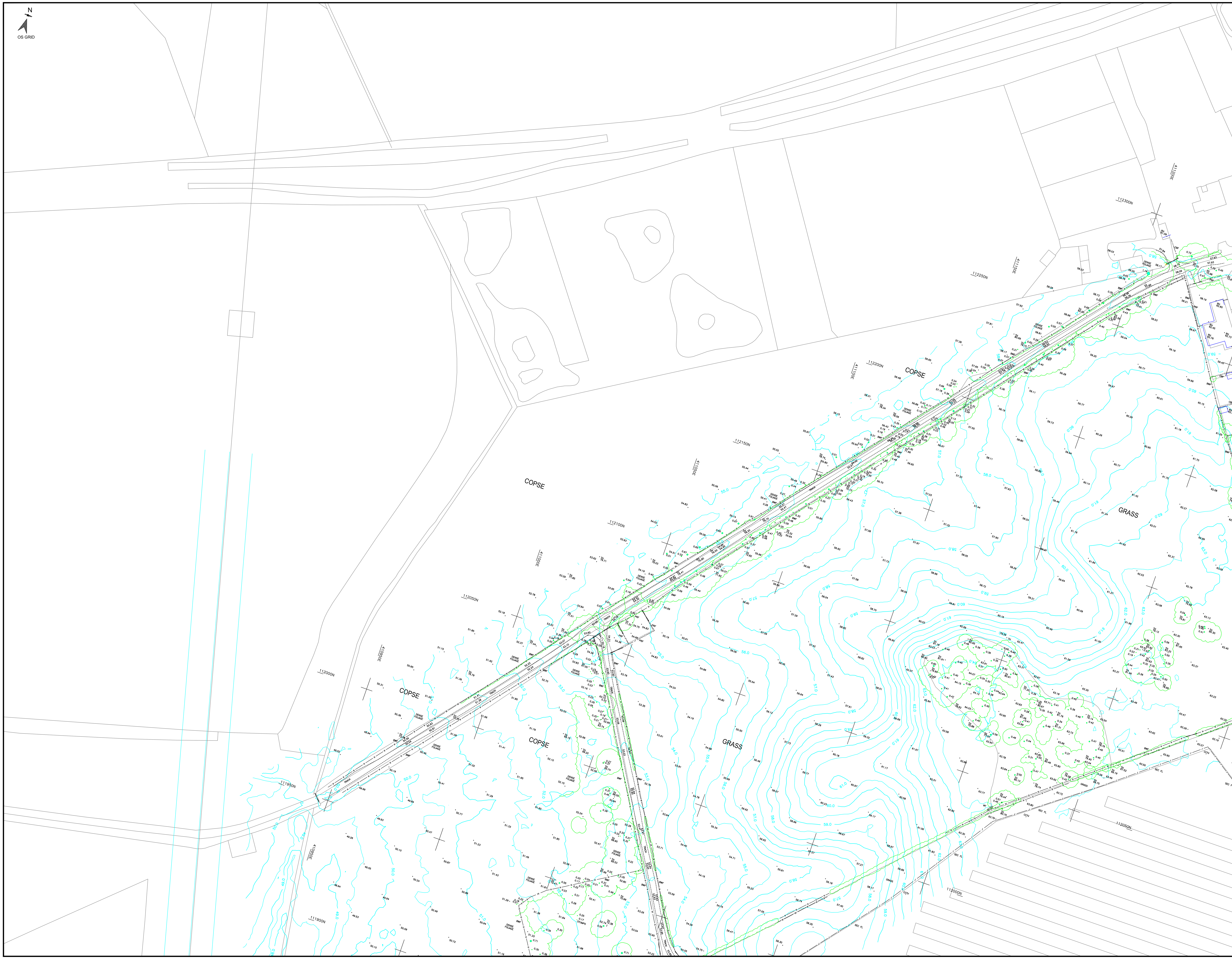

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0.2/2T
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LEANING TRUNK
OAK
0.2/2T
6

CANOPY LINE
FOLIAGE LINE
HEDGE LINE
WALL
(Widths drawn to scale)
1.20H BW

FENCE

BWF	BARBED WIRE FENCE
CBF	CLOSE BOARD FENCE
CIF	CORRUGATED IRON FENCE
CLF	CHAIN LINK FENCE
CPF	CHESTNUT PALING FENCE
CWF	CHICKEN WIRE FENCE
IRF	IRON RAILING FENCE
PCF	POST & CHAIN FENCE
PRF	POST & RAIL FENCE
PWF	POST & WIRE FENCE
WMF	WIRE MESH FENCE
GATE	
STILE	

TELEPHONE CABLE
ELECTRICITY CABLE

NOTES

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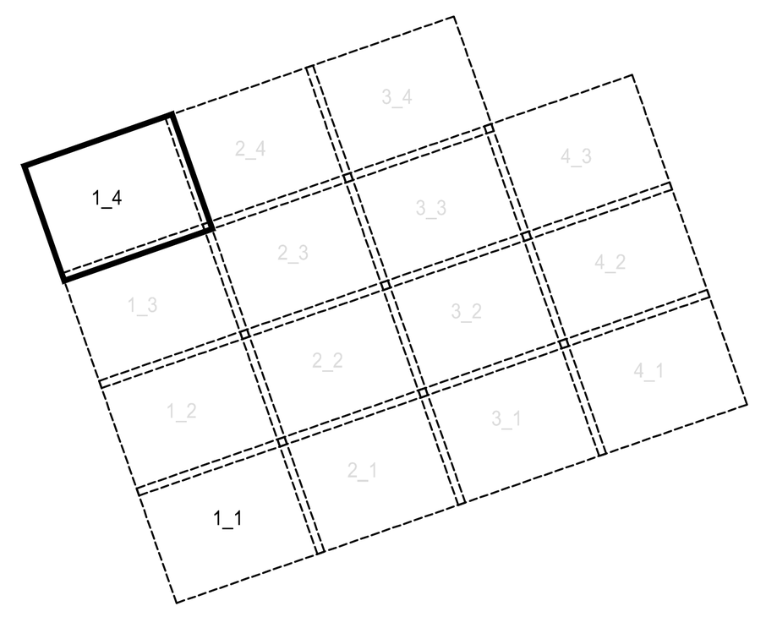
SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

Client

DUDSBURY HOMES (SOUTHERN) LTD

D G Yeatman Surveying & Engineering Ltd
82A York Road, Broadstone, Dorset, BH18 8EU
Tel: +44 (0)1202 692852
office@dgyeatman.co.uk
www.dgyeatman.co.uk

Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 1_4

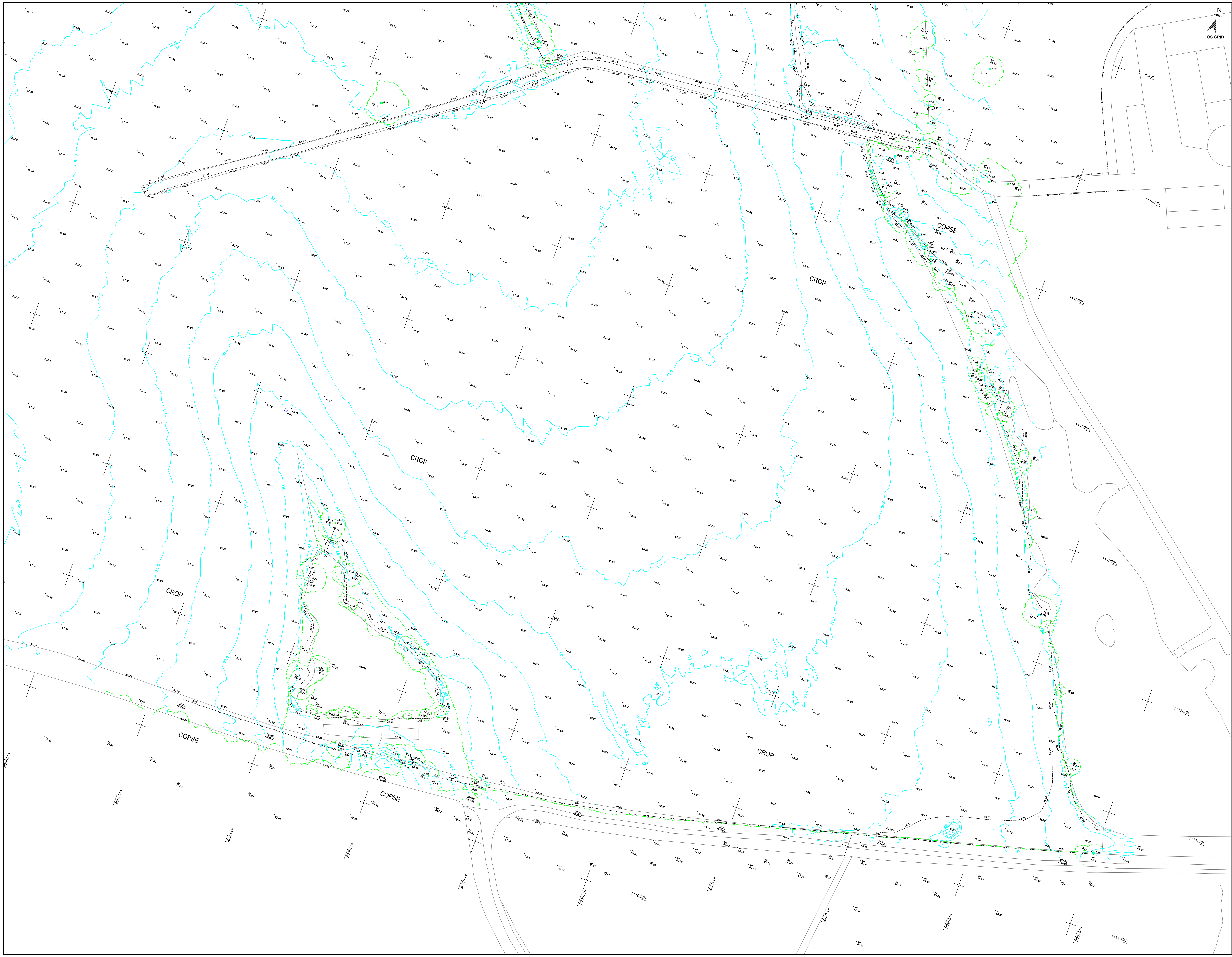
Surveyed by: D.G.Y \ S.J.Y Date: 02.21
Drawn by: D.G.Y Date: 03.21
Checked by: Date:

Drawing No. ALDERHOLT-0221 Revision

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthfl : 12 Oct 2022 - 9:02 am



OS GRID

STATION LISTING

STN ID	EASTING	NORTHING	LEVEL	TYPE
DY1	411987.62	111860.27	55.17	PEG
DY2	412390.29	111540.05	50.10	PEG
DY3	411728.37	111746.04	55.36	SURVEY NAIL

DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

AOD	ABOVE ORDNANCE DATUM
AV	AIR VALVE
B	BOLLARD
BH	BOREHOLE
BB	BELISHA BEACON
BTB	BRITISH TELECOM COVER
BS	BUS STOP
CATV	CABLE TELEVISION COVER
CONC	CONCRETE
CPS	CONCRETE PAVING SLABS
DK	DROP KERB
DP	DOWNPIPE
ECB	ELECTRICITY CONTROL BOX
ELCP	ELECTRICITY CABLE PIT
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ERC	EARTH ROD COVER
FH	FIRE HYDRANT
FB	FLOWER BED
FL	FLOOR LEVEL
FP	FOOTPATH / FLAG POLE
GP	GATE POST
GT	GAS VALVE
G	GULLEY
IC	INSPECTION COVER
LB	LETTER BOX
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MKR	MARKER POST
SNP	STREET NAME PLATE
OSBM	O.S. BENCHMARK
PCE	PRE-CAST CONCRETE EDGING
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PM	PARKING METER
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SP	SIGN POST
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STP	STACK PIPE
ST	STOP VALVE/COCK
TAP	WATER TAP/STANDPIPE
TBM	TEMPORARY BENCHMARK
TCB	TELEPHONE CALL BOX
TH	TREE HEIGHT
TL	TRAFFIC LIGHT
TP	TELEGRAPH POLE
VP	VENT PIPE
WL	WATER LEVEL
WM/SV	WATER METER/STOP VALVE
WO	WASH OUT
WT	WATER TROUGH

BUILDING

RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
EL	EAVES LEVEL
FRH	FLAT ROOF HEIGHT

TREES

ALD	ALDER
BCH	BEECH
CED	CEDAR
CHY	CHERRY
CON	CONIFER
CYP	CYPRESS
FRT	FRUIT
HAW	HAWTHORN
HLY	HOLLY
HCH	HORSE CHESTNUT
LAB	LABURNAM
LAR	LARCH
LIM	LIME
MPL	MAPLE
PNE	PINE
POP	POPLAR
RWN	ROWAN
SIB	SILVER BIRCH
SPR	SPRUCE
SCH	SWEET CHESTNUT
SYC	SYCAMORE
WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown)
(Dia of bole) / (No. of bole)
Approx. Height (if shown)
OAK 0.2/2T 6

LEANING TRUNK
OAK 0.2/2T 6

CANOPY LINE

FOLIAGE LINE

HEDGE LINE

WALL
(Widths drawn to scale)
1.20H BW

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GATE	
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TELEPHONE CABLE
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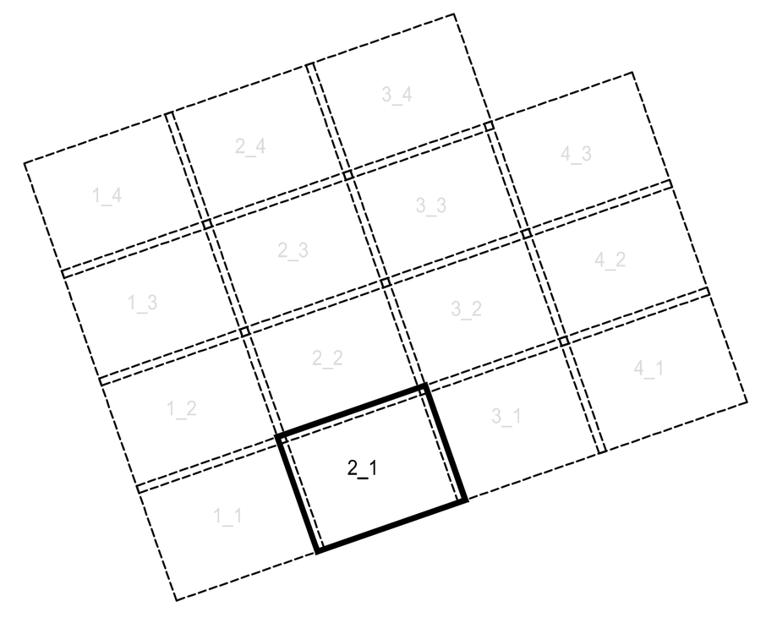

Rev	By	Chkd	Apprvd	Date	Description

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Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 2_1

Surveyed by: D.G.Y \ S.J.Y — Date: 02.21

Drawn by: D.G.Y — Date: 03.21

Checked by: — Date:

Drawing No.: ALDERHOLT-0221

Revision:

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
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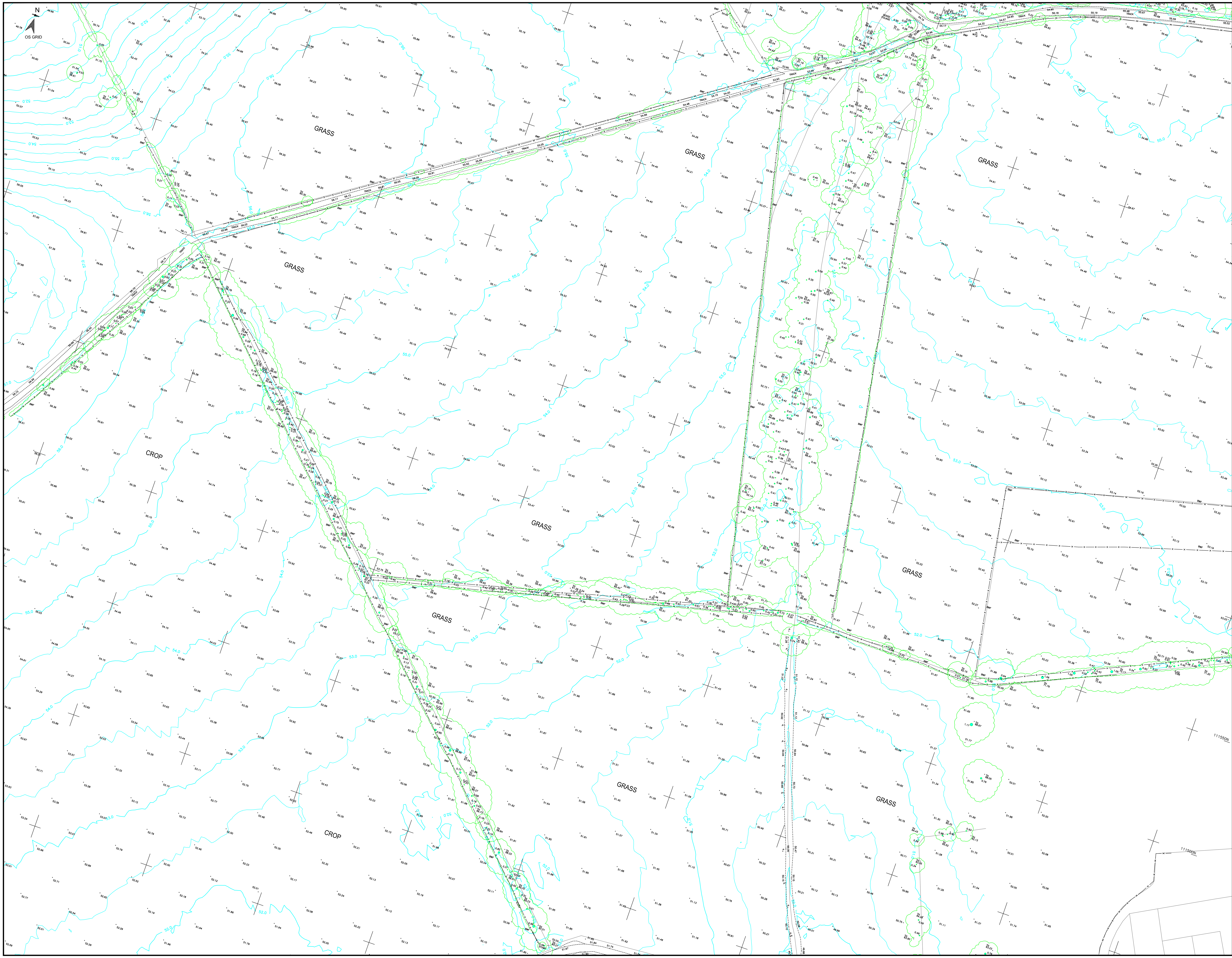

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DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

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GT	GAS VALVE
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BUILDING

RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
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TREES

ALD	ALDER
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CED	CEDAR
CHY	CHERRY
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POP	POPLAR
RWN	ROWAN
SIB	SILVER BIRCH
SPR	SPRUCE
SCH	SWEET CHESTNUT
SYC	SYCAMORE
WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown)
(Dia of bole) / (No. of bole)
Approx. Height (if shown)
OAK
0.2/2T
6

LEANING TRUNK
OAK
0.2/2T
6

CANOPY LINE
FOLIAGE LINE
HEDGE LINE
WALL
(Widths drawn to scale)
1.20H BW

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TELEPHONE CABLE
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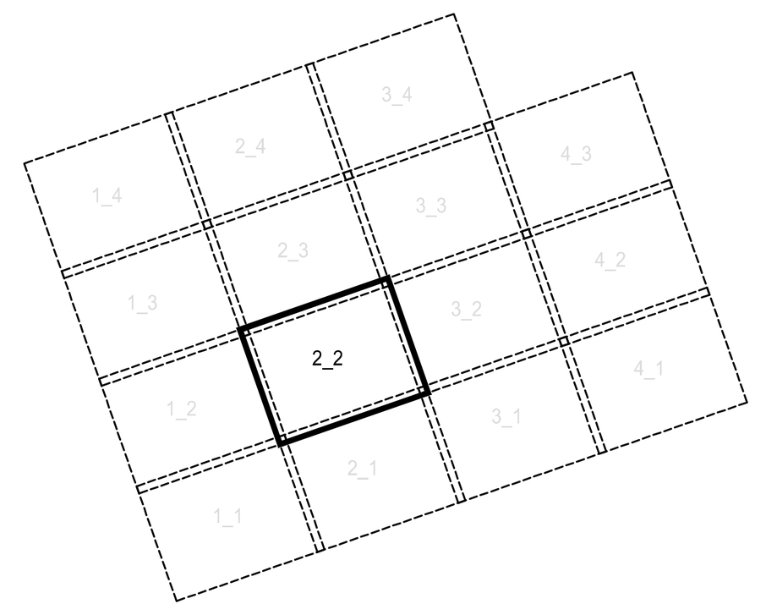
SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

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www.dgyeatman.co.uk

Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 2_2

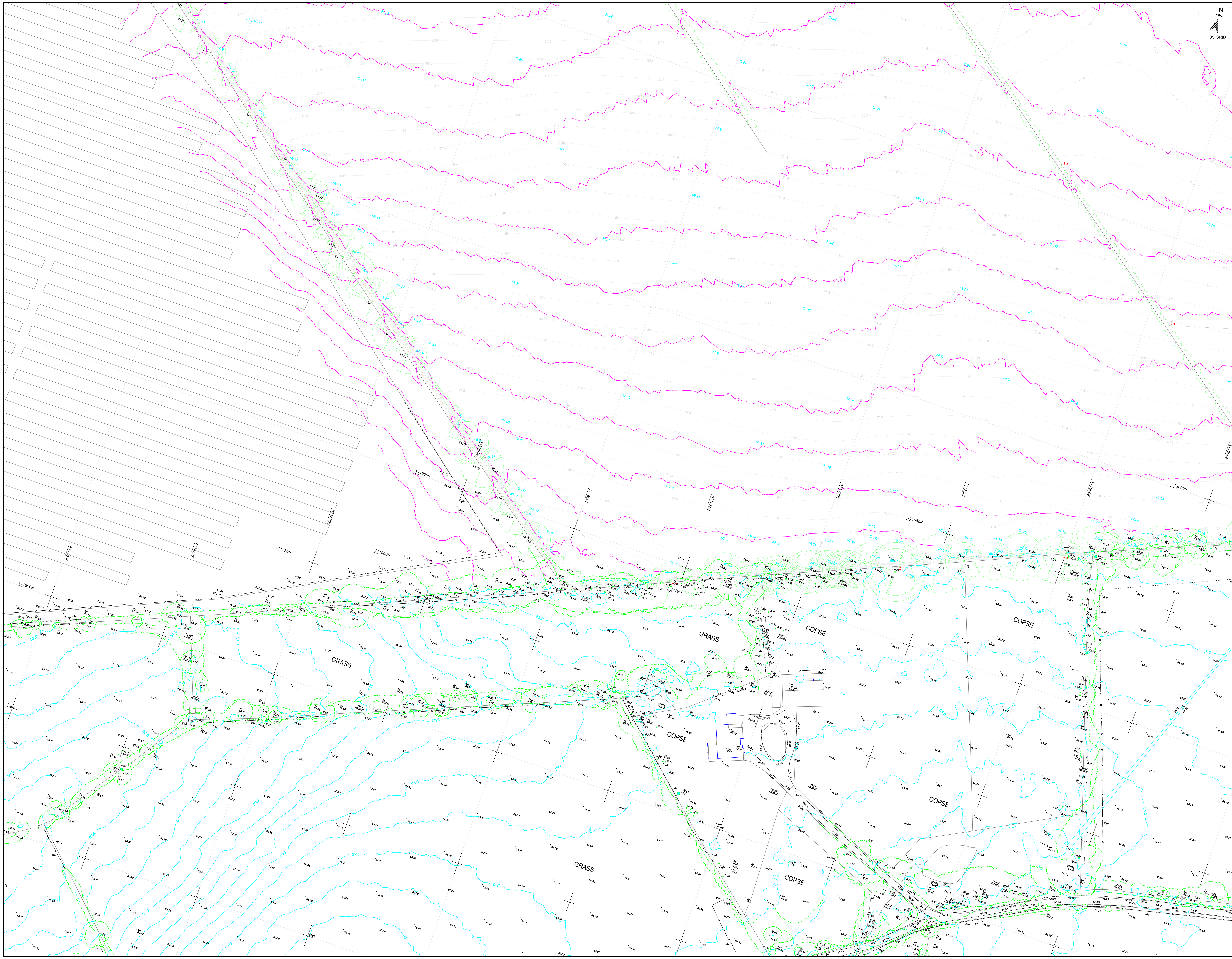
Surveyed by: D.G.Y \ S.J.Y   Date: 02.21
Drawn by: D.G.Y   Date: 03.21
Checked by: Date:

Drawing No.: ALDERHOLT-0221
Revision:

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthfl : 12 Oct 2022 - 9:00 am



N

OS GRID

STATION LISTING

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DY1	411987.62	111860.27	55.17	PEG
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DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

AOD	ABOVE ORDNANCE DATUM
AV	AIR VALVE
B	BOLLARD
BH	BOREHOLE
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GP	GATE POST
GT	GAS VALVE
G	GULLEY
IC	INSPECTION COVER
LB	LETTER BOX
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TAP	WATER TAP/STANDPIPE
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TL	TRAFFIC LIGHT
TP	TELEGRAPH POLE
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WL	WATER LEVEL
WM/SV	WATER METER/STOP VALVE
WO	WASH OUT
WT	WATER TROUGH

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RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
EL	EAVES LEVEL
FRH	FLAT ROOF HEIGHT

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HLY	HOLLY
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LAB	LABURNAM
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POP	POPLAR
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(Dia of bole) / (No. of bole)
Approx. Height (if shown)
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0.2/2T
6

LEANING TRUNK
OAK
0.2/2T
6

CANOPY LINE

FOLIAGE LINE

HEDGE LINE

WALL
(Widths drawn to scale)
1.20H BW

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TELEPHONE CABLE
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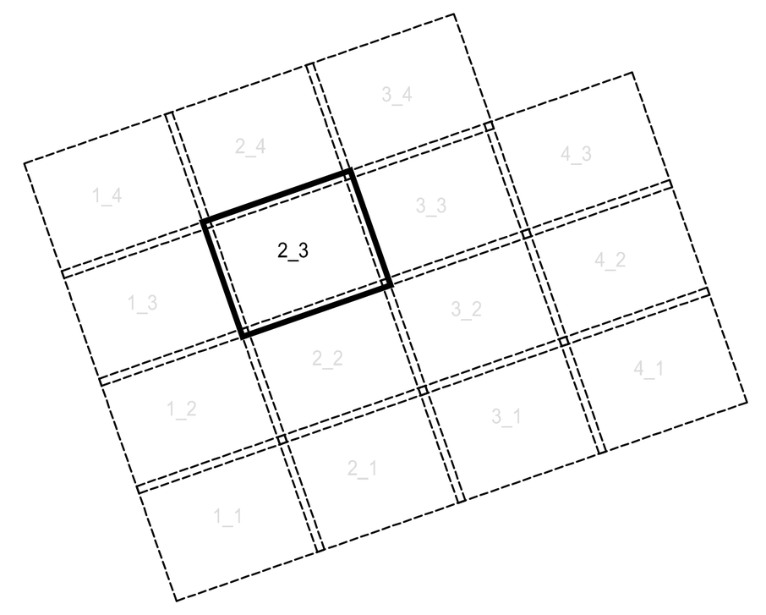

Rev	By	Chkd	Apprvd	Date	Description

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Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 2_3

Surveyed by:	D.G.Y \ S.J.Y	Date:	02.21
Drawn by:	D.G.Y	Date:	03.21
Checked by:		Date:	

Drawing No.

ALDERHOLT-0221

Revision

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
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LEANING TRUNK
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WALL (Widths drawn to scale) 1.20H BW

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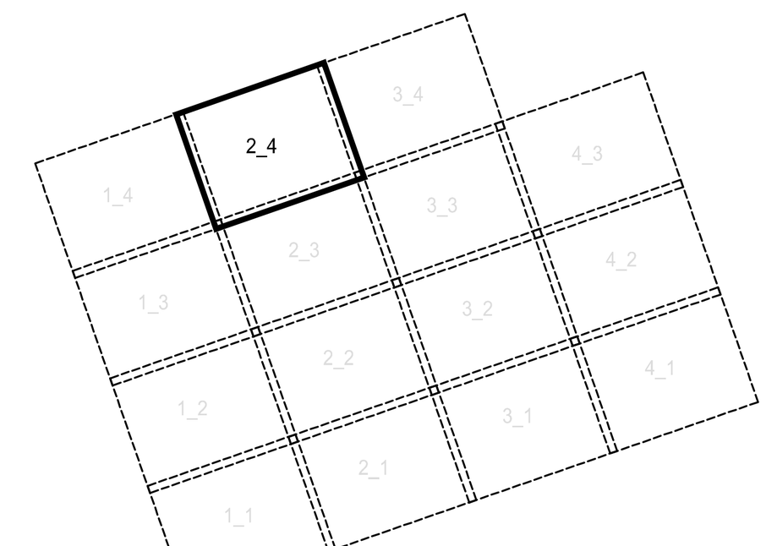

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ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 2_4

Surveyed by: D.G.Y \ S.J.Y — Date: 02.21
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DY2	412390.29	111540.05	50.10	PEG
DY3	411728.37	111746.04	55.36	SURVEY NAIL

DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

AOD	ABOVE ORDNANCE DATUM
AV	AIR VALVE
B	BOLLARD
BH	BOREHOLE
BB	BELISHA BEACON
BTB	BRITISH TELECOM COVER
BS	BUS STOP
CATV	CABLE TELEVISION COVER
CONC	CONCRETE
CPS	CONCRETE PAVING SLABS
DK	DROP KERB
DP	DOWNPIPE
ECB	ELECTRICITY CONTROL BOX
ELCP	ELECTRICITY CABLE PIT
EP	ELECTRICITY POLE
ERC	EARTH ROD COVER
FH	FIRE HYDRANT
FB	FLOWER BED
FL	FLOOR LEVEL
FP	FOOTPATH / FLAG POLE
GP	GATE POST
GT	GAS VALVE
G	GULLEY
IC	INSPECTION COVER
LB	LETTER BOX
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MKR	MARKER POST
SNP	STREET NAME PLATE
OSBM	O.S. BENCHMARK
PCE	PRE-CAST CONCRETE EDGING
PCK	PRE-CAST CONCRETE KERBS
PM	PARKING METER
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAINWATER DOWNPIPE
SP	SIGN POST
△	SURVEY STATION
STP	STACK PIPE
ST	STOP VALVE/COCK
TAP	WATER TAP/STANDPIPE
TBM	TEMPORARY BENCHMARK
TCB	TELEPHONE CALL BOX
TH	TREE HEIGHT
TL	TRAFFIC LIGHT
TP	TELEGRAPH POLE
VP	VENT PIPE
WL	WATER LEVEL
WM/SV	WATER METER/STOP VALVE
WO	WASH OUT
WT	WATER TROUGH

BUILDING

RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
EL	EAVES LEVEL
FRH	FLAT ROOF HEIGHT

TREES

ALD	ALDER
BCH	BEECH
CED	CEDAR
CHY	CHERRY
CON	CONIFER
CYP	CYPRESS
FRT	FRUIT
HAW	HAWTHORN
HLY	HOLLY
HCH	HORSE CHESTNUT
LAB	LABURNAM
LAR	LARCH
LIM	LIME
MPL	MAPLE
PNE	PINE
POP	POPLAR
RWN	ROWAN
SIB	SILVER BIRCH
SPR	SPRUCE
SCH	SWEET CHESTNUT
SYC	SYCAMORE
WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown)
(Dia of bole) / (No. of bole)
Approx. Height (if shown)
OAK 0.2/2T 6

LEANING TRUNK
OAK 0.2/2T 6

CANOPY LINE
FOLIAGE LINE
HEDGE LINE
WALL
(Widths drawn to scale)
1.20H BW

FENCE

BWF	BARBED WIRE FENCE
CBF	CLOSE BOARD FENCE
CIF	CORRUGATED IRON FENCE
CLF	CHAIN LINK FENCE
CPF	CHESTNUT PALING FENCE
CWF	CHICKEN WIRE FENCE
IRF	IRON RAILING FENCE
PCF	POST & CHAIN FENCE
PRF	POST & RAIL FENCE
PWF	POST & WIRE FENCE
WMF	WIRE MESH FENCE
GATE	
STILE	

TELEPHONE CABLE
ELECTRICITY CABLE

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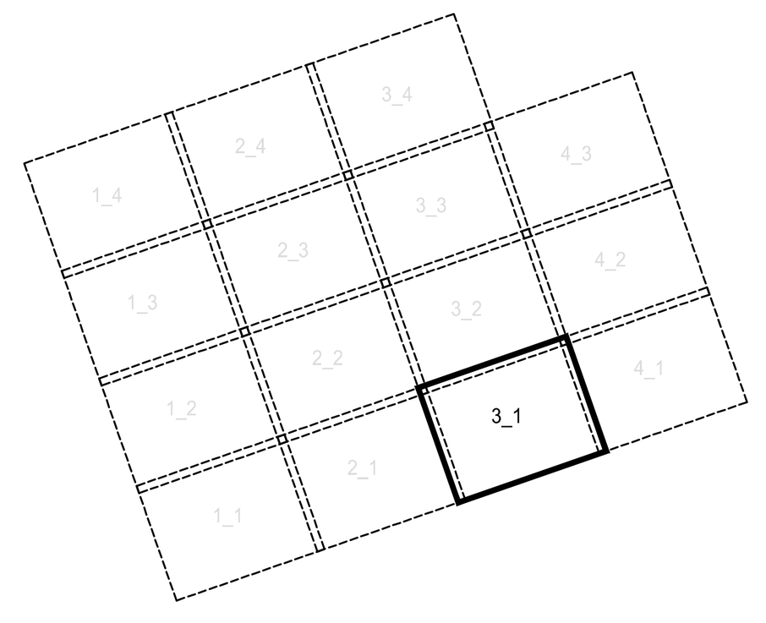
SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

Client

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Tel: +44 (0)1202 692852
office@dgyeatman.co.uk
www.dgyeatman.co.uk

Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 3_1

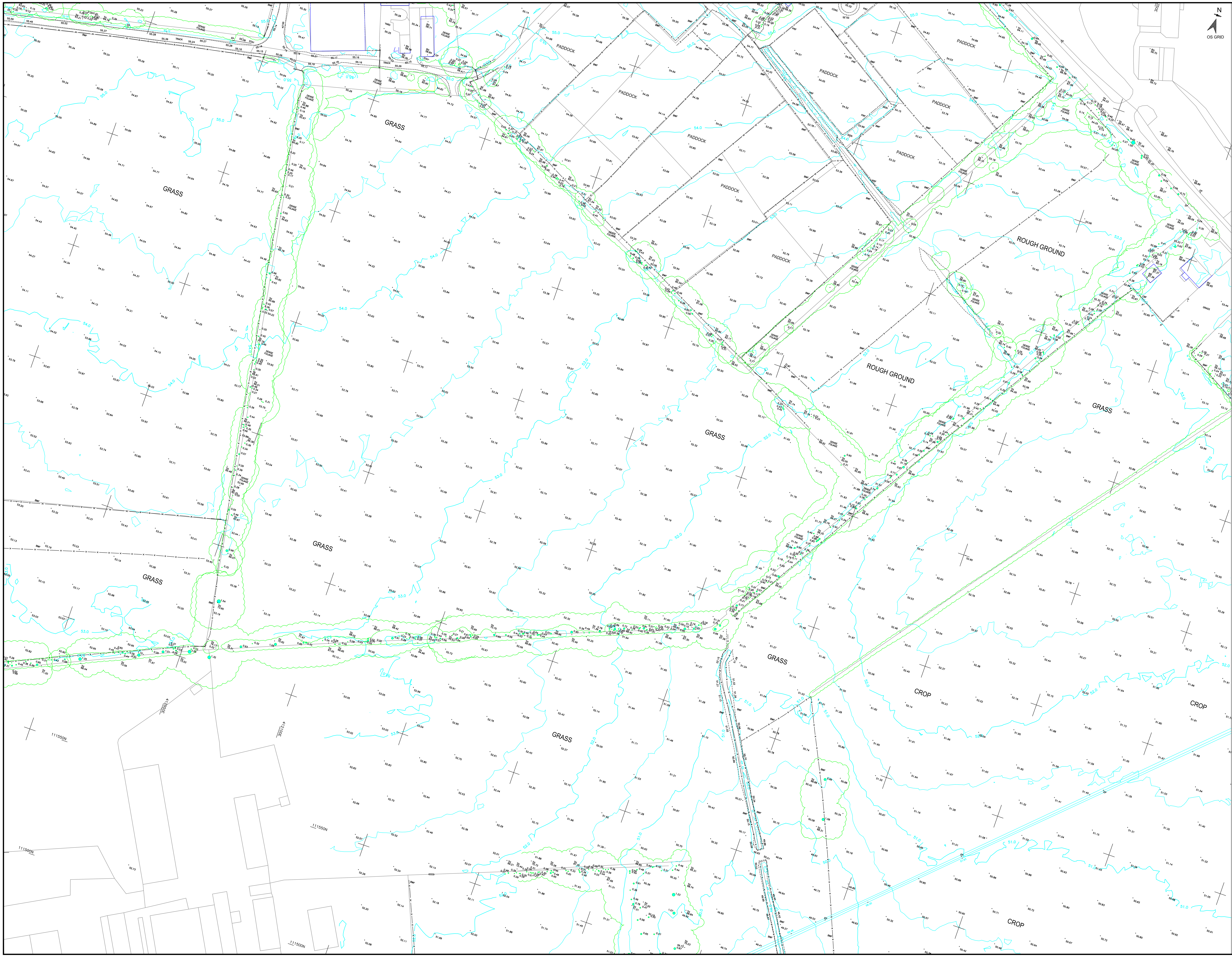
Surveyed by: D.G.Y \ S.J.Y Date: 02.21
Drawn by: D.G.Y Date: 03.21
Checked by: Date:

Drawing No. ALDERHOLT-0221
Revision

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthfl : 12 Oct 2022 - 8:59 am



N

OS GRID

STATION LISTING

STN ID	EASTING	NORTHING	LEVEL	TYPE
DY1	411987.62	111860.27	55.17	PEG
DY2	412390.29	111540.05	50.10	PEG
DY3	411728.37	111746.04	55.36	SURVEY NAIL

DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

AOD	ABOVE ORDNANCE DATUM
AV	AIR VALVE
B	BOLLARD
BH	BOREHOLE
BB	BELISHA BEACON
BTB	BRITISH TELECOM COVER
BS	BUS STOP
CATV	CABLE TELEVISION COVER
CONC	CONCRETE
CPS	CONCRETE PAVING SLABS
DK	DROP KERB
DP	DOWNPIPE
ECB	ELECTRICITY CONTROL BOX
ELCP	ELECTRICITY CABLE PIT
EP	ELECTRICITY POLE
ERC	EARTH ROD COVER
FH	FIRE HYDRANT
FB	FLOWER BED
FL	FLOOR LEVEL
FP	FOOTPATH / FLAG POLE
GP	GATE POST
GT	GAS VALVE
G	GULLEY
IC	INSPECTION COVER
LB	LETTER BOX
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MKR	MARKER POST
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OSBM	O.S. BENCHMARK
PCE	PRE-CAST CONCRETE EDGING
PCK	PRE-CAST CONCRETE KERBS
PM	PARKING METER
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SP	SIGN POST
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STP	STACK PIPE
ST	STOP VALVE/COCK
TAP	WATER TAP/STANDPIPE
TBM	TEMPORARY BENCHMARK
TCB	TELEPHONE CALL BOX
TH	TREE HEIGHT
TL	TRAFFIC LIGHT
TP	TELEGRAPH POLE
VP	VENT PIPE
WL	WATER LEVEL
WM/SV	WATER METER/STOP VALVE
WO	WASH OUT
WT	WATER TROUGH

BUILDING

RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
EL	EAVES LEVEL
FRH	FLAT ROOF HEIGHT

TREES

ALD	ALDER
BCH	BEECH
CED	CEDAR
CHY	CHERRY
CON	CONIFER
CYP	CYPRESS
FRT	FRUIT
HAW	HAWTHORN
HLY	HOLLY
HCH	HORSE CHESTNUT
LAB	LABURNAM
LAR	LARCH
LIM	LIME
MPL	MAPLE
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POP	POPLAR
RWN	ROWAN
SIB	SILVER BIRCH
SPR	SPRUCE
SCH	SWEET CHESTNUT
SYC	SYCAMORE
WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown)
(Dia of bole) / (No. of bole)
Approx. Height (if shown)

OAK
0.2/2T
6

LEANING TRUNK

OAK
0.2/2T
6

CANOPY LINE

FOLIAGE LINE

HEDGE LINE

WALL
(Widths drawn to scale)

1.20H BW

FENCE

BWF	BARBED WIRE FENCE
CBF	CLOSE BOARD FENCE
CIF	CORRUGATED IRON FENCE
CLF	CHAIN LINK FENCE
CPF	CHESTNUT PALING FENCE
CWF	CHICKEN WIRE FENCE
IRF	IRON RAILING FENCE
PCF	POST & CHAIN FENCE
PRF	POST & RAIL FENCE
PWF	POST & WIRE FENCE
WMF	WIRE MESH FENCE
GATE	
STILE	

TELEPHONE CABLE
ELECTRICITY CABLE

NOTES

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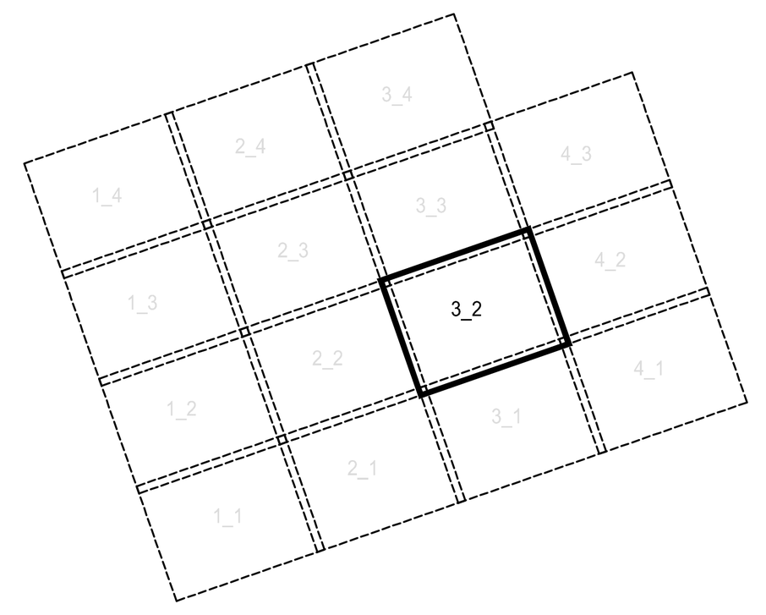
SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

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www.dgyeatman.co.uk

Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 3_2

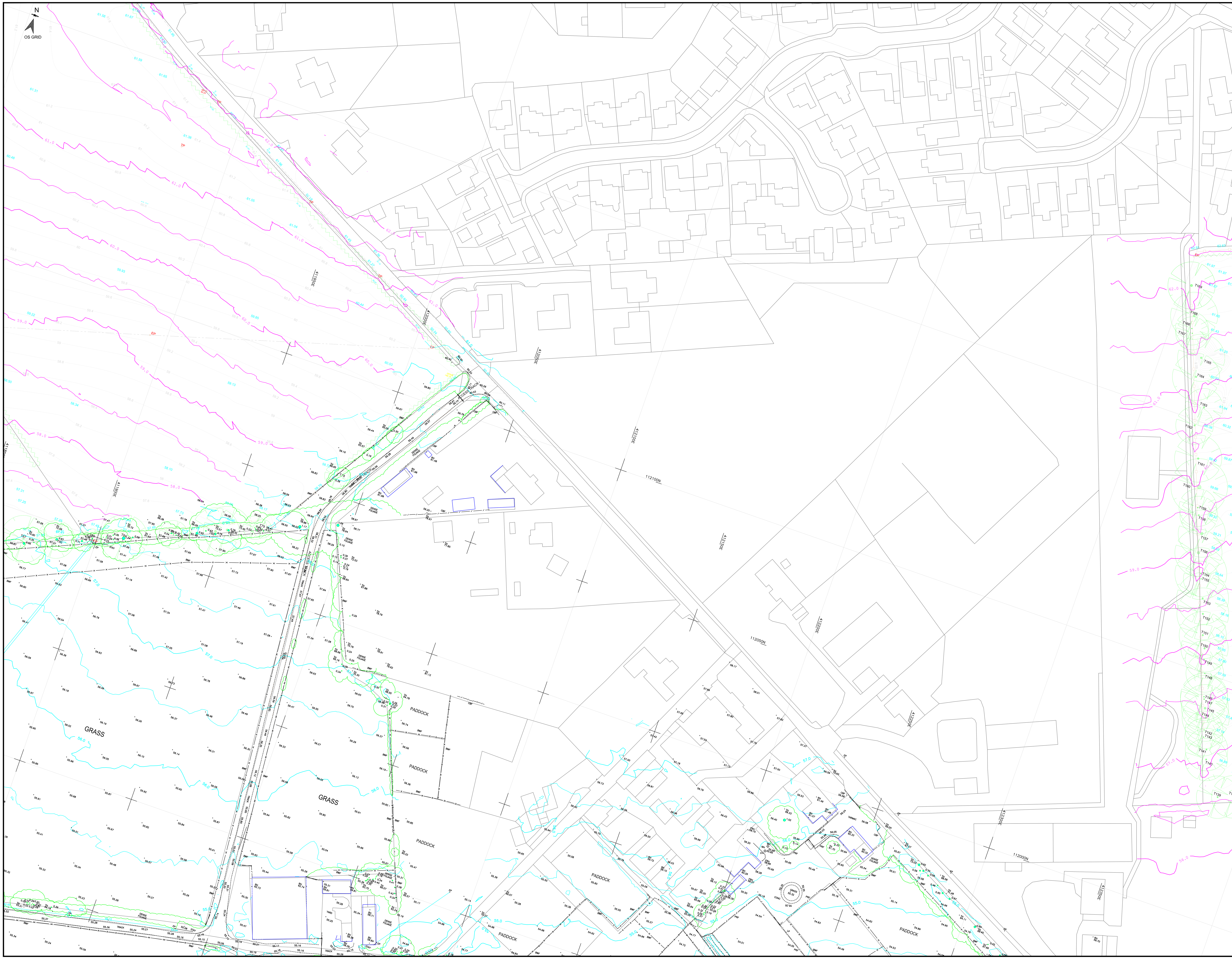
Surveyed by: D.G.Y \ S.J.Y Date: 02.21
Drawn by: D.G.Y Date: 03.21
Checked by: Date:

Drawing No. ALDERHOLT-0221
Revision

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthfl : 12 Oct 2022 - 9:00 am



STATION LISTING

STN ID	EASTING	NORTHING	LEVEL	TYPE
DY1	411987.62	111860.27	55.17	PEG
DY2	412390.29	111540.05	50.10	PEG
DY3	411728.37	111746.04	55.36	SURVEY NAIL

DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

AOD	ABOVE ORDNANCE DATUM
AV	AIR VALVE
B	BOLLARD
BH	BOREHOLE
BB	BELISHA BEACON
BTB	BRITISH TELECOM COVER
BS	BUS STOP
CATV	CABLE TELEVISION COVER
CONC	CONCRETE
CPS	CONCRETE PAVING SLABS
DK	DROP KERB
DP	DOWNPIPE
ECB	ELECTRICITY CONTROL BOX
ELCP	ELECTRICITY CABLE PIT
EP	ELECTRICITY POLE
ERC	EARTH ROD COVER
FH	FIRE HYDRANT
FB	FLOWER BED
FL	FLOOR LEVEL
FP	FOOTPATH / FLAG POLE
GP	GATE POST
GT	GAS VALVE
G	GULLEY
IC	INSPECTION COVER
LB	LETTER BOX
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MKR	MARKER POST
SNP	STREET NAME PLATE
OSBM	O.S. BENCHMARK
PCE	PRE-CAST CONCRETE EDGING
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PM	PARKING METER
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAINWATER DOWNPIPE
SP	SIGN POST
△	SURVEY STATION
STP	STACK PIPE
ST	STOP VALVE/COCK
TAP	WATER TAP/STANDPIPE
TBM	TEMPORARY BENCHMARK
TCB	TELEPHONE CALL BOX
TH	TREE HEIGHT
TL	TRAFFIC LIGHT
TP	TELEGRAPH POLE
VP	VENT PIPE
WL	WATER LEVEL
WM/SV	WATER METER/STOP VALVE
WO	WASH OUT
WT	WATER TROUGH

BUILDING

RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
EL	EAVES LEVEL
FRH	FLAT ROOF HEIGHT

TREES

ALD	ALDER
BCH	BEECH
CED	CEDAR
CHY	CHERRY
CON	CONIFER
CYP	CYPRESS
FRT	FRUIT
HAW	HAWTHORN
HLY	HOLLY
HCH	HORSE CHESTNUT
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POP	POPLAR
RWN	ROWAN
SIB	SILVER BIRCH
SPR	SPRUCE
SCH	SWEET CHESTNUT
SYC	SYCAMORE
WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown)
(Dia of bole) / (No. of bole)
Approx. Height (if shown)
OAK
0.2/2T
6

LEANING TRUNK
OAK
0.2/2T
6

CANOPY LINE
FOLIAGE LINE
HEDGE LINE
WALL
(Widths drawn to scale) 1.20H BW

FENCE

BWF	BARBED WIRE FENCE
CBF	CLOSE BOARD FENCE
CIF	CORRUGATED IRON FENCE
CLF	CHAIN LINK FENCE
CPF	CHESTNUT PALING FENCE
CWF	CHICKEN WIRE FENCE
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PCF	POST & CHAIN FENCE
PRF	POST & RAIL FENCE
PWF	POST & WIRE FENCE
WMF	WIRE MESH FENCE
GATE	
STILE	

TELEPHONE CABLE
ELECTRICITY CABLE

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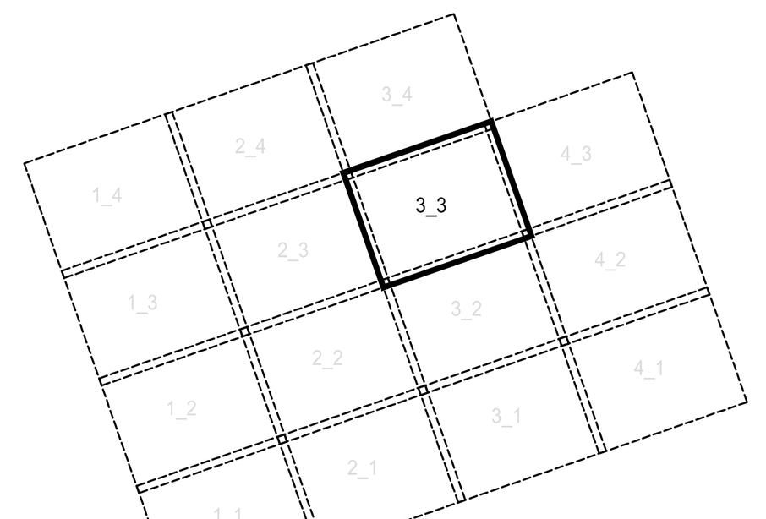
SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

Client

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www.dgyeatman.co.uk

Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 3_3

Surveyed by: D.G.Y \ S.J.Y Date: 02.21
Drawn by: D.G.Y Date: 03.21
Checked by: Date:

Drawing No. ALDERHOLT-0221 Revision

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthfl : 12 Oct 2022 - 9:02 am

STATION LISTING

STN ID	EASTING	NORTHING	LEVEL	TYPE
DY1	411987.62	111860.27	55.17	PEG
DY2	412390.29	111540.05	50.10	PEG
DY3	411728.37	111746.04	55.36	SURVEY NAIL

DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

AOD	ABOVE ORDNANCE DATUM
AV	AIR VALVE
B	BOLLARD
BH	BOREHOLE
BB	BELISHA BEACON
BTB	BRITISH TELECOM COVER
BS	BUS STOP
CATV	CABLE TELEVISION COVER
CONC	CONCRETE
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GP	GATE POST
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OSBM	O.S. BENCHMARK
PCE	PRE-CAST CONCRETE EDGING
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RE	RODDING EYE
RS	ROAD SIGN
RWP	RAINWATER DOWNPIPE
SP	SIGN POST
△	SURVEY STATION
STP	STACK PIPE
ST	STOP VALVE/COCK
TAP	WATER TAP/STANDPIPE
TBM	TEMPORARY BENCHMARK
TCB	TELEPHONE CALL BOX
TH	TREE HEIGHT
TL	TRAFFIC LIGHT
TP	TELEGRAPH POLE
VP	VENT PIPE
WL	WATER LEVEL
WM/SV	WATER METER/STOP VALVE
WO	WASH OUT
WT	WATER TROUGH

BUILDING

RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
EL	EAVES LEVEL
FRH	FLAT ROOF HEIGHT

TREES

ALD	ALDER
BCH	BEECH
CED	CEDAR
CHY	CHERRY
CON	CONIFER
CYP	CYPRESS
FRT	FRUIT
HAW	HAWTHORN
HLY	HOLLY
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SYC	SYCAMORE
WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown) / (Dia of bole) / (No. of bole) / Approx. Height (if shown) — OAK 0.2/2T 6

LEANING TRUNK — OAK 0.2/2T 6

CANOPY LINE

FOLIAGE LINE

HEDGE LINE

WALL (Widths drawn to scale) — 1.20H BW

FENCE

BWF	BARBED WIRE FENCE
CBF	CLOSE BOARD FENCE
CIF	CORRUGATED IRON FENCE
CLF	CHAIN LINK FENCE
CPF	CHESTNUT PALING FENCE
CWF	CHICKEN WIRE FENCE
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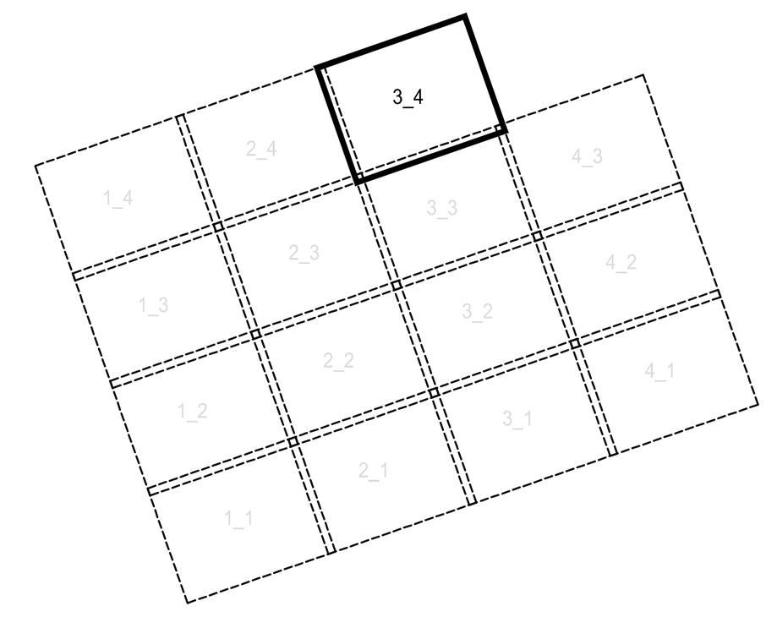
SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

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Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 3_4

Surveyed by:	D.G.Y \ S.J.Y	Date:	02.21
Drawn by:	D.G.Y	Date:	03.21
Checked by:		Date:	

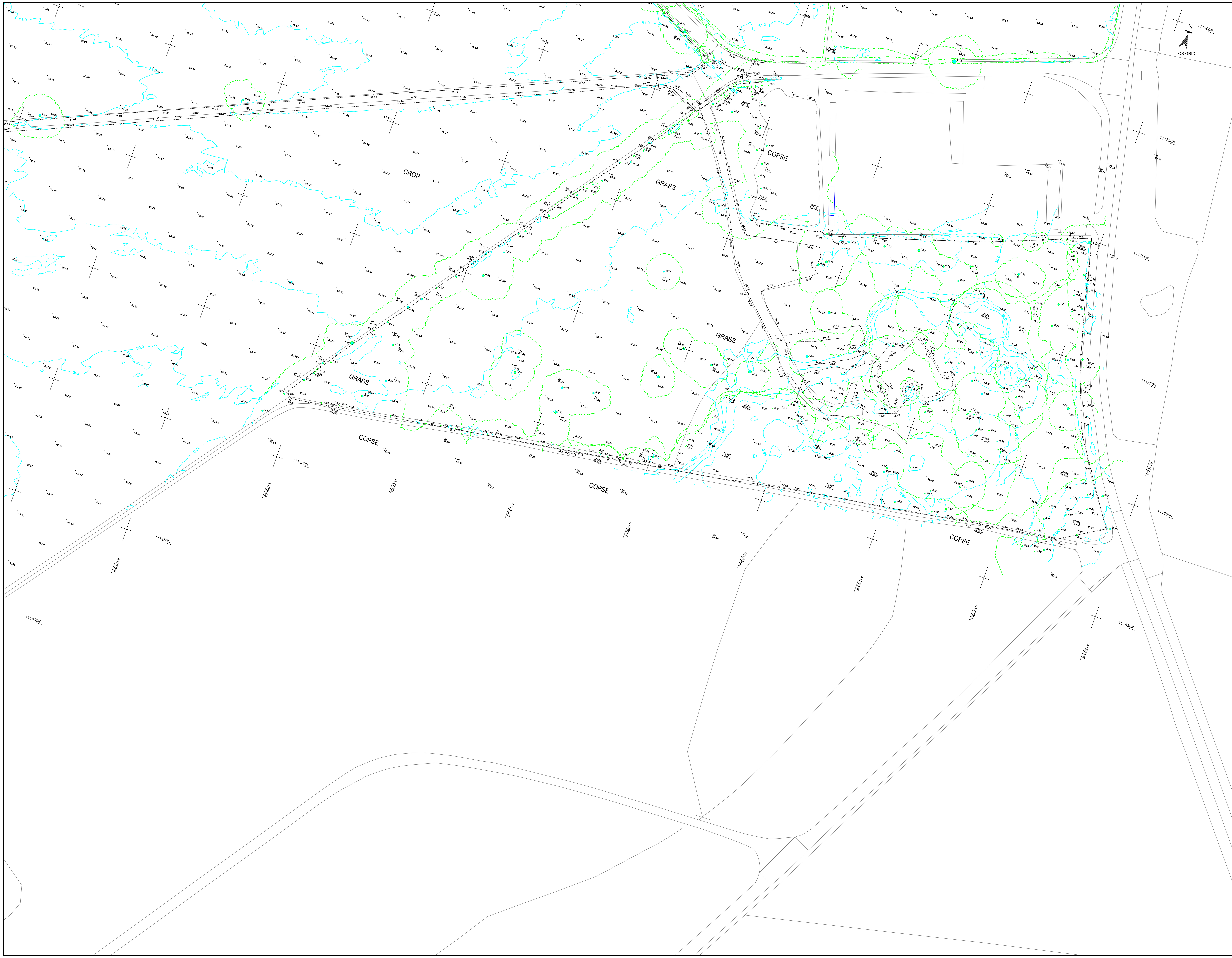
Drawing No.: ALDERHOLT-0221

Revision:

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthfl : 12 Oct 2022 - 9:03 am



STATION LISTING

STN ID	EASTING	NORTHING	LEVEL	TYPE
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DY2	412390.29	111540.05	50.10	PEG
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DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

AOD	ABOVE ORDNANCE DATUM
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WM/SV	WATER METER/STOP VALVE
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RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
EL	EAVES LEVEL
FRH	FLAT ROOF HEIGHT

TREES

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WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown)
(Dia of bole) / (No. of bole)
Approx. Height (if shown)
OAK
0.2/2T
6

LEANING TRUNK
OAK
0.2/2T
6

CANOPY LINE
FOLIAGE LINE
HEDGE LINE
WALL
(Widths drawn to scale)
1.20H BW

FENCE

BWF	BARBED WIRE FENCE
CBF	CLOSE BOARD FENCE
CIF	CORRUGATED IRON FENCE
CLF	CHAIN LINK FENCE
CPF	CHESTNUT PALING FENCE
CWF	CHICKEN WIRE FENCE
IRF	IRON RAILING FENCE
PCF	POST & CHAIN FENCE
PRF	POST & RAIL FENCE
PWF	POST & WIRE FENCE
WMF	WIRE MESH FENCE
GATE	
STILE	

TELEPHONE CABLE
ELECTRICITY CABLE

NOTES

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Trees, canopies and boles, are shown diagrammatically ie circular, their true shape in plan will be different.

Additional abbreviations maybe present and not indicated above.

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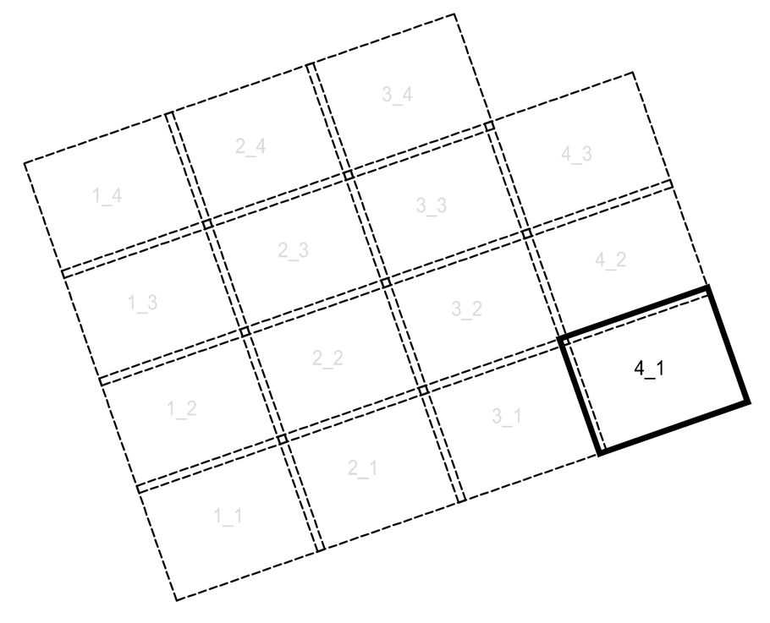
Boundaries, as shown, do not necessarily constitute legal boundaries.

This survey has been carried out to an accuracy consistent with the presentation scale shown, therefore interrogated dimensions will be within the tolerance associated with said scale.

SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

Client

DUDSBURY HOMES
(SOUTHERN) LTD

D G Yeatman Surveying & Engineering Ltd
82A York Road, Broadstone, Dorset, BH18 8EU
Tel: +44 (0)1202 692852
office@dgyeatman.co.uk
www.dgyeatman.co.uk

Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 4_1

Surveyed by: D.G.Y \ S.J.Y	Date: 02.21
Drawn by: D.G.Y	Date: 03.21
Checked by:	Date:

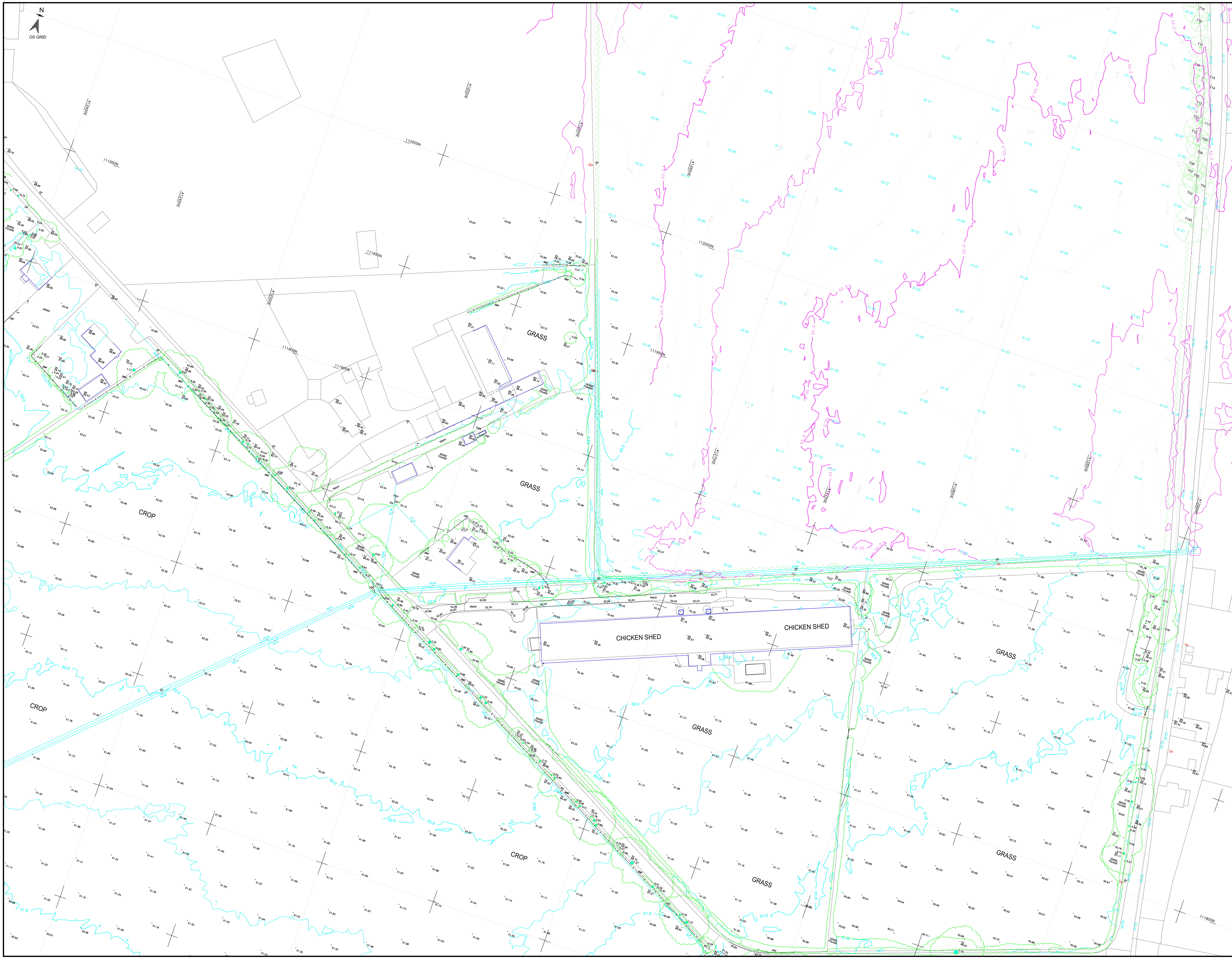
Drawing No. ALDERHOLT-0221

Revision

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthf : 12 Oct 2022 - 8:59 am



STATION LISTING

STN ID	EASTING	NORTHING	LEVEL	TYPE
DY1	411987.62	111860.27	55.17	PEG
DY2	412390.29	111540.05	50.10	PEG
DY3	411728.37	111746.04	55.36	SURVEY NAIL

DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
SF 1.00041319
OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

AOD	ABOVE ORDNANCE DATUM
AV	AIR VALVE
B	BOLLARD
BH	BOREHOLE
BB	BELISHA BEACON
BTB	BRITISH TELECOM COVER
BS	BUS STOP
CATV	CABLE TELEVISION COVER
CONC	CONCRETE
CPS	CONCRETE PAVING SLABS
DK	DROP KERB
DP	DOWNPIPE
ECB	ELECTRICITY CONTROL BOX
ELCP	ELECTRICITY CABLE PIT
EP	ELECTRICITY POLE
ERC	EARTH ROD COVER
FH	FIRE HYDRANT
FB	FLOWER BED
FL	FLOOR LEVEL
FP	FOOTPATH / FLAG POLE
GP	GATE POST
GT	GAS VALVE
G	GULLEY
IC	INSPECTION COVER
LB	LETTER BOX
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MKR	MARKER POST
SNP	STREET NAME PLATE
OSBM	O.S. BENCHMARK
PCE	PRE-CAST CONCRETE EDGING
PCK	PRE-CAST CONCRETE KERBS
PM	PARKING METER
RE	RODDING EYE
RS	ROAD SIGN
RWP	RAINWATER DOWNPIPE
SP	SIGN POST
△	SURVEY STATION
STP	STACK PIPE
ST	STOP VALVE/COCK
TAP	WATER TAP/STANDPIPE
TBM	TEMPORARY BENCHMARK
TCB	TELEPHONE CALL BOX
TH	TREE HEIGHT
TL	TRAFFIC LIGHT
TP	TELEGRAPH POLE
VP	VENT PIPE
WL	WATER LEVEL
WM/SV	WATER METER/STOP VALVE
WO	WASH OUT
WT	WATER TROUGH

BUILDING

RH	RIDGE HEIGHT
SL	SOFFIT LEVEL
EL	EAVES LEVEL
FRH	FLAT ROOF HEIGHT

TREES

ALD	ALDER
BCH	BEECH
CED	CEDAR
CHY	CHERRY
CON	CONIFER
CYP	CYPRESS
FRT	FRUIT
HAW	HAWTHORN
HLY	HOLLY
HCH	HORSE CHESTNUT
LAB	LABURNAM
LAR	LARCH
LIM	LIME
MPL	MAPLE
PNE	PINE
POP	POPLAR
RWN	ROWAN
SIB	SILVER BIRCH
SPR	SPRUCE
SCH	SWEET CHESTNUT
SYC	SYCAMORE
WLW	WILLOW
UNK	SPECIES UNKNOWN

Species (if shown)
(Dia of bole) / (No. of bole)
Approx. Height (if shown)

OAK
0.2/2T
6

LEANING TRUNK

OAK
0.2/2T
6

CANOPY LINE

FOLIAGE LINE

HEDGE LINE

WALL
(Widths drawn to scale)

1.20H BW

FENCE

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PRF	POST & RAIL FENCE
PWF	POST & WIRE FENCE
WMF	WIRE MESH FENCE
GATE	
STILE	

TELEPHONE CABLE
ELECTRICITY CABLE

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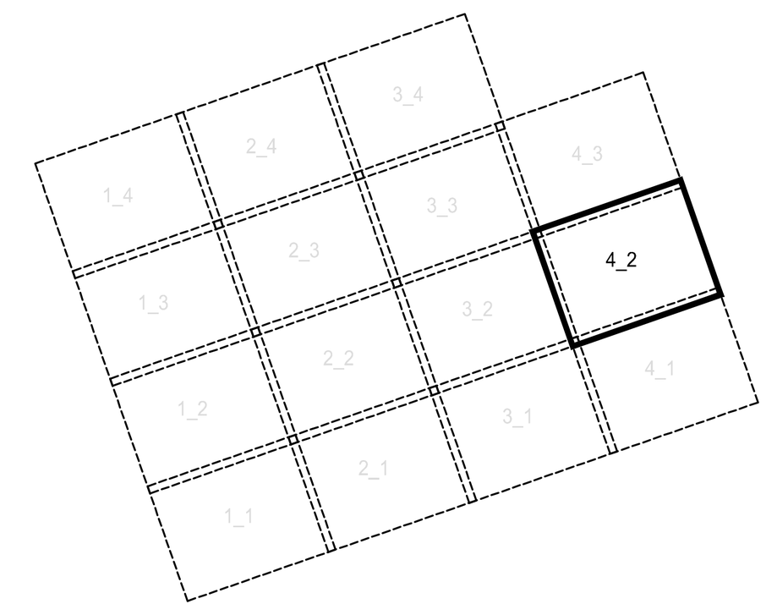
SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

Client

DUDSBURY HOMES (SOUTHERN) LTD

D G Yeatman Surveying & Engineering Ltd
82A York Road, Broadstone, Dorset, BH18 8EU
Tel: +44 (0)1202 692852
office@dgyeatman.co.uk
www.dgyeatman.co.uk

Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 4_2

Surveyed by: D.G.Y \ S.J.Y Date: 02.21
Drawn by: D.G.Y Date: 03.21
Checked by: Date:

Drawing No.: ALDERHOLT-0221
Revision:

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthfl : 12 Oct 2022 - 9:00 am

STATION LISTING

STN ID	EASTING	NORTHING	LEVEL	TYPE
DY1	411987.62	111860.27	55.17	PEG
DY2	412390.29	111540.05	50.10	PEG
DY3	411728.37	111746.04	55.36	SURVEY NAIL

DATUM DETAILS

OSGB36, VIA ETRS89 - OSTN15, FLAT PLANE ABOUT E: 411800 N: 111600
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OS NEWLYN, VIA ETRS89 - OSGM15

LEGEND

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CHY	CHERRY
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SIB	SILVER BIRCH
SPR	SPRUCE
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(Dia of bole) / (No. of bole)
Approx. Height (if shown)
OAK 0.2/2T 6

LEANING TRUNK
OAK 0.2/2T 6

CANOPY LINE
FOLIAGE LINE
HEDGE LINE
WALL (Widths drawn to scale) 1.20H BW

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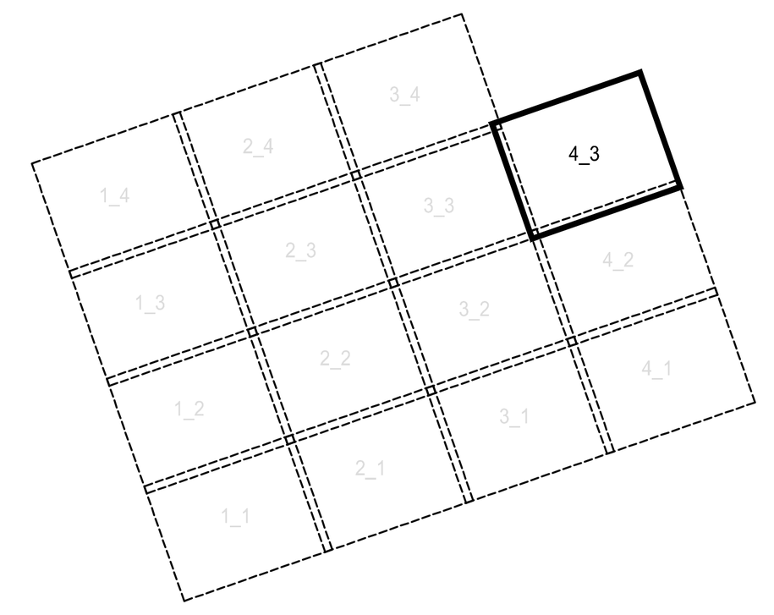
SHEET LAYOUT



Rev	By	Chkd	Apprvd	Date	Description

Client

DUDSBURY HOMES (SOUTHERN) LTD

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Tel: +44 (0)1202 692852
office@dgyeatman.co.uk
www.dgyeatman.co.uk

Project

ALDERHOLT

Drawing

LAND SURVEY
SHEET LOCATION : 4_3

Surveyed by:	D.G.Y \ S.J.Y	Date:	02.21
Drawn by:	D.G.Y	Date:	03.21
Checked by:		Date:	

Drawing No. ALDERHOLT-0221
Revision

Drawing Scale: 1:500 @ A0

0 5 10 15 20 30 40m
1:500

Drawing file path & name \\red-data1\Jobs\13500-13749\13577 - Alderholt\Docs\Docs In\Key and Background Docs\2022 10 10 Dropbox Downloads\ ALDERHOLT-0221.dwg
User and Plot Date ruthfl : 12 Oct 2022 - 9:02 am

Appendix D: EA Product 4 Report

265568-WX : 220518/lk03 : Land South and West of Alderholt - Product 4 Data Request

Wessex Enquiries to RuthFletcher@campbellreith.com 14/06/2022 11:56
History: This message has been forwarded.

8 attachments

265568 P4 letter.pdf 265568-WX - JFLOW Depth Map - 100yr (1%AEP).pdf
265568-WX - JFLOW Depth Map - 1000yr (0.1%AEP).pdf ATT00001.jpg ATT00001.jpg ATT00001.jpg
ATT00001.jpg ATT00001.jpg
ATT00001.jpg

265568 WX

Dear Ruth

Provision of FRA Product 4

Thank you for your recent request to use Environment Agency flood data. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments and our attached advisory text.
https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Further details about the Environment Agency information supplied and the permitted use of this information can be found on the GOV.UK website:
https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather
http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3

We respond to requests under the Freedom of Information Act 2000 (FOIA) and Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

We really value your thoughts on how we are doing and will always make changes where we can to improve our service. Please click on the link below and fill in our survey.
http://www.smartsurvey.co.uk/s/EnvironmentAgencyCustomerSurvey/?a=DC *Thank you.*

Yours sincerely

Corinne Moyse

Customer & Engagement, Wessex Enquiries
Email: wessexenquiries@environment-agency.gov.uk

From: RuthFletcher@campbellreith.com [mailto:RuthFletcher@campbellreith.com]
Sent: 12 May 2022 10:29
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 220518/lk03 Alderholt - Product 4 Data Request

Good Morning

I am currently looking at a wider development strategy for a large scheme in Alderholt, Dorset, see attached approximate location plan. Please could you provide any information you have for this area, including Product 4 Data, and any other details that would help to inform a Flood Risk Assessment such as past flood records?

Kind regards

Ruth Fletcher
Graduate Civil Engineer

No. 1 Marsden St,
Manchester
M2 1HW

Tel +44 (0)161 819 3060

www.campbellreith.com

Click here to report this email as spam.

creating a better place

Environment Agency

Ruth Fletcher
CampbellReith
RuthFletcher@campbellreith.com

Our ref: 265568-WX
Date: 8th June 2022

Dear Ruth

Thank you for your enquiry which was received on 12th May 2022. We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Please refer to Open Government Licence which explains the permitted use of this information.

Abstract

Name	Product 4
Description	Flood Risk Information for land at **Land South and West of Alderholt, Alderholt** SU1175711692
Licence	Open Government Licence
Information Warnings	*The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply.*
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2020 Ordnance Survey 100024198.

Open Data

The following Environment Agency published datasets are now available on the weblink below as part of the Government's 'Open Data' project and are available for you to download free of charge.

Environment Agency published datasets: https://data.gov.uk/data/search?publisher=environment-agency&unpublished=false

You will need to search and select the name of the following datasets to take you directly to the weblink to enable you to download the data:

- Flood Map for Planning (Rivers and the Sea) – Flood Zones 2 and 3
- Flood Map for Planning (Rives and Sea) – Areas Benefiting from Defences
- Flood Map for Planning (Rivers and Sea) Spatial Flood Defences
- Flood Map for Planning (Rivers and Sea) Flood Storage Areas
- Recorded Flood Outlines
- Historic Flood Map
- Risk of Flooding from Surface Water Extent for:

FLOODS DESTROY BE PREPARED

- → 3 percent annual chance
- → 1 percent annual chance
- → 0.5 percent annual chance

You can also access the Flood Map for Planning here: https://flood-map-for-planning.service.gov.uk/

You can also access the Risk of Flooding from Surface Water maps and Risk of Flooding from Reservoirs information here: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

Recorded Historic Flood Events

Our historic records show a record of possible flooding pre 2012 for the area, however we are currently unable to confirm the date and source of this.

Please note - we cannot guarantee that this is an exhaustive list of all past flood events in this location. All reasonable care has been taken to ensure that the historical flood event data is as accurate as possible. The Environment Agency will update its records if new evidence emerges.

Modelled Fluvial Water Levels

We have not carried out any detailed fluvial flood risk modelling in this location.

The fluvial Flood Map in this area has been produced using our National Generalised Model (JFLOW). This modelling is fit for the purpose of the Flood Zones. However, it is not based on a specific channel survey. Neither water depths nor water levels were outputs specified when we commissioned this generalised modelling for the Flood Zones. Whilst the modelling process does provide some information on depth of water, it would have been possible to produce the flood extents without storing the water depth values, since water depth is only a 'by-product' of the calculation process. As this type of modelling was developed, tested and reviewed for production of the Flood Zone extents only, we have no information on the accuracy of the water depth data.

Water depth or level outputs from this model are only suitable to be used for decision making at a broad catchment scale and is not fit for the purpose of a site-specific flood risk assessment.

For your information we have supplied maps showing the water depths derived from JFLOW for the 1% AEP (100yr) and 0.1% AEP (1000yr) fluvial modelled flood scenarios.

For more information on climate change allowances please see the guidance on the Gov.UK website here: Flood risk assessments: climate change allowances - GOV.UK. **Please be aware that we will soon be updating the peak river flow climate change allowances given in this link.**

Ordinary Watercourse

The watercourse adjoining this site is classed as an 'Ordinary Watercourse' not a 'Main River' under our control. It is under the jurisdiction of **Dorset Council**.

Please contact **Dorset Council** for information about the management of any assets or future works on the watercourse.

Flood Asset Information

The area does not benefit from any formal fluvial/tidal flood defences managed or owned by the Environment Agency. Please contact **Dorset Council** as the Lead Local Flood Authority to see whether they hold any relevant asset information.

Planning

If you have questions regarding the planning nature of your enquiry, or require advice on floor levels, please contact our Sustainable Places team on SWX.SP@environment-agency.gov.uk. Please be aware that we now charge for planning advice when consulted on pre-application enquiries. This new approach provides advice to developers in two ways. Firstly, there is the provision of 'free' advice available to everyone where we give a preliminary opinion on a proposed development. This sets out the environmental constraints together with any issues this raises for us. Should you wish us to review in detail any of these issues then we can do this through a chargeable scheme aimed at recovering our costs.

Strategic Flood Risk Assessment (SFRA)

Please contact Dorset Council for an update on their Strategic Flood Risk Assessment in your area of interest.

Further Information

We advise that you also contact the Flood Risk Management Department at **Dorset Council** as they may be able to provide further advice with regard to localised flooding and drainage issues.

Further details about the Environment Agency information supplied can be found on our website: https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

We hope you find this information helpful. It is provided subject to the attached notice 'Use of Environment Agency Information for Flood Risk Assessments', which we strongly recommend you read.

Yours sincerely

Corinne Moyse

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Telephone number: 02030 250 376
Email: wessexenquiries@environment-agency.gov.uk

Enc: Use of Environment Agency Information for Flood Risk Assessments (below)
265568-WX - JFLOW Depth Map - 100yr (1%AEP)
265568-WX - JFLOW Depth Map - 1000yr (0.1%AEP)

Use of Environment Agency Information for Flood Risk Assessments (FRAs)

Important
Use of Environment Agency data: you should note that

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment (FRA) where one is required, but the use of Environment Agency information does not constitute such an assessment on its own.

2. As part of your data request, we have provided all of the modelled data we hold for your location. Please note that some of our modelled information may have been produced for purposes other than for flood zone generation. This may mean that some of the modelled data you have been provided with has a lower confidence level, and has not been used in producing our flood map, nor definitively reflects the predicted flood water level at the property/development site scale. To check the suitability of the use of this information in your FRA please contact your local Partnership & Strategic Overview (PSO) team.

3. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or surface water runoff. The information produced by the Local Planning Authority and the Lead Local Flood Authority (LLFA) may assist in assessing other sources of flood risk.

4. Where a planning application requires a FRA and this is not submitted or deficient, the Environment Agency may well raise an objection.

5. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your Local Planning Authority.

Pre-Planning Advice from the Environment Agency
If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:

Pre-application Preliminary Opinion:
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Pre-application Charged Service:
https://www.gov.uk/government/publications/planning-advice-environment-agency-standard-terms-and-conditions

Depending on the enquiry we may also provide advice on other issues related to our responsibilities, including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

Flood Risk Assessment (FRA) Guidance
You should refer to the Planning Practice Guidance of the National Planning Policy Framework (NPPF) and the Environment Agency's Flood Risk Standing Advice for information about Flood Risk Assessment (FRA) for new development in the different Flood Zones. These documents can be accessed via:

National Planning Policy Framework Planning Practice Guidance:

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Phone: 02030 250 376
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

VAT No: 662 4901 34

http://planningguidance.planningportal.gov.uk/

Environment Agency advice on FRAs:
https://www.gov.uk/flood-risk-assessment-for-planning-applications#when-to-follow-standing-advice

https://www.gov.uk/government/publications/planning-applications-assessing-flood-risk

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Phone: 02030 250 376
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

VAT No: 662 4901 34

265568-WX - JFLOW Fluvial Water depths (m) Without Flood Defences. 100 year (1% AEP) centred on land at Alderholt[411757,111692]. Created 08.06.2022

Environment Agency

Scale 1:11,000

N W E S

Legend

100yr JFLOW Depth

metres

- 0 - 0.5
- 0.500000000 - 1
- 1.000000001 - 2
- 2.000000001 - 3
- 3.000000001 - 4
- 4.000000001 - 5
- 5.000000001 - 10
- 10.00000001 - 100
- Main River

Information Warning
We do not recommend the use of water depths/levels derived from JFLOW for site specific investigations such as Flood Risk Assessments.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

265568-WX - JFLOW Fluvial Water depths (m) Without Flood Defences. 1000 year (0.1% AEP) centred on land at Alderholt[411757,111692]. Created 08.06.2022

Environment Agency

Scale 1:11,000

N W E S

Legend

1000yr JFLOW Depth

metres

- 0 - 0.5
- 0.500000000 - 1
- 1.000000001 - 2
- 2.000000001 - 3
- 3.000000001 - 4
- 4.000000001 - 5
- 5.000000001 - 10
- 10.00000001 - 100
- Main River

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Appendix E: Masterplan

A0

NOTES

DRAWINGS CAN BE SCALED FOR PURPOSES OF PLANNING APPLICATION ONLY.

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Check all dimensions on site before work proceeds or materials are ordered, report discrepancies to the Architect.

If in doubt ask !!

NOTE:

This drawing has been prepared from topographical/Survey/OS data prepared by others. No responsibility is taken for accuracy. Please refer to original topographical/survey/OS data.

To be read in conjunction with all other specialist reports.

REV	DESCRIPTION	DATE	AUTHOR	CHK'D
P3	Building height mark up	06/07/2022	AT	MP
P4	Revised access is superimposed. Updated ecology buffers, SUDs & Sub stations.	23/08/2022	MP	
P5	Energy hub & SANG carparks added.	26/09/2022	MP	
P6	Indicative layout is reviewed and updated.	07/10/2022	MP	

Key:

- 2.5 Storey
- 3 Storey

All Dwellings & Employment buildings are 2 storey.

Garages are single storey

HT Summary

N

DRAFT / FOR DISCUSSION

Scott Worsfold Associates
RIBA Chartered Architects
The Studio, 22 Ringwood Road, Ferndown, Dorset, BH22 9AN
Telephone: 01202 580902 e-mail: info@sw-arch.com

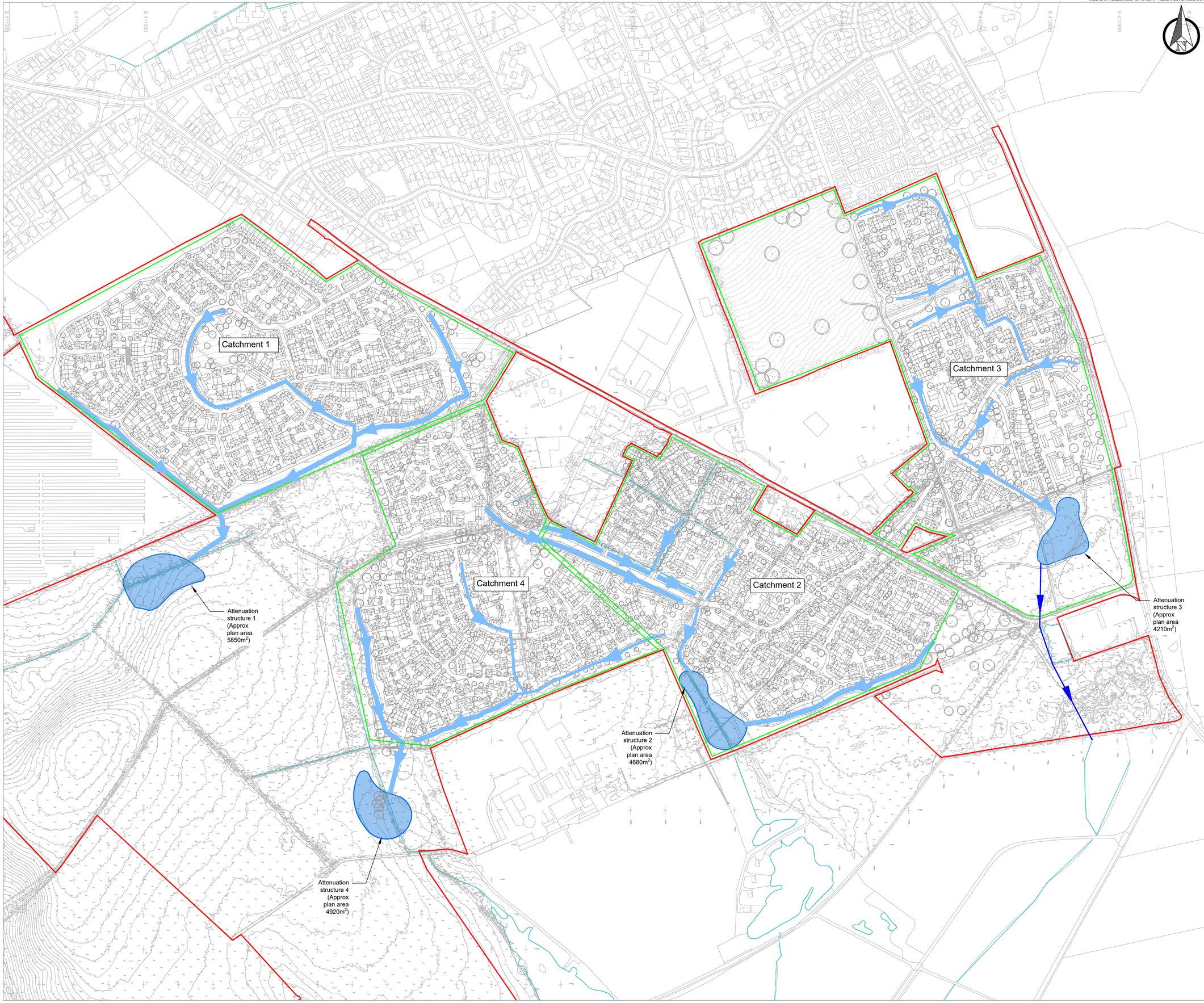
SCALE	DATE	AUTHOR	CHK'D
1:2000@ A0	April 2022	All	GW

JOB NO.	DRAWING NO.	REV
22-1126	SL.01	P6

File Location
W:\SW ARCH\01 PROJECTS\22-1126 - Aldermoll, IL\Drawings\SW Arch\02 Stage D Design Development\01 DWG\22-1126 SL.01 Rev P6 - Site Layout In Progress.dwg

Indicative Site Layout
Alderholt Park, Dorset

Appendix F: Proposed Drainage Strategy and Supporting Calculations



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P: Preliminary	Evolving drawings for approvals, tenders, billings etc.
C: Construction	Fully developed drawings issued under instructions for construction.

6. Only status **C** drawings to be used for construction.
7. Suitability code:

Work in progress
S0 - Work in progress
Shared (Non-contractual)
S1 - For coordination, **S2** - For information, **S3** - For internal review and comment, **S4** - For construction approval.
Documentation (For contractors purposes)
D1 - For Costing, **D2** - For Tender, **D3** - For contractor design, **D4** - for manufacture/procurement.
Construction
A - For construction, **B** - For construction but with comments (i.e. areas in abeyance), **CR** - Construction Record (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)

8. Proposed Masterplan based on 22-1126 SL01 Rev P6 (Received from Scott Worsfold Associates on 07/10/22). This Masterplan has been isntered onto the LIDAR data and no guarantee as to the accuracy of the layout in relation to the LIDAR is given or implied. Masterplan shown for information only.
9. All existing survey information shown or referred to is based upon topographical survey prepared by D G Yeatman Surveying & Engineering Ltd, Dwg reference ALDERHOLT-0221, dated February 2021 as supplied to CampbellReith - no warranty as to the accuracy of the information is given or implied.
10. For further information and calculations on the drainage strategy refer to 13577-CRH-ZZ-XX-RP-C-0001_FRA.

Key

- Site Boundary
- Proposed Indicative Swale Locations (4m-6.8m width)
- Catchment Boundaries
- Existing Surface Water Features
- Proposed Piped Outfall

Rev	Description	Date	By
P1	Issued for information	10/11/22	RF

CampbellReith
consulting engineers

London	020 7340 1700	Manchester	0161 819 3060
Surrey	01737 784 500	Birmingham	01675 467 484
Bristol	0117 916 1066	Dubai	00 971 4345 7088

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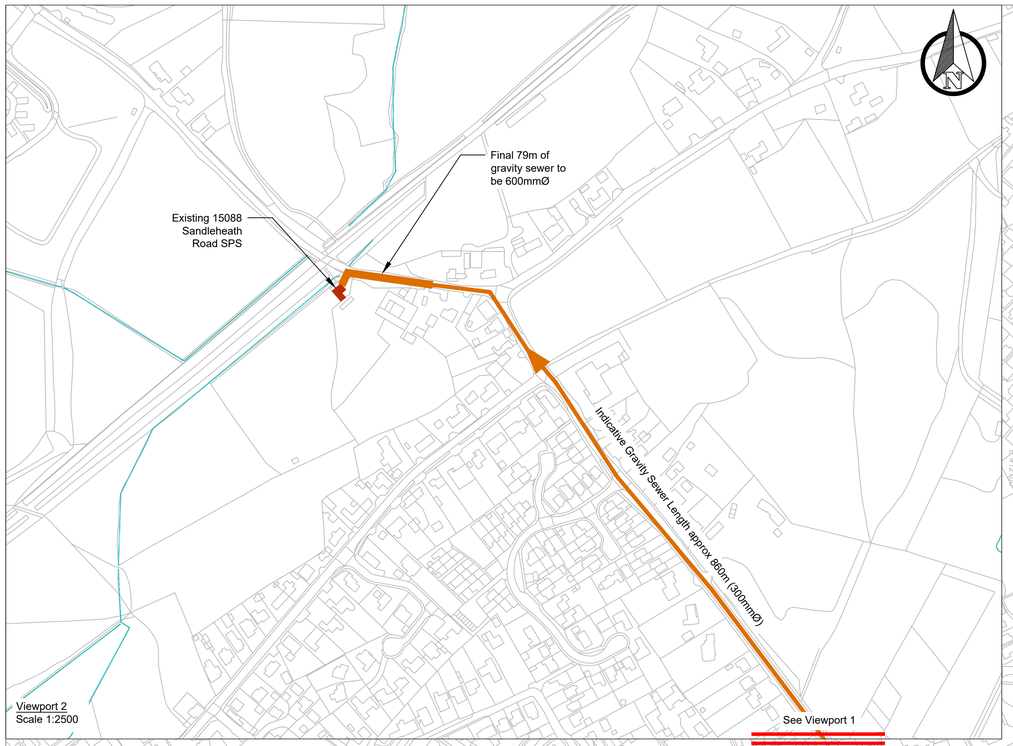
Job Title
Alderholt Meadows, Fordingbridge

Client
Dudsbury Homes (Southern)

Proposed Surface Water Drainage Strategy

Drawn by	Date made	Scale @ A1	Checked by	Suitability	CR Project
RF	21/09/22	1:2500	GT	S2	13577

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
13577	CRH	ZZ	XX	DR	C	5050	P1



Viewport 2
Scale 1:2500

Viewport 1
Scale 1:2500

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5. Drawing status:

   P: Preliminary — Evolving drawings for approvals, tenders, billings etc.

   C: Construction — Fully developed drawings issued under instructions for construction.

6. Only status **C** drawings to be used for construction.
7. Suitability code:

   Work in progress
   S0 - Work in progress
   Shared (Non-contractual)
   S1 - For coordination, **S2** - For information, **S3** - For internal review and comment, **S4** - For construction approval.
   Documentation (For contractors purposes)
   D1 - For Costing, **D2** - For Tender, **D3** - For contractor design, **D4** - for manufacture/procurement.
   Construction
   A - For construction, **B** - For construction but with comments (i.e. areas in abeyance), **CR** - Construction Record (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)

8. Proposed Masterplan based on 22-1126 SL01 Rev P6 (Received from Scott Worsfold Associates on 07/10/22). This Masterplan has been isntered onto the LIDAR data and no guarantee as to the accuracy of the layout in relation to the LIDAR is given or implied. Masterplan shown for information only.
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10. For further information and calculations on the drainage strategy refer to 13577-CRH-ZZ-XX-RP-C-0001_FRA.

Key

- Site Boundary
- Proposed Pumping Station and 15m easement
- Proposed Indicative Foul Network
- Proposed Indicative Rising Main
- Existing Surface Water Features

Rev	Description	Date	By
P1	Issued for information	10/11/22	RF

CampbellReith
consulting engineers

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Surrey 01737 784 500 | Birmingham 01675 467 484
Bristol 0117 916 1066 | Dubai 00 971 4345 7088
www.campbellreith.com

Job Title
Alderholt Meadows, Fordingbridge

Client
Dudsbury Homes (Southern)

Proposed Foul Drainage Strategy

Drawn by	Date made	Scale @ A1	Checked by	Suitability	CR Project
RF	21/09/22	As Shown	GT	S2	13577

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
13577	CRH	ZZ	XX	DR	C	5051	P1

Alderholt Meadows, Fordingbridge

SW Catchment 1

13577 – Source Control Calculations

Date: 13/10/22

Project No: 13577

Engineer: R. Fletcher

Checked: G. Taylor

Campbell Reith Hill LLP
Raven House
29 Linkfield Lane
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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	18.834	0.734	139.6	3422.9	O K
30 min Summer	18.966	0.866	139.6	4081.5	O K
60 min Summer	19.109	1.009	139.6	4809.7	O K
120 min Summer	19.256	1.156	139.6	5571.9	O K
180 min Summer	19.334	1.234	139.6	5982.3	O K
240 min Summer	19.377	1.277	139.6	6215.3	O K
360 min Summer	19.414	1.314	139.6	6413.3	O K
480 min Summer	19.428	1.328	139.6	6485.8	O K
600 min Summer	19.433	1.333	139.6	6512.6	O K
720 min Summer	19.432	1.332	139.6	6506.7	O K
960 min Summer	19.395	1.295	139.6	6312.6	O K
1440 min Summer	19.306	1.206	139.6	5835.7	O K
2160 min Summer	19.148	1.048	139.6	5011.3	O K
2880 min Summer	19.003	0.903	139.6	4266.2	O K
4320 min Summer	18.777	0.677	139.6	3143.4	O K
5760 min Summer	18.626	0.526	137.8	2411.6	O K
7200 min Summer	18.535	0.435	134.3	1981.2	O K
8640 min Summer	18.491	0.391	123.3	1776.0	O K
10080 min Summer	18.463	0.363	112.2	1643.1	O K
15 min Winter	18.918	0.818	139.6	3841.8	O K
30 min Winter	19.066	0.966	139.6	4587.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	167.303	0.0	3306.8	19
30 min Summer	101.105	0.0	4023.6	33
60 min Summer	61.100	0.0	5027.5	62
120 min Summer	36.924	0.0	6091.3	122
180 min Summer	27.502	0.0	6812.7	182
240 min Summer	22.314	0.0	7374.8	240
360 min Summer	16.620	0.0	8244.8	350
480 min Summer	13.485	0.0	8921.7	404
600 min Summer	11.467	0.0	9483.4	466
720 min Summer	10.044	0.0	9967.1	530
960 min Summer	8.028	0.0	10616.2	666
1440 min Summer	5.855	0.0	11590.9	940
2160 min Summer	4.270	0.0	12842.4	1340
2880 min Summer	3.413	0.0	13679.2	1704
4320 min Summer	2.500	0.0	14979.0	2420
5760 min Summer	2.005	0.0	16125.0	3112
7200 min Summer	1.689	0.0	16973.4	3752
8640 min Summer	1.469	0.0	17688.4	4416
10080 min Summer	1.305	0.0	18284.5	5144
15 min Winter	167.303	0.0	3720.0	18
30 min Winter	101.105	0.0	4521.0	33

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	19.227	1.127	139.6	5421.4	O K
120 min Winter	19.393	1.293	139.6	6297.5	O K
180 min Winter	19.480	1.380	139.6	6766.1	O K
240 min Winter	19.531	1.431	139.6	7047.4	O K
360 min Winter	19.581	1.481	139.6	7322.1	O K
480 min Winter	19.594	1.494	139.6	7390.3	O K
600 min Winter	19.591	1.491	139.6	7373.5	O K
720 min Winter	19.586	1.486	139.6	7350.9	O K
960 min Winter	19.535	1.435	139.6	7070.0	O K
1440 min Winter	19.406	1.306	139.6	6371.4	O K
2160 min Winter	19.169	1.069	139.6	5120.4	O K
2880 min Winter	18.943	0.843	139.6	3967.0	O K
4320 min Winter	18.633	0.533	138.0	2445.0	O K
5760 min Winter	18.502	0.402	127.1	1825.6	O K
7200 min Winter	18.455	0.355	108.9	1605.8	O K
8640 min Winter	18.424	0.324	95.4	1461.8	O K
10080 min Winter	18.400	0.300	85.0	1353.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	61.100	0.0	5640.0	62
120 min Winter	36.924	0.0	6830.9	120
180 min Winter	27.502	0.0	7638.9	178
240 min Winter	22.314	0.0	8268.4	234
360 min Winter	16.620	0.0	9242.5	346
480 min Winter	13.485	0.0	10000.5	450
600 min Winter	11.467	0.0	10629.3	488
720 min Winter	10.044	0.0	11170.6	562
960 min Winter	8.028	0.0	11897.0	714
1440 min Winter	5.855	0.0	12983.6	1024
2160 min Winter	4.270	0.0	14390.1	1448
2880 min Winter	3.413	0.0	15330.5	1816
4320 min Winter	2.500	0.0	16796.1	2464
5760 min Winter	2.005	0.0	18065.4	3056
7200 min Winter	1.689	0.0	19017.6	3752
8640 min Winter	1.469	0.0	19822.4	4496
10080 min Winter	1.305	0.0	20501.4	5240

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 412550 110450 SU 12550 10450
C (1km)	-0.026
D1 (1km)	0.393
D2 (1km)	0.341
D3 (1km)	0.352
E (1km)	0.300
F (1km)	2.396
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 11.200

Time (mins) From:	To:	Area (ha)
0	4	11.200

Model Details

Storage is Online Cover Level (m) 20.000

Tank or Pond Structure

Invert Level (m) 18.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	4400.0	1.500	5521.8	1.900	5842.4	1.901	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0447-1396-1500-1396
Design Head (m)	1.500
Design Flow (l/s)	139.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	447
Invert Level (m)	18.100
Minimum Outlet Pipe Diameter (mm)	500
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	139.6
Flush-Flo™	0.672	139.6
Kick-Flo®	1.175	124.0
Mean Flow over Head Range	-	112.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	11.8	1.200	125.2	3.000	195.8	7.000	296.6
0.200	42.8	1.400	135.0	3.500	211.1	7.500	306.8
0.300	84.9	1.600	144.1	4.000	225.4	8.000	316.7
0.400	126.5	1.800	152.6	4.500	238.8	8.500	326.3
0.500	137.0	2.000	160.6	5.000	251.4	9.000	335.6
0.600	139.2	2.200	168.3	5.500	263.5	9.500	344.6
0.800	138.6	2.400	175.6	6.000	275.0		
1.000	133.6	2.600	182.6	6.500	286.0		

Alderholt Meadows, Fordingbridge

SW Catchment 2

13577 – Source Control Calculations

Date: 13/10/22

Project No: 13577

Engineer: R. Fletcher

Checked: G. Taylor

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	18.852	0.752	114.0	2735.1	O K
30 min Summer	18.985	0.885	114.0	3259.8	O K
60 min Summer	19.129	1.029	114.0	3838.4	O K
120 min Summer	19.276	1.176	114.0	4441.0	O K
180 min Summer	19.350	1.250	114.0	4752.9	O K
240 min Summer	19.391	1.291	114.0	4925.7	O K
360 min Summer	19.423	1.323	114.0	5062.4	O K
480 min Summer	19.434	1.334	114.0	5108.4	O K
600 min Summer	19.436	1.336	114.0	5118.1	O K
720 min Summer	19.432	1.332	114.0	5103.0	O K
960 min Summer	19.392	1.292	114.0	4930.7	O K
1440 min Summer	19.296	1.196	114.0	4526.3	O K
2160 min Summer	19.130	1.030	114.0	3839.9	O K
2880 min Summer	18.978	0.878	114.0	3230.0	O K
4320 min Summer	18.744	0.644	114.0	2320.3	O K
5760 min Summer	18.590	0.490	112.5	1741.2	O K
7200 min Summer	18.501	0.401	109.5	1414.9	O K
8640 min Summer	18.461	0.361	100.0	1268.1	O K
10080 min Summer	18.434	0.334	90.8	1170.3	O K
15 min Winter	18.937	0.837	114.0	3070.1	O K
30 min Winter	19.086	0.986	114.0	3664.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	167.303	0.0	2679.1	19
30 min Summer	101.105	0.0	3255.0	33
60 min Summer	61.100	0.0	4039.9	62
120 min Summer	36.924	0.0	4892.1	122
180 min Summer	27.502	0.0	5470.4	182
240 min Summer	22.314	0.0	5921.0	240
360 min Summer	16.620	0.0	6618.6	344
480 min Summer	13.485	0.0	7161.8	400
600 min Summer	11.467	0.0	7612.7	464
720 min Summer	10.044	0.0	8001.3	526
960 min Summer	8.028	0.0	8523.6	664
1440 min Summer	5.855	0.0	9310.3	938
2160 min Summer	4.270	0.0	10286.3	1340
2880 min Summer	3.413	0.0	10957.5	1704
4320 min Summer	2.500	0.0	12006.1	2420
5760 min Summer	2.005	0.0	12907.1	3064
7200 min Summer	1.689	0.0	13587.8	3744
8640 min Summer	1.469	0.0	14163.2	4416
10080 min Summer	1.305	0.0	14647.3	5144
15 min Winter	167.303	0.0	3011.0	18
30 min Winter	101.105	0.0	3654.8	33

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	19.249	1.149	114.0	4328.9	O K
120 min Winter	19.412	1.312	114.0	5015.5	O K
180 min Winter	19.496	1.396	114.0	5377.9	O K
240 min Winter	19.546	1.446	114.0	5591.5	O K
360 min Winter	19.591	1.491	114.0	5789.7	O K
480 min Winter	19.599	1.499	114.0	5825.7	O K
600 min Winter	19.594	1.494	114.0	5804.6	O K
720 min Winter	19.587	1.487	114.0	5774.4	O K
960 min Winter	19.531	1.431	114.0	5528.2	O K
1440 min Winter	19.393	1.293	114.0	4936.6	O K
2160 min Winter	19.143	1.043	114.0	3895.0	O K
2880 min Winter	18.907	0.807	114.0	2952.4	O K
4320 min Winter	18.590	0.490	112.5	1743.4	O K
5760 min Winter	18.468	0.368	102.4	1294.1	O K
7200 min Winter	18.425	0.325	87.6	1137.2	O K
8640 min Winter	18.396	0.296	76.6	1033.9	O K
10080 min Winter	18.375	0.275	68.3	957.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	61.100	0.0	4530.5	62
120 min Winter	36.924	0.0	5484.8	120
180 min Winter	27.502	0.0	6132.4	178
240 min Winter	22.314	0.0	6637.0	234
360 min Winter	16.620	0.0	7418.2	346
480 min Winter	13.485	0.0	8026.4	448
600 min Winter	11.467	0.0	8531.2	484
720 min Winter	10.044	0.0	8966.2	558
960 min Winter	8.028	0.0	9550.9	714
1440 min Winter	5.855	0.0	10429.1	1024
2160 min Winter	4.270	0.0	11524.9	1444
2880 min Winter	3.413	0.0	12278.7	1812
4320 min Winter	2.500	0.0	13459.7	2460
5760 min Winter	2.005	0.0	14459.4	3048
7200 min Winter	1.689	0.0	15223.0	3744
8640 min Winter	1.469	0.0	15870.1	4416
10080 min Winter	1.305	0.0	16420.0	5152

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 412550 110450 SU 12550 10450
C (1km)	-0.026
D1 (1km)	0.393
D2 (1km)	0.341
D3 (1km)	0.352
E (1km)	0.300
F (1km)	2.396
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 8.960

Time (mins) From:	To:	Area (ha)
0	4	8.960

Model Details

Storage is Online Cover Level (m) 20.000

Tank or Pond Structure

Invert Level (m) 18.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3400.0	1.500	4393.8	1.900	4680.3	1.901	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0410-1140-1500-1140
Design Head (m)	1.500
Design Flow (l/s)	114.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	410
Invert Level (m)	18.100
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	114.0
Flush-Flo™	0.633	114.0
Kick-Flo®	1.153	100.3
Mean Flow over Head Range	-	92.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	11.2	1.200	102.3	3.000	159.8	7.000	241.9
0.200	40.2	1.400	110.2	3.500	172.3	7.500	250.2
0.300	78.0	1.600	117.6	4.000	183.9	8.000	258.3
0.400	109.5	1.800	124.5	4.500	194.8	8.500	266.1
0.500	112.7	2.000	131.1	5.000	205.1	9.000	273.6
0.600	113.9	2.200	137.3	5.500	214.9	9.500	281.0
0.800	112.7	2.400	143.3	6.000	224.3		
1.000	108.1	2.600	149.0	6.500	233.2		

Alderholt Meadows, Fordingbridge

SW Catchment 3

13577 – Source Control Calculations

Date: 13/10/22

Project No: 13577

Engineer: R. Fletcher

Checked: G. Taylor

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	18.905	0.805	137.1	2610.3	O K
30 min Summer	19.044	0.944	137.1	3100.3	O K
60 min Summer	19.190	1.090	137.1	3627.4	O K
120 min Summer	19.329	1.229	137.1	4142.6	O K
180 min Summer	19.389	1.289	137.1	4371.9	O K
240 min Summer	19.415	1.315	137.1	4471.5	O K
360 min Summer	19.433	1.333	137.1	4539.5	O K
480 min Summer	19.436	1.336	137.1	4548.9	O K
600 min Summer	19.429	1.329	137.1	4522.4	O K
720 min Summer	19.415	1.315	137.1	4470.7	O K
960 min Summer	19.354	1.254	137.1	4237.3	O K
1440 min Summer	19.211	1.111	137.1	3704.1	O K
2160 min Summer	19.004	0.904	137.1	2956.3	O K
2880 min Summer	18.834	0.734	137.1	2363.3	O K
4320 min Summer	18.613	0.513	135.1	1616.5	O K
5760 min Summer	18.508	0.408	128.0	1273.0	O K
7200 min Summer	18.464	0.364	111.9	1131.9	O K
8640 min Summer	18.434	0.334	99.3	1035.0	O K
10080 min Summer	18.411	0.311	89.1	961.2	O K
15 min Winter	18.997	0.897	137.1	2932.7	O K
30 min Winter	19.152	1.052	137.1	3488.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	167.303	0.0	2605.1	18
30 min Summer	101.105	0.0	3162.6	33
60 min Summer	61.100	0.0	3897.7	62
120 min Summer	36.924	0.0	4718.4	122
180 min Summer	27.502	0.0	5275.5	180
240 min Summer	22.314	0.0	5709.7	240
360 min Summer	16.620	0.0	6382.4	298
480 min Summer	13.485	0.0	6906.4	360
600 min Summer	11.467	0.0	7341.8	428
720 min Summer	10.044	0.0	7717.4	498
960 min Summer	8.028	0.0	8223.7	636
1440 min Summer	5.855	0.0	8990.9	908
2160 min Summer	4.270	0.0	9894.4	1280
2880 min Summer	3.413	0.0	10540.4	1640
4320 min Summer	2.500	0.0	11555.3	2296
5760 min Summer	2.005	0.0	12408.5	2992
7200 min Summer	1.689	0.0	13064.1	3680
8640 min Summer	1.469	0.0	13619.7	4408
10080 min Summer	1.305	0.0	14090.9	5144
15 min Winter	167.303	0.0	2926.1	18
30 min Winter	101.105	0.0	3550.0	33

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	19.316	1.216	137.1	4096.5	O K
120 min Winter	19.471	1.371	137.1	4684.4	O K
180 min Winter	19.543	1.443	137.1	4962.8	O K
240 min Winter	19.578	1.478	137.1	5100.7	O K
360 min Winter	19.595	1.495	137.1	5167.9	O K
480 min Winter	19.590	1.490	137.1	5147.9	O K
600 min Winter	19.577	1.477	137.1	5094.8	O K
720 min Winter	19.554	1.454	137.1	5004.8	O K
960 min Winter	19.465	1.365	137.1	4661.0	O K
1440 min Winter	19.258	1.158	137.1	3879.5	O K
2160 min Winter	18.934	0.834	137.1	2709.8	O K
2880 min Winter	18.697	0.597	136.7	1895.7	O K
4320 min Winter	18.492	0.392	122.5	1221.6	O K
5760 min Winter	18.436	0.336	100.0	1040.3	O K
7200 min Winter	18.401	0.301	84.7	928.8	O K
8640 min Winter	18.376	0.276	74.0	850.8	O K
10080 min Winter	18.357	0.257	65.8	791.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	61.100	0.0	4370.0	62
120 min Winter	36.924	0.0	5289.1	120
180 min Winter	27.502	0.0	5913.1	176
240 min Winter	22.314	0.0	6399.5	232
360 min Winter	16.620	0.0	7152.9	336
480 min Winter	13.485	0.0	7739.9	380
600 min Winter	11.467	0.0	8227.6	458
720 min Winter	10.044	0.0	8648.3	536
960 min Winter	8.028	0.0	9215.3	690
1440 min Winter	5.855	0.0	10074.5	982
2160 min Winter	4.270	0.0	11085.6	1344
2880 min Winter	3.413	0.0	11810.2	1676
4320 min Winter	2.500	0.0	12952.0	2288
5760 min Winter	2.005	0.0	13900.0	2992
7200 min Winter	1.689	0.0	14635.3	3680
8640 min Winter	1.469	0.0	15259.7	4416
10080 min Winter	1.305	0.0	15793.7	5144

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 412550 110450 SU 12550 10450
C (1km)	-0.026
D1 (1km)	0.393
D2 (1km)	0.341
D3 (1km)	0.352
E (1km)	0.300
F (1km)	2.396
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 8.610

Time (mins) From:	To:	Area (ha)
0	4	8.610

Model Details

Storage is Online Cover Level (m) 20.000

Tank or Pond Structure

Invert Level (m) 18.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3000.0	1.500	3937.3	1.900	4208.8	1.901	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0444-1372-1500-1372
Design Head (m)	1.500
Design Flow (l/s)	137.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	444
Invert Level (m)	18.100
Minimum Outlet Pipe Diameter (mm)	500
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	137.1
Flush-Flo™	0.671	137.1
Kick-Flo®	1.176	121.8
Mean Flow over Head Range	-	110.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	11.7	1.200	123.0	3.000	192.3	7.000	291.3
0.200	42.6	1.400	132.6	3.500	207.4	7.500	301.3
0.300	84.4	1.600	141.5	4.000	221.4	8.000	311.1
0.400	125.3	1.800	149.9	4.500	234.5	8.500	320.5
0.500	134.7	2.000	157.8	5.000	247.0	9.000	329.6
0.600	136.8	2.200	165.3	5.500	258.8	9.500	338.5
0.800	136.2	2.400	172.4	6.000	270.1		
1.000	131.4	2.600	179.3	6.500	280.9		

Alderholt Meadows, Fordingbridge

SW Catchment 4

13577 – Source Control Calculations

Date: 13/10/22

Project No: 13577

Engineer: R. Fletcher

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	18.831	0.731	107.3	2805.5	O K
30 min Summer	18.962	0.862	107.3	3347.2	O K
60 min Summer	19.105	1.005	107.3	3949.3	O K
120 min Summer	19.252	1.152	107.3	4586.7	O K
180 min Summer	19.331	1.231	107.3	4930.8	O K
240 min Summer	19.376	1.276	107.3	5131.0	O K
360 min Summer	19.416	1.316	107.3	5313.0	O K
480 min Summer	19.429	1.329	107.3	5369.6	O K
600 min Summer	19.434	1.334	107.3	5392.7	O K
720 min Summer	19.433	1.333	107.3	5389.5	O K
960 min Summer	19.399	1.299	107.3	5236.8	O K
1440 min Summer	19.316	1.216	107.3	4868.2	O K
2160 min Summer	19.170	1.070	107.3	4226.8	O K
2880 min Summer	19.027	0.927	107.3	3620.0	O K
4320 min Summer	18.798	0.698	107.3	2671.8	O K
5760 min Summer	18.636	0.536	106.8	2024.2	O K
7200 min Summer	18.532	0.432	104.6	1614.6	O K
8640 min Summer	18.474	0.374	100.7	1391.6	O K
10080 min Summer	18.445	0.345	91.8	1280.4	O K
15 min Winter	18.914	0.814	107.3	3148.1	O K
30 min Winter	19.061	0.961	107.3	3761.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	167.303	0.0	2725.7	19
30 min Summer	101.105	0.0	3312.7	33
60 min Summer	61.100	0.0	4126.3	62
120 min Summer	36.924	0.0	4997.4	122
180 min Summer	27.502	0.0	5588.3	182
240 min Summer	22.314	0.0	6048.6	242
360 min Summer	16.620	0.0	6761.2	360
480 min Summer	13.485	0.0	7315.7	416
600 min Summer	11.467	0.0	7775.8	478
720 min Summer	10.044	0.0	8171.9	542
960 min Summer	8.028	0.0	8703.6	674
1440 min Summer	5.855	0.0	9500.7	952
2160 min Summer	4.270	0.0	10521.3	1360
2880 min Summer	3.413	0.0	11208.2	1732
4320 min Summer	2.500	0.0	12278.0	2460
5760 min Summer	2.005	0.0	13206.8	3120
7200 min Summer	1.689	0.0	13902.6	3816
8640 min Summer	1.469	0.0	14490.1	4416
10080 min Summer	1.305	0.0	14982.5	5152
15 min Winter	167.303	0.0	3064.0	19
30 min Winter	101.105	0.0	3719.8	33

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	19.221	1.121	107.3	4451.5	O K
120 min Winter	19.386	1.286	107.3	5178.7	O K
180 min Winter	19.474	1.374	107.3	5574.1	O K
240 min Winter	19.527	1.427	107.3	5816.5	O K
360 min Winter	19.582	1.482	107.3	6064.4	O K
480 min Winter	19.598	1.498	107.4	6140.9	O K
600 min Winter	19.595	1.495	107.3	6128.1	O K
720 min Winter	19.592	1.492	107.3	6111.1	O K
960 min Winter	19.545	1.445	107.3	5898.5	O K
1440 min Winter	19.427	1.327	107.3	5361.7	O K
2160 min Winter	19.214	1.114	107.3	4419.6	O K
2880 min Winter	18.988	0.888	107.3	3454.1	O K
4320 min Winter	18.659	0.559	107.0	2112.5	O K
5760 min Winter	18.487	0.387	102.8	1439.8	O K
7200 min Winter	18.437	0.337	89.1	1249.3	O K
8640 min Winter	18.406	0.306	78.3	1130.1	O K
10080 min Winter	18.383	0.283	69.6	1044.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	61.100	0.0	4627.8	62
120 min Winter	36.924	0.0	5603.1	120
180 min Winter	27.502	0.0	6264.8	178
240 min Winter	22.314	0.0	6780.3	236
360 min Winter	16.620	0.0	7578.0	348
480 min Winter	13.485	0.0	8198.7	454
600 min Winter	11.467	0.0	8713.6	546
720 min Winter	10.044	0.0	9156.8	570
960 min Winter	8.028	0.0	9751.4	724
1440 min Winter	5.855	0.0	10639.4	1036
2160 min Winter	4.270	0.0	11788.1	1472
2880 min Winter	3.413	0.0	12560.1	1844
4320 min Winter	2.500	0.0	13765.7	2508
5760 min Winter	2.005	0.0	14795.4	3064
7200 min Winter	1.689	0.0	15576.2	3752
8640 min Winter	1.469	0.0	16237.1	4488
10080 min Winter	1.305	0.0	16797.1	5152

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 412550 110450 SU 12550 10450
C (1km)	-0.026
D1 (1km)	0.393
D2 (1km)	0.341
D3 (1km)	0.352
E (1km)	0.300
F (1km)	2.396
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 9.170

Time (mins) From:	To:	Area (ha)
0	4	9.170

Model Details

Storage is Online Cover Level (m) 20.000

Tank or Pond Structure

Invert Level (m) 18.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3600.0	1.500	4620.7	1.900	4914.4	1.901	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0400-1076-1500-1076
Design Head (m)	1.500
Design Flow (l/s)	107.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	400
Invert Level (m)	18.100
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	107.5
Flush-Flo™	0.623	107.3
Kick-Flo®	1.144	94.3
Mean Flow over Head Range	-	87.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	11.0	1.200	96.5	3.000	150.6	7.000	228.0
0.200	39.4	1.400	103.9	3.500	162.4	7.500	235.9
0.300	76.1	1.600	110.9	4.000	173.4	8.000	243.5
0.400	103.4	1.800	117.4	4.500	183.6	8.500	250.8
0.500	106.3	2.000	123.6	5.000	193.3	9.000	257.9
0.600	107.3	2.200	129.5	5.500	202.6	9.500	264.9
0.800	105.9	2.400	135.1	6.000	211.4		
1.000	101.4	2.600	140.5	6.500	219.9		

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