DOCUMENTS FOR SCANNING

- ☐ Decision Notice
- ☐ Application Form
- ☐ Officer Report
- ☐ Conditions
- ☐ Plans
- ☑ Other
- ☐ Confidential

APPLICATION NUMBER: F/2001/3255

SITE ADDRESS: formerly Fluidrive Engineering
Molly Millars Lane Wokingham

GEOTECHNICS-MATERIALS LIMITED

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March 7, 2001

REPORT ON GROUND & CONTAMINATION INVESTIGATIONS
FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

Report Prepared By

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For Geotechnics-Materials Ltd.

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EXECUTIVE SUMMARY

- This report comprise the first part of a two part study on the site. The first part has comprised a desk study of historical maps of the site, followed by an intrusive investigation involving Window Sampler boreholes, together with the associated sampling and laboratory analyses for contamination.

- Some ICRCL contamination was found to be present in the soils beneath the site and further investigations and laboratory analyses will be required before a detailed remedial strategy can be formulated.

- Regarding foundations, the ground conditions indicate that spread foundations comprising reinforced concrete strips or pads (or piers with interconnecting ground beams) may be utilised. However in view of the relatively deep made ground and water-bearing subsoil, consideration should also be given to piled foundations.

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FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

1. INTRODUCTION.

This report presents the results of our ground and contamination investigation work in connection with the above site.

It was carried out generally in accordance our quotations of 29th September and 14th December 2000 and with Bailey Johnson Hayes letters of 11th December 2000 and 9th January 2001.

This report is prepared solely for the use of Bailey Johnson Hayes acting on behalf of Albion Land plc.

It takes into account only their particular instructions and requirements in connection with their redevelopment proposals for the site.

In preparing this report we have taken account of the information contained in a previous report on the site, Phase II Contamination Assessment Report, prepared by RPS Consultants Ltd, referenced CD3064/3064-004, draft dated 16th June 2000.

2. SCOPE.

The investigation has comprised a desk study, which has collated information on the site's previous uses, history, geology, hydrogeology and other information on possible contaminate processes, including landfill gases.

The fieldwork phase of the investigation has comprised the drilling of thirteen boreholes using the Window Sampler method.

This was followed by the laboratory phase involving the testing of 26 soil samples for the ICRCL[1] contaminants.

The whole investigation is required so that opinions and recommendations regarding any soil/water contamination, together with foundation design, could be given with respect to the redevelopment proposals for the site.

It should be understood that the scope of the work, as regards the number and positioning of the boreholes, has been limited by the presence of external concrete hardstandings, the existing buildings, their concrete ground floor slabs, together with their internal walls, staircases and other elements within the buildings.

3. SITE CONDITIONS.

The site is situated on the eastern side of Molly Millars Lane and is approximately 1km south-west of Wokingham station.

It is understood that the site formed part of a complex owned and operated by Fluidrive Ltd, who carried out the manufacture of hydraulic jacks.

The site is generally level and rectangular shaped, having maximum dimensions on plan of approximately 95m x 65m and a National Grid Reference of SU 8028 6815.

The site is bounded on the north by other buildings which comprised part of the Fluidrive complex, on the south by another light industrial building and on the east by the north-flowing Emm Brook.

The general layout of the site, as existing, is shown on page 24, which is a photo-copy of a site sketch plan provided by Bailey Johnson Hayes.

4. PROPOSED WORKS.

It is understood that the existing buildings will be demolished and a complex of three office buildings constructed, the total buildings area being approximately 3,700m^2.

Also included in the redevelopment will be car parking for 117 vehicles, a reformed site entrance, landscaping and a new drainage system.

5. DESK STUDY SOURCES.

To obtain historical and other information on the site a visit was made to Wokingham Library on 19th January 2001.

The following Ordnance Survey maps were inspected, with copies appended as pages 20 to 23:

- 1:2,500 scale, 1911 Edition. The map shows the site area as open fields.
- 1:2,500 scale, 1933 Edition. The map shows the site area as open fields.
- 1:2,500 scale, 1964 Edition, published 1966, SU8068. The map shows the site as occupied by an "Engineering Works".
- 1:1,250 scale, 1976 Edition. The map shows the site as occupied by a "Works".

6. GEOLOGY.

The geological map examined was the 1 inch to 1 mile scale, British Geological Survey, map No. 268, Reading, dated 1952, Solid and Drift edition.

The map indicates that the area containing the site to be located on Drift deposits of Alluvium, associated with Emm Brook.

Beneath the Alluvium the "solid" London Clay is shown to be present.

7. HYDROGEOLOGY.

The National Rivers Authority, Groundwater Vulnerability Map of England and Wales (1992) has been inspected.

This indicates that the site is located on soils which are designated Minor Aquifers.

Minor Aquifers are formations which can be fractured or potentially fractured rocks, which do not have a high primary permeability, or other formations of variable permeability.

Major Aquifers may occur beneath Minor Aquifers.

8. ASSESSMENT OF POTENTIAL CONTAMINATION.

It is apparent from the site inspection, and the desk study maps, that the site has been used for a potentially contaminative process, i.e. an engineering works, for the last 40-50 years.

This activity will have encompassed metal machining, metal cleaning and metal finishing processes and involved the use of acids, oils and greases.

In addition, as the "natural" soil is gravel over clay, it is considered that contamination resulting from the operation of the works may have contaminated the soils and groundwaters beneath the floor slabs and external paved areas.

Based on this, and to check the actual contamination situation, the laboratory test phase of the investigation has comprised the analysis of made ground and "natural" soil samples for the ICRCL[1] contaminants, together with total petroleum hydrocarbons (TPH).

Also, based on the above information, it is considered that there is a only a low probability that there is any landfill gas contamination in the soils beneath the site.

As the geological map indicates that the site is underlain by alluvial soils associated with Emm Brook it is considered that the shallow groundwater within the alluvial soils will be hydraulically connected to Emm Brook.

Therefore the shallow groundwater should be considered as a sensitive receptor, together with Emm Brook, when considering the migration of any pollutants there may be in the soils beneath the site.

9. FIELDWORK.

The Window Sampler boreholes were drilled on the 18th and 19th January 2001, and in positions indicated on page 24.

Details of the ground and groundwater conditions encountered in the boreholes, together with the depths of representative sampling are shown in the borehole logs on pages 25 to 37.

10. GROUND CONDITIONS.

Based on the results of the investigation the ground conditions at the site may be summarised as follows:-

Stratum No.	Stratum Description	Stratum Thickness (m)	Depth To Stratum Base (m)
1	Made Ground - Tarmac (0.025m-0.15m) or concrete (0.1m-0.25m) over black, brownish-grey and grey, gravel-sized ashy and clinkery, clayey, silty FILL with organic soil and fine to medium gravel, gravel-sized fragments of pottery, wood, stone, brick and concrete.	1.0 to 1.5 approx.	1.0 to 1.5 approx.
2	Very soft and soft, occasionally soft to firm, dark grey-brown, brownish-black and greenish-grey mottled, slightly organic, sandy, silty CLAY with medium to fine gravel. Alluvium.	0.5 to 1.5 approx.	2.0 to 3.0 approx.
3	Loose to medium dense, dark grey, greyish-brown and brown, sandy, silty, clayey, fine medium and coarse GRAVEL. Alluvium.	0.5 approx.	2.5 approx.
4	Soft to firm, becoming firm and firm to stiff, brown, greyish-brown and bluish-grey, brownish-grey and light brown mottled, silty CLAY with occasional fine to medium gravel. Weathered London Clay.	0.5 to 1.0 Not penetrated	3.0 to 3.5 Not penetrated

Notes On Ground Conditions Summary Table:

- The summary is based only on the information from the thirteen Window Sampler boreholes.
- Stratum No. 2 not penetrated in WS 3.
- Stratum No. 3 not encountered in WS's 1, 3, 7 & 10, and encountered above Stratum No. 2 in WS's 6, 11, 12 & 13.

- Stratum No. 4 not encountered in WS's 3 & 11.
- There may be different ground conditions elsewhere beneath the site which cannot be taken account of in this report.

11. LABORATORY TESTS.

All soil samples taken from the boreholes were inspected and given engineering descriptions.

Laboratory testing was then undertaken on selected samples as follows:-

- Samples from each Window Sampler borehole (WS1-WS13), representing thirteen "made ground" samples and thirteen "natural ground" samples (twenty-six in total) were selected for chemical analyses to determine the TPH content and the ICRCL 59/83[1] Table 3 - Group A and B and Table 4 suite of contaminants.

The results of the contamination tests are shown in Tables 1 to 4.

12. GROUNDWATER CONDITIONS.

Groundwater seepages were encountered in all the Window Sampler boreholes during the drilling, at depths of between 1.0m-1.5m and 2.0m-2.5m below ground level.

After allowing the water levels to stabilise for a few minutes, further depths to the groundwater table of between 0.5m and 1.2m below ground level were observed.

The above information represents the groundwater situation only at the time of this investigation.

It should be appreciated that the groundwater present beneath the site, including that at depths greater than those investigated, could be subject to seasonal and other variations.

13. CONTAMINATION.

The soil in the boreholes, and also the samples taken for testing, appeared free of any contamination.

Nevertheless, a slight hydrocarbons odour was noted in several made ground samples, namely WS6-0.5m, WS10-GL and WS10-1.0m.

As a guide to the interpretation of the contamination test results they have been compared with the ICRCL Threshold Trigger Concentrations (TTC's) for end-uses consisting of "domestic gardens" and "open spaces", even though the actual end-use will be "hard cover".

The comparison for the humanly toxic metals of the ICRCL schedule (Table 3A) shows that no result for cadmium, hexavalent chromium, total chromium, mercury and selenium exceeded the TTC's for either "domestic gardens" or "open spaces", with the exception of cadmium, WS8-0.5m and WS10-1.5m, mercury WS5-0.5m and WS6-0.5m, all exceeding the "domestic gardens" TTC.

However, twenty-three of the twenty-six samples (88%) exceeded the "domestic gardens" TTC for arsenic, and two of the arsenic results, (WS2-0.5m and WS8-0.5m) were significantly above the TTC for "open spaces".

No other made ground sample and none of the "natural" ground samples had any elevated level of the Table 3A, humanly toxic metals.

A similar comparison for the ICRCL Table 3B schedule (plant toxic contaminants - boron, copper, nickel and zinc) indicates that eleven of the thirteen made ground samples and six of the thirteen "natural" ground samples had at least one elevated level of these metals.

The most frequently exceeded level was that for water soluble boron, (12 of 26 samples - 46%), followed by zinc (9 samples - 35%) then copper (6 samples - 23%) and finally nickel (1 sample - 4%).

Finally, the comparison for the Table 4 contaminants (coal carbonisation) indicates that five out of twenty-six samples (19%) had levels of PAH above the TTC for "domestic gardens".

However, no PAH result exceeded the TTC for an end-use as "hard cover" and none of the other ICRCL Table 4 results exceeded the TTC's for either "domestic gardens" or "hard cover".

In addition no sample had an elevated level of TPH.

Based on the above it is considered that there is very little humanly toxic ICRCL contamination present in the soil beneath the site, and that what is present (arsenic) appears to be concentrated in the made ground soil beneath the floor slabs, at depths of less than 1.0m below ground level.

In addition, some plant toxic contamination is present, especially in the made ground soils in the vicinity of WS's 1, 2, 5, 9, 10 and 13, where elevated levels of both boron and zinc were present.

The analysis of the contamination results are summarised below:-

Contaminant	No. of results	Summary range mg/kg	Guideline concentration mg/kg	No. of results above guide-line value
Arsenic	26	<0.5-86.0	40	2-both made ground
Cadmium	26	<0.5-12.1	15	0
Hex. Chromium	26	All <2	25	0
Tot. Chromium	26	17-148	1,000	0
Lead	26	19-1496	2,000	0
Mercury	26	<0.5-2.3	20	0
Selenium	26	<0.5-2.2	6	0
Boron	26	<0.5-6.0	3	12-8 made ground
Copper	26	11-366	130	6-3 made ground
Nickel	26	8-121	70	1-made ground
Zinc	26	41-1733	300	9-7 made ground
PAH	26	<0.5-446.9	1,000	5-3 made ground
Phenols	26	All <1	5	0
Total Cyanide	26	<1-6.2	-	-
Free Cyanide	26	All <1	100	0
Thiocyanate	26	All <2	50	0
Total Sulphate %	26	<0.01-0.09	0.2	0
Sulphide	26	<2-26.6	250	0
Sulphur	26	<20-831	5,000	0
PH	26	6.7-10.2	5.0	0
TPH	26	<5-202	2,000	0

Notes On Contamination Summary Table:

- The guideline concentrations are those from ICRCL, either "open spaces" or "hard cover".
- The TPH guideline concentration is from ERL 1987 - Derivation of trigger values for hydrocarbons in contaminated soils.

14. ENVIRONMENTAL RISK ASSESSMENT.

The risks posed by the sources of contamination identified by the investigations have been assessed on the establishment of a pollution linkage from a source via an exposure pathway to a sensitive receptor.

The assessment is based on the assumption that the proposed end-use will be of a light industrial or commercial nature.

As such it comprises three elements:

- **Hazard Identification** - the assessment of the degree of hazard associated with the contamination;
- **Hazard Assessment** - the assessment of the linkages between the sources and the potential receptors and;
- **Risk Estimation and Evaluation** - an estimation of the likelihood and significance of adverse effects from the contamination.

Generally speaking, the contaminants within the made ground materials will remain isolated from the end-users of the site, by the presence of buildings and hardstandings.

Significant humanly toxic contamination has not been identified by the laboratory tests.

However, although the TPH results were low, a limited number of samples emitted a "hydrocarbons" odour which may be indicative of the presence of trace amounts of oils and/or solvents.

In addition, phytotoxic (plant toxic) contaminants have been identified and therefore, should areas of soft landscaping be envisaged, some measures may be required to protect new plantings.

The replacement of the old hardstandings and floor slabs and the control of surface water run-off should prevent the downward percolation of water through any contaminated soils, thereby preventing pollution of the shallow aquifer and by migration, Emm Brook.

However, consideration of the prevention of the prevention of creating a preferential pathway for the downward migration of any contaminants will need to be taken in the choice of foundation solution.

It is possible that soils containing contaminants will be present beneath parts of the site, as yet not investigated or exposed, i.e. "hotspots", and consideration will need to be given to their removal during the redevelopment of the site.

The following table provides a summary of the risk assessment, and indicates where a pollution linkage has been established for which remedial action may be required:

SOURCE	PATHWAY	RECEPTOR	REMEDIATION REQ.
Slight heavy metal contamination (arsenic) within near surface (made ground) materials	None	End-users	No - pathway closed by hardstandings and slabs
As above	None	Groundwater	No - pathway closed by hardstandings and slabs
Possible slight oils/solvent contamination within soils and groundwater	Groundwater	Groundwater	Yes - removal of saturated made ground soils, i.e. "hotspots" during site redevelopment
As above	Vapours	End-users	Yes - removal of saturated made ground soils, i.e. "hotspots" during site redevelopment

15. OPINION AND RECOMMENDATIONS.

15.1 Stratigraphy.

The results of the investigation generally confirm the information given on the geological plan.

Beneath the made ground, the very soft and soft to firm clays (Stratum No. 2) and the medium dense gravels, (Stratum No. 3) belonging the Alluvium are present.

Beneath the alluvial strata the firm clays (Stratum No. 4) of the London Clay are present.

15.2. Groundwater.

As indicated above, groundwater was encountered in all the boreholes, within the alluvial soils of Stratum Nos. 2 and 3, and at an approximate depth of 1.5m below ground level.

In addition it appears to be under a slight artesian head as it rose to an approximate depth of 1.0m.

It is considered that the groundwater is shallow "perched" groundwater, within the Alluvium.

As the "natural" soil containing the groundwater are likely to be penetrated during the site redevelopment, groundwater amounts and inflow rates into excavations less than 3m deep are anticipated to be "moderate".

Therefore relatively moderate "sumping and pumping" operations will be required to keep excavation clear of groundwater.

15.3. Foundation Design.

Based on the results of the investigation, conventional shallow-based spread foundations, comprising strips and pads, are considered unsuitable for the support of the new foundations of the development.

This is because of the presence of the soft and loose alluvial soils, containing groundwater, extending to a maximum depth of 2.5m-3.0m below existing ground level.

It is considered that spread foundations may be utilised but only after a programme of vibro-stabilisation has been carried out on the alluvial soils.

Alternatively, a piled foundation would be suitable but further ground investigation work (involving the excavation of trial pits and the drilling of 15m deep boreholes) would be required before detailed recommendations on these two foundation options could be give.

13.4 Gas Contamination.

No significant amounts of organic soils or fills were encountered in the boreholes and in addition the sub-soil type consists of impermeable clay.

Based on this, it is considered that no significant amounts of landfill gases are present in the soil or groundwater beneath the site.

13.5 Sulfate Attack.

The results of the chemical analyses for soluble sulfates and pH value, carried out on the twenty-six soil samples, as part of the ICRCL suites, indicate only low amounts present in near-neutral acidic conditions.

Based on this, any new buried concrete may conform to Class 1 conditions, as indicated in Table 5, which is abstracted from BRE Digest 363[2].

13.6 Further Investigations.

As indicated above the scope of this investigation was somewhat limited, due to the presence of the concrete floor slabs and also the existing building.

Therefore, it is recommended that further investigations be carried out, preferably after demolition.

The further investigation should comprise the excavation of trial pits, by JCB, so that the made ground material and water-bearing alluvial soils can be inspected and sampled in further detail.

Once this work has been carried out, including further laboratory analyses on recovered soil and/or groundwater samples, the contamination situation at the site can be more fully reported on.

13.7 Contamination Remediation.

As identified above, some ICRCL contamination is present in the soils beneath the site, both humanly toxic and phytotoxic.

Therefore a remediation strategy will need to be devised.

This can be done after the results of any further investigation work but it is considered inevitable that some material, from immediately beneath floors and hardstandings, in the form of "hotspots", will need to be removed offsite.

Notwithstanding the above, the object of any remedial works is to achieve a reduction in the environmental risks to generally acceptable levels.

To this end, it is considered that detailed and on-going consultations with the Local Environmental Health Officer, and others, will be required.

As ever, it would be prudent to inspect all soils, liquids and other materials exposed during any site clearance, site preparation and construction processes, carried out as part of the site redevelopment works.

Materials and liquids regarded as suspect, through their appearance, colour, or odour may then be identified, sampled and tested.

If confirmed as contaminated they can then be disposed of according to the local Environmental Health Officers requirements.

16. REFERENCES.

1. ICRCL 59/83. Guidance on the assessment and redevelopment of contaminated land. ICRCL Guidance Note 59/83, Second Edition, July 1987. Interdepartmental Committee On The Redevelopment of Contaminated Land.
2. Building Research Establishment. Sulfate and acid resistance of concrete in the ground. BRE Digest 363. Garston, BRE. January 1996.

REPORT ON GROUND & CONTAMINATION INVESTIGATIONS

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TABLE 1 - SUMMARY OF CONTAMINATION RESULTS

SAMPLE DETAILS		ICRCL 59/83 TABLE 3A							ICRCL 59/83 TABLE 3B			
WS No.	Depth (m)	Total Arsenic mg/kg	Total Cadmium mg/kg	Hex. Chrom. mg/kg	Total Chrom. mg/kg	Total Lead mg/kg	Total Mercury mg/kg	Total Selenium mg/kg	Soluble Boron mg/kg	Total Copper mg/kg	Total Nickel mg/kg	Total Zinc mg/kg
1	0.5-1.0	33.7	1.6	<2	31	206	<0.5	1.6	3.7	201	48	317
1	1.0-1.5	<0.5	<0.5	<2	24	23	<0.5	<0.5	1.7	14	21	51
2	0.5-1.0	54.3	2.0	<2	33	1496	0.7	2.2	4.9	115	54	1724
2	1.0-1.5	23.8	1.0	<2	23	145	<0.5	1.1	2.5	46	22	267
3	GL-0.5	7.2	<0.5	<2	17	25	<0.5	<0.5	<0.5	12	9	83
3	1.0-1.5	11.7	0.6	<2	40	69	<0.5	<0.5	3.1	364	32	209
4	1.0-1.5	31.0	1.1	<2	30	83	<0.5	1.6	3.8	124	42	191
4	2.0-2.5	11.0	1.4	<2	24	122	<0.5	0.5	1.1	185	18	186
5	0.5-1.0	21.3	0.9	<2	32	145	2.3	1.4	6.0	72	23	613
5	1.5-2.0	23.0	1.2	<2	43	19	<0.5	1.9	2.2	17	19	97
6	0.5-1.0	22.4	2.4	<2	37	344	1.3	0.6	1.0	93	34	550
6	2.0-2.5	8.7	<0.5	<2	21	19	<0.5	<0.5	1.6	11	8	41
7	0.5-1.0	16.3	0.7	<2	33	378	<0.5	0.6	2.1	322	15	250
TTC–Dom. Gdns.		**10**	**3**	**25**	**600**	**500**	**1**	**3**	**3**	**130**	**70**	**300**
TTC–Open spaces		**40**	**15**	**25**	**1000**	**2,000**	**20**	**6**	**3**	**130**	**70**	**300**

TTC - Denotes ICRCL Threshold Trigger Concentration.

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TABLE 2 - SUMMARY OF CONTAMINATION RESULTS CONTD.

SAMPLE DETAILS		ICRCL 59/83 TABLE 3A							ICRCL 59/83 TABLE 3B			
WS No.	Depth (m)	Total Arsenic mg/kg	Total Cadmium mg/kg	Hex. Chrom. Mg/kg	Total Chrom. mg/kg	Total Lead mg/kg	Total Mercury mg/kg	Total Selenium mg/kg	Soluble Boron mg/kg	Total Copper mg/kg	Total Nickel mg/kg	Total Zinc mg/kg
7	1.0-1.5	16.6	0.8	<2	33	45	<0.5	0.8	3.6	16	13	116
8	0.5-1.0	86.0	3.2	<2	50	444	<0.5	2.2	2.9	366	121	469
8	1.0-1.5	17.1	0.8	<2	26	147	<0.5	0.6	2.5	80	22	190
9	0.5-1.0	19.5	0.9	<2	58	335	<0.5	0.8	5.3	116	48	398
9	1.5-2.0	19.0	0.9	<2	38	24	<0.5	1.1	2.4	16	14	133
10	0.5-1.0	10.2	0.7	<2	23	155	<0.5	<0.5	1.0	46	16	268
10	1.5-2.0	34.8	12.1	<2	51	356	<0.5	0.8	3.1	105	44	1733
11	GL-0.5	11.0	0.5	<2	24	196	<0.5	0.8	4.5	39	30	97
11	1.0-1.5	18.0	0.9	<2	34	179	<0.5	0.5	3.8	79	44	211
12	0.5-1.0	13.5	0.7	<2	19	117	<0.5	0.6	3.5	65	19	209
12	1.0-1.5	17.2	0.7	<2	17	53	<0.5	<0.5	0.9	73	14	94
13	0.5-1.0	28.0	1.2	<2	27	408	0.6	1.2	5.7	97	43	747
13	1.0-1.5	28.4	1.4	<2	148	690	<0.5	<0.5	1.4	143	46	472
TTC–Dom. Gdns.		**10**	**3**	**25**	**600**	**500**	**1**	**3**	**3**	**130**	**70**	**300**
TTC–Open spaces		**40**	**15**	**25**	**1000**	**2,000**	**20**	**6**	**3**	**130**	**70**	**300**

TTC - Denotes ICRCL Threshold Trigger Concentration.

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TABLE 3 - SUMMARY OF CONTAMINATION RESULTS CONTD.

SAMPLE DETAILS		ICRCL 59/83 TABLE 4									
WS No.	Depth (m)	Polyaromatic Hydrocarbons mg/kg	Total Phenols mg/kg	Total Cyanide mg/kg	Free Cyanide mg/kg	TPH mg/kg	Thio-cyanate mg/kg	Total Sulfate SO4 %	Sulphide mg/kg	Sulphur mg/kg	pH Value
1	0.5-1.0	22.8	<1	<1	<1	<5	<2	0.02	<2	<20	6.9
1	1.0-1.5	9.2	<1	<1	<1	<5	<2	<0.01	5.0	<20	7.5
2	0.5-1.0	103.5	<1	1.7	<1	<5	<2	0.05	5.1	80	7.3
2	1.0-1.5	96.1	<1	<1	<1	<5	<2	0.01	3.8	50	7.4
3	GL-0.5	446.9	<1	<1	<1	<5	<2	0.02	8.1	658	8.6
3	1.0-1.5	117.6	<1	<1	<1	<5	<2	<0.01	25.5	84	8.1
4	1.0-1.5	7.6	<1	<1	<1	<5	<2	0.04	14.9	831	8.0
4	2.0-2.5	<0.5	<1	<1	<1	<5	<2	0.04	<2	<20	8.8
5	0.5-1.0	135.4	<1	<1	<1	<5	<2	<0.01	<2	83	7.7
5	1.5-2.0	6.3	<1	<1	<1	<5	<2	<0.01	<2	<20	7.4
6	0.5-1.0	15.3	<1	1.1	<1	30	<2	0.01	<2	37	8.6
6	2.0-2.5	<0.5	<1	<1	<1	<5	<2	<0.01	<2	<20	8.8
7	0.5-1.0	1.0	<1	1.4	<1	<5	<2	0.02	<2	275	8.5
TTC-Dom. Gdns.		**50**	**5**	**-**	**25**	**2,000**	**50**	**0.2**	**250**	**5000**	**5**
TTC-Hard Cover		**1000**	**5**	**-**	**100**	**2,000**	**50**	**0.2**	**250**	**5000**	**NL**

TTC - Denotes ICRCL Threshold Trigger Concentration. NL - Denotes No Limit.

REPORT ON GROUND & CONTAMINATION INVESTIGATIONS

FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

TABLE 4 - SUMMARY OF CONTAMINATION RESULTS CONTD.

SAMPLE DETAILS		ICRCL 59/83 TABLE 4									
WS No.	Depth (m)	Polyaromatic Hydrocarbons mg/kg	Total Phenols mg/kg	Total Cyanide mg/kg	Free Cyanide mg/kg	TPH mg/kg	Thio-cyanate mg/kg	Total Sulfate SO4 %	Sulphide mg/kg	Sulphur mg/kg	pH Value
7	1.0-1.5	1.0	<1	<1	<1	<5	<2	<0.01	2.4	188	7.5
8	0.5-1.0	1.4	<1	<1	<1	<5	<2	0.01	<2	20	6.7
8	1.0-1.5	10.4	<1	1.2	<1	<5	<2	0.04	<2	90	9.1
9	0.5-1.0	28.3	<1	5.6	<1	<5	<2	0.06	8.1	68	7.5
9	1.5-2.0	1.3	<1	<1	<1	55	<2	<0.01	6.4	42	7.0
10	0.5-1.0	18.9	<1	<1	<1	<5	<2	0.01	15.6	<20	9.5
10	1.5-2.0	13.3	<1	6.2	<1	202	<2	<0.01	26.6	244	7.6
11	GL-0.5	3.3	<1	<1	<1	<5	<2	0.02	4.5	<20	9.6
11	1.0-1.5	4.8	<1	<1	<1	32	<2	0.05	9.7	112	8.4
12	0.5-1.0	4.6	<1	1.8	<1	123	<2	0.04	<2	<20	8.8
12	1.0-1.5	3.6	<1	<1	<1	<5	<2	0.01	2.7	<20	10.2
13	0.5-1.0	11.0	<1	2.9	<1	<5	<2	0.09	4.9	<20	7.5
13	1.0-1.5	4.1	<1	<1	<1	12	<2	0.02	2.1	82	9.3
TTC-Dom. Gdns.		**50**	**5**	**-**	**25**	**2,000**	**50**	**0.2**	**250**	**5000**	**5**
TTC-Hard Cover		**1000**	**5**	**-**	**100**	**2,000**	**50**	**0.2**	**250**	**5000**	**NL**

TTC - Denotes ICRCL Threshold Trigger Concentration. NL - Denotes No Limit.

REPORT ON GROUND & CONTAMINATION INVESTIGATIONS

FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

TABLE 5 - ABSTRACT FROM BRE DIGEST 363

Requirements for well-compacted cast-in-situ concrete 140mm to 450mm in thickness exposed on all vertical faces to a permeable sulfate soil or fill. Aggregates to BS882 or BS1047. For other exposures or types of concrete see Tables 1a and 1b. For acid conditions see Table 2.

Class	Concentration of sulfate and magnesium – Note 1					Cement type see Table 1c	Minimum cement content kg/m³ Notes 2 & 3	Maximum free water/cement ratio Note 2
	In soil or fill			In groundwater g/l				
	By acid extraction % SO_4	By 2:1 water/soil extract g/l						
		SO_4	Mg	SO_4	Mg			
1	<0.24	<1.2		<0.4		A-L	Note 4	0.65
2	If >0.24 classify on basis of 2:1 extract	1.2-2.3		0.4-1.4		A-G	330	0.50
						H	280	0.55
						I-L	300	0.55
3		2.3-3.7		1.4-3.0		H	320	0.50
						I-L	340	0.50
4		3.7-6.7	<1.2	3.0-6.0	<1.0	H	360	0.45
		3.7-6.7	<1.2	3.0-6.0	<1.0	I-L	380	0.45
		3.7-6.7	>1.2	3.0-6.0	>1.0	H	360	0.45
5		>6.7	<1.2	>6.0	<1.0	As for Class 4 plus surface protection see CP 102		
		>6.7	>1.2	>6.0	>1.0			

Note 1 – To convert results expressed as SO_3 to SO_4, multiply by 1.2.

Note 2 – Cement content includes pfa and slag.

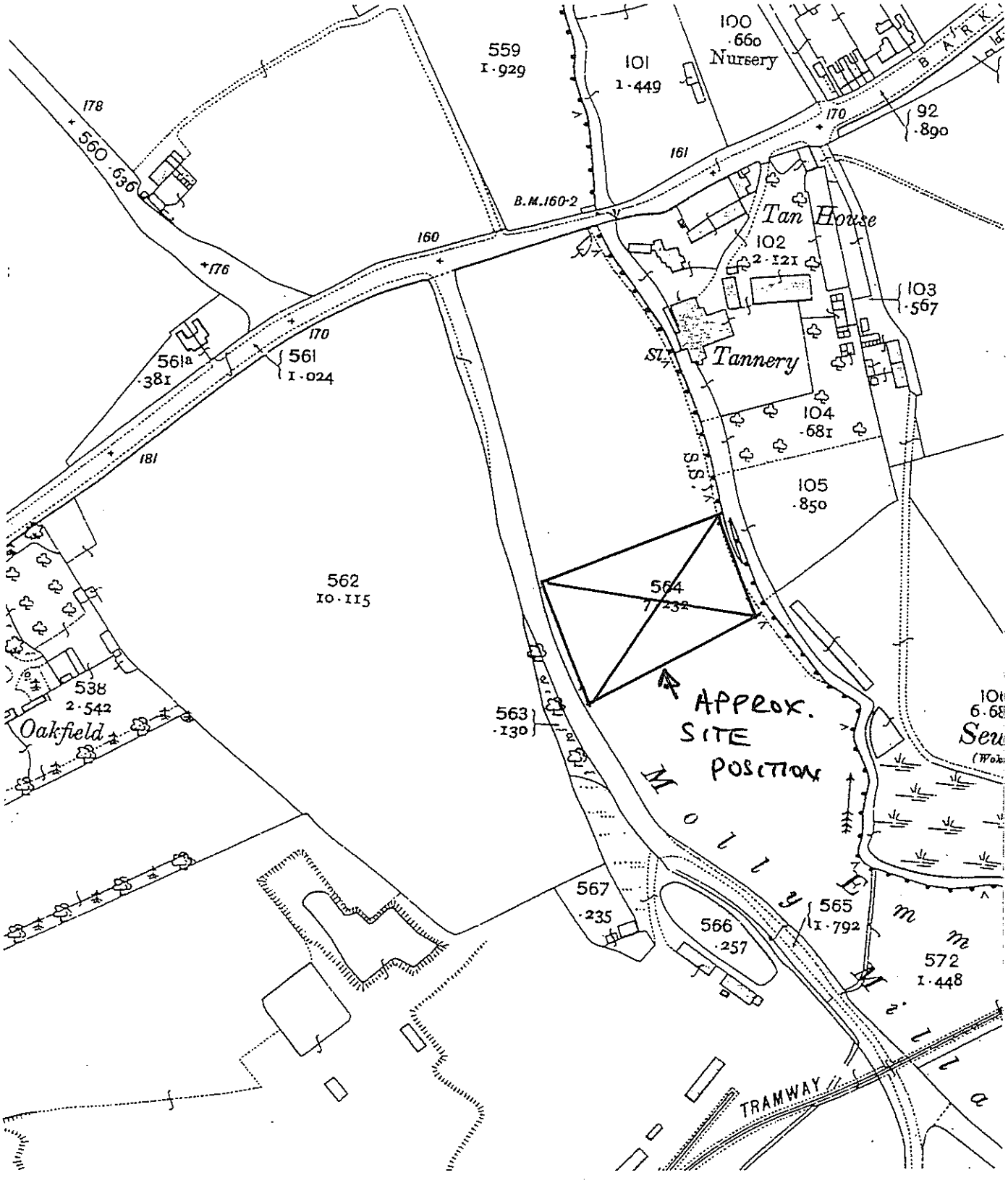
Note 3 – Cement contents relate to 20mm nominal maximum size aggregate. In order to maintain the cement content of the mortar fraction at similar values, the minimum cement contents given should be increased by 40kg/m³ for 10mm nominal maximum size aggregate and may be decreased by 30kg/m³ for 40mm nominal size aggregate as described in Table 8 of BS 5328:Part 1.

Note 4 – The minimum value required in BS 8110 and BS 5328:Part 1 is 275kg/m³ for unreinforced structural concrete in contact with non-aggressive soil. A minimum cement content of 300kg/m³ (BS 8110) and a maximum free water/cement ratio of 0.60 is required for reinforced concrete. A minimum cement content of 220kg/m³ and a maximum free water/cement ratio of 0.80 is permissible for C20 grade concrete when using unreinforced strip foundations and trench fill for low-rise buildings in Class 1.

REPORT ON GROUND & CONTAMINATION INVESTIGATIONS

FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

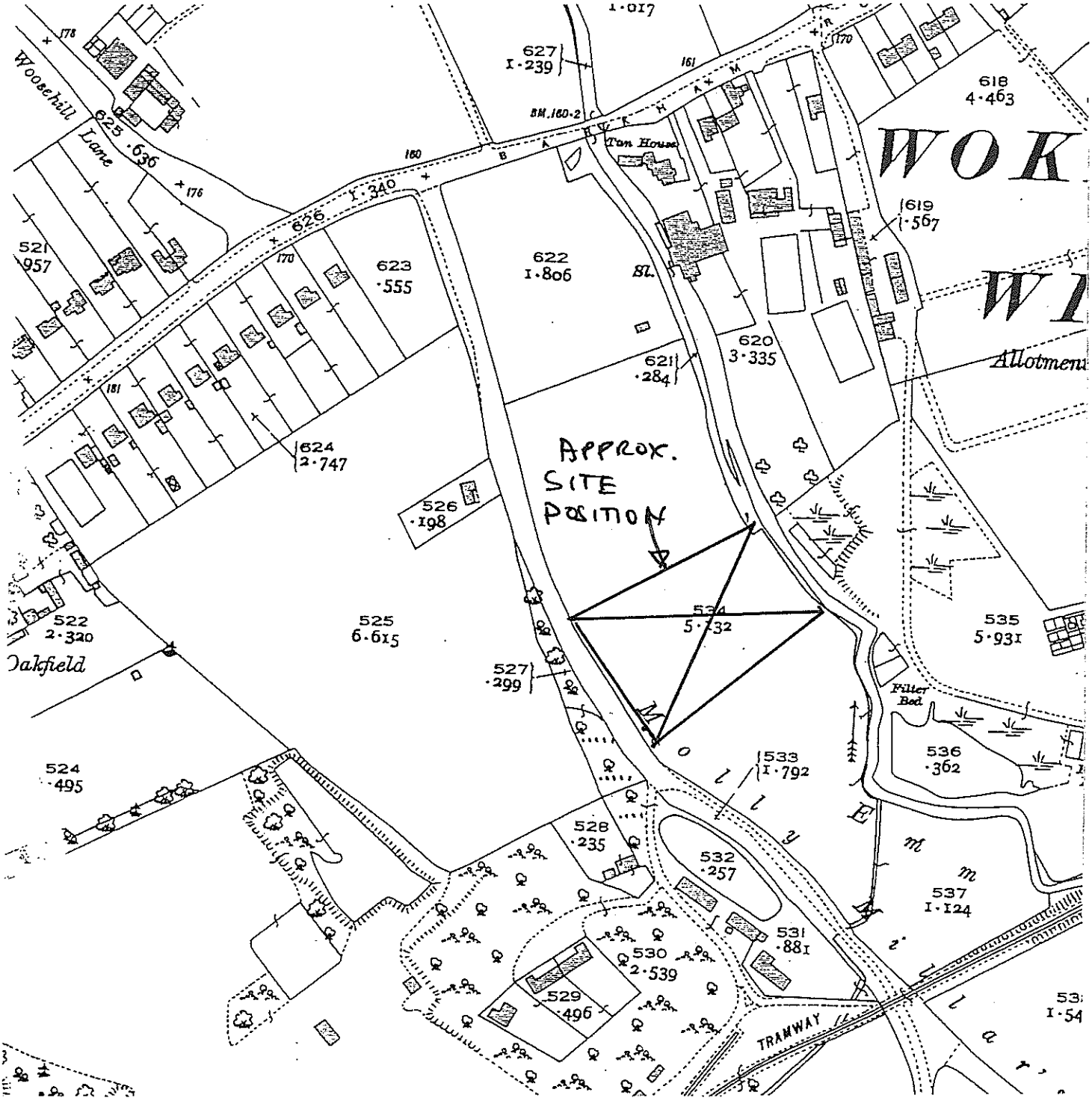
DESK STUDY ORDNANCE SURVEY PLAN – 1:2,500 SCALE 1911 EDITION



REPORT ON GROUND & CONTAMINATION INVESTIGATIONS

FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

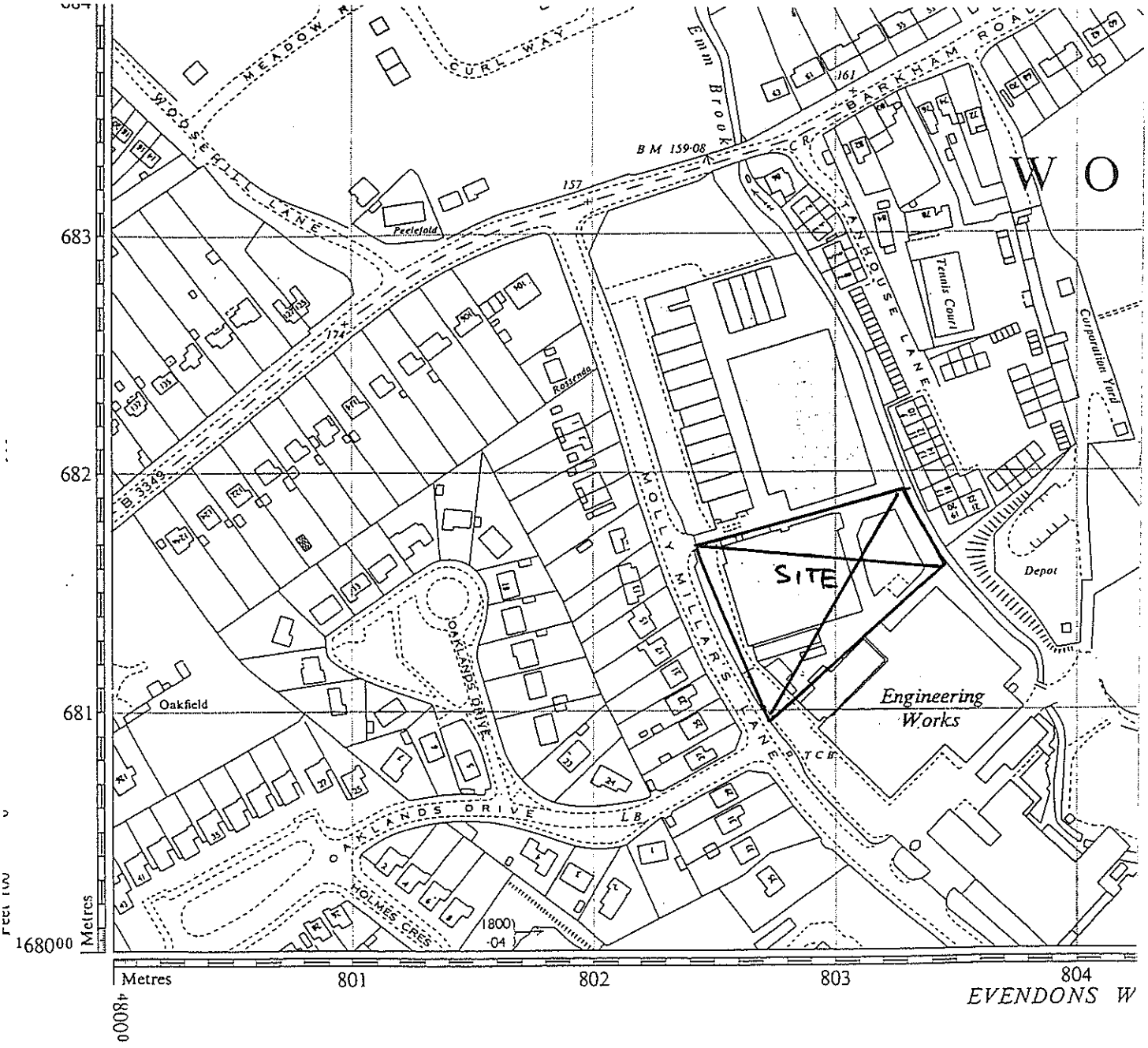
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REPORT ON GROUND & CONTAMINATION INVESTIGATIONS

FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

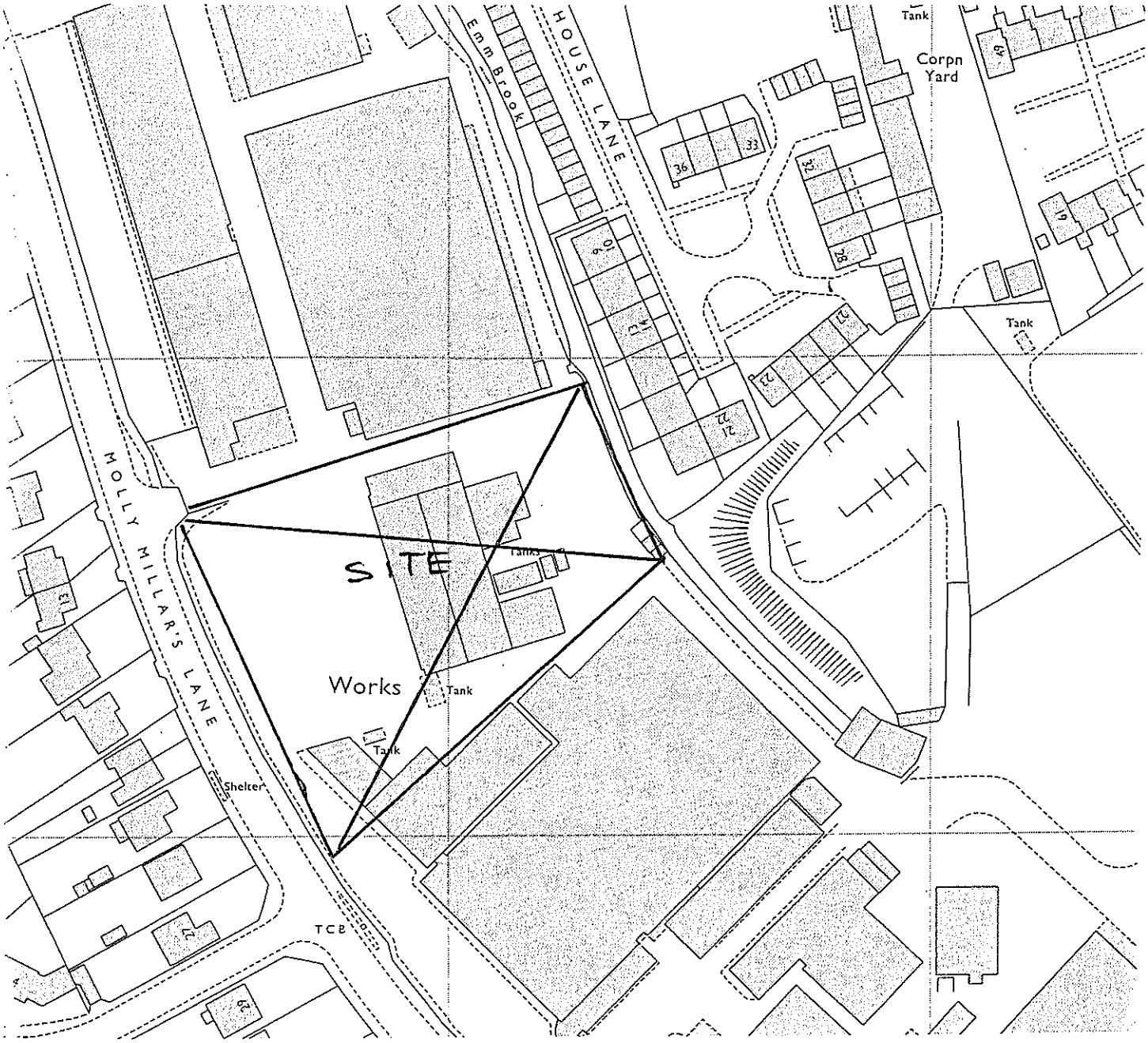
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REPORT ON GROUND & CONTAMINATION INVESTIGATIONS

FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

DESK STUDY ORDNANCE SURVEY PLAN - 1:1,250 SCALE 1976 EDITION

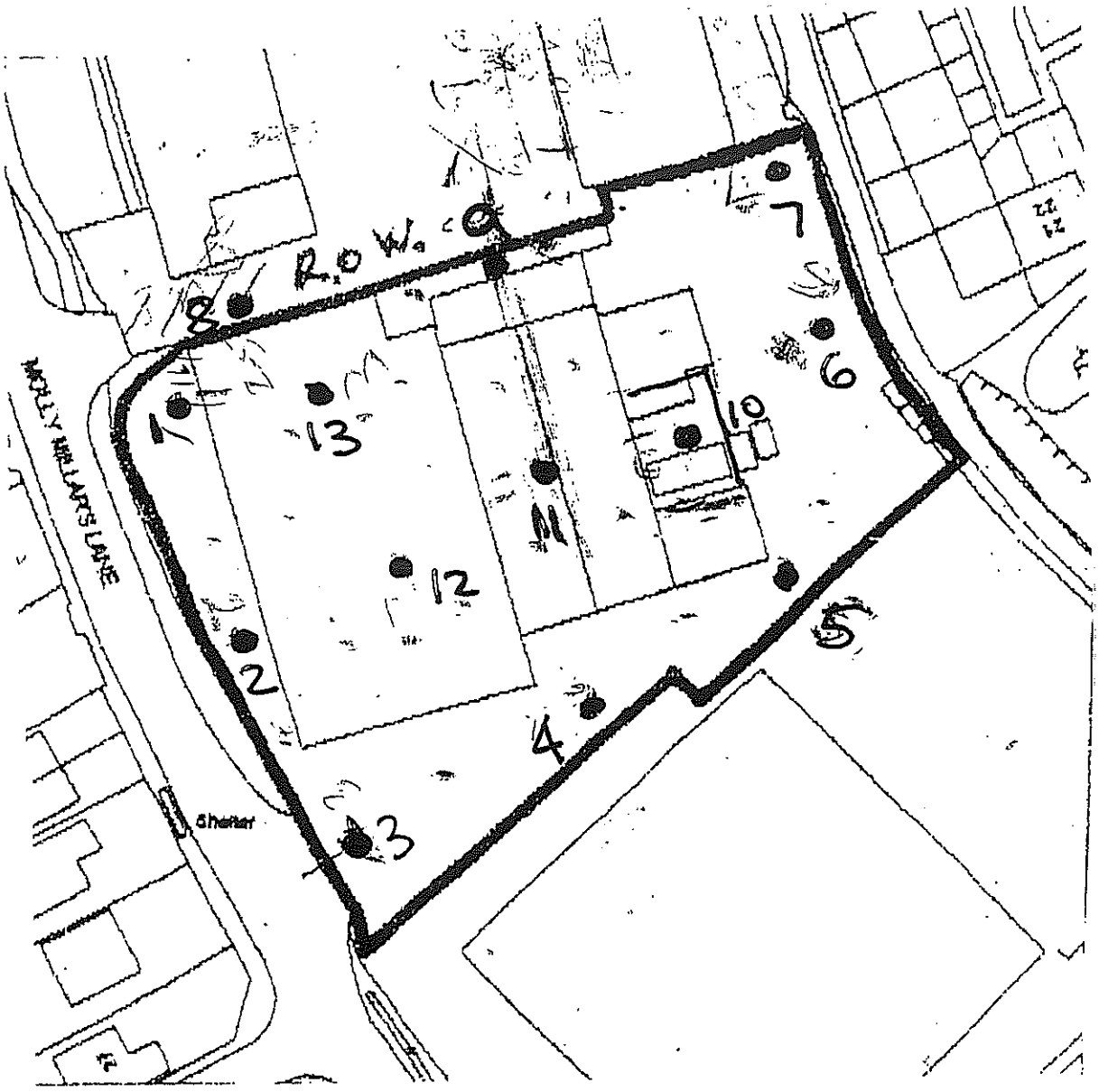


REPORT ON GROUND & CONTAMINATION INVESTIGATIONS

FLUIDRIVE SITE, MOLLY MILLARS LANE, WOKINGHAM, BERKS.

BOREHOLE LOCATION PLAN

POSITIONS APPROXIMATE - NOT TO SCALE



BOREHOLE LOG

WS NO: 1

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS: DEPTH (m) AND TYPE	STRATA CHANGES (m): SCALE	DEPTH	LEG.	STRATA DESCRIPTION
18th Jan. 2001		GL - 0.5 D	0.1 (m) 0.2 — 0.3 — 0.4 —			Made Ground - Tarmac (0.05m) over black, ashy, organic FILL with fine to medium gravel and gravel-sized fragments of stone, brick and concrete.
		0.5 - 1.0 D	**0.5** — 0.6 — 0.7 — 0.8 — 0.9 —			Made Ground - Black, becoming brown, ashy, organic clayey, silty FILL with fine to medium gravel and occasional gravel-sized fragments of stone, brick and concrete.
	Standing water level 1.15m apprx.	1.0 - 1.5 D	**1.0** ——	1.0 apprx		Soft, grey, brown mottled, silty CLAY with occasional organic matter traces and fine to medium gravel.
		1.5 - 2.0 D	**1.5** ——	1.5 apprx		Firm, greenish-grey, greyish-brown and brown mottled, silty CLAY with occasional black organic remains.
	Seepage at 2.0m-2.5m.	2.0 - 2.5 D	**2.0** ——	2.0 apprx		Soft, brown and brownish-grey, very sandy, silty CLAY with much fine to medium gravel.
		2.5 - 3.0 D	**2.5** ——	2.5 apprx		Firm to stiff, brown, greyish-brown and grey mottled, silty CLAY.
3.0			**3.0** ——	3.0 apprx		Borehole completed
			3.5 ——			
			4.0 —			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.5m.
Standing water level after drilling 1.15m apprx.

G - M

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG

WS NO: 2

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS: DEPTH (m) AND TYPE	STRATA CHANGES (m): SCALE	STRATA CHANGES (m): DEPTH	STRATA CHANGES (m): LEG.	STRATA DESCRIPTION
18th Jan. 2001		GL - 0.5 D	0.1(m) 0.2 --- 0.3 --- 0.4 ---			Made Ground - Tarmac (0.06m) over black, fine, medium and coarse sand-sized and fine to medium gravel-sized ashy/clinkery FILL with some sand and gravel and fragments of stone and concrete.
		0.5 - 1.0 D	**0.5** --- 0.6 --- 0.7 --- 0.8 --- 0.9 ---			
	Standing water level 0.95m apprx.	1.0 - 1.5 D	**1.0** ----	1.0 apprx		Soft, grey, black and greenish-grey, silty CLAY with organic matter traces and occasional fine to medium gravel.
		1.5 - 2.0 D	**1.5** ----	1.5 apprx		Soft, greenish-grey, brownish-black mottled, silty CLAY with occasional black organic remains and occasional fine to medium gravel.
	Seepage at 2.0m-2.5m.	2.0 - 2.5 D	**2.0** ----	2.0 apprx		Loose to medium dense, greyish-brown, sandy, silty, fine to medium GRAVEL.
		2.5 - 3.0 D	**2.5** ----	2.5 apprx		Soft to firm, grey, brown, greyish-brown mottled, silty CLAY with occasional fine to medium gravel.
3.0			**3.0** ----	3.0 apprx		Borehole completed
			3.5 ----			
			4.0 ----			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.5m.
Standing water level after drilling 0.95m apprx.

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG	WS NO: 3

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS DEPTH (m) AND TYPE	STRATA CHANGES (m) SCALE	DEPTH	LEG.	STRATA DESCRIPTION
18th Jan. 2001		GL - 0.5 D	0.1(m) 0.2 --- 0.3 --- 0.4 --- **0.5** --- 0.6 --- 0.7 --- 0.8 --- 0.9 --- **1.0** ----	0.5 apprx		Made Ground - Tarmac (0.025m) over dark brownish-grey, fine, medium and coarse sand-sized and fine to medium gravel-sized ashy/clinkery FILL with some fragments of brick and concrete, and pockets of light grey clay.
	Standing water level 1.0m apprx.	0.5 - 1.0 D				Made Ground - Black, fine, medium and coarse sand-sized ashy/clinkery FILL, becoming soft, light grey, greyish-brown mottled clay FILL with occasional fine to medium gravel.
		1.0 - 1.5 D		1.0 apprx		Soft, greenish-grey, light brown and black mottled, silty CLAY with occasional organic matter traces.
		1.5 - 2.0 D	**1.5** ----	1.5 apprx		Soft, dark grey, black mottled, slightly sandy, very silty organic CLAY with fine to medium gravel.
2.25	Seepage at 2.0m-2.25m.	2.0 - 2.25 D	**2.0** ---- **2.5** ---- **3.0** ---- **3.5** ---- **4.0** ---	2.25 apprx		Borehole completed

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.25m.
Standing water level after drilling 1.0m apprx.

BOREHOLE LOG

WS NO: 4

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS: DEPTH (m) AND TYPE	STRATA CHANGES (m): SCALE	STRATA CHANGES (m): DEPTH	STRATA CHANGES (m): LEG.	STRATA DESCRIPTION
18th Jan. 2001		GL - 0.5 D	0.1(m) 0.2 — 0.3 — 0.4 —			Made Ground - Concrete (0.15m) over black-grey, fine, medium and coarse sand-sized and fine to medium gravel-sized, organic, silty, clayey, ashy/clinkery FILL with some sand and gravel.
		0.5 - 1.0 D	0.5 — 0.6 — 0.7 — 0.8 — 0.9 —			
	Standing water level 0.75m apprx.	1.0 - 1.5 D	1.0 ----	1.0 apprx		Made Ground - Black-grey, fine, medium and coarse sand-sized and fine to medium gravel-sized, organic, silty, clayey, ashy/clinkery FILL with some sand and gravel and fragments of brick. Becoming soft, grey, brown-black mottled, organic, silty clayey FILL.
		1.5 - 2.0 D	1.5 ----	1.5 apprx		Soft, greenish-grey, dark grey mottled, slightly sandy, silty CLAY with fine to medium gravel.
	Seepage at 2.0m-2.5m.	2.0 - 2.5 D	2.0 ----	2.0 apprx		Loose to medium dense, dark grey and grey, sandy, silty, fine to medium GRAVEL.
		2.5 - 3.0 D	2.5 ----	2.5 apprx		Soft to firm, becoming firm, brown, greyish-brown and grey mottled, silty CLAY with occasional fine to medium gravel.
		3.0 - 3.5 D	3.0 ----			
3.5			3.5 ----	3.5 apprx		Borehole completed
			4.0 —			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.5m.
Standing water level after drilling 0.75m apprx.

G - M

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG	WS NO: 5

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS DEPTH (m) AND TYPE	STRATA CHANGES (m) SCALE	DEPTH	LEG.	STRATA DESCRIPTION
18th Jan. 2001		GL - 0.5 D	0.1(m) 0.2 0.3 0.4			Made Ground - Concrete (0.2m) over black soil FILL with some organic, silty, clayey, ashy/clinkery FILL and gravel-sized fragments of stone and concrete.
		0.5 - 1.0 D	**0.5**	0.5 apprx		Made Ground - Soft, black, organic, slightly sandy, very silty, clayey FILL with occasional fine to medium gravel.
	Standing water level 1.05m apprx.	1.0 - 1.5 D	0.6 0.7 0.8 0.9 **1.0**	1.0 apprx		Soft, dark grey, brownish-grey, black and brown mottled, slightly sandy, very silty CLAY with roots and occasional fine to medium gravel.
		1.5 - 2.0 D	**1.5**			
	Seepage at 2.0m-2.5m.	2.0 - 2.5 D	**2.0**	2.0 apprx		Loose to medium dense, grey, brownish-grey, becoming brown, sandy, very silty, very clayey, fine, medium and coarse GRAVEL.
		2.5 - 3.0 D	**2.5**	2.5 apprx		Firm, brownish-grey, light brown and light grey mottled, silty CLAY.
3.0			**3.0** 3.5 **4.0**	3.0 apprx		Borehole completed

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.5m.
Standing water level after drilling 1.05m apprx.

G - M

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG

WS NO: 6

METHODS:	**CASING DETAILS:**	**LOCATION:** Molly Millars Lane, Wokingham, Berks.	**GRD. LEV.**
Window sampler.	Not applicable.		Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS: DEPTH (m) AND TYPE	STRATA CHANGES (m): SCALE	STRATA CHANGES (m): DEPTH	STRATA CHANGES (m): LEG.	STRATA DESCRIPTION
18th Jan. 2001		GL - 0.5 D	0.1(m) 0.2 --- 0.3 --- 0.4 ---			Made Ground - Concrete (0.1m) over greyish-brown, soil FILL with some fine, medium and coarse sand and gravel and gravel-sized fragments of stone and concrete.
		0.5 - 1.0 D	**0.5** --- 0.6 --- 0.7 --- 0.8 --- 0.9 ---	0.5 apprx		Made Ground - Grey, organic, slightly sandy, very silty, slightly clayey, gravel FILL with occasional fine to medium gravel-sized fragments of brick, concrete and stone. Slight hydrocarbons odour.
	Standing water level 1.1m apprx.	1.0 - 1.5 D	**1.0** -----	1.0 apprx		Loose, greyish-black, silty, slightly clayey, fine, medium and coarse SAND and fine to medium GRAVEL.
		1.5 - 2.0 D	**1.5** -----	1.5 apprx		Very soft, dark greenish-grey, becoming brown, dark brownish-grey mottled, silty CLAY with occasional fine to medium gravel.
	Seepage at 2.0m-2.5m.	2.0 - 2.5 D	**2.0** -----	2.0 apprx		Very soft, grey and black, dark brownish-grey and dark greenish-grey mottled, slightly sandy, silty CLAY with fine to medium gravel.
		2.5 - 3.0 D	**2.5** -----	2.5 apprx		Soft, dark bluish-grey, brownish-grey mottled, silty CLAY with occasional fine to medium gravel.
3.0			**3.0** -----	3.0 apprx		Borehole completed
			3.5 -----			
			4.0 ---			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.5m.
Standing water level after drilling 1.1m apprx.

BOREHOLE LOG	WS NO: 7

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS DEPTH (m) AND TYPE	STRATA CHANGES (m) SCALE	DEPTH	LEG.	STRATA DESCRIPTION
18th Jan. 2001		GL - 0.5 D	0.1 (m) 0.2 0.3 0.4			Made Ground - Concrete (0.2m) over brown, fine, medium and coarse, sand and gravel FILL with soil and some gravel-sized fragments of brick.
		0.5 - 1.0 D	**0.5**	0.5 apprx		Made Ground - Brown, fine, medium and coarse, sand and gravel FILL with black, organic, sandy, clayey soil and some gravel-sized fragments of brick.
	Standing water level 1.2m apprx.	1.0 - 1.5 D	0.6 0.7 0.8 0.9 **1.0**	1.0 apprx		Very soft, dark greenish-grey, brown mottled, silty CLAY with occasional fine to medium gravel.
		1.5 - 2.0 D	**1.5**			
	Seepage at 2.0m-2.5m.	2.0 - 2.5 D	**2.0**	2.0 apprx		Very soft, grey, dark greenish-grey, brownish-grey mottled, very gravelly, slightly sandy, silty CLAY.
		2.5 - 3.0 D	**2.5**	2.5 apprx		Soft, bluish-grey, brown mottled, very silty CLAY with occasional fine to medium gravel.
3.0			**3.0**	3.0 apprx		
			3.5			Borehole completed
			4.0			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.5m.
Standing water level after drilling 1.2m apprx.

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG

WS NO: 8

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS: DEPTH (m) AND TYPE	STRATA CHANGES (m): SCALE	STRATA CHANGES (m): DEPTH	STRATA CHANGES (m): LEG.	STRATA DESCRIPTION
18th Jan. 2001		GL - 0.5 D	0.1(m) 0.2 — 0.3 — 0.4 — **0.5** — 0.6 — 0.7 — 0.8 — 0.9 — **1.0** ----	0.5 apprx		Made Ground - Concrete/tarmac (0.15m) over black soil FILL with some organic, silty, clayey, ashy/clinkery FILL and gravel-sized fragments of stone and concrete.
		0.5 - 1.0 D				Made Ground - Black, medium and coarse sand-sized, and fine to medium gravel-sized ash/clinkery FILL with occasional gravel and gravel-sized fragments of brick.
	Standing water level 1.1m apprx.	1.0 - 1.5 D		1.0 apprx		Very soft, dark grey, dark brownish-grey and brown mottled, very gravelly, slightly sandy, silty CLAY.
		1.5 - 2.0 D	**1.5** ----	1.5 apprx		Soft, brown, dark brownish-grey, grey mottled, very gravelly, slightly sandy, silty, slightly organic, CLAY with occasional fine to medium gravel.
	Seepage at 2.0m-2.5m.	2.0 - 2.5 D	**2.0** ----	2.0 apprx		Loose to medium dense, dark grey, dark greenish-grey, slightly sandy, silty, clayey, fine to medium GRAVEL.
		2.5 - 3.0 D	**2.5** ----	2.5 apprx		Firm, brownish-grey, brown and light grey, occasionally black mottled, silty CLAY.
		3.0 - 3.5 D	**3.0** ----	3.0 apprx		Firm, brown, light brownish-grey mottled, silty CLAY.
3.5			**3.5** ----	3.5 apprx		
			4.0 ---			Borehole completed

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.5m.
Standing water level after drilling 1.1m apprx.

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG

WS NO: 9

METHODS:	CASING DETAILS:	LOCATION: Molly Millars Lane, Wokingham, Berks.	GRD. LEV.
Window sampler.	Not applicable.		Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS DEPTH (m) AND TYPE	STRATA CHANGES (m) SCALE	DEPTH	LEG.	STRATA DESCRIPTION
19th Jan. 2001		GL - 0.5 D	0.1(m) 0.2 0.3 0.4			Made Ground - Concrete (0.25m) over brown, fine, medium and coarse, sand and gravel FILL with some gravel-sized fragments of brick.
		0.5 - 1.0 D	**0.5**	0.5 apprx		Made Ground - Black, medium and coarse sand-sized, and fine to medium gravel-sized ash/clinkery FILL with occasional gravel and gravel-sized fragments of pottery, timber and brick.
	Standing water level 0.8m apprx.	1.0 - 1.5 D	**1.0**	1.0 apprx		Very soft, organic, black, slightly gravelly, slightly sandy, silty CLAY.
		1.5 - 2.0 D	**1.5**	1.5 apprx		Soft, dark grey, greyish-brown mottled, slightly sandy, very silty CLAY with fine to medium gravel.
	Seepage at 2.0m-2.5m.	2.0 - 2.5 D	**2.0**	2.0 apprx		Loose to medium dense, slightly organic, dark grey and brown, slightly sandy, silty, clayey, fine to medium GRAVEL.
		2.5 - 3.0 D	**2.5**	2.5 apprx		Firm, grey, brownish-grey, brown and light grey mottled, silty CLAY.
3.0			**3.0**	3.0 apprx		
			3.5			Borehole completed
			4.0			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 2.0m-2.5m.
Standing water level after drilling 0.8m apprx.

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG	WS NO: 10

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS DEPTH (m) AND TYPE	STRATA CHANGES (m) SCALE	DEPTH	LEG.	STRATA DESCRIPTION
19th Jan. 2001		GL - 0.5 D	0.1 (m) 0.2 --- 0.3 --- 0.4 --- **0.5** --- 0.6 --- 0.7 --- 0.8 --- 0.9 ---	0.5 apprx		Made Ground - Concrete (0.25m) over light greenish-grey, medium and coarse sand and fine to medium gravel FILL with some gravel-sized fragments of crushed rock and concrete. Slight hydrocarbons odour.
	Standing water level 0.5m apprx.	0.5 - 1.0 D				Made Ground - Light greenish-grey, medium and coarse sand and fine to medium gravel FILL with lumps of soft dark grey organic silty clay FILL and gravel-sized fragments of crushed rock and concrete.
	Seepage at 1.0m-1.5m.	1.0 - 1.5 D	**1.0** ---- ------- ------- ------- -------	1.0 apprx		Made Ground - Black, medium and coarse sand and fine to medium gravel FILL. Slight hydrocarbons odour.
		1.5 - 2.0 D	**1.5** ---- ------- ------- ------- -------	1.5 apprx		Very soft, dark grey, becoming brownish-grey, occasionally dark greenish-grey mottled, slightly organic, slightly sandy, silty CLAY with occasional fine to medium gravel.
		2.0 - 2.5 D	**2.0** ---- ------- ------- ------- -------	2.0 apprx		Soft, dark greenish-grey, greyish-brown mottled, silty CLAY with a little fine to medium gravel.
		2.5 - 3.0 D	**2.5** ---- ------- ------- ------- -------	2.5 apprx		Firm, brownish-grey, brown and light grey mottled, very gravelly, sandy, silty CLAY.
		3.0 - 3.5 D	**3.0** ---- ------- ------- ------- -------	3.0 apprx		Firm, reddish-grey, brown and light grey mottled, silty CLAY.
3.5			**3.5** ---- ------- ------- ------- ------- **4.0** ---	3.5 apprx		Borehole completed

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 1.0m-1.5m.
Standing water level after drilling 0.5m apprx.

G - M

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG

WS NO: 11

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS DEPTH (m) AND TYPE	STRATA CHANGES (m) SCALE	DEPTH	LEG.	STRATA DESCRIPTION
19th Jan. 2001		GL - 0.5 D	0.1(m) 0.2 --- 0.3 --- 0.4 --- **0.5** ---	0.5 apprx		Made Ground - Concrete (0.2m) over black, fine to medium gravel-sized and medium to coarse sand-sized ashy/clinkery FILL with occasional fine to medium gravel.
	Standing water level 1.0m apprx.	0.5 - 1.0 D	0.6 --- 0.7 --- 0.8 --- 0.9 ---			Made Ground - Black, medium and coarse sand-sized, and fine to medium gravel-sized ashy/clinkery FILL with fine to medium gravel and gravel-sized fragments of brick.
	Seepage at 1.0m-1.5m.	1.0 - 1.5 D	**1.0** --- _____ _____ _____ _____	1.0 apprx		Loose to medium dense, dark grey, slightly sandy, silty, very clayey, fine to medium GRAVEL.
		1.5 - 2.0 D	**1.5** --- _____ _____ _____ _____	1.5 apprx		Soft, grey, greenish-grey, greyish-brown and brown mottled, slightly gravelly, slightly sandy, silty CLAY.
		2.0 - 2.5 D	**2.0** --- _____ _____ _____ _____	2.0 apprx		Medium dense, dark grey, slightly sandy, silty, fine to medium GRAVEL.
		2.5 - 3.0 D	**2.5** --- _____ _____ _____ _____	2.5 apprx		Medium dense, grey, slightly sandy, silty, fine to medium GRAVEL with pockets of greenish-grey, sandy, silty clay.
3.0			**3.0** --- _____ _____ _____ _____	3.0 apprx		Borehole completed
			3.5 --- _____ _____ _____ _____			
			4.0 ---			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 1.0m-1.5m.
Standing water level after drilling 1.0m apprx.

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG

WS NO: 12

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS: DEPTH (m) AND TYPE	STRATA CHANGES (m): SCALE	STRATA CHANGES (m): DEPTH	STRATA CHANGES (m): LEG.	STRATA DESCRIPTION
19th Jan. 2001	Borehole caved-in no standing water level noted.	GL - 0.5 D	0.1(m) 0.2 --- 0.3 --- 0.4 --- **0.5** --- 0.6 --- 0.7 --- 0.8 --- 0.9 --- **1.0**	0.5 apprx		Made Ground - Concrete (0.25m) over light grey, fine to medium gravel-sized and fine, medium and coarse sand-sized crushed concrete FILL with occasional fine to medium gravel and gravel-sized fragments of brick.
		0.5 - 1.0 D				Made Ground - Black, medium and coarse sand-sized, and fine to medium gravel-sized ashy/clinkery FILL with fine to medium gravel and gravel-sized fragments of pottery and brick.
	Seepage at 1.0m-1.5m.	1.0 - 1.5 D		1.0 apprx		Loose to medium dense, grey and light grey, slightly sandy, silty, very clayey, fine to medium GRAVEL.
		1.5 - 2.0 D	**1.5**	1.5 apprx		Soft, organic, black, greenish-grey, greyish-brown and brown mottled, very gravelly, very sandy, silty CLAY.
		2.0 - 2.5 D	**2.0**			
		2.5 - 3.0 D	**2.5**			At 2.5m apprx. Becoming less organic and more brownish-grey.
		3.0 - 3.5 D	**3.0**	3.0 apprx		Firm, greenish-grey, black-grey and brown, light brown and light grey mottled, silty CLAY.
3.5			**3.5**	3.5 apprx		Borehole completed
			4.0			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 1.0m-1.5m.
Borehole caved-in, no standing water level noted.

GEOTECHNICS-MATERIALS LIMITED

BOREHOLE LOG

WS NO: 13

METHODS:	CASING DETAILS:	LOCATION:	GRD. LEV.
Window sampler.	Not applicable.	Molly Millars Lane, Wokingham, Berks.	Not available.

DATE AND DEPTH	WATER LEVELS (m)	SAMPLES AND INSITU TESTS DEPTH (m) AND TYPE	STRATA CHANGES (m) SCALE	DEPTH	LEG.	STRATA DESCRIPTION
19th Jan. 2001		GL - 0.5 D	0.1 (m) 0.2 --- 0.3 --- 0.4 --- **0.5** ---	0.5 apprx		Made Ground - Concrete (0.2m) over light grey, fine to medium gravel-sized and fine, medium and coarse sand-sized crushed concrete FILL with occasional fine to medium gravel and gravel-sized fragments of brick.
	Standing water level 1.15m apprx.	0.5 - 1.0 D	0.6 --- 0.7 --- 0.8 --- 0.9 ---			Made Ground - Black, medium and coarse sand-sized, and fine to medium gravel-sized ashy/clinkery FILL with fine to medium gravel and gravel-sized fragments of pottery and brick.
	Seepage at 1.0m-1.5m.	1.0 - 1.5 D	**1.0** ----	1.0 apprx		Loose to medium dense, dark grey and brownish-grey, very sandy, silty, very clayey, fine to medium GRAVEL.
		1.5 - 2.0 D	**1.5** ----	1.5 apprx		Soft, grey, dark greyish-brown and brown mottled, very gravelly, very sandy, silty CLAY.
		2.0 - 2.5 D	**2.0** ----	2.0 apprx		Soft to firm, brown, brownish-grey, light grey and light brown mottled, silty CLAY.
		2.5 - 3.0 D	**2.5** ----	2.5 apprx		Firm, brown, brownish-grey, light brown and light grey mottled, silty CLAY.
3.0			**3.0** ----	3.0 apprx		
			3.5 ----			Borehole completed
			4.0 ----			

Samples and Insitu Test Key
D - Small disturbed sample. B - Bulk disturbed sample. W - Water sample.

Remarks
Groundwater seepage encountered at 1.0m-1.5m.
Standing water level after drilling 1.15m apprx.