JNP GROUP

CONSULTING ENGINEERS

Phase II Geo-environmental Report

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FOR AND ON BEHALF OF JNP GROUP

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Rev	Date	Description	Prepared	Checked	Approved
P01	11-10-2023	First Issue	BT	CW	HI
P02	14-11-2023	Completed gas and groundwater level monitoring	BT	CW	HI

Contents

EXECUTIVE SUMMARY

Site location	Winscott Farm, Soulbury, Leighton Buzzard, LU7 0DJ	
Development scheme	Development of six properties as a mix of refurbishment and conversion and new-build	
NGR	487344 226346 (SP 873 263)	
Current use	On-site: Farmyard	Off-site: Fields
Geology (from GI)	Made ground To 0.60 m, generally cohesive with flint, brick and concrete, frequent metal and plastic, some broken glass. Some areas of hardcore. Drift Generally brown gravelly clay with some flints and rare chalk. Becomes more gravelly with depth.	
Groundwater	Groundwater 3 m to 5 m at base of Glaciofluvial Deposits	
Contamination	Risk to human health as no contaminants identified above screening values across north and centre of the site. Watching brief recommended during site clearance works for unanticipated areas of contamination. Widespread occurrence of deleterious materials including brick, glass, plastic and metal. Non-standard (i.e. Protecta-Line) water supply utility pipes may be required.	
Ground gas	Characteristic situation 1 – based on results obtained to date. No radon protection measures required.	

1 INTRODUCTION

1.1 General

1.1.1 JNP Group was instructed by Daldorch Estates to undertake a supplementary ground investigation of:

Winscott Farm,
Soulbury,
Leighton Buzzard

hereinafter referred to as 'the site'. This report is subject to the limitations presented in Appendix A:.

1.1.2 It is understood that the existing buildings are to be demolished or converted, and the site redeveloped with a number of six two-storey residential properties, with roads and areas of hardstanding for access servicing and parking, and with private gardens. The proposed layout, ref Juliet Staddon Drawing 1203:02, dated September 2023 is appended.

1.1.3 All comments given are based on the understanding that the proposed redevelopment will be as detailed above.

1.2 Objectives

1.2.1 The purpose of the investigation was to further determine the or geo-environmental ground conditions at the site and assess the implications of such relative to the proposed residential redevelopment. The scope of work comprised intrusive investigation, laboratory testing, and gas and groundwater level monitoring. This report contains details of the site, the work and laboratory testing undertaken, strata encountered, chemical laboratory test results, monitoring results, and provides an interpretative assessment of the ground conditions with regard to contaminated land issues.

1.2.2 This report has been produced in support of discharging Condition 5 of Buckinghamshire Council Planning Application 22/01565/APP.

1.3 Methodology

1.3.1 This report has been compiled in accordance with the on-line Land contamination: risk management (LCRM) guidance produced by the Environment Agency (June 2019). This can be found on the UK government website: https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks.

1.3.2 This report should be read in conjunction with the following JNP Group Report:

M43012-JNP-XX-XX-RP-G-1001. Ground Investigation Report Dated November 2019.

2 SITE DESCRIPTION

2.1 Setting

2.1.1 The site currently comprises the existing farm buildings, farmyard and an extensive garden area of the farmhouse. This area measures approximately 1.8 hectares. A 550 m long access track with associated verge areas connects the north-western corner of the site to Stewkley Road. The verge areas are occupied by hedge-type vegetation and a number of trees of varying maturity. The site has not changed substantially since the previous investigation undertaken in 2019.

2.1.2 There are five main areas within the site. From west to east they comprise:

Vehicle storage and salvage yard. This is sub-let to individuals for the storage of vehicles and some containers, as well as repair and disassembly. This part of the site is approximately level and forms the highest part of the site. It is mainly surfaced with compacted hardcore, however a patch of grass with a row of tree stumps is present in the southern third of the site.

Main farmyard area. This area occupied the central-western part of the site and mainly comprises a complicated hardcore yard, with buildings on all sides. Barns of brick and corrugated steel construction are present to the north and east, a farmhouse and stables block (converted to bungalow accommodation) are present to the south and smaller barns of brick and corrugated steel construction are located along the west of the yard. The central area contains a small, grassed area with a tree. A small, concreted area is present in the north-east of the yard. This is used for the storage of oil drums, metal items and burning of farm and domestic waste. The whole yard slopes to the east.

Farmhouse and garden – this area is located to the south of the farmyard and comprises a two-storey thatched building, with a converted single-storey stables block at its western end. Overgrown private gardens are located to the south of the structures. An above ground heating oil tank is located in the north-western part of the garden area.

Overgrown open area. This area occupied the majority of the eastern half of the site and comprises an eastward-sloping open area, overgrown with long grass, thistles, nettles, sorrel, cow-parsley, hemlock and other weeds. Amongst the weeds, there are numerous discarded waste metal and plastic items. There are a number of earth berms of up to 1 m in height within this area together with accumulations of old tyres. The inspection of historical google-earth imagery indicates that this area was likely used as a private off-road racetrack for previous residents at the site. The north-eastern corner of the area is occupied by a clay-surface tennis court. The tennis court is currently dilapidated and a large pile of various metal-containing waste is stored in the northern part. A strand of Japanese Knotweed is located to the west of the tennis court.

The north-eastern corner of the site is occupied by a depressed area occupied by thick scrub and a number of trees. Access to this area was very limited by the vegetation.

3 RESULTS OF PREVIOUS INVESTIGATION

3.1 Ground Conditions Encountered

3.1.1 The following ground conditions were encountered:

Table 3.1 Summary of geological materials recorded in Ground Investigation 2019.

Lithological Unit	Depth to Base (m bgl)	Description
Topsoil DS3, DS4	0.15 – 0.25	Dark brown gravelly Topsoil with flint and rootlets
Made Ground All locations except DS3, DS4	0.10 – 0.80	Dark grey brown variably clayey sand and gravel containing flint, brick and concrete within DS1, DS2 and DS5, TP02, TP03, TP04. Dark brown gravelly organic clay with flint and brick in TP05, TP06, TP07, TP09 and TP10, locally with some concrete fragments. Grey brown sand and gravel with masonry, bricks, metal and plastic items, together with gravel of flint, brick and concrete within TP01 and TP08.
Glaciofluvial Deposits All locations	4.50 - >5.00	Upper 2.00 m generally firm orange brown sandy gravelly clay with flints, localised discontinuous lenses of clayey sand and gravel in southern half of site. Below 2.00 m generally orange brown variably clayey, variably gravelly sand. The unit thins to the east.
Oadby Member DS3, DS4, DS5	Not proven > 6.00	Stiff pale grey gravelly clay with flint and chalk. DS4 encountered a thickness of 1.50 m of chalk, determined to comprise a chalk boulder entrained within the Oadby Member, as underlying solid geology is not chalk.

3.1.2 Deleterious materials (plastic and metal) were encountered in TP01 and TP08.

3.2 Chemical Testing Undertaken

3.2.1 The following laboratory testing of soils was undertaken:

3 No. moisture contents and Atterberg Limit tests (plasticity);

7 No. metals and semi-metals (arsenic, beryllium, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc);

5 No. Polycyclic Aromatic Hydrocarbons (PAH) 16 USEPA Speciated;

2 No. triband petroleum hydrocarbons;

7 No. asbestos screens.

3.2.2 The following laboratory testing of groundwater was undertaken:

2 No. metals and semi-metals (arsenic, beryllium, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc);

1 No. Polycyclic Aromatic Hydrocarbons (PAH) 16 USEPA Speciated;

3.2.3 From a detailed comparison of the chemical testing results with the UK published C4SL and S4UL, for a residential with plant uptake scenario, which is a conservative assessment, the following summary can be made:

Asbestos was not detected in any of the samples tested;

Exceedances of the S4UL for arsenic were recorded in TP09 (in proposed parking area) and DS3 (In proposed Plot 4 garden);

An exceedance of the C4SL for lead was recorded in TP08, located beneath the proposed northern access road.

Exceedances of the S4UL for PAH contaminants were recorded in DS2 (in proposed Plot 6 garden), TP08 and TP10 (in proposed eastern open space area).

Table 3.2 Summary of exceeding contaminant concentrations recorded in Ground Investigation 2019.

Determinant	Maximum Measured Concentration (mg/kg)	Background Concentration (mg/kg)	LQM/CIEH S4UL: Residential with plant uptake Value (mg/kg)	Number of tests	Number/location of exceedances
Arsenic	50	35	37	7	TP09 @ 0.20 m 39 mg/kg (MG) DS3 @ 0.10 m 50 mg/kg (Topsoil)
Lead	500	46	200**	7	TP08 @ 0.20 m 500 mg/kg-(MG)
Benzo(b)fluoranthene	4.2	-	3.3	5	DS2 @ 0.30 m 4.2 mg/kg(MG)
Benzo(a)pyrene	3.6	-	2.7	5	DS2 @ 0.30 m 3.6 mg/kg (MG)
Dibenzo(a,h)anthracene	0.95	-	0.28	5	TP08 @ 0.20 m 0.50 mg/kg (MG) TP10 @ 0.10 m 0.45 mg/kg(MG) DS2 @ 0.30 m 0.95 mg/kg (MG)

3.2.4 There was no visible source of the recorded contamination such as ash or clinker.

4 SITE WORK AND MONITORING

4.1 Introduction

4.1.1 The intrusive site work was undertaken by JNP Group on 19th and 21st July 2023 and comprised five dynamic sampling boreholes, and fourteen mechanically excavated trial pits. AGas and groundwater level monitoring visit was undertaken on 27th July, 16th and 30th August, 18th and 27th September, and 9th November 2023.

4.1.2 An asbestos refurbishment and demolition survey for the buildings on site was commissioned from Salvum. The survey report (reference J027803) is included in Appendix C.

4.1.3 All site work was completed under the instruction and supervision of JNP Group with the ground investigation procedures and sample descriptions given in the following publications:

BS 5930 (2015).Code of Practice for Site Investigations;

BS 10175 (2001+A1:2013+A2:2017). Investigation of potentially contaminated sites - code of practice;

BS EN ISO 14688-1. "Soil - Identification and Description;

BS EN ISO 14688-2. Soil - Classification principles and quantification of descriptive characteristics;

BS 18400-104:2018. Soil Quality – Sampling. Part 104: Strategies;

BS 18400-202:2018. Soil Quality – Sampling. Part 202: Preliminary Investigations;

BS 18400-203: 2018. Soil Quality – Sampling. Part 203: Investigation of potentially contaminated sites;

BS 18400-205: 2018. Soil Quality – Sampling. Part 205: Guidance on the procedure for investigation of natural, near natural and cultivated sites;

4.1.4 For sites affected by asbestos impacted soils, the guidance given in the following publications has been followed:

Industry Guidance on Interpretation for Managing & Working with Asbestos in Soil and Construction and Demolition Materials (CL:AIRE 2016);

Asbestos in Soil and made ground: a guide to understanding and managing risks (CIRIA C733 2014).

4.1.5 The design and installation of groundwater quality monitoring points has been undertaken following the guidance given in the Environment Agency science report:

SC020093. Guidance on the design and installation of groundwater quality monitoring points. 2006.

4.1.6 The locations of the exploratory holes are shown on JNP Group Drawing No. M43012-JNP-XX-XX-DR-G-2004. The exploratory hole records including strata and groundwater encountered, in-situ testing and samples taken are presented in Appendix D. The full details of the site work undertaken are summarised in the following sections.

4.1.7 The purpose of the intrusive sitework was to obtain data to support a planning application.

4.1.8 The site investigation strategy comprised judgemental (i.e. targeted) locations of the above ground oil tank and locations highlighted as hotspots for soil contamination by previous investigation, with the remainder of the positions providing a systemic distribution across the site to suit the proposed redevelopment. Table 4.1 shows the rationale for the location of each exploratory hole.

Table 4.1 Exploratory Hole Location Rationale

Exploratory Hole Reference	Rationale
DS03A +DS09	General site coverage. To target proposed garden areas
DS10	To target above ground fuel tank
DS05+DS08	General site coverage
TP11, TP23, TP17 + TP16	To target proposed garden areas
TP11-25	General site coverage.

4.1.9 The general sampling strategy was to take representative soil samples from the ground to characterise the strata encountered and to provide suitable horizontal distribution, however, where visible contamination was present or suspected, targeted spot samples were taken.

4.2 Dynamic Sampling Boreholes

4.2.1 Five dynamic sampled boreholes were drilled across site to a depth of 5 m bgl. DS10 was drilled within close proximity to the above ground fuel tank to the rear of the farmhouse to screen for any surface and subsurface hydrocarbon contamination. DS03A was drilled within an area of moderately elevated carbon dioxide concentrations to replace the previously drilled DS03 and establish an observation well. DS09 was situated in the north-west of the property to target previous recorded polycyclic aromatic hydrocarbons. DS07 and DS08 were located for general site coverage.

4.2.2 The dynamic sampling technique uses a lightweight tracked rig to advance a borehole by 1 m intervals using 1 m long steel sampler tubes, at diameters of 100 mm, reducing to 70 mm. The soils are then recovered from each sample tube as continuous core samples, which are logged and sub-sampled on site. Environmental soil samples were generally taken from each made ground material, together with any materials suspected of containing elevated concentrations of contaminants, based on visual and olfactory evidence. The environmental samples comprised a small volatiles jar, and an amber glass jar. In situ Standard Penetration Tests (SPTs) were undertaken in accordance with BS 5930 (2015) at 1.0 m depth intervals in the boreholes in order to obtain in situ strength or relative density parameters for geotechnical design.

4.2.3 All exploratory boreholes commenced with hand excavated trial pits to depths of 1.20 m bgl to mitigate risks of encountering existing underground utilities.

4.2.4 Three boreholes (DS09, DS10 and DS3a) were completed with 50 mm gas monitoring standpipe installations, with flush fitting steel covers set in concrete at ground level. The remaining boreholes were backfilled with arisings and the ground surface left in a safe and tidy manner.

4.2.5 Response zones within the installations were installed between depths of 0.5 m bgl to 5.0 m bgl in order to target made ground and assess ground water levels.

4.3 Trial Pits

4.3.1 Fourteen trial pits, designated TP10 to TP25 were excavated on the 19th July 2023, to depths of between 0.5 m and 0.8 m bgl. The pits were excavated using a JCB 3CX excavator and logged and sampled by a ground engineering specialist by examining soil samples brought to the surface.

4.3.2 All trial pits were terminated in natural soils underlying made ground or Topsoil.

4.4 Monitoring

4.4.1 Monitoring of the installed wells was undertaken on the following occasions at (27th July, 16th and 30th August, 18th and 27th September and 9th November 2023) after the completion of the site work.

4.4.2 It should be noted that WS09 was lost early in the monitoring period due to site clearance and stored equipment removal activities undertaken by the site vendor.

4.4.3 Monitoring involved the measurement of the ground gas composition at each of the installations for methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) concentrations, together with atmospheric pressure, downhole pressure and flow rates, using a Gas Data GFM430 gas meter. After the measurement of gas concentrations, the depth to any groundwater within the standpipe was recorded. The visits undertaken on 18th September and 9th November undertaken during periods of low and falling pressure.

4.4.4 The frequency and duration of gas monitoring was selected based on the guidance given in the following publications:

CIRIA C665. Assessing risks posed by hazardous gases to buildings. 2007;

BS 8485. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. 2015;

CL:AIRE RB 17. A Pragmatic Approach to Ground Gas Risk Assessment. 2012.

4.4.5 Volatile organic compound (VOC) monitoring was undertaken during each site visit, after the initial site work, using a photoionization detector (PID). Recorded concentrations of VOCs are presented in the monitoring records.

4.4.6 An insufficient water column has so far been available within WS10 to allow for sampling of groundwater.

4.4.7 It should be noted that long-term groundwater levels may vary from those reported due to seasonal fluctuation or weather events, such as droughts, significant rainfall, or recent flooding.

4.4.8 The monitoring results are presented in Appendix E.

2 LABORATORY TESTING

5.1 Environmental

5.1.1 A programme of chemical laboratory testing was scheduled by JNP Group on selected soil samples taken from various depths in the made ground and natural ground recovered from the exploratory holes. Samples of any soils displaying visual or olfactory evidence of contamination were also collected and submitted for laboratory analyses. The samples were placed into suitable containers for the required chemical analyses.

5.1.2 All samples were transported, on the day of collection, to i2 Analytical Testing Services in Watford which is accredited under UKAS and MCerts. The following table summarises the contaminants scheduled:

Table 5.1 Scheduled Soil Chemical Analyses

Determinant	No. (made ground)	No. (natural)
Asbestos Screen	8	1
Metals and semi-metals (arsenic, beryllium, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc)	4	7
Polycyclic Aromatic Hydrocarbons (PAH) 16 USEPA Speciated	7	4
Total Petroleum Hydrocarbons (TPH) Carbon banded	4	1
TPH Criteria Working Group (TPH CWG) including BTEX	0	4

5.1.3 The results of the laboratory chemical testing are interpreted in Section 8 and are presented in full in Appendix F.

6 GROUND AND GROUNDWATER CONDITIONS

6.1 Strata Encountered

6.1.1 The ground conditions encountered during the intrusive investigation were generally consistent with the published geological map and the findings of previous investigations by JNP Group. A variable thickness of made ground was found to be underlain by granular Glaciofluvial Deposits, which in turn was underlain by cohesive strata of the Oadby Member; presenting itself as Clay with sands and chalk.

6.1.2 A summary of the stratigraphy encountered during the investigation is presented in Table 6.1 and described in the following sections, but for full details and descriptions, reference should be made to the exploratory hole records presented in Appendix D.

Table 6.1 Stratigraphy Encountered

Stratum	Depth to Top (m bgl)	Depth to Base (m bgl)	Thickness (m)
Made ground (including hardstanding) All exploratory locations except WS10	Ground level	0.30 – 0.8	0.30 – 0.8
Glaciofluvial Deposits All exploratory locations	0.20 – 2.40	0.70 – >5.00	0.00 - >4.70
Oadby Member WS10	4.80 - 4.90	Not proven	Not proven

6.2 Topsoil and/or Made Ground

6.2.1 Concrete and asphalt hardstanding was encountered at surface in WS07.

6.2.2 Made ground was encountered below the hardstanding (were encountered) or from surface to depths of 0.35 m – 1.0 m (bgl).

6.2.3 The made ground consisted of brown to dark grey, Silt, sand and gravel, with occasional asphalt and organic pockets. The proportion of clay, sand and gravel varied between exploratory holes. The gravel fraction comprised flint, brick, concrete, and charcoal with rare clinker. Occasional fragments of wood, rusted scrap metal and plastic packaging were also encountered.

6.2.4 The SPT N value / depth profile is presented as Figure 2, the undrained shear strength / depth profile as Figure 3, and a plasticity chart as Figure 4.

6.3 Groundwater

6.3.1 Details of groundwater entries recorded during the site work period to date, and levels recorded subsequently during the monitoring visits, are summarised in the table which follows.

Table 6.2 Summary of groundwater observations

Exploratory Location	Groundwater during site work		Groundwater during monitoring
	Strikes (m bgl)	Comments	Range
DS01	--	--	4.80 - dry
WS03A	4.0	Seepage	3.55 – 2.80

Exploratory Location	Groundwater during site work		Groundwater during monitoring
	Strikes (m bgl)	Comments	Range
WS07	--	--	
WS08	--	--	
WS09	--	--	
WS10	5.0	Seepage	4.60 - Dry
TP13	0.80	Seepage	~

6.3.2 Seepage was primarily encountered in the lower glaciofluvial deposits comprising clayey, gravelly sand.

6.4 Ground Contamination and Deleterious Material

6.4.1 Deleterious materials were encountered within a number of locations, as follows:

TP11 – plastic fragments,

TP12 bricks and tile,

TP13 – metal, brick and tile,

TP14 – asphalt, brick and plastic,

TP16 – metal and bricks

TP17 – broken glass

TP20 – asphalt

TP24 – broken glass

6.5 Ground Gas Conditions

6.5.1 During the five monitoring visits, methane concentrations remained below detection limits, and a maximum concentration of carbon dioxide of 2.1 % was recorded, with negligible flow rates. Full details of the gas concentrations and flow rates recorded during the monitoring period are presented in Appendix E.

6.6 Trees and Tree Roots

6.6.1 Single mature tree is present within the centre of site. JNP Group recorded tree roots within TP22 to depths of 0.5 m.

6.6.2 A number of mature trees within the margins of the site are located in close proximity to the footprints of the proposed plots. The following table identifies the rootlets recorded at the site:

Table 6.3 Summary of tree roots encountered during the investigations

Exploratory Location	Depth (m bgl)	Comments
TP 14, TP18, TP22	0.0 – 0.30	Rare to frequent fine rootlets
WS09	0.0-0.40	Frequent decayed roots
WS10	0.0 – 0.35	Rootlets

6.7 Obstructions

6.7.1 A 19mm blue plastic water pipe was exposed and damaged at 0.4m in TP18, this nis believed to be a private installation which was not relayed on any service diagrams or could be detected by CAT and Gennie. The mains were shut off at the stop valve and the pipe repaired and reburied.

6.7.2 WS08 was moved from a concrete hardstanding in the Dutch barn that measured 0.3 - 0.4m, to soft standing adjacent due to time limitations of concrete coring.

6.8 Data Gaps and Uncertainties

6.8.1 From consideration of the spatial distribution of the exploratory holes formed and the ground conditions encountered, JNP Group considers that the site has now been sufficiently characterised to inform a robust human health risk assessment and remedial strategy.

2 HUMAN HEALTH DETAILED QUANTITATIVE RISK ASSESSMENT

7.1 Introduction

7.1.1 Qualitative assessment of risks may be sufficient in many cases to eliminate the possibility of significant pollutant linkages. However, quantitative risk assessment is formally required to determine whether there is a 'significant possibility of significant harm being caused'. Part IIA of the Environmental Protection Act 1990 recommends that 'authoritative and scientifically based guideline values for concentrations of the potential pollutants in or under the land' be used to quantify the risk posed by contamination.

7.1.2 Under the Planning Regime, a quantitative risk assessment can be used to decide whether the site is suitable for the proposed use. In addition, the National Planning Policy Framework (March 2012) also indicates that after remediation, as a minimum land should not be capable of being determined as contaminated land under Part IIA.

7.2 Current UK Screening Values

7.2.1 The UK technical guidance for assessing risks to human health is issued from various UK bodies, including the Environment Agency (EA), DEFRA, Contaminated Land: Applications in Real Environment (CL:AIRE), Chartered Institute of Environmental Health (CIEH), and Land Quality Management (LQM) Ltd (part of the University of Nottingham).

7.2.2 New and updated screening values in the form of provisional Category 4 Screening Levels (C4SL) (published in 2014), and Suitable for Use Levels (S4UL), (published 2015), have been produced by DEFRA and CIEH / LQM respectively using modified versions of the EA's Contaminated Land Exposure Assessment (CLEA) software.

7.3 C4SL

7.3.1 Provisional C4SL have been derived by CL:AIRE (project team for DEFRA's SP1010 project) following revised statutory guidance, and as a tool to assist in applying the Part IIA Category 1- 4 classifications to a site. The purpose of the C4SL is to provide a simple test for deciding that land is suitable for use, and definitely not contaminated land under Part IIA. They describe a level of risk that is above minimal, but is still low.

7.3.2 In calculating provisional C4SL some of the exposure modelling scenarios and exposure parameters used in the CLEA software have been modified. These modifications are not discussed further, but reference should be made to the original CL:AIRE / DEFRA publications should further information or clarification be required. A list of the new publications is included in the references section at the end of this report.

7.3.3 To date, six contaminants have been assigned provisional C4SL: arsenic; benzene; benzo[a]pyrene; cadmium; chromium VI, and lead, for the standard land uses (residential with, and without plant uptake, allotments, commercial, and public open space (parks and residential).

7.3.4 The C4SL are also considered suitable to be used under the planning regime, and DEFRA have confirmed this to all local authorities.

7.4 S4UL

7.4.1 The LQM / CIEH S4UL represent generic assessment criteria based on minimal or tolerable risk that are intended to be protective of human health. They have been derived in

accordance with current UK legislation using a modified version of the CLEA software, and are still based on many conservative assumptions. They represent values above which further assessment of the risks or remedial actions may be needed.

7.4.2 S4UL have been derived for a comprehensive list of metals, non–metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, chlorinated hydrocarbons, phenolic compounds, explosives, and pesticides, for the standard land uses (residential with, and without plant uptake, allotments, commercial, and public open space (residential and park)).

7.4.3 For details of the exposure parameters and scenarios used to derive the S4UL the reader is reference to the original LQM / CIEH document "The LQM/CIEH S4UL for Human Health Risk Assessment" (2015).

7.4.4 Both sets of screening values can be used to undertake a generic risk assessment by comparing the data directly to the screening value which is considered a conservative approach or statistically to the screening value. Alternatively and if a sufficient dataset is available, a statistical assessment can be undertaken following the guidance given in the joint Chartered Institute of Environmental Health (CIEH) and the Contaminated Land: Applications in Real Environment (CL:AIRE) organisation publication "Guidance On Comparing Soil Contamination Data with a Critical Concentration" (CIEH / CL:AIRE May 2008).

7.5 Petroleum Hydrocarbons

7.5.1 JNP Group have followed the guidance given in the Environment Agency publication 'The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils' (Environment Agency, 2005). LQM S4UL values have been published based on carbon banded hydrocarbons with aliphatic and aromatic split, corresponding to the TPH CWG bands. JNP Group undertook carbon banded analysis for some samples using wider bands than used by TPH CWG without aliphatic and aromatic split.

7.5.2 JNP Group have compared the results of carbon-banded hydrocarbon analysis with the most sensitive LQM S4UL value within the band under scrutiny. Generally, the most sensitive band comprises the lightest aromatic fraction within the carbon band under scrutiny.

7.5.3 The Society of Brownfield Risk Assessment (SoBRA) have produced some Generic Assessment Criteria for assessing chronic risks from the inhalation of vapours arising from groundwater (GAC_{gwvap}) for a short list of 66 organic contaminants (SoBRA February 2017). These are designed to a defensible screening criteria to assist in evaluating this exposure pathway. They represent concentrations below which the chronic risks from vapour migration and inhalation can be considered low / tolerable. GAC_{gwvap} have been developed in line with current UK risk assessment guidance, and CLEA v1.07 software was used for residential and commercial land use scenarios.

7.5.4 Further details of the input parameters selected for use to generate the GAC_{gwvap} can be found in the SoBRA report, and have not been reproduced here. However, it should be noted that they have been derived using some conservative assumptions:

Impacted ground / perched water is beneath the buildings;

An infinite source term is present;

There is no biodegradation;

Groundwater depth is 0.65m below ground;

Use of a sand soil type (in line with SR3)

6 SOIL AND GROUNDWATER ASSESSMENT RESULTS

8.1 Soil Results

8.1.1 The results of chemical testing of a total of twenty two samples of made ground and thirteen samples of natural soils have been compared with the C4SL and the LQM S4UL values for a 'residential with gardens end use'. These comparisons are summarised in the following tables.

8.1.2 The following determinants were recorded at concentrations less than their respective limits of laboratory detection, and hence have not been included in this assessment: mercury, selenium, BTEX, unlisted petroleum hydrocarbon fractions.

8.1.3 Four SOM tests were undertaken on the materials types identified at the site between the two investigations. On the basis of the results obtained, a site SOM of 2.5 % has been determined. Parameters listed in italics are from the 2019 investigation.

Table 8.1 Comparison of Soil Chemical Test Results with Residential with plant uptake Guideline Values (Combined both investigations, 2019 data in italics)

Determinant	Maximum Measured Concentration		Background Concentration	LQM/CIEH S4UL: Residential with plant uptake (mg/kg)			Number of tests (2019), 2023	Number of exceedances
	Made ground	Natural Ground						
Arsenic	43	68	20	37			(7), 11	TP12 @ 0.30 m 42 mg/kg TP16 @ 0.20 m 43 mg/kg TP09 @ 0.20 m 39 mg/kg TP11 @ 0.45 m 47 mg/kg TP15 @ 0.45 m 44 mg/kg TP16 @ 0.35 m 68mg/kg TP18 @ 0.20 m 41 mg/kg TP23 @ 0.45 m 57 mg/kg DS3 @ 0.10 m 50 mg/kg
Beryllium	2.1	1.5	-	1.7			(7), 11	TP12 @ 0.30 m 2.1 mg/kg
Boron	4.8	0.7	-	290			(7), 11	0
Cadmium	4.6	1.6	0.3	11			(7), 11	0
Chromium *	58	40	82	910			(7), 11	0
Copper	82	60	25	2400			(7), 11	0
Lead	500	58	45	200**			(7), 11	TP08 @ 0.20 m 500 mg/kg
Nickel	47	73	36	180			(7), 11	0
Vanadium	70	86	111	410			(7), 11	0
Zinc	1300	430	111	3700			(7), 11	0
				1%	2.5%	6%		
Naphthalene	0.67	0.00	-		5.6		(5), 11	0

Determinant	Maximum Measured Concentration		Background Concentration	LQM/CIEH S4UL: Residential with plant uptake (mg/kg)			Number of tests (2019), 2023	Number of exceedances
	Made ground	Natural Ground						
Acenaphthylene	0.16	0.18	-	170	420	920	(5), 11	0
Acenaphthene	0.07	0.00	-	210	510	1100	(5), 11	0
Fluorene	0.16	0.10	-	170	400	860	(5), 11	0
Phenanthrene	3.20	2.10	-	95	220	440	(5), 11	0
Anthracene	0.27	0.17	-	2400	5400	11000	(5), 11	0
Fluoranthene	4.60	3.30	-	280	560	890	(5), 11	0
Pyrene	3.70	2.60	-	620	1200	2000	(5), 11	0
Benzo(a)anthracene	1.20	0.91	-	7.2	11	13	(5), 11	0
Chrysene	1.70	1.20	-	15	22	27	(5), 11	0
Benzo(b)fluoranthene	4.2	1.40	-	2.6	3.3	3.7	(5), 11	DS2 @ 0.30 m 4.2 mg/kg
Benzo(k)fluoranthene	0.99	0.50	-	77	93	100	(5), 11	0
Benzo(a)pyrene	3.6	1.10	-	2.2	2.7	3.0	(5), 11	DS2 @ 0.30 m 3.6 mg/k
Indeno(1,2,3-c,d)pyrene	0.80	0.61	-	27	36	41	(5), 11	0
Dibenzo(a,h)anthracene	0.95	0.11	-	0.24	0.28	0.3	(5), 11	TP08 @ 0.20 m 0.50 mg/kg TP10 @ 0.10 m 0.45 mg/kg DS2 @ 0.30 m 0.95 mg/kg
Benzo(g,h,i)perylene	0.81	0.62	-	320	340	350	(5), 11	0
TPH Aliphatic $C_{16} – C_{35}$	-	36	-	65000	92000	110000	(0), 4	0
TPH Aromatic $C_{16} – C_{21}$	-	12	-	260	540	930	(0), 4	0
TPH Aromatic $C_{21} – C_{35}$	-	28	-	1100	1500	1700	(0), 4	0
TPH C_{10}-C_{25} (TPH aromatic C_{10}-C_{12}***)	95	310	-	74	180	380	(2), 5	WS09 @ 0.40 m 310 mg/kg
TPH C_{25}-C_{40} (TPH aromatic C_{21}-C_{35}***)	120	2200	-	1100	1500	1700	(2), 5	WS09 @ 0.40 m 2200 mg/kg
			-					
Asbestos	Present	Not Present	-				(7), 9	WS08 @ 0.15 m Chrysotile loose fibres TP12 @ 0.20 m Chrysotile loose fibres

*assumes all chromium on site is in trivalent form
** provisional C4SL
***most sensitive fraction within wider TPH band (specified)

8.2 Interpretation

8.2.1 The analyses undertaken during both phases of investigation recorded elevated concentrations of some heavy metals (arsenic, beryllium and lead) PAH compounds, petroleum hydrocarbon fractions and asbestos with respect to the selected screening values.

These occurrences are discussed in the following sections. Locations of samples with exceedances and locations of clean samples are presented on Drawing M43012-JNP-XX-XX-DR-G-2005.

Heavy Metals

8.2.2 Elevated concentrations of metallic contaminants were recorded as follows:

In made ground, elevated concentrations of arsenic were recorded in TP09 @ 0.20 m (39 mg/kg), TP12 @ 0.30 m (42 mg/kg) and TP16 @ 0.20 m (43 mg/kg). An elevated concentration of beryllium was recorded in TP12 @ 0.30 m (2.1 mg/kg) and an elevated concentration of lead was recorded in TP08 @ 0.20 m (500 mg/kg). These locations all comprised a cohesive made ground containing demolition materials (bricks, concrete, tile etc with rare metal items in TP16).

In natural ground, elevated concentrations of arsenic were recorded in TP11 @ 0.45 m (47 mg/kg), TP15 @ 0.45 m (44 mg/kg), TP16 @ 0.35 m (68mg/kg), TP18 @ 0.20 m (41 mg/kg), TP23 @ 0.45 m (57 mg/kg) and DS3 @ 0.10 m (50 mg/kg), comprising six of the eight samples of natural soil analysed.

Petroleum Hydrocarbons

8.2.3 Elevated concentrations of petroleum hydrocarbons were recorded in WS09 @ 0.40 m and were as follows:

TPH C_{10}-C_{25} (TPH aromatic C_{10}-C_{12}) -(310 mg/kg)

TPH C_{25}-C_{40} (TPH aromatic C_{21}-C_{35}) -(2200 mg/kg).

8.2.4 No visually apparent sources of contamination were recorded in the soils and no odours were recorded, however this location was in an area where vehicles have been historically parked or stored.

PAH Hydrocarbons

8.2.5 Elevated concentrations of dibenzo(a,h)anthracene were recorded in made ground in three locations, DS2, TP08 and TP10 with a maximum concentration of 0.95 mg/kg recorded.

8.2.6 Elevated concentrations of benzo(b)fluoranthene and benzo(a)pyrene were also recorded within made ground in DS2.

8.2.7 No visually apparent sources of contamination were recorded in the soils and no odours were recorded, however this location was in an area where vehicles have been historically parked or stored.

Asbestos

8.2.8 Nine additional samples were submitted for an asbestos screen, and asbestos (chrysotile – loose fibres) was recorded in two locations in made ground. WS08 at 0.15 m and TP12 at 0.20 m. Quantification of asbestos is recommended to determine classification of asbestos impacted soils as waste, if removal is required.

8.3 Summary

8.3.1 On the basis of the chemical testing undertaken, JNP Group considers that a viable risk to human health exists from elevated concentrations of contaminants in the north-western

yard area, the north-central area beneath and to the north of the main barn and a small area in the central-east of the site.

8.3.2 Hence, remedial actions at the site are considered necessary in these areas for the proposed development.

8.3.3 In addition, six of eight samples of natural soil analysed recorded elevated concentrations of arsenic, and therefore these concentrations are considered of natural origin. In order to further quantify any risk presented by naturally occurring elevated arsenic at the site, it is recommended that bioaccessibility testing is undertaken. The results of this testing may allow arsenic concentrations to be reduced in risk, with a resultant reduction in remedial requirements within natural soils.

8.4 Risk to Controlled Waters

8.4.1 The investigation undertaken in 2019 did not identify any risks to controlled waters. The additional testing undertaken in 2023 has not identified any further risks to controlled waters.

8.4.2 Where elevated concentrations of arsenic were recorded in made ground, the concentrations were lower than the concentrations generally recorded in natural soils, which indicates that arsenic may be locally high in the natural strata.

8.4.3 Based upon a review of the contaminants recorded in Table 8.1, highly mobile organic hydrocarbons, such as BTEX, lighter TPH fractions, or naphthalene, were not recorded within the made ground.

8.4.4 However, it is recognised that surface water run-off during the redevelopment does pose a risk to controlled waters via the ditech located off-site to the north-east and it is recommended that surface water quality monitoring is undertaken before, during and after the redevelopment work and silt runoff mitigation measures are employed.

8.5 Summary

8.5.1 On the basis of the chemical testing undertaken, JNP Group consider that a risk to human health is present from elevated concentrations of metals, asbestos and hydrocarbons in near surface soils across the central and northern parts of the site. Hence, remedial actions at the site are considered necessary in these areas.

6 GROUND GAS PROTECTION REQUIREMENTS

9.1 Guidance and Standards

9.1.1 JNP Group has used the guidance given in the following document to assess the risks from ground gases:

CIRIA C665. Assessing risks posed by hazardous gases to buildings. 2007;

BS 8485. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. 2015 +A1 2019;

CL:AIRE RB 17. A Pragmatic Approach to Ground Gas Risk Assessment. 2012.

9.1.2 It is intended that the proposed new build will be low rise housing. In addition, suspended floors are required due to the plasticity of the underlying soils.

9.1.3 The level of gas protection is determined by comparing the following parameters to reference values prescribed within BS 8485 (2015):

"Typical Maximum Concentrations" for initial screening purposes;

Risk based "Gas Screening Values" (GSV) for consideration where the typical maximum concentrations are exceeded.

9.1.4 The GSV is calculated using the following equation, and the resulting GSVs are compared to the Site Characteristic GSV given in Table 2 of BS 8485: 2015 +A1 2019.

Maximum gas concentration (%) x worst case borehole flow rate (l/h)

9.2 Definitions

9.2.1 In accordance with Table 4 of BS 8485: 2015 +A1 2019, varying levels of protection are required for each category of risk for 'Type A' buildings (private housing), 'Type B' buildings (hotels, managed apartments, small commercial/retail), 'Type C' buildings (commercial, retail, industrial), and 'Type D' buildings (large industrial / commercial / warehouse).

A 'CS1' determination requires no ground gas protection measures to be installed.

A 'CS2' determination requires ground gas protection measures to be installed. The level of ground gas protection required should be equal or greater than 3.5 points for a Type A building, when at least two items from the following three: Table 5 (structural barrier); Table 6 (ventilation), and Table 7 (gas resistant membrane) within BS 8485: 2015 +A1 2019 are selected.

9.3 Results

9.3.1 The maximum carbon dioxide and methane concentrations, the maximum flow rate, and the screening values for each borehole during the site work period and a single visit undertaken in October 2019, are summarised in the following table.

9.3.2 The visits undertaken on 18th September and 9th November 2023 were undertaken during periods of low and falling pressure.

Table 9.1 Calculated Gas Screening Values

Location	Maximum CH_4 Concentration (% v/v)	Maximum CO_2 Concentration (% v/v)	Maximum Flow Rate (l/hr)	Maximum Gas Screening Value (l/hr)
DS1	0.1	3.3	<0.1	0.0033
DS3/3A	0.1	4.5	<0.1	0.0037
DS4	<0.1	1.1	<0.1	0.0011
WS09	<0.1	0.9	<0.1	0.0009
WS10	<0.1	2.4	<0.1	0.0024

9.4 Interpretation

9.4.1 A 'CS1' determination was derived from the monitoring results obtained from the monitoring boreholes.

9.4.2 Consequently, ground gas protections measures are not considered to be required.

10 REVISED CONCEPTUAL SITE MODEL AND OVERALL ENVIRONMENTAL RISK

10.1 Summary

10.1.1 Following the ground investigation and subsequent assessment undertaken, the conceptual site model and overall environmental risk assessment have been updated as detailed in the following table.

Table 10.1 Updated Conceptual Model and Risk Assessment

Issue	Risk		Justification
HUMAN HEALTH	MEDIUM		Unacceptable concentration of heavy metals, hydrocarbons and asbestos are present within the made ground within the northern and central parts of the site. Remediation is required at the site to reduce the risks to acceptable levels. No hazardous concentrations of gases have been recorded.
GROUNDWATER	LOW		With the exception of rare localised hotspots, contamination concentrations of metals are generally similar to background. No mobile species of hydrocarbons present.
SURFACE WATER	LOW		Contamination concentrations are generally similar to background. No mobile species of metals or hydrocarbons present. Silt run-off during construction will require management to maintain low risk during this phase
PROPERTY & INFRASTRUCTURE	LOW		No elevated concentrations of gases have been recorded. Highly acidic or mobile hydrocarbons have not been recorded at the site. However this should be subject to agreement by the water supply provider.
ECOLOGY	LOW		Based on the assumption that there may be sensitive/ protected species on site (subject to any ecological survey undertaken)

10.2 Conclusions

10.2.1 JNP Group has determined through intrusive investigation, laboratory testing, monitoring, and assessment that:

Ground conditions at the site comprise between 0.20 m and 0.60 m of made ground, overlying generally cohesive Glaciofluvial Deposits.

A risk to future residential end users is present from asbestos, metal and hydrocarbon contaminants in made ground deposits;

Deleterious materials were encountered in a number of locations across the site, but mostly in the north and west.

No risks to controlled waters were identified. However. silt management will be required during groundworks to prevent runoff into the nearby watercourse.

Ground gas protection measures are not required, based on results of the completed monitoring programme.

Radon gas protection measures are not required,

10.3 Recommendations

10.3.1 In line with the guidelines given LCRM and consequent to the ground investigation conclusions; JNP Group recommends that:

Bioaccessibility testing for arsenic is undertaken to clarify the degree of risk from this this contaminant in natural soils;

A remediation strategy report be produced for the site. This would include undertaking an options appraisal of potential remediation options for chemical contaminants and deleterious materials and assess the feasibility of short-listed remedial options, undertaking a hazardous waste assessment, designing a sustainable remediation strategy for the site, and an outline validation plan.

A copy of this report is submitted to the Regulatory Authorities for their approval before any further work is undertaken at the site.

10.3.2 In addition, JNP Group recommends that the proposed development works are undertaken in accordance with the definition of Waste Code of Practice (DoWCoP); in following this guidance and to ensure materials are managed correctly, a Materials Management Plan would need to be prepared and declared in advance by a Qualified Person if re-use of site-derived soils is proposed, then implemented and documented in a Verification Report. If this process is not undertaken, then following recent changes in Landfill Tax Regulations by HMRC. There is a risk of penalties equating to twice the Landfill Tax being applied to the re-use of material on site. If the proposed works are to be undertaken outside the DoWCoP, there would need to be some of Environmental Permitting or suitable equivalent. The requirements of such are likely to be more onerous and may take longer to be granted.

10.3.3 A MMP would not be required where excess soils are to be disposed of to a waste treatment facility or landfill.

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FIGURES / DRAWINGS

Figure 1

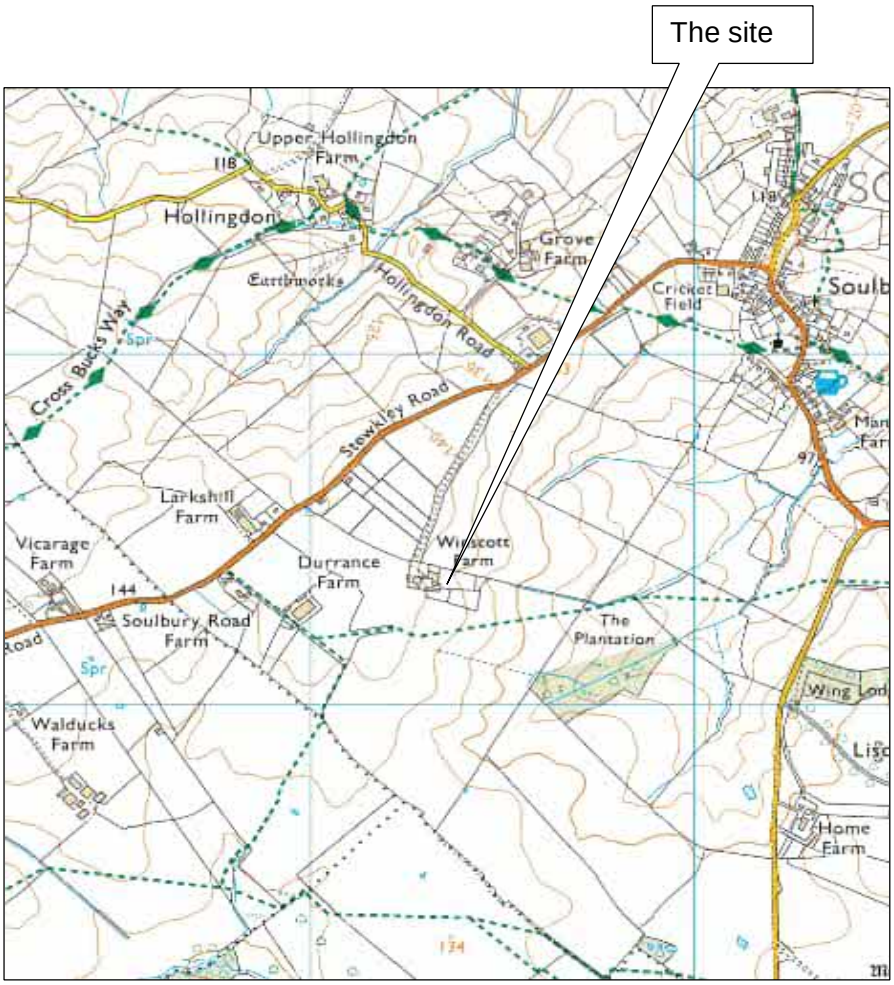
Site Location Plan

Project:

Winscott Farm, Soulbury

Project No:

M43012



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Legend

- Site Boundary
- Open Land Boundary
- Trial Pit 2019
- Borehole 2019
- Trial Pit 2023
- Borehole 2023

TP01 (sa)
TP24
TP08
TP12
TP25
TP04 (sa)
DS09
DS2
TP14
TP13
DS08
TP11
TP15
TP03 (sa)
DS3 (m)
DS07
TP18
DS5
DS03A
TP16
TP23
TP05 (sa)
TP07
TP22
TP10
TP17
TP21
TP09
DS10
DS1 (m)
TP02 (sa)
TP20
TP06 (sa)
DS4 (m)

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HAZARD IDENTIFICATION BOX

This table is provided to assist the Principal Contractor to fulfil their obligations under the CDM Regulations 2015

Hazard Ref	Hazard Type (Construction/Maintenance/ Cleaning/Demolition/Adaptation)	Hazard Description	Mitigation Measures/ Residual Risk
1			

Rev.	Date	Description	Drn / Chk'd / App'd
P01	10/10/2023	Created	BT/HI/HI

Suitability: S2 - Suitable for Information

Client Logo:

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Chesham ● Brighouse ● Hartlepool ● Leamington Spa ● Sheffield
Website www.jnpgroup.co.uk

Client: Daldorch Estates

Job: Winscott Farm, Soulbury

Title: Exploratory Hole Location Plan

Classification:	Scale @ A1:	Date Issued:	Drawn / Checked / Approved
FI_60_20	1:250	04/10/19	MF / CHK / APR

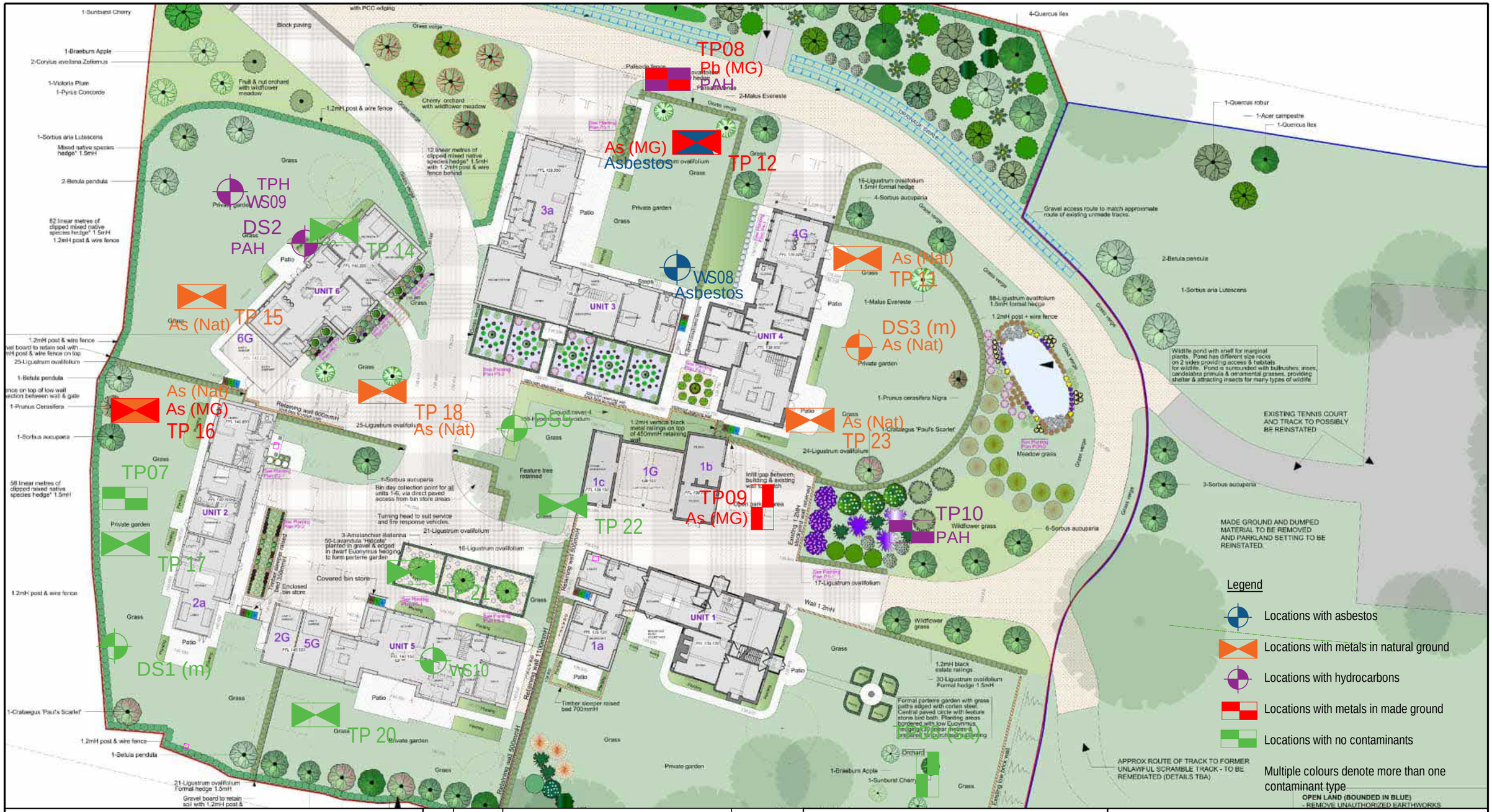
Accredited Contractor

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number: M43012-JNP-XX-XX-DR-G-2004 | Revision: P01

Document/Drawing Number

JNP Group Internal Project Number: M3012

Complies to ISO17100:2004 JNP QA Ref: QD03/Rev 5



Rev.	Date	Description	Drn / Chk'd / App'd
P01	10/10/2023	Created	CWH/HI

Suitability: S2 - Suitable for Information

Client: Daldorch Estates

Job: Winscott Farm, Soulbury

Title: Locations of recorded contamination

Classification: FI_60_20

Scale @ A3: 1:250

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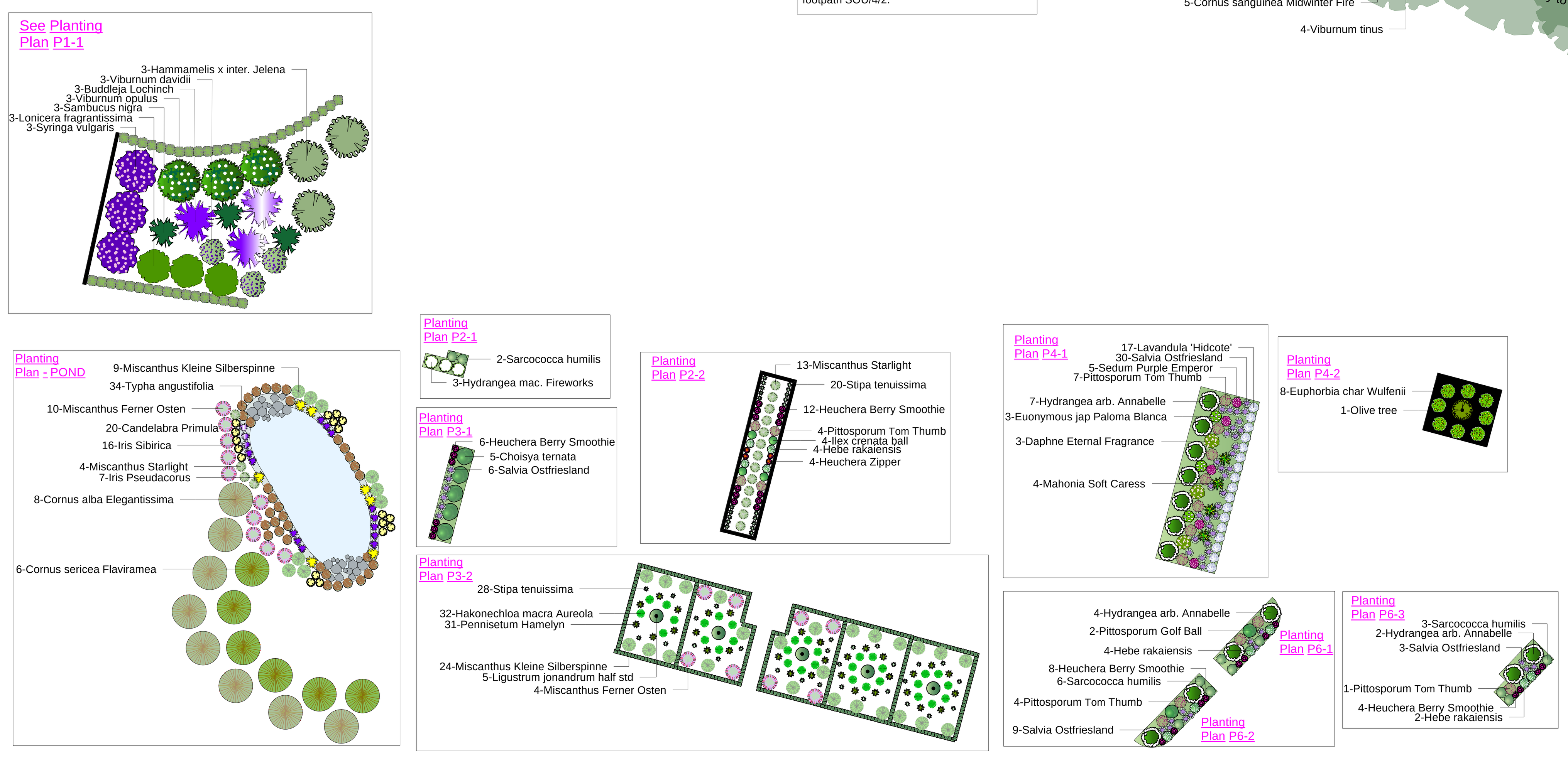
Project - Originator - Volume/System - Level/Location - Type - Discipline - Number: M43012 - JNP - XX - XX - DR - G - 2005

Document/Drawing Number

Revision: P01

JNP Group Internal Project Number: M43012



PLANTING SCHEDULE - TREES, SHRUBS, HEDGES & PLANTS

Category	Quantity	Latin Name	Notes
Formal Hedge	399	Ligustrum ovalifolium	222 linear metres. B/R @ 1.5mH
Grasses	32	Hakonechloa macra Aureola	2L
Grasses	18	Miscanthus Ferner Osten	2L
Grasses	34	Miscanthus Kleine Silberspinne	2L
Grasses	17	Miscanthus Starlight	2L
Grasses	31	Pennisetum Hamelyn	2L
Grasses	48	Stipa tenuissima	2L
Ground cover	558	Cornus canandensis	
Ground cover	158	Hypericum calycidum	
Ground cover	84	Pachysandra terminalis	
Perennials	20	Candelabra Primula	2L
Perennials	30	Heuchera Berry Smoothie	2L
Perennials	4	Heuchera Zipper	2L
Perennials	7	Iris Pseudacorus	Bulbs
Perennials	16	Iris Sibirica	Bulbs
Perennials	48	Salvia Ostfriesland	2L
Perennials	5	Sedum Purple Emperor	2L
Perennials	34	Typha angustifolia	
Shrubs	3	Buddleja Lochinch	3L
Shrubs	5	Choisya ternata	2L
Shrubs	8	Cornus alba Elegantissima	2L
Shrubs	17	Cornus sanguinea Midwinter Fire	2L
Shrubs	6	Cornus sericea Flaviramea	2L
Shrubs	8	Corylus avellana	5L
Shrubs	3	Daphne Eternal Fragrance	2L
Shrubs	3	Euonymous jap Paloma Blanca	2L
Shrubs	8	Euphorbia char Wulfenii	2L
Shrubs	3	Hammamelis x inter. Jelena	5L
Shrubs	10	Hebe rakaiensis	2L
Shrubs	13	Hydrangea arb. Annabelle	3L
Shrubs	3	Hydrangea mac. Fireworks	3L
Shrubs	67	Lavandula 'Hidcote'	1L
Shrubs	3	Lonicera fragrantissima	3L
Shrubs	4	Mahonia Soft Caress	2L
Shrubs	14	Mahonia Winter Sun	3L
Shrubs	3	Osmanthus burkwoodii	3L
Shrubs	2	Pittosporum Golf Ball	2L
Shrubs	16	Pittosporum Tom Thumb	2L
Shrubs	11	Prunus laurocerasus shrub	3L
Shrubs	5	Ribes sang King Edward VII	3L
Shrubs	12	Sambucus nigra	3L
Shrubs	11	Sarcococca humilis	2L
Shrubs	3	Syringa vulgaris	3L
Shrubs	25	Viburnum davidii	2L
Shrubs	6	Viburnum opulus	3L
Shrubs	13	Viburnum tinus	3L
Topiary	4	Ilex crenata ball	30cm
Topiary	5	Ligustrum jonandrum half std	1/2 STD
Trees	4	Acer campestre	STD 8-10cm girth, 2.5MH+
Trees	1	Alnus glutinosa	STD 8-10cm girth, 2.5MH+
Trees	3	Amelanchier Ballerina	STD 8-10cm girth, 2.5MH+
Trees	11	Betula pendula	STD 8-10cm girth, 2.5MH+
Trees	4	Carpinus betulus	STD 8-10cm girth, 2.5MH+
Trees	3	Cotoneaster cornubia	STD 8-10cm girth, 2.5MH+
Trees	8	Crataegus 'Paul's Scarlet'	STD 8-10cm girth, 2.5MH+
Trees	8	Crataegus monogyna	STD 8-10cm girth, 2.5MH+
Trees	5	Ilex Castaneifolia	STD 8-10cm girth, 2.5MH+
Trees	6	Malus Evereste	STD 8-10cm girth, 2.5MH+
Trees	1	Olive tree	2mH
Trees	2	Prunus Avium	STD 8-10cm girth, 2.5MH+
Trees	1	Prunus Cerasifera	STD 8-10cm girth, 2.5MH+
Trees	1	Prunus cerasifera Nigra	STD 8-10cm girth, 2.5MH+
Trees	7	Quercus Ilex	STD 8-10cm girth, 2.5MH+
Trees	4	Quercus robur	STD 8-10cm girth, 2.5MH+
Trees	2	Sorbus aria Lutescens	STD 8-10cm girth, 2.5MH+
Trees	19	Sorbus aucuparia	STD 8-10cm girth, 2.5MH+
Trees	2	Tilia cordata	STD 8-10cm girth, 2.5MH+
Trees - Fruit	2	Braeburn Apple	Maiden 1.5mH+
Trees - Fruit	2	Celeste cherry tree	Maiden 1.5mH+
Trees - Fruit	2	Corylus avellana Zellernus	Maiden 1.5mH+
Trees - Fruit	1	Ficus carica Brown Turkey	Maiden 1.5mH+
Trees - Fruit	1	Prunus Reine Claude de Bavay	Maiden 1.5mH+
Trees - Fruit	2	Pyrus Concorde	Maiden 1.5mH+
Trees - Fruit	2	Sunburst Cherry	Maiden 1.5mH+
Trees - Fruit	3	Sunburst cherry tree	Maiden 1.5mH+
Trees - Fruit	2	Sylvia cherry tree	Maiden 1.5mH+
Trees - Fruit	2	Victoria Plum	Maiden 1.5mH+
Hedge - Native	260 linear m	Species rich mixed native hedge, comprising Crataegus monogyna, Prunus spinosa, Cornus sanguinea, Carpinus betulus, Corylus avellana, Rosa canina	B/R 1.2mH. Plant in double row @ 7 plants per linear metre
Hedge - Dwarf	153 linear m	Euonymus Green Spire dwarf hedge	25-30cmH planted @ 7 plants per linear metre

Land use types within red bordered area

Linear metres	
222	Formal hedging (Ligustrum ovalifolium)
260	Species rich mixed native hedging
153	Dwarf hedging 30cmH (Euonymus Green spire)

Square metres	
252	Planted areas within gardens
1272	Amenity planting outside gardens
552	Wildflower areas outside gardens, including orchards
759	Grassland outside of gardens, including verges
54	Pond including margin
79	Total number of trees (excl fruit)
19	Total number of fruit trees

Square metres	
1194	Block paving
684	Gravel, excl. main access track
426	Paved areas - patios/paths

5 10 15 20 25

Keys

Refuse:
Waste Management to AVDC requirement
- b General waste - 240L wheelie bin
- b Recyclable waste - 240L wheelie bin
- b Garden waste - 240L wheelie bin
Food waste bin

Landscaping:
- Existing tree
- Removed tree
- Grass
- Planted area. Frontages & open areas have detailed planting plans. Rear planted areas are prepared for occupiers personal decision
- Species rich mixed native hedge, comprising Crataegus monogyna, Prunus spinosa, Cornus sanguinea, Carpinus betulus, Corylus avellana, Rosa canina
- Formal hedge
- Wildflower meadow
- Dwarf hedge 300mmH (Euonymus as substitute for Box which is susceptible to disease)
- Palisade fence
- Post & wire fence
- Black metal estate railings

Surfacing Materials:
- Permeable block paving, herringbone: brindle colour
- Permeable gravel drive running surface over bound DOT type 1 road stone on prepared base with flush PCC edgings
- Selected random coursed amenity paving laid to crossfall
- Timber sleeper raised bed
- Loose gravel
- Plum slate chippings 40mm
- Wall (will have facing brick to match units

Client Name:	Daldorch Estates Ltd	Drawing No:	1203:02
Site Name:	WINSCOTT FARM	Date:	20 Sept 2023
Scale:	1:200 on A0	Date of revision:	
Drawing Name:	LANDSCAPE DESIGN PLAN	Drawn by:	Juliet Staddon

Juliet Staddon, Professional Garden Design & Consultancy
1 Derehams Lane, Loudwater, High Wycombe, Bucks HP10 9RH
M: 07740 104459

All measurements must be checked on site and not scaled from this drawing

APPENDIX A: LIMITATIONS

INTRODUCTION

This report is confidential and has been prepared solely for the benefit of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from JNP Group; a charge may be levied against such approval. JNP Group accepts no responsibility or liability for the consequences of this document being used for any purpose or project other than for which it was commissioned, and: this document to any third party with whom and agreement has not been executed.

Any comments given within this report are based on the understanding that the proposed works to be undertaken will be as described in the introduction and the information referred to and provided by others and will be assumed to be correct and will not have been checked by JNP Group and JNP Group will not accept any liability or responsibility for any inaccuracy in such information.

Any deviation from the recommendations or conclusions contained in this report should be referred to JNP Group in writing for comment and JNP Group reserve the right to reconsider their recommendations and conclusions contained within. JNP Group will not accept any liability or responsibility for any changes or deviations from the recommendations noted in this report without prior consultation and our full approval.

The details contained within this report reflect the site conditions prevailing at the time of investigation. JNP Group warrants the accuracy of this report up to and including that date. Additional information, improved practice or changes in legislation may necessitate this report having to be reviewed in whole or in part after that date. If necessary, this report should be referred back to JNP Group for re-assessment and, if necessary, re-appraisal.

This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report. Whilst this report and the opinion made herein are correct to the best of JNP Group' belief, JNP Group cannot guarantee the accuracy or completeness of any information provided by third parties.

The report represents the finding and opinions of experience geotechnical and geo-environmental engineers. JNP Group does not provide legal advice and the advice of lawyers may also be required.

JNP Group has provided advice and made recommendations based on the findings of the work undertaken, however this is subject to the approval / acceptance by the relevant Regulatory Authorities.

Objectives

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, JNP Group reserves the right to review such information and, if warranted, to modify the opinions accordingly. It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Intrusive Investigations

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made.

Where intrusive investigations have been undertaken, they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature sampling, no investigation technique is capable of identifying all conditions present in all areas. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised “hotspots” of contamination where concentrations may be significantly higher than those actually encountered. The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

The objectives of the investigation have been linked to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and ground water. The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to areas unoccupied by the building(s) on the site and by buried services.

Gas and groundwater levels may vary from those reported due to seasonal, or other effects.

APPENDIX B: PHOTO DOCUMENT

M43012
Winscott Farm
Photographs of Exploratory Holes

TP14

TP15