

Oaklands College & Land south of Sandpit Lane, St Albans

Flood Risk Assessment
& Sustainable Urban Drainage Strategy

October 2025



Flood Risk Assessment and Drainage Strategy

Project: Oaklands Blossom and Oaklands
College, St. Albans

Client: Taylor Wimpey and Oaklands College

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Contents

1	INTRODUCTION	1
1.1	Terms of Reference	1
1.2	Policy Framework and Key Stakeholders	1
1.3	Sources of Information.....	2
2	DEVELOPMENT SITE	3
2.1	Extent and Location.....	3
2.2	Topography	4
2.3	Hydrology	5
2.4	Geology and Hydrogeology	5
3	PROPOSED DEVELOPMENT.....	7
4	FLOOD RISK ASSESSMENT	9
4.1	Overview.....	9
4.2	Climate Change.....	9
4.3	Surface Water Flood Risk	10
4.4	Groundwater Flood Risk.....	11
4.5	Sewer Flood Risk.....	12
5	FLOOD RISK MANAGEMENT	14
5.1	Sequential and Exception Tests.....	14
5.2	Flood Risk Management Measures	15
6	SURFACE WATER DRAINAGE STRATEGY	17
6.1	Overview.....	17
6.2	Existing Drainage	17
6.3	Hierarchy for Surface Water Disposal	17
6.4	Proposed Drainage Strategy.....	18
6.5	Watercourse Diversion.....	19
6.6	Sustainable Drainage Systems (SuDS)	20
6.7	Exceedance Events	21
6.8	Water Quality Management	21
6.9	Operation and Maintenance	22
6.10	Drainage During Construction.....	24
7	FOUL WATER DRAINAGE STRATEGY.....	26
8	CONCLUSIONS AND RECOMMENDATIONS	27
APPENDIX A	DEVELOPMENT SITE	29
APPENDIX B	PROPOSED DEVELOPMENT.....	30
APPENDIX C	FLOOD RISK INFORMATION	31
APPENDIX D	DRAINAGE STRATEGY	32
APPENDIX E	EXCEEDANCE FLOW ROUTES.....	33

1 INTRODUCTION

1.1 Terms of Reference

- 1.1.1 JNP Group has been commissioned by Taylor Wimpey and Oaklands College to prepare a flood risk assessment and drainage strategy for the proposed Oaklands Blossom and Oaklands College development in St. Albans, Hertfordshire.
- 1.1.2 This report assesses flood risk at the development site from all potential sources and describes the measures adopted in the master planning process to manage such risks. It has been prepared in compliance with current national and local planning policies and best practices.

1.2 Policy Framework and Key Stakeholders

- 1.2.1 The *National Planning Policy Framework* (NPPF) sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow. Where these tests are not met, national policy is clear that new development should not be allowed.
- 1.2.2 In areas at risk of flooding from any source – now and in the future – or for sites of one hectare (ha) or more, developers must undertake a site-specific flood risk assessment to accompany planning applications.
- 1.2.3 In decision making, local planning authorities must ensure a sequential approach to site selection and master planning is followed so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest, taking account of climate change and the vulnerability of future users to flood risk.
- 1.2.4 Where development needs to be in locations where there is a risk of flooding, local planning authorities and developers must ensure development is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk elsewhere.
- 1.2.5 The Environment Agency (EA) is a statutory consultee on applications where there is a risk of flooding from the sea or main rivers.
- 1.2.6 Lead Local Flood Authorities (LLFAs) are responsible for managing local flood risk from ordinary watercourses, surface water and groundwater, and for preparing local flood risk management strategies. Local planning authorities (LPAs) work with LLFAs to ensure local planning policies are compatible with the local flood risk management strategy.
- 1.2.7 Hertfordshire County Council (HCC) is the LLFA and its strategy for managing local flood risk is set out in *LFRRMS 2 (2019-2029)* (February 2019), which includes policies regarding sustainable drainage systems (SuDS).
- 1.2.8 St. Albans City & District Council (SACDC) is the LPA and its stance regarding flood risk and drainage is set out in *Policy 84* and *Policy 84A* of *District Local Plan Review 1994: Saved and Deleted Policies Version* (July 2020).

1.2.9 Where relevant, local planning authorities and developers must also take advice from:

- Sewerage undertakers: to ensure they can assess the impact of new development on their assets and plan any required improvements. Thames Water (TW) is the local sewerage undertaker.
- Reservoir undertakers: to avoid an intensification of development within areas at risk from reservoir failure and ensure they can assess the cost implications of any reservoir safety improvements required due to change in land use downstream of their assets.
- Navigation authorities: in relation to developments adjacent to, or which discharge into, canals (especially where water is impounded above surrounding ground levels).

1.3 Sources of Information

1.3.1 This flood risk assessment has been based on the following sources of information:

- Bespoke topographical survey undertaken by Survey Solutions (October 2024).
- DEFRA/EA's LiDAR topographical data.
<https://environment.data.gov.uk/survey>
- British Geological Survey's (BGS) *GeoIndex*.
<http://mapapps2.bgs.ac.uk/geoindex/home.html>
- Cranfield University's *Soilscapes*.
<http://www.landis.org.uk/soilscapes/>
- DEFRA / EA's Multi-Agency Geographic Information for the Countryside (MAGIC).
<https://magic.defra.gov.uk/MagicMap.html>
- UK Centre for Ecology & Hydrology's *Flood Estimation Handbook Web Service*.
<https://fehweb.ceh.ac.uk/>
- EA's Flood Map for Planning.
<https://flood-map-for-planning.service.gov.uk/>
- EA's Long Term Flood Risk.
<https://www.gov.uk/check-long-term-flood-risk>
- HCC's Strategic Flood Risk Assessment Level 1 (July 2022).
<https://www.hertfordshire.gov.uk/media-library/documents/waste/mwlp/core-document-library/primary-evidence/pe-08-strategic-flood-risk-assessment-jul-2022.pdf>
- SACDC's South-West Hertfordshire Level 1 Strategic Flood Risk Assessment: Addendum for St. Albans (July 2024).
[https://www.stalbans.gov.uk/sites/default/files/attachments/Planning%20Policy/EDH/EDH%2002.01%20-%20SFRA%20Level%201%20Addendum%20\(2024\).pdf](https://www.stalbans.gov.uk/sites/default/files/attachments/Planning%20Policy/EDH/EDH%2002.01%20-%20SFRA%20Level%201%20Addendum%20(2024).pdf)
- TW's *Property Searches* (July 2024).

2 DEVELOPMENT SITE

2.1 Extent and Location

- 2.1.1 The total area of land within the site area (Figure 2.1) amounts to approximately 69.88 hectares. This comprises:
- HCC Highway Land (1.49 ha approx.)
 - The *Oaklands Blossom* area (23.38 ha), referred to by SACDC as “Site B4 East St. Albans”.
 - The *Oaklands College* area (45.01 ha), including the college and associated facilities and sports pitches.
- 2.1.2 At 69.88 ha, the combined *Oaklands Blossom* and *Oaklands College* development site (red line boundary) is part of 130.80 ha of land within the college’s ownership (blue line boundary).
- 2.1.3 The development site is located to the east of St. Albans, Hertfordshire, bound by Sandpit Lane to the north, Oaklands Lane to the east and Hatfield Road (A1057) to the south (Table 2.1).

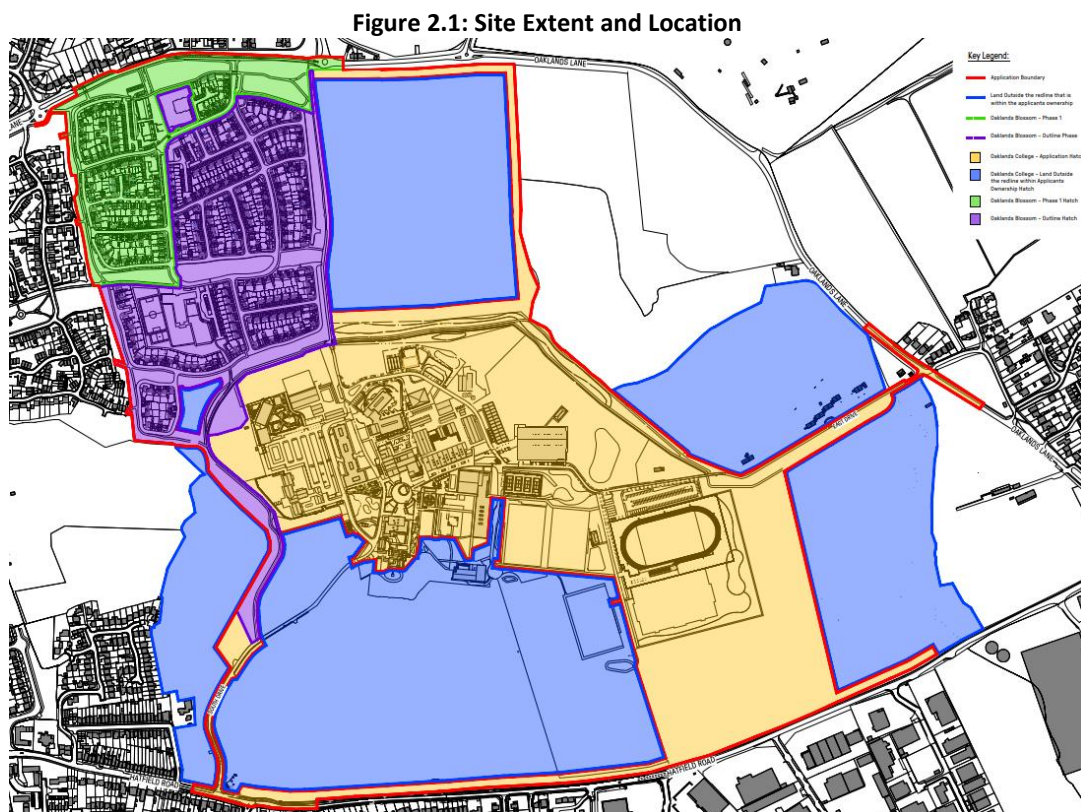


Table 2.1: Site Extent and Location

OS X	OS Y	Site Area (ha)	Nearest Postcode
518375	207865	69.88	AL4 0HZ

- 2.1.4 The *Oaklands Blossom* area (23.38 ha) comprises the open fields in the northwestern corner of the college owned land, bound by Sandpit Lane to the north, North Drive (bridleway) and

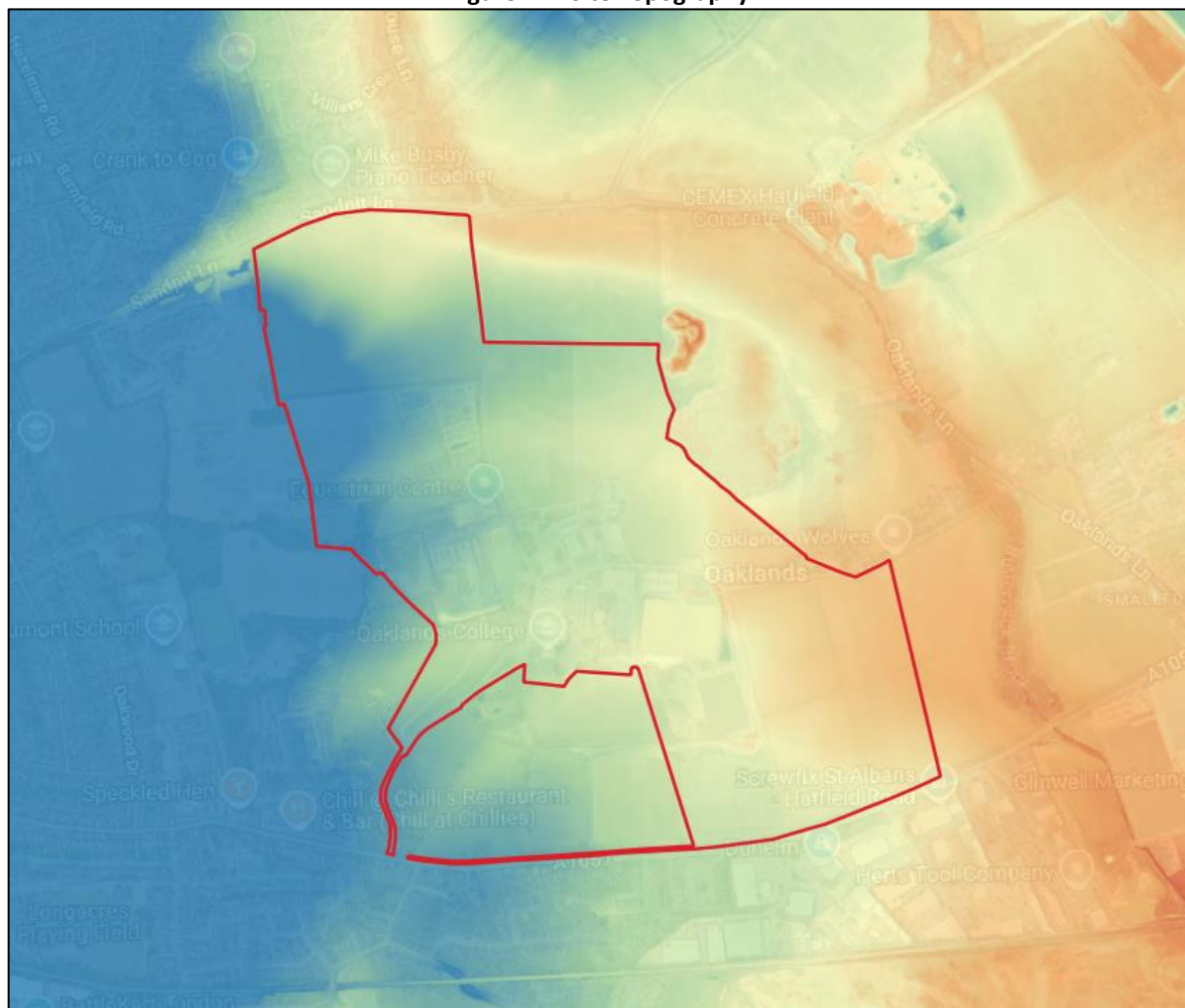
open fields to the east, Oaklands College to the south and Oaklands Grange (residential development) to the west.

- 2.1.5 The Oaklands College area (45.01 ha) comprises the college's buildings, sports pitches and associated infrastructure, as well as some adjacent open fields. It is bound by the Oaklands Blossom site and open fields to the north, open fields and Oaklands Lane to the east, Hatfield Road to the south and St. Albans to the west.

2.2 Topography

- 2.2.1 The bespoke topographical survey undertaken by Survey Solutions (October 2024) (Appendix A) and LiDAR topographical information (Figure 2.2) show that ground levels within the development site range between c.95 mAOD in the northwestern part of the site and c.76 mAOD in the southeastern part of the site, generally falling in a west to east direction towards the lower-lying area ('dry valley') along House Lane – Oaklands Lane – Butterwick Brook.

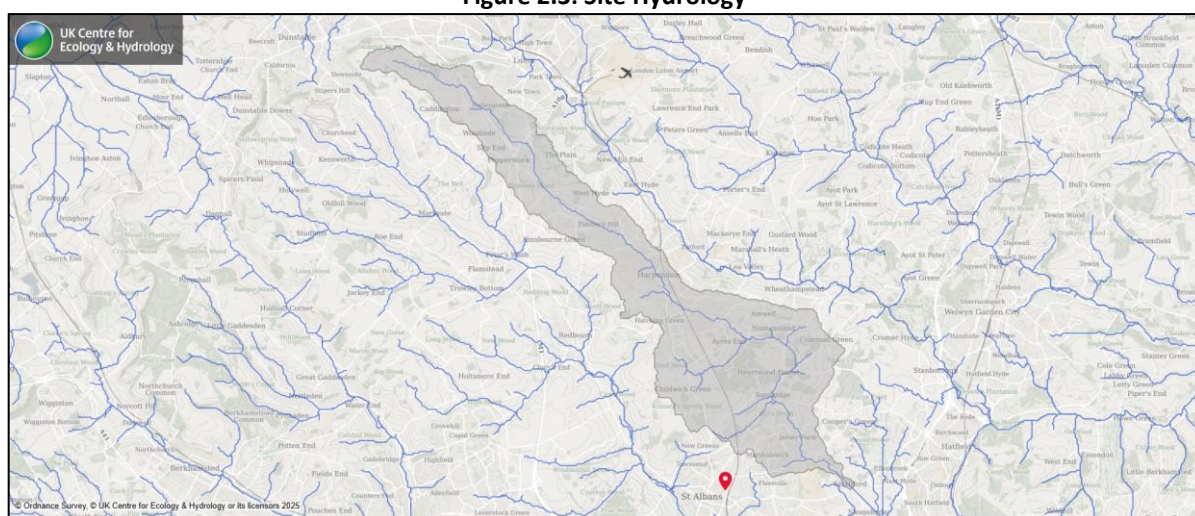
Figure 2.2: Site Topography



2.3 Hydrology

- 2.3.1 With the exception of small ditches near its western boundary, the development site's nearest open water feature is the Butterwick Brook, in the southeastern corner of the land owned by the college, in the continuation of the north-south 'dry valley' along House Lane – Oaklands Lane.
- 2.3.2 This 'dry valley' is thought to be a chalk stream subjected to over abstraction. The stream is a tributary of the river Colne, with a (large) catchment area of c.45 km² (Figure 2.3). Evidence suggests that this 'dry valley' was once known as the river Kin ([The Kin - Harpenden's Forgotten River](#)).

Figure 2.3: Site Hydrology

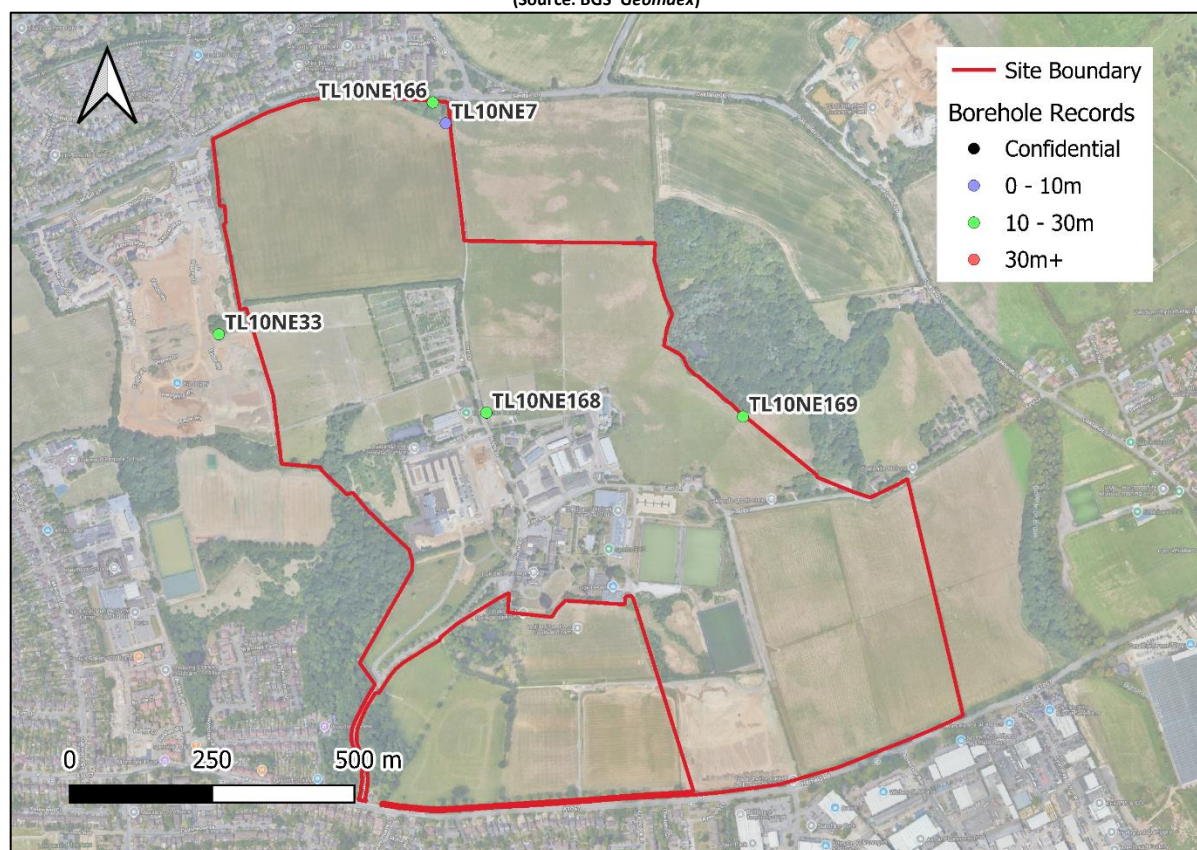


2.4 Geology and Hydrogeology

- 2.4.1 In accordance with BGS' *GeoIndex*, the development site lies on chalk bedrock (Lewes Nodular Chalk Formation and Seaford Chalk Formation) overlain (largely) by superficial deposits of chalky till and outwash sands and gravels, silts and clays (Lowestoft Formation).
- 2.4.2 Along the lower-lying House Lane – Oaklands Lane alignment (i.e., 'dry valley'), superficial deposits consist of sand and gravel (Kesgrave Catchment Subgroup), turning to clay, silt, sand and gravel (Alluvium) along the Butterwick Brook.
- 2.4.3 In accordance with BGS' *GeoIndex*, there is no record of artificial/manmade ground within the development site.
- 2.4.4 Cranfield University's *Soilscapes* describes the development site's soils as mostly "loamy and clayey soils with impeded drainage" with a restricted area in the northern part of the site described as having "freely draining slightly acid but base-rich soils".
- 2.4.5 DEFRA/EA's *MAGIC* classifies the site's bedrock as a principal aquifer and its superficial deposits as a secondary aquifer.
- 2.4.6 Principal aquifers are defined as "layers of rock or drift deposits that have high intergranular and/or fracture permeability – meaning they usually provide a high level of water storage and may support water supply and/or river base flow on a strategic scale".

- 2.4.7 Secondary aquifers (undifferentiated) are described as “cases where it has not been possible to attribute either category A or B to a strata – meaning they can either be: (A) permeable layers capable of supporting water supplies at a local rather than strategic scale, in some cases forming an important source of base flow to rivers; or (B) lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering”.
- 2.4.8 In accordance with DEFRA/EA’s *MAGIC*, the development site straddles Source Protection Zones II and III.
- 2.4.9 Zone II (Outer Zone) is defined as “the 400-day travel time from any point below the water table to the groundwater source”, while Zone III (Total Catchment) is defined as “the area around a source within which all groundwater recharge is presumed to reach the source”.
- 2.4.10 Records of boreholes within/near the development site (Figure 2.4 and Appendix A) largely confirm the expected geology, with groundwater found at depths ranging between 20 m and 5 m below ground level (bgl).

Figure 2.4: Borehole Records
(Source: BGS’ *GeolIndex*)

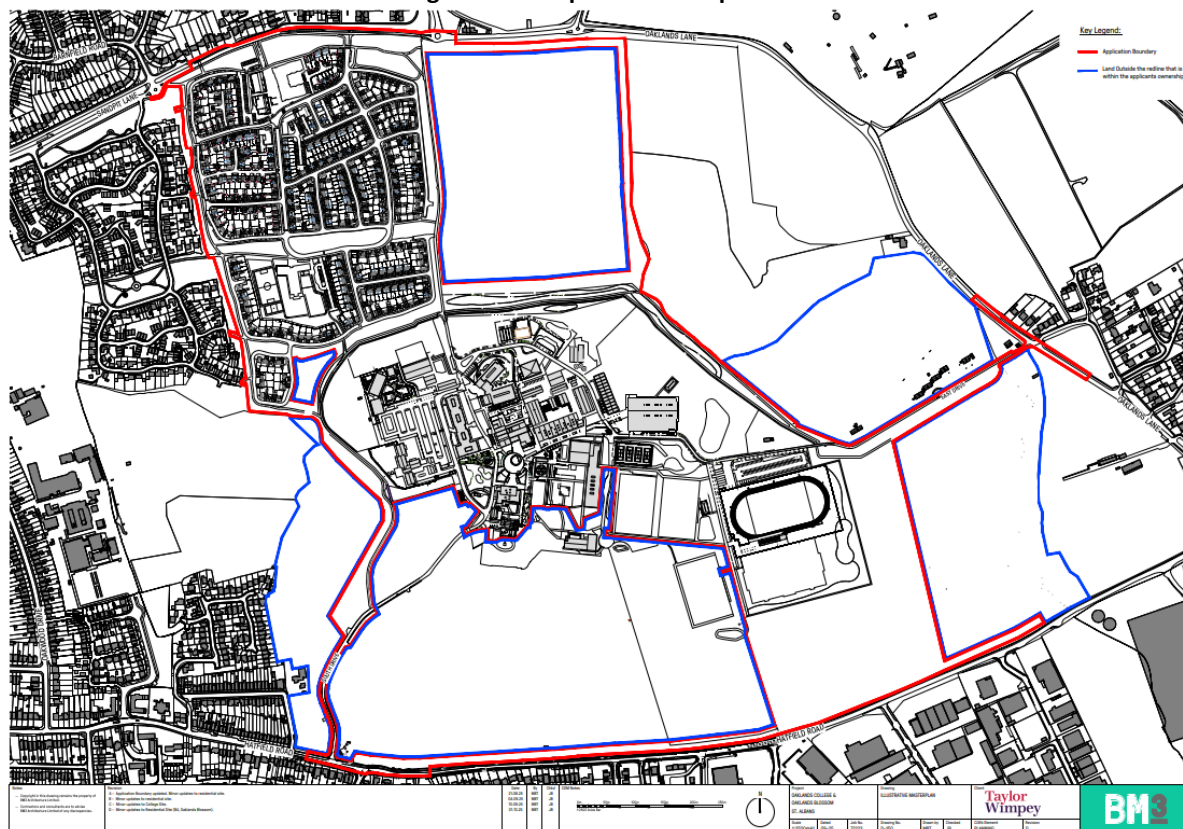


3 PROPOSED DEVELOPMENT

3.1.1 The proposals covered by this report (Figure 3.1 and Appendix B) are described as a hybrid planning application for severable phased development comprising:

- Full planning application for the construction of homes (use class C3); new local centre and community facility (use classes E(a to f) and F); a children's home (use class C2); demolition and renovation of existing college buildings; construction of new college buildings (use class F1); creation of Active Travel Routes including footpaths for walking, cycling and equestrian activities; removal and planting of trees; along with the laying out of green infrastructure (including publicly accessible open space) and habitat creation; drainage infrastructure, earthworks, new means of access and alterations to existing access points.
- Outline planning application (access only, all other matters reserved) for the construction of new homes (use class C3); new extra care home dwellings (use class C2); land for the construction of a new primary school (use class F1); demolition and renovation of existing college buildings; construction of new college buildings (use class F1); the construction of new sports facilities and pitches; the creation of Active Travel Routes including footpaths for walking, cycling and equestrian activities; removal and planting of trees; new energy centre; new recycling facilities; new car parking facilities; along with the laying out of green infrastructure and habitat creation; drainage infrastructure, earthworks; pedestrian and cycle routes, alterations to existing access points.

Figure 3.1: Proposed Development



- 3.1.2 The phasing of the development is indicative, allowing different phases to commence at different times and independently (severable) from each other. The outline phases will be the subject of parameter plans and design codes.
- 3.1.3 Under Annex 3 of the NPPF, the proposed development's flood risk vulnerability ranges between 'more vulnerable' (e.g., homes, children's home, college buildings, care home dwellings, primary school), 'less vulnerable' (e.g., local centre, community facility, car parking facilities) and water-compatible (e.g., green infrastructure, public open spaces, sports facilities and pitches, non-essential footpaths).

4 FLOOD RISK ASSESSMENT

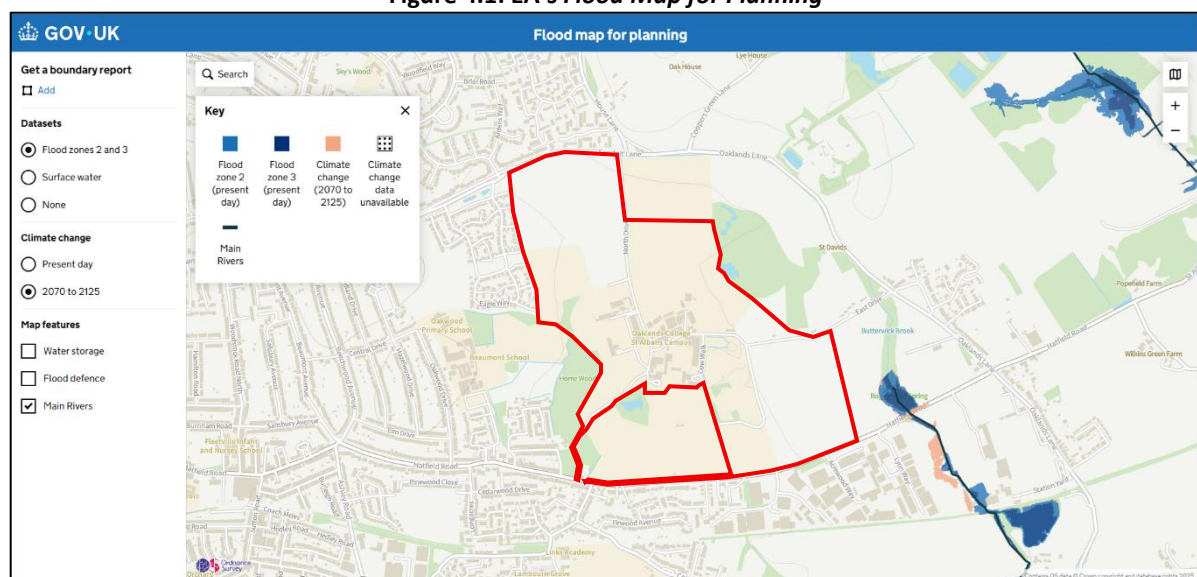
4.1 Overview

- 4.1.1 All potential sources of flood risk at the development site have been assessed based on the information listed in Section 1.3 and are summarised below. The key sources of flood risk to the proposed development are further described in the ensuing sections.

Table 4.1: Potential Sources of Flood Risk

Source	Flood Risk
<i>Coastal</i>	<i>No risk, site levels >76 mAOD.</i>
<i>Fluvial</i>	<i>No risk, site entirely in Flood Zone 1, at low risk of flooding from main rivers, even considering the predicted impacts of climate change (Figure 4.1).</i>
Surface Water	Very low risk in general, with higher risk restricted to three (west-east) overland flow paths adjacent/through the site.
Groundwater	Presumed low risk, with some concern around the chalk stream/'dry-valley' along House Lane – Oaklands Lane.
Sewers	Unquantified risk. Existing sewers upslope and within the site (Oaklands College) can pose some risk.
<i>Infrastructure Failure</i>	<i>No risk, no canals or reservoirs upslope of the site.</i>

Figure 4.1: EA's Flood Map for Planning



4.2 Climate Change

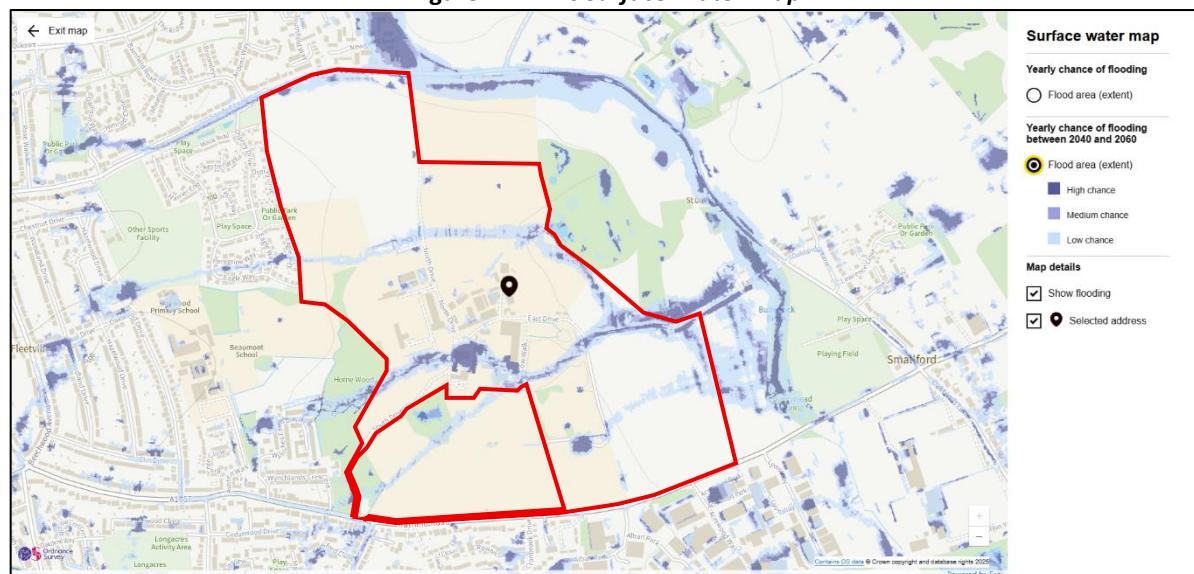
- 4.2.1 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account.
- 4.2.2 In accordance with the EA's climate change guidance, the proposed development must take account of the following allowances:

- Peak River Flows (Colne Management Catchment – 2080s)
 - **Central** 21%
 - Higher 35%
 - Upper 72%
- Peak Rainfall Intensity (Colne Management Catchment – 1.0% AEP – 2070s)
 - Central 25%
 - **Upper End** 40%

4.3 Surface Water Flood Risk

- 4.3.1 Surface water flooding is a description for excessive overland flows that have yet to enter a natural or manmade receptor (e.g. aquifer, watercourse or sewer). Surface water flooding also occurs when the amount of runoff exceeds the capacity of the collecting system and spills onto overland flow routes.
- 4.3.2 Surface water flooding is usually the result of intense, short lived rainfall events, but can also occur during milder, longer lived rainfall events, when collecting systems are at or near capacity or the ground is saturated. It often results in the inundation of low points in the terrain.
- 4.3.3 In accordance with the EA's *Long Term Flood Risk* (Figure 4.2), the development site is largely at very low (< 0.1% AEP) risk of surface water flooding, even considering the predicted impacts of climate change, with areas at low (0.1% to 1.0% AEP), medium (1.0% to 3.3% AEP) and high (> 3.3% AEP) risk of surface water flooding restricted to three (west-east) overland flow paths adjacent/through the site:
- **Northern Overland Flow Path.** Flowing west-east along the northern boundary of the development site (i.e., Sandpit Lane), this overland flow path merges with the chalk stream/'dry-valley' along House Lane – Oaklands Lane (refer to Section 4.4) near the northeastern corner of the site. The flood risk associated with this overland flow path is mostly low (0.1% to 1.0% AEP), with higher risk (1.0% to > 3.3% AEP) seemingly limited to the channel of an existing boundary/highway ditch.
 - **Central Overland Flow Path.** This route flows west-east through the southern part of the Oaklands Blossom area and along the northern edge of the Oaklands College area, before turning south and merging with the southern overland flow path near the site's eastern boundary. The flood risk associated with this overland flow path is mostly low (0.1% to 1.0% AEP), with higher risk (1.0% to > 3.3% AEP) limited to small pockets of lower-lying ground.
 - **Southern Overland Flow Path.** This route flows west-east through the central part of the Oaklands College area, before merging with the central overland flow path near the site's eastern boundary. The flood risk associated with this overland flow path is generally high (> 3.3% AEP), presumably due to the obstruction to flow posed by existing buildings and associated infrastructure.

Figure 4.2: EA's Surface Water Map



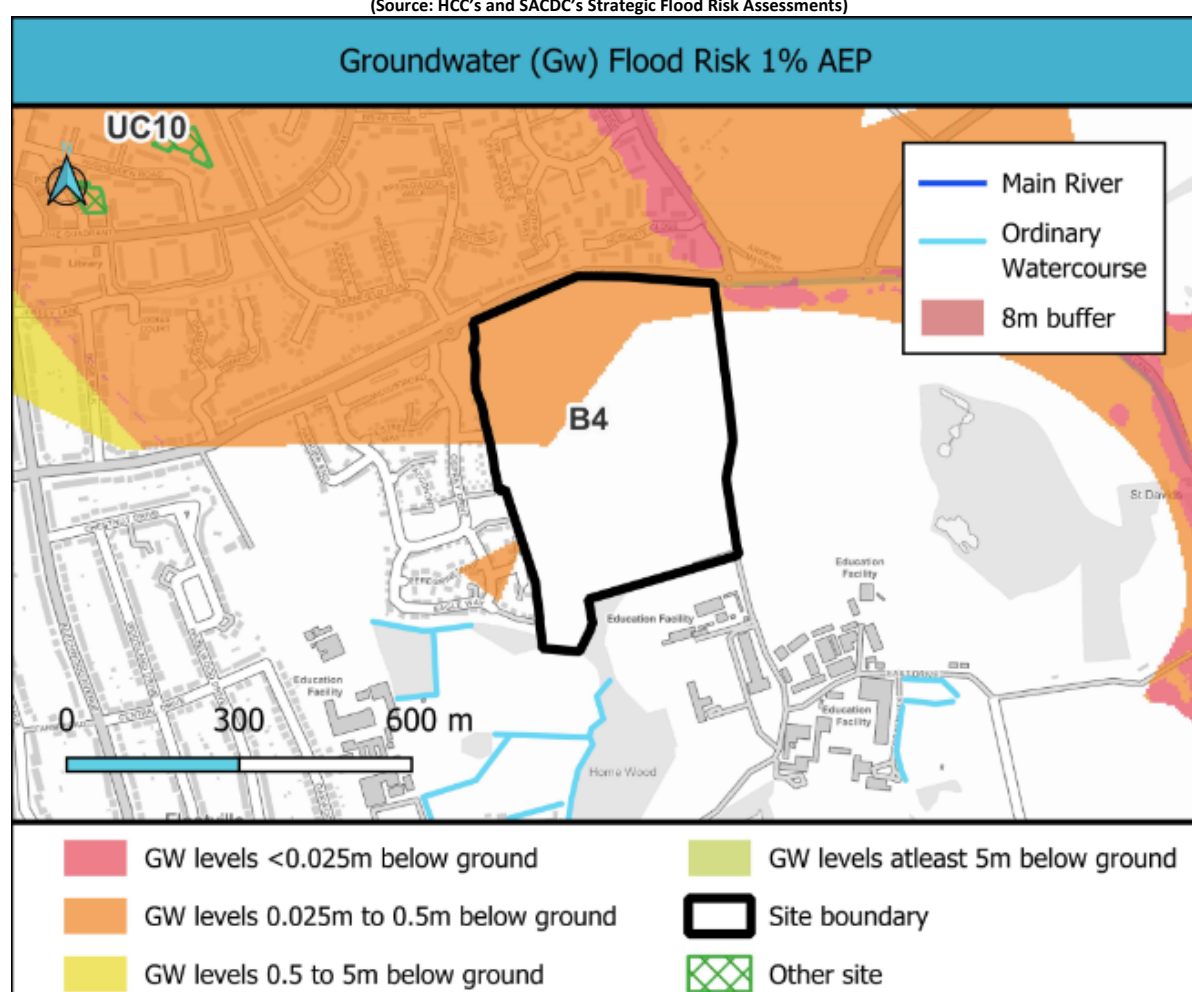
- 4.3.4 HCC's and SACDC's strategic flood risk assessments are based on the EA's *Long Term Flood Risk* and do not provide any additional insight to surface water flood risk.
- 4.3.5 Site-specific flood risk modelling has been undertaken by JNP Group, with results detailed in the accompanying report ref. BR31287-JNP-XX-XX-RP-C-1001. Site-specific results are broadly in line with the EA's *Long Term Flood Risk*, confirming the key findings stated above in relation to overland flow paths, while also enabling the distinction between runoff generated off or on-site.
- 4.3.6 The measures proposed to manage overland flows resulting from runoff generated off-site are described in Section 5, while flood risk from runoff generated on-site will be managed by the surface water drainage strategy described in Section 6.

4.4 Groundwater Flood Risk

- 4.4.1 Groundwater flooding occurs when the level of water filling the pores and / or cracks in the underlying soil and / or rock (i.e. water table) rises and emerges on the surface. The level of the water table varies seasonally and depends upon long term rainfall, thickness and porosity of the underlying strata and groundwater abstraction.
- 4.4.2 Groundwater flooding is most common in areas where the underlying bedrock and superficial deposits are very porous, but it can also happen at locations where superficial layers of sand or gravel overlay impermeable bedrock.
- 4.4.3 Groundwater flooding usually occurs after days or weeks of prolonged rainfall and often lasts for days or weeks, as subsiding of the water table can be a very slow process.
- 4.4.4 Besides posing a direct flood risk to developments (particularly basements), high water table levels can exacerbate other sources of flood risk by preventing infiltration and/or leaking into drainage systems of poor integrity.

- 4.4.5 In accordance with HCC's and SACDC's strategic flood risk assessments (Figure 4.3), the development site is largely at no/low risk of flooding from groundwater, with higher risk restricted to the northern end of the site, in alignment with the chalk stream/'dry-valley' along House Lane – Oaklands Lane.
- 4.4.6 This presumed low risk of groundwater flooding is supported by the available records of boreholes within/near the development site (Figure 2.4 and Appendix A), where groundwater was found at depths ranging between 20 m and 5 m bgl.
- 4.4.7 The measures proposed to manage the presumed low risk of groundwater flooding are described in Section 5.

Figure 4.3: Groundwater Flood Risk
(Source: HCC's and SACDC's Strategic Flood Risk Assessments)



4.5 Sewer Flood Risk

- 4.5.1 Sewer flooding occurs when manmade drainage systems receive greater than usual amounts of water and the overwhelmed systems start overflowing at gullies and manholes, thus generating overland flows.
- 4.5.2 Sewer flooding is usually the result of very intense, short lived rainfall events, but can also occur during milder, longer lived rainfall events, when outfalls become surcharged/locked by high water levels in receiving features.

- 4.5.3 In addition to a flood risk, overflowing combined or foul water sewers also pose a significant public health and environmental risk.
- 4.5.4 HCC's and SACDC's strategic flood risk assessments note 24 records of sewer flooding in the postcode area of the development site between 2018 and 2024. For confidentiality reasons, TW does not provide the exact location of sewer flooding incidents.
- 4.5.5 In the absence of sufficient information to quantify or discard sewer flood risk at the development site, it must be assumed that existing sewers upslope and within the development site (Appendix C) can pose some flood risk.
- 4.5.6 The measures proposed to manage the assumed risk of sewer flooding are described in Section 5.

5 FLOOD RISK MANAGEMENT

5.1 Sequential and Exception Tests

- 5.1.1 The sequential, risk-based approach to the location of development is designed to ensure that areas at little or no risk of flooding from any source (Flood Zone 1) are developed in preference to areas at higher risk. The aim is to keep development out of medium and high flood risk areas (Flood Zones 2 and 3) from any source where possible.
- 5.1.2 Application of the sequential approach in the master planning process, in particular application of the *Sequential Test*, helps ensure that development can be safely and sustainably delivered, and developers do not waste resources promoting proposals which are inappropriate on flood risk grounds.
- 5.1.3 The *Sequential Test* ensures that a sequential approach is followed to steer new development to areas with the lowest probability of flooding. The aim is to steer new development to Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, local planning authorities in their decision making should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2, applying the *Exception Test* if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, taking into account the flood risk vulnerability of land uses and applying the *Exception Test* if required.
- 5.1.4 *Annex 3* of the *NPPF* categorises different types of uses and development according to their vulnerability to flood risk. [Table 2](#) of the *Flood Risk and Coastal Change Guidance* (Table 5.1) maps these vulnerability classes against flood zones to indicate where development is appropriate and where it should not be permitted.

Table 5.1: Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zone	Flood Risk Vulnerability				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test	✓	✓	✓
Zone 3a	Exception Test	✗	Exception Test	✓	✓
Zone 3b	Exception Test	✗	✗	✗	✓

Key:

✓ Development is appropriate

✗ Development should not be permitted

- 5.1.5 The *Exception Test* is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.
- 5.1.6 Essentially, the two parts of the *Exception Test* require proposed development to show that it will:
- Provide wider sustainability benefits to the community that outweigh flood risk; and
 - Be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

- 5.1.7 The following section describes how the sequential approach to the location of development and, where necessary, the second part of the *Exception Test* have been implemented in the proposed development's master planning.

5.2 Flood Risk Management Measures

- 5.2.1 As concluded in Section 4, surface water (off-site runoff) is the main source of flood risk at the development site, with groundwater and sewer flooding the other (residual) sources of risk.

- 5.2.2 The following measures have been implemented in the proposed development's master plan to ensure it can be made safe for its lifetime without increasing flood risk elsewhere:

- With the exception of proposals within the central part of the Oaklands College area, which are greatly restricted by existing buildings and infrastructure, the proposed development has been steered to areas at low risk of flooding from any source (Flood Zone 1) in preference to areas at higher risk of flooding (Flood Zones 2 and 3).
- In order to maximise the site's development potential and achieve other wider sustainability goals, some (limited) manipulation of Flood Zones 2 and 3 along the Northern and Central Overland Flow Paths (refer to Section 4.3) is proposed through the formalization of blue/green corridors across the site compatible with the proposed master plan. Site-specific flood risk modelling detailed in the accompanying report ref. BR31287-JNP-XX-XX-RP-C-1001 confirms that the proposed development can be made safe without increasing flood risk elsewhere.
- The finished floor level (FFL) of all vulnerable development will be set at least 300 mm above the nearest/relevant 1.0% AEP + climate change flood level.
- The FFL of all vulnerable development will also be set at least 150 mm above external ground levels and 300 mm above road channel levels, which in turn will be designed to safely route overland flows away from vulnerable features and towards the proposed blue/green corridors or other existing overland flow routes off-site, using water compatible or less vulnerable parts of the proposed development such as public open spaces, parking areas and roads to convey and attenuate flood flows.
- Within the central part of the Oaklands College area, where proposals are restricted by existing buildings and infrastructure and the above measures cannot be fully implemented, the following flood resistance and resilience measures are envisaged:
 - **Flood depth up to 300 mm:** buildings will be designed to keep water out as much as possible using low permeability materials and construction (e.g. impermeable concrete).
 - **Flood depth from 300 to 600 mm:** buildings will be designed to keep water out as much as possible but prepared to flood using resilient materials and design (e.g., lime plaster and raised electrical sockets) and ensuring access to all spaces for drying and cleaning.
 - **Flood depth above 600 mm:** buildings will be designed to allow water through using resilient materials and design and ensuring access to all spaces for drying and cleaning.

- 5.2.3 Safe ingress/egress routes to all vulnerable parts of the proposed development are available for storm events up to 1.0% AEP + climate change.
- 5.2.4 The proposed surface water drainage strategy (Section 6) has been designed so that flooding does not occur on any part of the site for events up to 1.0% AEP + climate change.

6 SURFACE WATER DRAINAGE STRATEGY

6.1 Overview

- 6.1.1 This report outlines the proposed surface water drainage strategy for the residential area of the site, referred to as Oaklands Blossom. This area of the site also includes a local centre, an extra care home and a primary school.
- 6.1.2 The surface water drainage strategy for the Oaklands College area of the site has been prepared separately by Elliott Wood and is detailed in their *Sustainable Drainage Strategy*, ref. 2240224-EWP-ZZ-XX-RP-C-00001.
- 6.1.3 This document focuses solely on the Oaklands Blossom area and sets out the approach to managing surface water runoff generated on-site through sustainable drainage systems (SuDS).

6.2 Existing Drainage

- 6.2.1 The Oaklands Blossom area is currently undeveloped greenfield land and does not benefit from a formal surface water drainage system. Runoff generated across the site is expected to either infiltrate into the ground or flow overland.
- 6.2.2 The site's topography features a gentle ridge that divides the area into two distinct sub-catchments:
- The northern catchment, covering approximately two thirds of the Oaklands Blossom area, drains towards an ordinary watercourse located along the northern boundary, adjacent to Sandpit Lane.
 - The southern catchment drains to the southeast, ultimately discharging into Butterwick Brook, located approximately 1 km to the east.
- 6.2.3 Greenfield runoff rates have been calculated using the HR Wallingford online tool, applying the FEH statistical methodology. These rates are summarised in Table 6.1 below.

Table 6.1: Greenfield Runoff Rates

	Rate per ha (l/s/ha)	Site rate (l/s) – 23.4 ha
Q1	2.3	53.8
Qbar	2.8	65.5
Q30	6.3	147.4
Q100	8.8	205.9

6.3 Hierarchy for Surface Water Disposal

- 6.3.1 The National Standards for Sustainable Drainage Systems (Defra, 2025) state that the following options must be considered in accordance with the hierarchy for surface water disposal:

- 6.3.2 *Discharge to Ground (Infiltration)*: Preliminary geological and hydrogeological assessments (Section 2.4) suggest that infiltration may be feasible at the site, subject to further on-site infiltration testing and groundwater monitoring. Although infiltration testing has been undertaken, results are pending at the time of writing. For the purposes of this strategy, infiltration is assumed to be unviable; however, this assumption should be revisited as the design progresses.
- 6.3.3 *Discharge to Surface Water Body*: As outlined in Section 2.3, an ordinary watercourse is located along the northern boundary of the Oaklands Blossom area, running parallel to Sandpit Lane. Butterwick Brook, situated approximately 1 km to the east is also a potential discharge location. However, due to its distance from the site, Butterwick Brook has been discounted, and surface water from the entirety of the Oaklands Blossom area is proposed to discharge to the northern watercourse.
- 6.3.4 *Discharge to Sewer*: As discharge to surface water is proposed, discharge to sewer is not considered further.

6.4 Proposed Drainage Strategy

- 6.4.1 The proposed surface water drainage strategy (Appendix D) has been designed in accordance with the DCG and in compliance with the NPPF, local requirements and current best practices, to collect, convey and attenuate runoff from all impermeable areas (11.2 ha) before discharge into the ordinary watercourse on the northern boundary of the site.
- 6.4.2 As infiltration drainage has been discounted at this stage, the volume of runoff leaving the proposed development cannot be reduced to greenfield values and the excess volume must be discharged at a low rate that will not pose a flood risk downstream of the site. The proposed drainage strategy has therefore been designed to limit discharge to the QBAR greenfield runoff rate of 2.8 l/s/ha.
- 6.4.3 The southern third of the Oaklands Blossom area does not naturally drain to the northern watercourse but instead flows eastwards towards Butterwick Brook downstream. Accordingly, the greenfield discharge rate has only been applied to the proposed impermeable areas located within the natural catchment of the northern watercourse, as shown on the Greenfield Runoff Catchment Layout in Appendix D. On this basis, the final site discharge rate is 21.2 l/s, calculated from 7.69 ha of impermeable area within the northern catchment.
- 6.4.4 Attenuation storage will be provided primarily within six detention basins distributed across the Oaklands Blossom area. These basins will serve a multi-functional role, delivering both surface water management and enhanced amenity and biodiversity value. Further details are provided in the landscape architect's drawings. All site flows will ultimately be routed through the final detention basin (Basin 6), located at the north-east corner of the site, before discharging to the watercourse.
- 6.4.5 A swale will be provided along the eastern boundary of the Oaklands Blossom area. This is a key conveyance feature directing flows from the southern part to the final detention basin.
- 6.4.6 Permeable paving will be installed to significant areas of private parking and development roads. In addition to conveying runoff from the carriageways and adjacent footways, it will provide a significant volume of attenuation storage. As infiltration has been discounted at this stage, the permeable paving is assumed to include an impermeable liner. Given the

steep gradients across the site, with roads at slopes of up to 1:20, a series of check dams with orifice flow controls will be required to optimise storage within the permeable paving system.

- 6.4.7 At this stage of design, it would be excessively detailed to model every individual check dam and flow control. Instead, the attenuation capacity of the permeable paving has been represented in the hydraulic model using dummy pipes and storage nodes at key locations within the drainage network, as shown on the drainage layout (Appendix D). To approximate the effect of regular check dams, the permeable paving areas have been modelled by adjusting dimensions within the software. For example, a 160 m road length with a width of 5 m at a 1:20 gradient provides 800 m² of permeable paving area. In practice, check dams with orifice controls would be installed every 16 m. Within the model, this has been represented by reducing the length of the permeable paving storage structure to 16 m and increasing the width to 50 m, maintaining the same 800 m² of area. The gradient of 1:20 has been retained in the model to reflect the reduced storage efficiency associated with steep slopes.
- 6.4.8 Rain gardens will also be incorporated through the development, as shown on the landscape drawings. These features will provide water quality treatment and amenity value, but only limited attenuation capacity. For simplicity, they have been excluded from the hydraulic network model at this stage.
- 6.4.9 The proposed school is not being delivered by the developer. For the purposes of this drainage strategy, it has been assumed that the site-wide network will accommodate an unrestricted surface water discharge from the school. A conservative allowance has been made by assuming that 50% of the total school site area will be impermeable.
- 6.4.10 The proposed drainage strategy has been designed so that:
- Flooding does not occur on any part of the site for all events up to 3.3% AEP (1 in 30 years);
 - Flooding does not occur in any part of a building or utility plant susceptible to water for all events up to 1.0% AEP (1 in 100 years) + 40% climate change allowance.
- 6.4.11 The performance of the proposed surface water drainage strategy has been tested for storm events with 100.0% AEP, 3.3% AEP and 1.0% AEP + 40% climate change and durations of 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640 and 10080 minutes.
- 6.4.12 The results of the simulations are included in Appendix D and demonstrate how the proposed surface water drainage strategy can manage surface water flood risk at the development site without increasing flood risk elsewhere for storm events up to the 1.0% AEP + 40% climate change allowance.
- 6.5 Watercourse Diversion**
- 6.5.1 To enable the proposed development, the watercourse along the northern boundary will need to be diverted. At present, the watercourse runs parallel to Sandpit Lane but is relatively shallow in depth. This prevents the installation of culverts beneath the two proposed access points into the site, as there would be insufficient cover above the culverts.

Furthermore, the proposed widening of Sandpit Lane and the addition of a new footway along the site frontage would conflict with the existing watercourse alignment.

6.5.2 The diversion also presents an opportunity to deepen and widen the watercourse, thereby reducing the extent of existing surface water flood risk associated with the overland flow route and creating additional capacity for above-ground SuDS features.

6.5.3 A watercourse diversion layout is provided within Appendix D.

6.5.4 Any watercourse diversion works are subject to Ordinary Watercourse Consent from the LLFA.

6.6 Sustainable Drainage Systems (SuDS)

6.6.1 In accordance with the *NPPF*, (major) developments should incorporate sustainable drainage systems (SuDS) unless there is clear evidence that this would be inappropriate. In addition to water quantity control, SuDS should consider opportunities to provide water quality and amenity / biodiversity benefits (i.e. multifunctionality approach).

6.6.2 The proposed drainage strategy includes a combination of pervious paving, swales, rain gardens, and detention basins. To provide additional attenuation capacity for surface water management, underground attenuation tanks are also proposed beneath selected areas of pervious paving. Descriptions of these SuDS features are provided within the Table 6.2 below.

Table 6.2: Sustainable Drainage Systems (SuDS)

SuDS Component	Description and Opportunities
Swales	Swales are shallow, flat bottomed, vegetated open channels designed to treat, convey and often attenuate surface water runoff. Swales can also provide aesthetic and biodiversity benefits. Swales can help reduce flow rates by providing attenuation storage when flow at the outlet is controlled. Coarse to medium sediments and associated pollutants can be removed by filtration through surface vegetation and ground cover.
Bioretention Systems	Bioretention systems (including rain gardens) are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution. They also provide attractive landscape features and biodiversity. Bioretention systems can help reduce flow rates from a site by promoting infiltration / evapotranspiration and providing some attenuation storage. Bioretention systems can also provide very effective treatment functionality. Bioretention systems are a very flexible surface water management component that can be integrated into a wide variety of developments / densities using different shapes, materials, planting and dimensions.

SuDS Component	Description and Opportunities
Pervious Pavements	Pervious pavements provide a pavement suitable for pedestrian and / or vehicular traffic, while allowing rainwater to infiltrate through the surface and into the underlying structural layers. Pervious pavements help reduce flow rates from a site by providing attenuation storage. A flow control structure is required to constrain the rate of water discharged from the sub-base via an outlet pipe. Pervious pavement drainage has been shown to have decreased concentrations of a range of surface water pollutants, including heavy metals, oil and grease, sediment and some nutrients. Pervious pavements are typically built as an alternative to impermeable surfaces and therefore require no extra development space for their construction.
Detention Basins	Detention basins are landscaped depressions that are normally dry except during and immediately following storm events. They can be on-line components where surface runoff from regular events is routed through the basin or off-line components into which runoff is diverted once flows reach a specific threshold. Detention basins can be vegetated depressions (providing treatment in on-line components) or hard landscaped storage areas. Off-line basins will normally have an alternative principal use (e.g. amenity or recreational facility or urban (hard) landscaping).
Attenuation Storage Tanks	Attenuation storage tanks are used to create a below-ground void space for the temporary storage of surface water before use, infiltration or controlled release. Attenuation storage tanks can help reduce flow rates from a site by providing significant attenuation storage. Storage tanks do not provide any form of treatment of surface water runoff and therefore need to be combined in a “management train” with other methods that do provide suitable treatment of all relevant pollutants (coarse sediment must always be removed upstream of a storage tank). The inherent flexibility in size and shape of the typical attenuation storage tank systems means that they can be tailored to suit the specific characteristics and requirements of any site. However, the lack of amenity and biodiversity benefits means that storage tanks should be a last resort in any surface water drainage strategy for a major development.

6.7 Exceedance Events

- 6.7.1 In the event of a storm event greater than the 1.0% AEP + 40% climate change, or a failure of the drainage system, exceedance flows may be generated from the drainage network. The mitigation measures to protect more vulnerable parts of the site are discussed in Section 5.2.
- 6.7.2 The exceedance flow routes are shown on the flood routing layout in Appendix E.

6.8 Water Quality Management

- 6.8.1 The suitability of the proposed drainage strategy to manage the development’s pollution risk has been assessed using the simple index approach in The SuDS Manual (2015), as summarised in Table 6.3 below.
- 6.8.2 The assessment focuses on permeable paving and detention basins, as these represent the primary SuDS features within the network. As a minimum, all site runoff will be treated

within at least one detention basin, while the majority of flows from the Oaklands Blossom area will pass through multiple SuDS components in sequence before reaching the outfall.

Table 6.3: Surface Water Quality Management (Simple Index Approach)

Runoff Route / Treatment Train 1				
Land Use / SuDS	Hazard Level	TSS	Metals	Hydrocarbons
Pollution Hazard Indices				
Residential roofs	Very Low	0.2	0.2	0.05
Driveways, residential car parks and low traffic roads	Low	0.5	0.4	0.4
SuDS Mitigation Indices				
Permeable pavement		0.7	0.6	0.7
Total SuDS Mitigation Index $\geq$ Pollution Hazard Index (for each contaminant type)				

Runoff Route / Treatment Train 2				
Land Use / SuDS	Hazard Level	TSS	Metals	Hydrocarbons
Pollution Hazard Indices				
Residential roofs	Very Low	0.2	0.2	0.05
Driveways, residential car parks and low traffic roads	Low	0.5	0.4	0.4
SuDS Mitigation Indices				
Detention Basin	-	0.5	0.5	0.6
Total SuDS Mitigation Index $\geq$ Pollution Hazard Index (for each contaminant type)				

6.9 Operation and Maintenance

- 6.9.1 The function of the surface water drainage system must be understood by those responsible for maintenance, regardless of whether individual components are below ground or on the surface. In any system properly designed, monitored and maintained, performance deterioration can usually be minimised.
- 6.9.2 The long-term operation and maintenance of the proposed surface water drainage strategy will be the responsibility of entities, as detailed in the table below. Appropriate legal agreements defining maintenance responsibilities and access rights over the lifetime of the proposed development must be established prior to construction.

Table 6.4: Entities Responsible for SuDS Maintenance

SuDS Component	Location	Function	Responsible Entity
Swale	Eastern Boundary	Store, convey and treat runoff	Water company or private management company
Bioretention System (rain gardens)	Individual plots	Store & treat runoff	Owner or private management company

SuDS Component	Location	Function	Responsible Entity
Pervious Pavement	Development roads	Store & treat runoff	Local authority, owner or private management company
Detention Basin	Public open spaces	Store & treat runoff	Water company or private management company
Attenuation Storage Tank	Beneath development roads and parking courts	Store runoff	Water company or private management company

- 6.9.3 Where the user/beneficiary of a system is not responsible for maintenance, then it is important to ensure that they know when the SuDS is not functioning correctly and who to contact if any issue arises.
- 6.9.4 Maintenance plans are often required to clearly identify who is responsible for maintaining proposed SuDS as well as the maintenance regime to be applied. Maintenance plans can also form a useful tool for public engagement with SuDS and understanding their wider benefits. The maintenance requirements of the proposed surface water drainage strategy are summarised in the table below.

Table 6.5: Typical Operation and Maintenance Requirements

Operation and Maintenance Activity	SuDS Component				
	Swale	Bioretention System	Pervious Pavement	Detention Basin	Attenuation Storage Tank
Regular Maintenance					
Inspection	■	■	■	■	■
Litter and debris removal	■	■	■	■	□
Grass cutting	■	■	□	■	□
Weed and invasive plant control			□	□	
Shrub management (including pruning)	□	□	□	□	
Shoreline vegetation management				□	
Aquatic vegetation management				□	
Occasional Maintenance					
Sediment management	■	■	■	■	■
Vegetation replacement	□	□		□	
Vacuum sweeping and brushing			■		
Remedial Maintenance					

Operation and Maintenance Activity	SuDS Component				
	Swale	Bioretention System	Pervious Pavement	Detention Basin	Attenuation Storage Tank
Structure rehabilitation/repair	☐	☐	☐	☐	☐
Infiltration surface reconditioning	☐	☐	☐		

6.10 Drainage During Construction

- 6.10.1 Drainage is typically an early activity in the construction of a development, taking form during the earthworks phase as it is the responsibility of the contractor to manage all construction runoff rates and water quality. However, the connection the of piped drainage system to SuDS components should not take place until the end of construction works, unless a robust strategy for silt removal prior to occupation of the site is implemented.
- 6.10.2 Silt-laden runoff from construction sites represents a common form of waterborne pollution and cannot enter SuDS components not specifically designed to manage this, as it can overwhelm the system and pollute receiving water features. Any gullies and piped systems should be capped off during construction and fully jetted and cleaned prior to connection to SuDS components.
- 6.10.3 The three principal aspects of drainage during construction are conveying runoff, controlling runoff and trapping sediments:
- Conveyance of runoff can be achieved through small ditches / swales, channels and drains. Runoff control measures should be implemented to ensure that runoff does not overwhelm the temporary drainage system causing flooding on site or elsewhere.
 - Control of runoff can be achieved through perimeter ditches or appropriate grading to ensure that any runoff from the construction site stays on site. Runoff rates leaving the site should be managed so they do not exceed the proposed rates stated in this report, based on pre-development conditions.
 - Construction runoff should be directed to dedicated settlement basins with adequate upstream sediment and pollution control such as sediment basins, silt fences and straw bales prior to infiltration or off-site discharge.
- 6.10.4 Additional conveyance, control and treatment measures should be installed as needed during grading. Slope stability needs to be considered when using open water features to convey, control and treat runoff across the site. Any necessary surface stabilisation measures should be applied immediately on all disturbed areas where construction work is either delayed or incomplete.
- 6.10.5 Maintenance inspections should be performed weekly, and maintenance repairs should be made immediately after periods of rainfall.

- 6.10.6 All drainage infrastructure (namely underground features) must be protected from damage by construction traffic and heavy machinery through the implementation of measures such as protective barriers and storing construction materials away from the drainage infrastructure.

7 FOUL WATER DRAINAGE STRATEGY

- 7.1.1 Sewerage undertakers have a legal obligation under the Water Industries Act 1991 to provide developers with the right to connect to public (foul) networks. The Water Industries Act 1991 also contains safeguards to ensure that flows resulting from new developments do not cause detriment to the existing public sewerage networks by imposing a duty on sewerage undertakers to carry out works required to accommodate additional flows into their networks.
- 7.1.2 According to records obtained from Thames Water (TW), foul water sewers are located within Sandpit Lane, to the north of the site. It is proposed that the Oaklands Blossom area will discharge to these sewers via gravity.
- 7.1.3 A pre-development enquiry with TW has confirmed that sufficient capacity exists within the network and that a connection to the sewers in Sandpit Lane can be accommodated (Appendix D).
- 7.1.4 Foul water from the Oaklands College area will continue to discharge to the public sewer via existing outfalls. While the precise connection point is currently unknown, it is believed to discharge to the 457 mm diameter trunk foul water sewer located at:
- Easting 519032
 - Northing 207878
- 7.1.5 The proposed increase in college pupil numbers is 548, which corresponds to an increase in peak foul flows of 10.3 l/s.
- 7.1.6 TW have not been consulted specifically regarding these additional college flows; however, as the proposal utilises an existing connection to a trunk sewer, it is anticipated that the surrounding network has sufficient capacity to accommodate the increased flows.
- 7.1.7 Once planning consent has been granted, it is recommended that this document is forwarded to the water company to ensure that they are aware of the additional capacity required for the development.

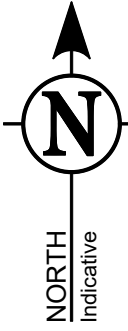
8 CONCLUSIONS AND RECOMMENDATIONS

- 8.1.1 JNP Group has been commissioned by Taylor Wimpey and Oaklands College to prepare a flood risk assessment and drainage strategy for the proposed Oaklands Blossom and Oaklands College development in St. Albans, Hertfordshire.
- 8.1.2 This report assesses flood risk at the development site from all potential sources and describes the measures adopted in the master planning process to manage such risks. It has been prepared in compliance with current national and local planning policies and best practices.
- 8.1.3 The development site comprises two main areas:
- The Oaklands Blossom area (21.63 ha), referred to by SACDC as “Site B4 East St. Albans”.
 - The Oaklands College area (55.47 ha), including the college and associated facilities and sports pitches.
- 8.1.4 All potential sources of flood risk at the development site have been assessed based on the available information. The key potential sources of flood risk to the proposed development are surface water, groundwater and sewers.
- 8.1.5 In accordance with the available information, the development site is largely at very low risk of surface water flooding, even considering the predicted impacts of climate change, with areas at low, medium and high risk of surface water flooding restricted to three (west-east) overland flow paths adjacent/through the site.
- 8.1.6 Site-specific flood risk modelling has been undertaken by JNP Group, with results detailed in the accompanying report ref. BR31287-JNP-XX-XX-RP-C-1001. Site-specific results are broadly in line with the EA’s *Long Term Flood Risk*, confirming the key findings stated above in relation to overland flow paths, while also enabling the distinction between runoff generated off or on-site.
- 8.1.7 In accordance with the available information, the development site is largely at no/low risk of flooding from groundwater, with higher risk restricted to the northern end of the site, in alignment with the chalk stream/‘dry-valley’ along House Lane - Oaklands Lane. This presumed low risk of groundwater flooding is supported by the available records of boreholes within/near the development site, where groundwater was found at depths ranging between 20 m and 5 m bgl.
- 8.1.8 HCC’s and SACDC’s strategic flood risk assessments note 24 records of sewer flooding in the postcode area of the development site between 2018 and 2024. For confidentiality reasons, TW does not provide the exact location of sewer flooding incidents. In the absence of sufficient information to quantify or discard sewer flood risk at the development site, it must be assumed that existing sewers upslope and within the development site can pose some flood risk.
- 8.1.9 The following measures have been implemented in the proposed development’s master plan to ensure it can be made safe for its lifetime without increasing flood risk elsewhere:
- With the exception of proposals within the central part of the Oaklands College area, which are greatly restricted by existing buildings and infrastructure, the proposed

development has been steered to areas at low risk of flooding from any source (Flood Zone 1) in preference to areas at higher risk of flooding (Flood Zones 2 and 3).

- In order to maximise the site's development potential and achieve other wider sustainability goals, some (limited) manipulation of Flood Zones 2 and 3 along overland flow paths is proposed through the formalisation of blue/green corridors across the site compatible with the proposed master plan. Site-specific flood risk modelling detailed in the accompanying report ref. BR31287-JNP-XX-XX-RP-C-1001 confirms that the proposed development can be made safe without increasing flood risk elsewhere.
- The finished floor level (FFL) of all vulnerable development will be set at least 300 mm above the nearest/relevant 1.0% AEP + climate change flood level.
- The FFL of all vulnerable development will also be set at least 150 mm above external ground levels and 300 mm above road channel levels, which in turn will be designed to safely route overland flows away from vulnerable features and towards the proposed blue/green corridors or other existing overland flow routes off-site, using water compatible or less vulnerable parts of the proposed development such as public open spaces, parking areas and roads to convey and attenuate flood flows.
- Within the central part of the Oaklands College area, where proposals are restricted by existing buildings and infrastructure and the above measures cannot be fully implemented, the following flood resistance and resilience measures are envisaged:
 - Flood depth up to 300 mm: buildings will be designed to keep water out as much as possible using low permeability materials and construction (e.g. impermeable concrete).
 - Flood depth from 300 to 600 mm: buildings will be designed to keep water out as much as possible but prepared to flood using resilient materials and design (e.g., lime plaster and raised electrical sockets) and ensuring access to all spaces for drying and cleaning.
 - Flood depth above 600 mm: buildings will be designed to allow water through using resilient materials and design and ensuring access to all spaces for drying and cleaning.
- Safe ingress/egress routes to all vulnerable parts of the proposed development are available for storm events up to 1.0% AEP + climate change.
- The proposed surface water drainage strategy has been designed so that flooding does not occur on any part of the site for all events up to 3.3% AEP and flooding does not occur in any part of a building or utility plant susceptible to water for all events up to 1.0% AEP + 40% climate change allowance

APPENDIX A DEVELOPMENT SITE



Trees are drawn to scale showing the average canopy spread. Description heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type incl. roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to start of work.

Detail, services and features may not have been surveyed if obstructed or reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary line.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

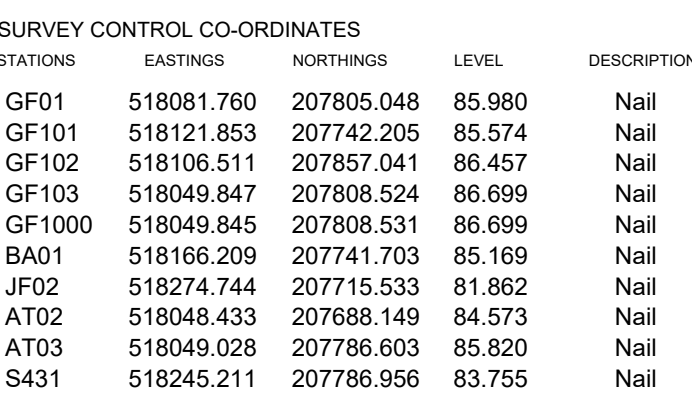
General

The contractor must check and verify all site and building dimensions, level, utilities and drainage details and connections prior to commencing work. All errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

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This drawing should only be scaled using digital methods.



New areas added to existing survey. Previous survey areas not verified

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.00

The level datum established for this survey is related to Ordnance Survey (OS) datum using GPS Smartnet.

To avoid discrepancies within the survey, adding to the survey or setting out from the survey, any coordinated data must be directly derived from the original survey control. Survey Solutions are not responsible for any third-party adding survey data to the existing information.

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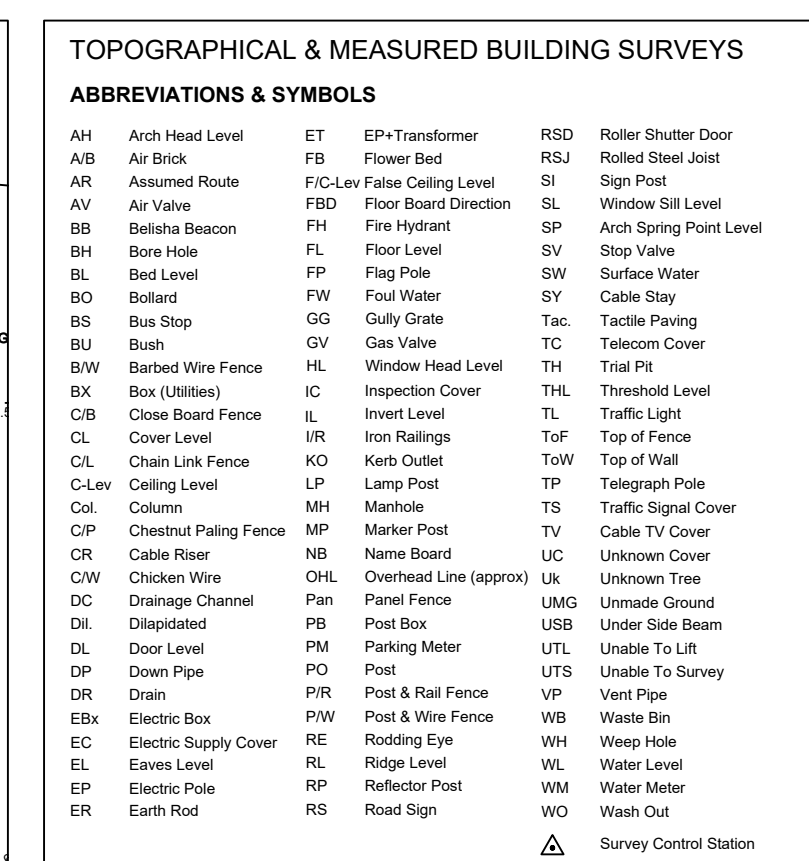


PROJECT TITLE
OAKLANDS COLLEGE, Hatfield Rd, ST ALBANS

HERTFORDSHIRE, AL4 0JA
 DRAWING DETAIL
 TOPOGRAPHICAL SURVEY
 Sheet 4 of 19

CLIENT FUSION PROJECT MANAGEMENT				SCALE 1:200
SURVEYOR DP,GF,BT	SURVEY DATE 23/10/2024	CHECKED BY BM	APPROVED BY DB	DWG ST FINAL
DRAWING NUMBER S3214CVLS-04			REVISION	ISSUE D 11/1/2





All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including: sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

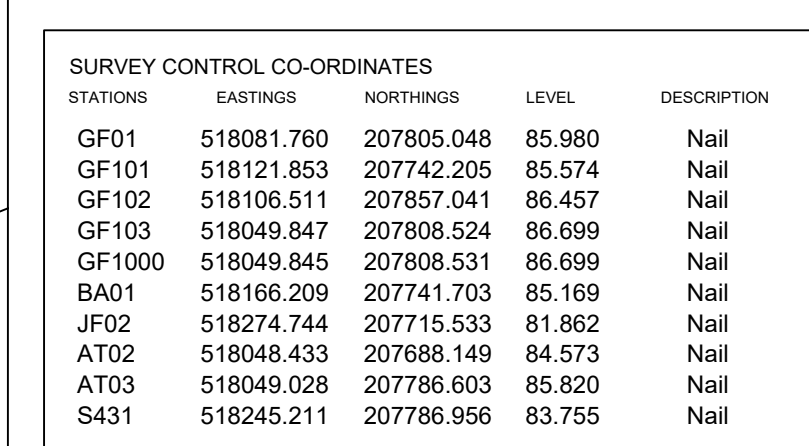
Measured Building Surveys

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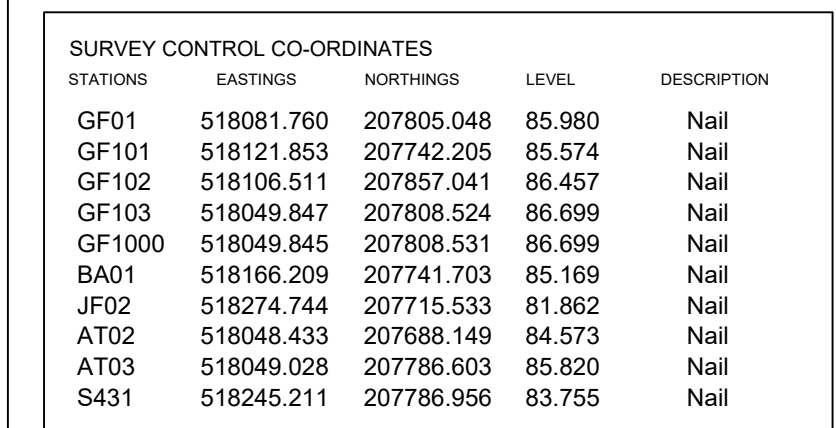
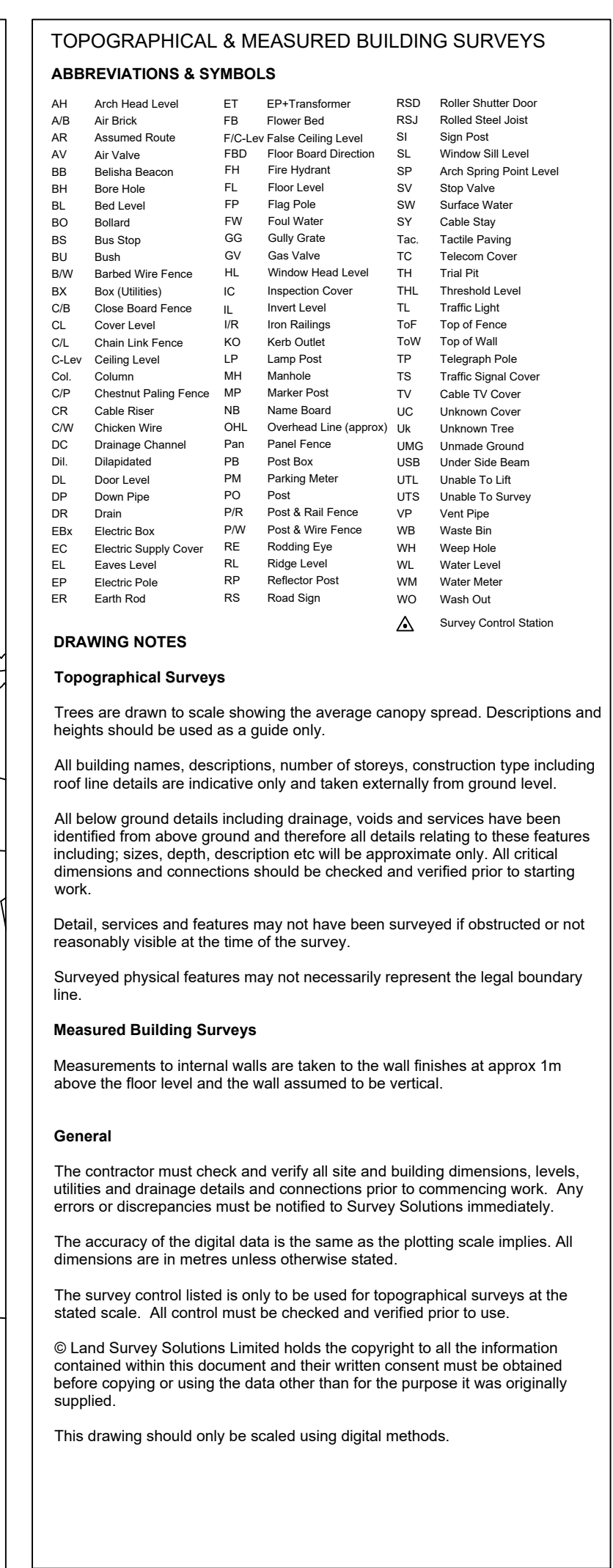


New areas added to existing survey. Previous survey areas not verified.

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SURVEY GRID AND LEVEL DATUM

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The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

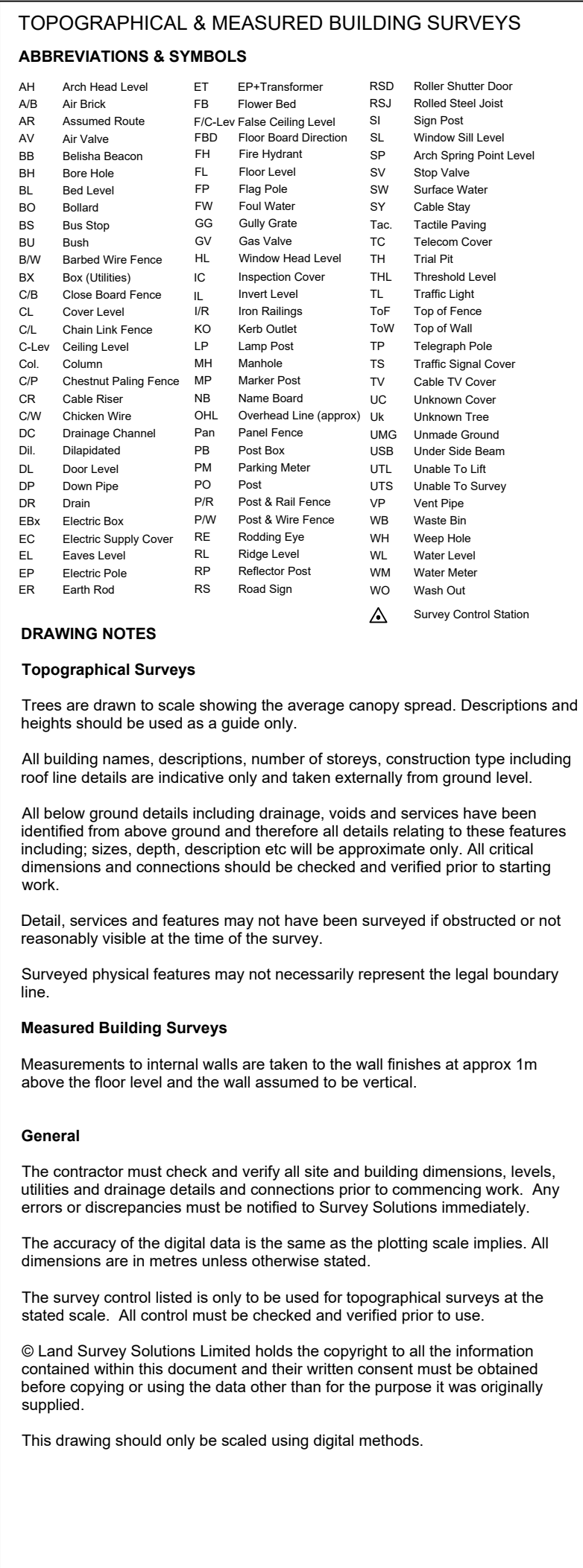
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PROJECT TITLE OKLANDS COLLEGE, Hatfield Rd, ST ALBANS HERTFORDSHIRE, AL4 0JA			
DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 10 of 19			
CLIENT FUSION PROJECT MANAGEMENT			SCALE 1:200
SURVEYOR DP.GF.BT	SURVEY DATE 23/10/2024	CHECKED BY BM	APPROVED BY DB
DRAWING NUMBER 63214CVLS-10			DWG STATUS FINAL
		REVISION	ISSUE DATE 1/11/2024





The diagram, titled "Sheet Layout", illustrates a grid of rectangles. A rectangle in the middle-right section is highlighted with diagonal hatching and contains the text "R12C10:R12". This rectangle is part of a larger arrangement of overlapping rectangles of various sizes and positions, representing a layout on a sheet.

SURVEY CONTROL CO-ORDINATES				
STATION	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
GF01	518081.760	207805.048	85.980	Nail
GF101	518121.852	207825.205	85.974	Nail
GF102	518106.511	207827.041	86.457	Nail
GF103	518049.847	207808.524	86.699	Nail
GF1000	518049.845	207808.531	86.699	Nail
BA01	518166.209	207741.703	85.169	Nail
JF02	518274.744	207715.533	81.862	Nail
AF02	518048.433	207688.149	84.573	Nail
SA01	518049.028	207786.603	85.620	Nail
S431	518245.211	207786.956	83.755	Nail

New areas added to existing survey. Previous survey areas not verified.

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies within the survey, adding to the survey or setting out points from the survey, any coordinated data must be directly derived from the original survey control. Survey Solutions are not responsible for any third-party adding survey data to the existing information.

REV	DESCRIPTION	DRAWN	APPR	DATE
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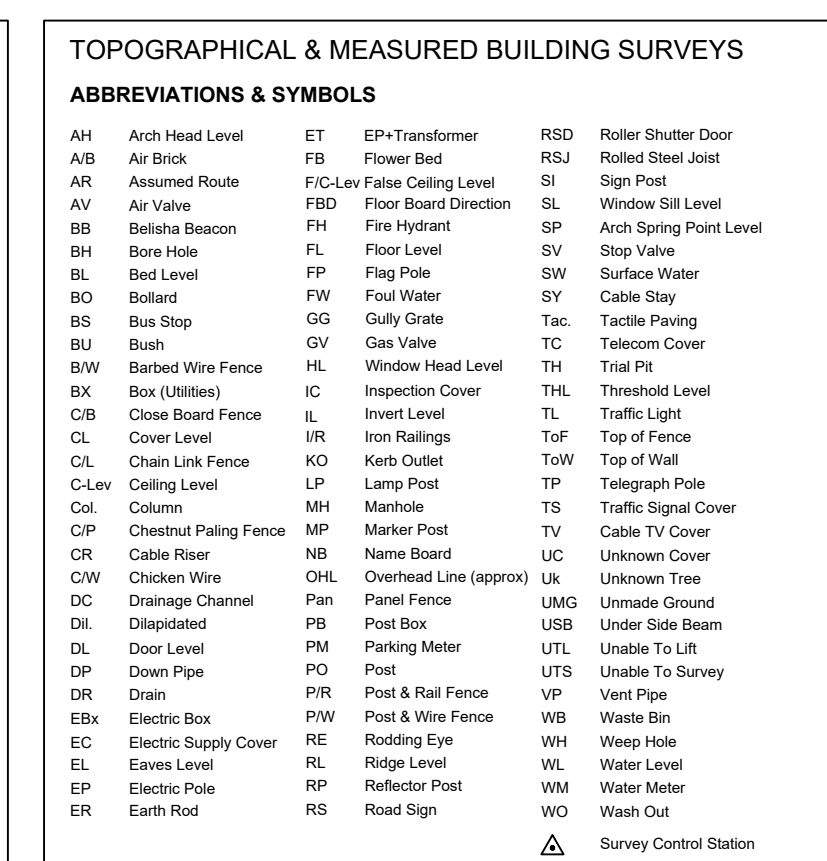
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IPSWICH BEDFORD BIRMINGHAM BRISTOL
LONDON CENTRAL LONDON EAST-ANGLES
COVENTRY CRAWLEY GLASGOW
NORWICH NOTTINGHAM THAMES VALLEY

PROJECT TITLE				SCALE
OAKLANDS COLLEGE, Hatfield Rd, ST ALBANS HERTFORDSHIRE, AL4 0JA				1:200
DRAWING DETAIL				
TOPOGRAPHICAL SURVEY				
Sheet 12 of 19				
CLIENT				
FUSION PROJECT MANAGEMENT				
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
DP.GF.BT	23/10/2024	BM	DB	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
63214C/VS-12				1/11/2024

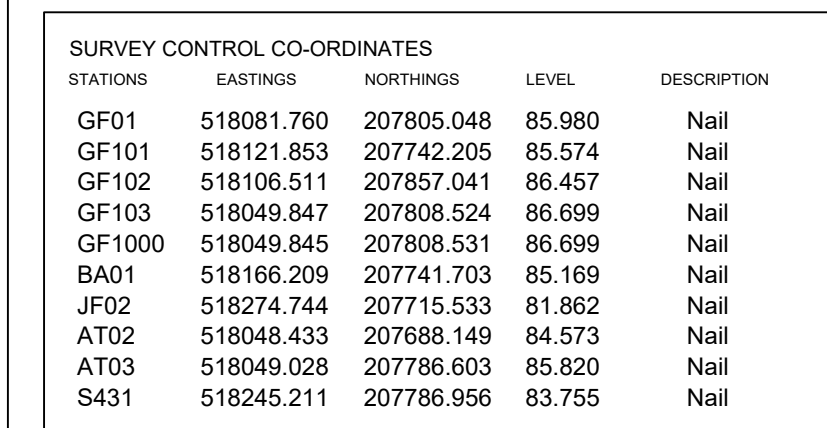




Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

This drawing should only be scaled using digital methods.



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REV	DESCRIPTION	DRAWN	APPR	DATE
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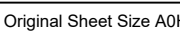
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LONDON-CENTRAL LONDON-EAST MANCHESTER NORWICH NOTTINGHAM THAMES VALLEY

PROJECT TITLE	OAKLANDS COLLEGE, Hatfield Rd, ST ALBANS HERTFORDSHIRE, AL4 0JA
DRAWING DETAIL	TOPOGRAPHICAL SURVEY Sheet 14 of 19

CLIENT FUSION PROJECT MANAGEMENT				SCALE 1:200
SURVEYOR DP,GF,BT	SURVEY DATE 23/10/2024	CHECKED BY BM	APPROVED BY DB	DWG STATUS FINAL
DRAWING NUMBER 63214CVLS-14			REVISION	ISSUE DATE 1/11/2024



[illegible]

Topographical Surveys

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Description heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type incl. roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to start of work.

Detail, services and features may not have been surveyed if obstructed or reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx. 1m above the floor level and the wall assumed to be vertical.

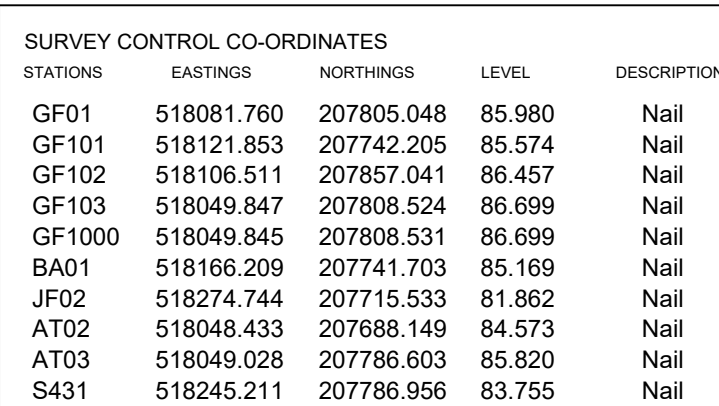
General

The contractor must check and verify all site and building dimensions, level, utilities and drainage details and connections prior to commencing work. All errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

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This drawing should only be scaled using digital methods.



New areas added to existing survey. Previous survey areas not verified.

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.00

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REV	DESCRIPTION	DRAWN	APPR	E
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PROJECT TITLE
OAKLANDS COLLEGE, Hatfield Rd. ST ALBANS

HERTFORDSHIRE, AL4 0JA

DRAWING DETAIL
TOPOGRAPHICAL SURVEY

Sheet 15 of 19

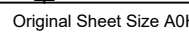
CLIENT FUSION PROJECT MANAGEMENT SCALE 1:200

SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG ST
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DP,GF,BT	23/10/2024	BM	DB	FINAL
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DRAWING NUMBER	REVISION	ISSUE D
63214CVLS-15		1/11/2



[illegible]

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

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STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
GF01	5180811.760	207805.048	85.390	Nail
GF101	518121.853	207842.205	85.574	Nail
GF102	518106.511	207857.041	86.457	Nail
GF103	518049.847	207808.524	86.699	Nail
GF1000	518049.845	207808.531	86.699	Nail
BA01	518166.209	207741.703	85.169	Nail
JF02	518274.744	207715.533	81.862	Nail
AT02	518048.433	207688.149	84.573	Nail
AT03	518049.028	207786.603	85.820	Nail
S431	518245.211	207786.956	83.755	Nail

New areas added to existing survey. Previous survey areas not verified.

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REV	DESCRIPTION	DRAWN	APPR	DATE
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BUILDING SURVEYING
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MONITORING

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LONDON/CENTRAL LONDON/EAST MANCHESTER NORWICH NOTTINGHAM THAMES

BOOK REVIEW BOARD

OAKLANDS COLLEGE, Hatfield Rd, ST ALBANS
HERTFORDSHIRE AL4 0JA

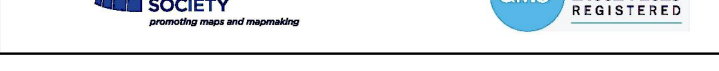
DRAWING DETAIL
TOPOGRAPHICAL SURVEY

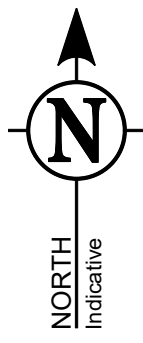
Sheet 16 of 19

CLIENT	SCALE
FUSION PROJECT MANAGEMENT	1:200

SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG ST
DP,GF,BT	23/10/2024	BM	DB	FINAL

DRAWING NUMBER 63214CVLS-16	REVISION	ISSUE D 1/11/2
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DRAWING NOTES

Topographical Surveys

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Surveyed physical features may not necessarily represent the legal boundary line.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

General

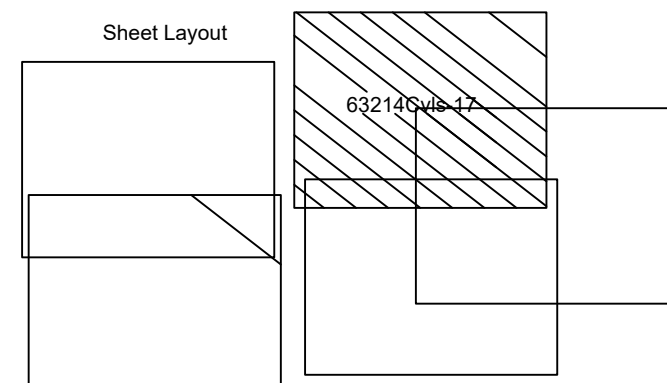
The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

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This drawing should only be scaled using digital methods.



SURVEY CONTROL CO-ORDINATES				
STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
GF01	518081.760	207805.048	85.980	Nail
GF101	518121.853	207742.205	85.574	Nail
GF102	518081.261	207857.041	86.547	Nail
GF103	518049.847	207898.524	86.998	Nail
GF1000	518049.845	207808.531	86.699	Nail
BA01	518166.209	207741.703	85.169	Nail
JF02	518274.744	207715.533	81.862	Nail
AT02	518048.433	207688.149	84.753	Nail
AT01	518049.028	207786.603	85.820	Nail
S431	518245.211	207786.956	83.755	Nail

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REV	DESCRIPTION	DRAWN	APPR	DATE
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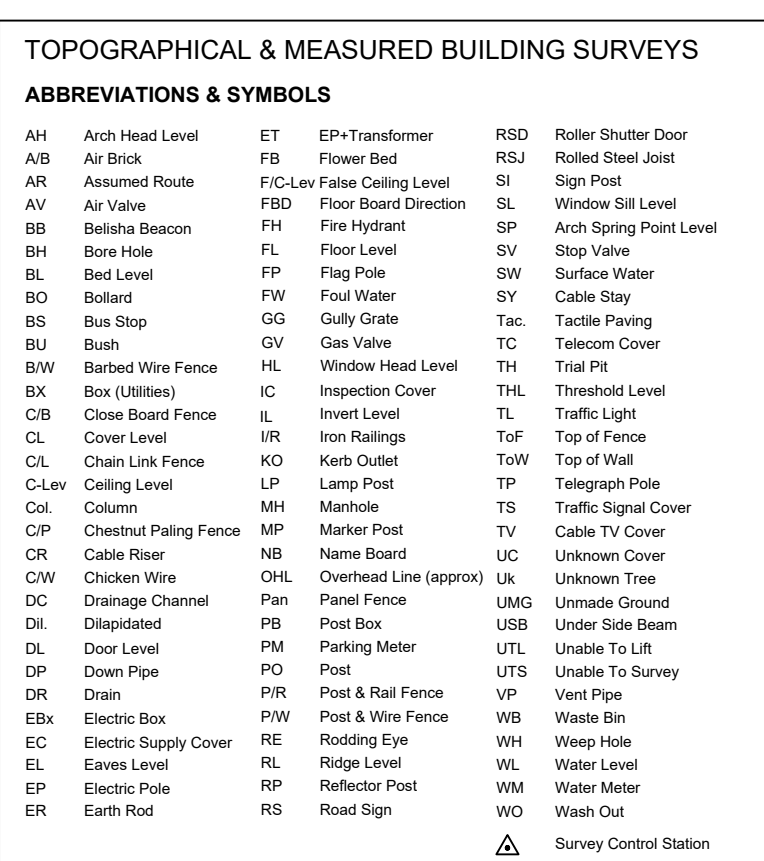
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LONDON-CENTRAL LONDON-EAST MANCHESTER
NORWICH NOTTINGHAM THAMES VALLEY

OAKLANDS COLLEGE, Hatfield Rd, ST ALBANS HERTFORDSHIRE, AL4 0JA			
DRAWING DETAIL: TOPOGRAPHICAL SURVEY Sheet 17 of 19			
CLIENT FUSION PROJECT MANAGEMENT			SCALE 1:200
SURVEYOR DP.GF.BT	SURVEY DATE 23/10/2024	CHECKED BY BM	APPROVED BY DB
DWG STATUS FINAL			
DRAWING NUMBER 63214CVLS-17		REVISION	ISSUE DATE 1/11/2024





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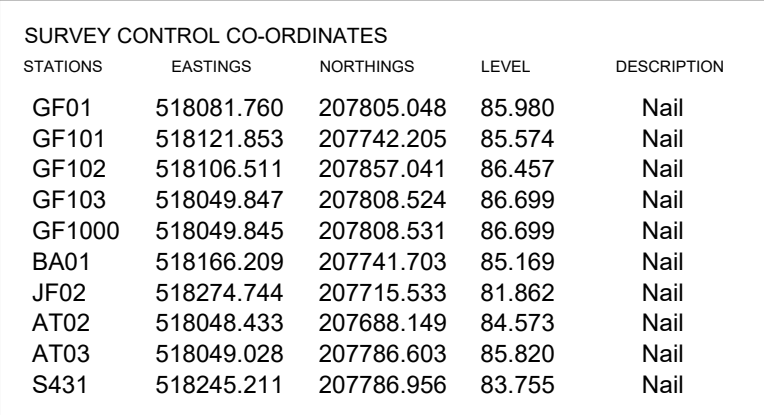
Measured Building Surveys

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SURVEY
SOLUTIONS

PROJECT TITLE
OAKLANDS COLLEGE, Hatfield Rd, ST ALBANS
HERTFORDSHIRE, AL4 0JA

TL 10 NE 6

TL 10 NE 6 1699 0966 Jersey Farm, Sandridge

Block C

Surface level (+105.5 m) +346 ft
Water not struck
Shell and auger, 6 in (152 mm) diameter
March 1972

Waste 1.8 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.3	0.3
Glacial Sand and Gravel	Brown pebbly clay	1.5	1.8
Upper Chalk	Soft white chalk	0.2+	2.0

TL 10 NE 7

TL 10 NE 7 1809 0844 Newgate, Colney Heath

Block C

Surface level (+77.7 m) +255 ft
Water struck at(+69.8 m)
Shell and auger, 6 in (152 mm) diameter
February 1972

Overburden 0.5 m
Mineral 2.0 m
Waste 3.3 m
Mineral 3.0 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Glacial Sand and Gravel	Brown, slightly sandy soft clay with a few rounded flint and quartz pebbles	0.1	0.5
	a 'Very clayey' sandy gravel Gravel: fine to coarse, angular to rounded black flint and rounded brown flint with a trace of quartz and quartzite Sand: mainly fine from 0.5 m to 1.5 m; mainly medium to coarse from 1.5 m to base; brown	2.0	2.5
	Soft, brown, sandy pebbly clay	3.3	5.8
	b 'Clayey' gravel Gravel: fine to coarse, rounded brown flint with some quartzite and a few large flint cobbles Sand: fine to coarse; brown	3.0	8.8
Upper Chalk	Soft white chalk	0.2+	9.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages					
	Fines	Sand	Gravel		Fines	Sand	Gravel			
					-1/16	+1/16 -1/4	+1/4 -1	+1 - 4	+4 16	+16
a	28	42	30	0.5-1.5	15	48	14	2	17	4
				1.5-2.5	41	2	10	8	22	17
				Mean	28	25	12	5	20	10
b	18	28	54	5.8-6.8	14	11	15	10	17	33
				6.8-7.8	26	6	10	8	26	24
				7.8-8.8*	15	5	11	6	25	38
				Mean	18	8	12	8	22	32
a + b	22	33	45	Mean	22	15	12	6	22	23

239 TL10NE/33
1769 0807
1" 239

ST. ALBANS

11. St. Peter's Rural? Windmill-pump, 800 yards NW. of Oaklands. From
Dr. H. L. SHERLOCK.

Average water-level 65 ft. down.

Boulder Clay ... 10 to 20
Chalk ... 70 or more } 90 ft.

Herts 35 NW (W)

2 mls 150 yds. E.N.E. of Cathedral.

Visited 15.2.49.

O.D. +310

Discussed. — Reservoir (Inaccessable)

Threats to Agriculture

Oaklands

Smallford.



Water Supply of
Bucks. & Herts.

Page 245

101 TL 1768 0807

ST. ALBANS

11. St. Peter's Rural? Windmill-pump, ~~800~~ ⁷⁵⁰ yards NW. of Oaklands. From
Dr. R. L. SHERLOCK.

Average water-level 65 ft. down.

Boulder Clay	...	...	10 to 20	} 90 ft.
Chalk	...	...	70 or more	

Herts 35 NW (W)

2 mls 150 yds. E.N.E. of Cathedral.

Visited 15.2.49.

O.D. + 310

Discussed. — Reservoir (inaccess.)

Institute of Agriculture

'Oaklands'

Small Pond.

Water Supply of
Bucks. & Herts.

Page 245



TL10/98

239 / 101

~~239~~

Quaternary - glacial boulder clay to 10 to 20 ft
U. Chalk to 90 ft or more.

11/06

25.1.79

375. Even if the Secretary of State could lawfully act in such a fashion, it would be quite wrong for him to do so in this case. There could be no moral or other justification for requiring Dartford to "pay" for new hospitals for Bromley, Lewisham and elsewhere by the sacrifice of part of its environment.

376. In addition to the severe environmental damage that had been caused by the chalk quarrying operations themselves, there had been further serious problems caused by the redistribution of bulk materials arising from the extraction of chalk and the manufacture of cement. In particular the redistribution of overburden had been carried out in the post-war period in a seemingly piecemeal fashion without regard to an overall long-term disposal strategy leading to proper restoration. Evidence suggested that the prime motivation for overburden redistribution had been ad hoc quarry operational requirements. Similarly and particularly following the commissioning of the Northfleet Works, the disposal of flue dust and the storage of coal and clinker had posed an increasing problem to the Company and the community. The principle areas in which problems had arisen were Stone Castle Pit, Swanscombe Recreation Field, Alkerden Lane Pits, Southfleet Quarry, Bakers Hole/Northfield Extension and Swanscombe/Broadness Marshes.

377. The construction of the Northfleet Works and the consequent closure of the 4 other works resulted in an overall decrease in the work force. Information provided by the Company for the years 1968 and 1975 indicated there was a loss of 721 jobs from the Dartford Employment Exchange Area (the closure of Kent and Johnsons Works) and a gain of 610 jobs in the Gravesend Employment Exchange Area (the Northfleet Works). There had been some minor fluctuations in employment in the cement industry reflecting market conditions and the economy generally. In 1976, for example, 100 persons were laid off from the Northfleet plant.

378. The total numbers employed at the Eastern and Western Quarries, and the Swanscombe and Northfleet Works amounted to some 2,000 which was 2.5% of the total employed residents of Thames-side as a whole (79,000 - Borough of Gravesham - 43,000 and Dartford - 36,000). That was down from the 1971 figures. The impact of the fluctuations within the industry on the employment situation for Thames-side had therefore been marginal.

379. The total number of employed persons at Darenth Park Hospital was some 1,100. If the Hospital closed there would be a substantial loss of jobs.

380. The Borough had a rateable value as at 1 April 1978 of £9,952,197 of which the commercial element was £5,112,948. The rateable value of the Company's industrial, office and quarry premises was £252,475. In terms of rate income the Borough anticipated receiving some £330,000 from the Company during the current financial year out of a total expected income of around £11 m.

381. Applications for the winning of chalk to -30 ft OD at Eastern and Western Quarries, north of Watling Street (A296) and for winning chalk from land at the Darenth Park site, including the construction of tunnels under Watling Street and Bean Road, were submitted to the Dartford District Council on 19 September 1975 (DA/75/557 and 558), and reported on at the Council's Planning and Transportation Committee meeting held on 23 March 1976. (The application, DA/75/557 had been amended at the Inquiry so that that proposal now related solely to deeper excavation in Eastern Quarry). The report contained a resume of all the observations and representations received from statutory consultees, interested groups and bodies and the public at large, including 446 letters of objection. (Document 41).

382. The County Council's Planning and Transportation Committee on preliminary consideration of the proposals resolved that they, together with Members of the Powers Sub-Committee, should undertake a programme of site visits and meetings



TL10/152

RMC		READY MIXED CONCRETE (UK) LTD LAND SEARCH & EXPLORATION DEPT.		BOREHOLE No. WM1PG				
SITE NAME		DRILLING METHOD		CASING DETAILS				
Oakland's College		Shell and Auger		1 8" to 8.0				
St Albans		LOG BOOK REF. Drilling & Servicing		2 6" to 16.1				
SITE REF. TL 10		GROUND LEVEL		CO-ORDINATES				
		78.71 m AOD		E 518068.35 N 208477.17				
				DATE DRILLED				
				START : 9/4/97				
				FINISH : 10/4/97				
DESCRIPTION	REDUCED LEVEL (m AOD)	LEGEND	DEPTH & THICKNESS (m)	SAMPLE DEPTH (m) & TYPE	WATER STRIKE (m)	MONITOR INSTALLATION	DEPTH (m)	REMARKS
TOPSOIL	78.61		0.10 (0.10)					Bentonite seal
Dark brown stony CLAY	78.33		0.38 (0.28)				1.00	33x25.9mm PVC casing
Firm light brown stony CLAY	77.81		0.90 (0.52)				1.10	WM1PG/P1
Flinty brown SAND and GRAVEL			(1.14)				2.10	33x25.9mm PVC screen 1mm slots, 150um geowrap, 16/30 filter s
Firm brown stony CLAY with sand and gravel lenses	76.67		2.04					
			(1.46)					
Firm brown chalky boulder CLAY	75.21		3.50					Bentonite seal
			(1.66)					
Very chalky brown boulder CLAY	73.55		5.16				5.50	63x55.8mm Envirotene plain casing
Soft friable flinty CHALK with large flints	73.21		5.50 (0.34)				7.00	
								63x55.8mm Envirotene screen, 0.3mm slots, 1t filter sand pack
@9.00m becoming firmer chalk with large flints			(10.50)		7.4 7.85 10.2			WM1PG/P2
	62.71		16.00				16.00	

NOTES		TOTAL DEPT
Water struck at 10.20m, rose to 7.85m in 30 mins, rose to 7.40m in 4 hrs		16.00
Borehole completed with steel lockable cover		METRES
Datum level of cover 79.125m OD		LOGGED BY
		B. Bellamy
		DATE LOGGED
B - Bulk disturbed (bag) sample	U100 - Undisturbed Sample	SCALE
D - Small disturbed (jar) sample	W - Water Sample	1 : 125



TL10/154

RMC		READY MIXED CONCRETE (UK) LTD LAND SEARCH & EXPLORATION DEPT.		BOREHOLE No. WM3PG				
SITE NAME		DRILLING METHOD		CASING DETAILS				
Oakland's College		Shell and Auger		1 8" to 9m				
St Albans		LOG BOOK REF. Drilling & Servicing		2 6" to 18.5				
SITE REF. TL 10		GROUND LEVEL		CO-ORDINATES				
200		85.70 m AOD		E 518159.41 N 207932.25				
				DATE DRILLED				
				START : 7/4/97				
				FINISH : 7/4/97				
DESCRIPTION	REDUCED LEVEL (m AOD)	LEGEND	DEPTH & THICKNESS (m)	SAMPLE DEPTH (m) & TYPE	WATER STRIKE (m)	MONITOR INSTALLATION	DEPTH (m)	REMARKS
TOPSOIL	85.60		0.10 (0.10)					Bentonite seal
Dark brown stony CLAY	85.34		0.36 (0.26)					
Firm light brown flinty sandy stony CLAY			(1.64)					
Chalky brown boulder CLAY	83.70		2.00					
			(2.66)					
Flinty GRAVEL and grit with some brown sand	81.04		4.66				4.60	33x25.9mm PVC plain casing
			(2.64)				6.00	33x25.9mm PVC screen 1mm slots, 150um geowrap, 16/30 filter sar
Firm brown stony CLAY	78.40		7.30		7.2		7.50	WM3PG/P1
			(1.80)				7.60	Bentonite seal
Flinty brown SAND and GRAVEL	76.60		9.10				9.00	63x55.8mm Envirotene plain casing
			(3.96)		10.7		9.50	63x55.8mm Envirotene screen, 0.3mm slots, 16/ filter sand pack
Very sandy slightly silty SAND and GRAVEL	72.64		13.06					WM3PG/P2
			(2.44)					
Brown flinty SAND and GRAVEL with large flints	70.20		15.50					
Firm flinty CHALK	69.66		16.04 (0.54)					
Firm laminated flinty CHALK	69.44		16.26 (0.22)					
			(2.24)					
	67.20		18.50				18.50	

NOTES		TOTAL DEPTH-
Water struck at 7.20m; Water struck at 10.75m (7/4/97)		18.50
Water struck at 10.70m (8/4/97)		METRES
Borehole completed with steel lockable cover		LOGGED BY
Datum level of cover 86.070m OD		B. Bellamy
		DATE LOGGED

B		U100		SCALE
- Bulk disturbed (bag) sample		- Undisturbed Sample		1 : 125
D - Small disturbed (jar) sample		W - Water Sample		

Contact BGS: ngdc@bgs.ac.uk

APPENDIX B PROPOSED DEVELOPMENT