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Proposed Travis Perkins
Olds Approach,
Watford



Piling Risk Assessment

October 2023
Revision 00
R-PRA-27317-01-00

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1.0 Introduction

1.1 Client instructions and reliance

- 1.1.1 Travis Perkins Plc instructed JPP to produce a Piling Risk Assessment for the proposed redevelopment of the Watford Timber Co Ltd, Old's Approach, 4-7 Tolpits Lane, Watford, WD18 9RE into a new Travis Perkins site under the planning application reference 23/0216/FUL.
- 1.1.2 Correspondence with the Environment Agency has been undertaken as part of the planning application process with their latest response to the application being submitted on 16th August 2023, ref NE/2023/1360/22/01, which is included in Appendix B for reference.
- 1.1.3 The site has been subject to two previous ground investigations which were submitted to support the planning application for the proposed redevelopment and which also form the basis of our Piling Risk Assessment. The reports submitted were undertaken by Ashdown Site Investigation Ltd, Ref. P15290/R14954 dated October 2021 and by Soiltechnics, ref STU5650-GO1, revision 02, dated December 2022.
- 1.1.4 Interpretations and recommendations within this report are based upon information drawn from the previous reports (detailed in Section 2) and this report should be read in conjunction with those reports. We do not accept liability or guarantee the authenticity or reliability of the information obtained or provided by others. There is a potential for ground conditions to vary from those encountered during previous investigations and may differ where not exposed by previous investigations.
- 1.1.5 This report has been produced for the benefit of Travis Perkins Plc and JPP Geotechnical & Environmental Ltd will not accept liability for the third-party use of the information herein without prior reliance agreed. This report is valid for 6 years from the date of issue however any significant changes to the proposals or followed legislation and guidance within this time could dictate a review of our findings and recommendations.

1.2 Site Proposals

- 1.2.1 It is proposed to demolish the existing buildings which are situated across the site and redevelop the site into a builders merchants with new steel framed warehouse buildings and areas of external hardstanding which will be used for storage of supplies, areas of parking and general yard areas.

1.3 Scope

- 1.3.1 This document provides an assessment of the risk presented by the proposed ground improvement works to the underlying principal aquifer and associated SPZ 1 on which the subject site is positioned and to the River Colne which is situated to the south of the subject site.

2.0 Previous Reports

2.1 Ensafe Consultants

2.1.1 During the sites previous use as a timber treatment works, the site was registered with an environmental permit, ref EPR/A2/001, for the regulated activity; Preserving wood and wood products with chemicals with a production capacity exceeding 75m³ per day other than exclusively treating against sapstain.

2.1.2 As part of the permit, groundwater monitoring was required to be undertaken in accordance with Section 12 of the permit.

2.1.3 Ensafe were appointed to undertake the monitoring works, their last report was dated April 2021 which included the sampling of groundwater from three locations (WS101, WS102 and W103) from across the site. The locations of the monitoring wells are shown on the attached plan by Ensafe in Appendix A.

2.1.4 The chemical analysis focused on a range of contaminants associated with the regulated activity as set out below:

Benzalkonium chloride - Chloride, as a marker compound. Ammoniacal and Kjeldahl nitrogen. Analysis directly for BAK not commercially available.
Copper Carbonate hydroxide - Copper, carbonate and bicarbonate alkalinity
Boric Acid - Boron, pH
Permethrin - Direct analysis
Propiconazole - Direct Analysis
Tebuconazole - Direct Analysis

2.1.5 The report dated April 2021 contained no assessment of the results of the testing and we understand that the reports were submitted by the landowners to the regulatory body in line with the permit requirements.

2.2 Ashdown Site Investigation Ltd

2.2.1 Ashdown Site Investigation Ltd undertook a combined Phase I and Phase II Ground Investigation across the former timber works in August 2021 Ref. P15290/R14954. The work included the drilling of 3 No. cable percussive boreholes to 15.0m bgl, 8 No. windowless sampler boreholes to between 2.0m to 4.0m bgl and subsequent land gas/groundwater monitoring, geotechnical and contamination testing.

2.2.2 As part of the works 3 No. 15m deep wells were installed at the locations of BH201, BH202 and BH203 and 5 No. 1.0m to 3.0m deep wells were installed at the locations of WS201, WS202, WS203, WS205 and WS206.

2.2.3 The locations of the monitoring wells are shown on the attached plan in Appendix A.

2.2.4 The investigation concluded, in regards to environmental risk associated with the sites use a timber yard, that the risk posed to the wider environment and future development is low based on the very low concentrations of contaminants recorded across the site.

2.2.5 The reader is referred to the report for further detail including monitoring data and results of contamination testing.

2.3 Soiltechnics Ltd

2.3.1 Soiltechnics Ltd undertook a supplementary Phase II Ground Investigation across the former timber works in May 2022, ref STU5650-GO1. The work included the drilling of 6 No. cable percussive boreholes to depths of between 12.0m to 25.0m bgl and 22 No. windowless sampler boreholes to between 2.25m to 5.45m bgl along with subsequent land gas/groundwater monitoring, geotechnical and contamination testing.

2.3.2 As part of the works 3 No. 12.0m deep wells were installed at the locations of BH302, BH304 and BH305, 3 No. 25m deep wells were installed at the locations of BH301, BH303 and BH306 and 4 No. 3.0m to 5.0m deep wells were installed at the locations of WS310, WS318, WS319 and WS322.

2.3.3 The locations of the monitoring wells are shown on the attached plan in Appendix A.

2.3.4 The investigation concluded that 'The GQRA assessment on both human health and controlled water receptors has not identified any significantly elevated contaminants to be present. No plausible contaminant linkages have been identified. The site is considered suitable for redevelopment without any requirement for further investigative works or remediation.'

2.3.5 The reader is referred to the report for further detail including monitoring data and results of contamination testing.

3.0 Site Setting

3.1 Location

3.1.1 The site is located within the footprint of the former Watford Timber Co Ltd, Old's Approach, 4-7 Tolpits Lane, Watford, WD18 9RE, centered approximately at National Grid Reference 508142,194409.

3.1.2 The site is roughly rectangular in shape and is approximately 1.0ha in area. The site currently comprises numerous warehouse style buildings and areas of external hardstanding. The proposed works are to be carried out across the site as a whole, with the existing buildings being demolished and a new large warehouse style building constructed along the site's western boundary and a smaller building constructed in the southern part of the site.

3.1.3 The site is situated in a built up commercial/industrial area, with further similar style developments bounding the subject site to the north, east and west. To the south of the site is an area of car parking and woodland beyond which the River Colne is situated.



Figure 3.1: OS map showing the site location in red.

3.2 Geology

- 3.2.1 The British Geological Survey (BGS) online mapping records the geology at the site to comprise Made Ground soils overlying superficial deposits of Alluvium overlying Taplow Gravel.
- 3.2.2 The underlying bedrock geology is recorded as the Seaford Chalk and Newhaven Chalk Formation.

3.3 Hydrogeology

- 3.3.1 The superficial deposits are classified as a Secondary A Aquifer whilst the underlying Seaford Chalk and Newhaven Chalk Formation (bedrock geology) is classified as a Principal Aquifer.
- 3.3.2 Groundwater is likely to be in direct continuity between the superficial deposits and the underlying bedrock geology and may be in hydraulic continuity with the River Colne to the south of the site.
- 3.3.3 The site is located within a Groundwater Source Protection Zone I (SPZ I), which are considered to be highly sensitive due to the proximity to an abstraction point and shortened travel time of 50 days of pollutants to the source.

3.4 Site History

- 3.4.1 The site has been subject to a detailed historical map review as part of the previous ground investigations to which the reader is referred.
- 3.4.2 In general, the site was mapped as open undeveloped agricultural land up until the 1960's map when a small building was shown in the north west corner of the site. By the 1974 map the site had become fully developed with a works, with numerous new buildings mapped on site including a substation, works buildings and areas of earthworks. Between 2005 and 2011 an additional works building was constructed in the southern most part of the site. Between 2011 and the present day some minor small scale alteration were noted to have taken place on the site.
- 3.4.3 The immediate surrounding area appears to have been developed along the same timeline as the subject site, with areas of large scale works first appearing on the early 1960's maps, continuing to develop upto the present day.

3.5 Site Based Monitoring Programme

- 3.5.1 The site has been historically subject to a site-based monitoring programme, which is referred to in the Soiltechnics report and detailed above in Section 2.1.
- 3.5.2 Groundwater sampling was undertaken on the site during both of the previous phases of ground investigation. During the Ashdown Site Investigation sampling minor exceedances in PAH's and hydrocarbons were reported above the drinking water standard (DWS)/WHO screening values, with evidence of VOC's also recorded in all

samples tested. It should be noted that the samples were all from relatively shallow depths (<5m bgl).

- 3.5.3 Additional deeper groundwater sampling was undertaken in the cable percussive boreholes installed as part of the Soiltechnics investigation. The results from the groundwater samples recovered from within the underlying chalk aquifer indicated no exceedances above the DWS screening criteria. Minor exceedances were reported in regards to surface water quality (EQS) for Cadmium, Lead, Nickel and Zinc, however the exceedances were not considered to pose a significant risk
- 3.5.4 Both the previous reports risk assessments concluded that although some minor elevated determinands are present within the groundwater, they are not considered to be indicative of widespread soil or groundwater impact and that no further works or remedial measures are deemed to be required.
- 3.5.5 JPP have provided a site-specific borehole management report and monitoring/maintenance plan for the site under separate cover to this report, reference R-GMP-27317-01-00, dated October 2023. This report provides details on the existing boreholes which are to be decommissioned to prevent them acting as future pollutant pathways and the existing boreholes which are to be maintained for future groundwater monitoring and sampling to assess compliance and where required undertake further groundwater level assessment and sampling.

3.6 Ground Model

- 3.6.1 The most recent and more detailed ground investigation report produced by Soiltechnics in 2022, confirmed that the soils encountered across the site generally comprised a covering of concrete hardstanding which was found to overlie made ground soils to depths of between 0.8m to 2.4m bgl. The made ground was found to comprise reworked clayey sand and gravel with variable anthropogenic material including concrete, brick, plastic, clinker glass and metals.
- 3.6.2 Underlying the made ground soils, Alluvium was encountered which comprised generally organic clay with variable sand and gravel content. The Alluvium was found to extend to a maximum depth of 4.0m bgl, but was found to be deeper on the western part of the site, thinning to the east.
- 3.6.3 Soils considered to be representative of the Taplow Gravel Member were encountered beneath the Alluvium to depths of upto 3.5m bgl, however the presence of Taplow Gravel was found to vary across the site, with the soils being found to be generally absent in the eastern most part.
- 3.6.4 Across the site bedrock geology associated with the Seaford Chalk and Newhaven Chalk Formation was encountered from depths of between 0.5m to 3.5m bgl. These soils were found to extend down to the base of the deepest boreholes at 25.0m bgl and generally transitioned from a weathered Dm Chalk to a Dc Chalk (or better) with depth.

3.6.5 The ground model across the site is considered to be sufficiently detailed based on the number of boreholes drilled and is therefore considered to be an accurate representation of the conditions likely to be encountered beneath the site. The ground model is summarised in the table below:

General Ground Model based on Soiltechnics log descriptions		
Stratum	Description	Thickness
Made Ground	Reworked clayey sand and gravel with variable anthropogenic material including concrete, brick, plastic, clinker glass and metals	0.4m to 0.7m
Alluvium	Variable, comprising: Brown slightly sandy and occasionally gravelly Clay or; Brown/grey-brown clayey gravel with inclusions of flint and rare inclusions of chalk	Up to 2.0m
Taplow Gravel	Brown sandy slightly clayey Gravel. Gravel is fine to coarse subrounded to subangular flint and chalk.	1.0m to 1.5m
Chalk (Dm)	Structureless CHALK composed of pale brown slightly sandy gravelly CLAY. Gravel is weak low density cream subrounded to subangular. Frequent gravels of int.	11.5m to 14.5m
Chalk (Dc or better)	Structureless CHALK composed of silty subangular to subrounded GRAVEL and COBBLES. Clasts are moderately strong light brown. Matrix is light brown. Frequent gravel and cobbles of int.	10.0m+

Table 3.6

3.7 Groundwater

3.7.1 Groundwater monitoring data has been provided as part of the Soiltechnics report which has been made available to JPP.

3.7.2 On review of the groundwater monitoring data, which was undertaken during the summer months of June and July 2022, recorded groundwater levels, converted to m AOD based on the borehole elevation data, indicates that the groundwater gradient falls in a south westerly direction towards the River Colne and the associated potable groundwater abstraction point which is mapped 190m south west of the site. A maximum recorded fall of 0.69cm has been recorded from the northern site boundary (BH301) down towards the southern site boundary (BH305).

Summary of Groundwater Observations			
Borehole location	Ground level (m AOD)	Depth Groundwater Encountered (below ground level and m AOD)	Observations
BH301	50.37	3.03m bgl (47.34m AOD)	Level during monitoring 17/06/2022
		3.29m bgl (47.08m AOD)	Level during monitoring 22/06/2022
		3.09m bgl (47.28m AOD)	Level during monitoring 06/07/2022
		3.16m bgl (47.21m AOD)	Level during monitoring 13/07/2022
		3.86m bgl (46.51m AOD)	Level during monitoring 22/07/2022
		3.81m bgl (46.56m AOD)	Level during monitoring 26/07/2022

Summary of Groundwater Observations

Borehole location	Ground level (m AOD)	Depth Groundwater Encountered (below ground level and m AOD)	Observations
BH302	50.35	3.01m bgl (47.34m AOD)	Level during monitoring 17/06/2022
		3.39m bgl (46.96m AOD)	Level during monitoring 22/06/2022
		3.01m bgl (47.34m AOD)	Level during monitoring 06/07/2022
		3.15m bgl (47.20m AOD)	Level during monitoring 13/07/2022
		3.90m bgl (46.45m AOD)	Level during monitoring 22/07/2022
		3.84m bgl (46.51m AOD)	Level during monitoring 26/07/2022
BH303	50.5	3.22m bgl (47.28m AOD)	Level during monitoring 17/06/2022
		3.55m bgl (46.95m AOD)	Level during monitoring 22/06/2022
		3.19m bgl (47.31m AOD)	Level during monitoring 06/07/2022
		3.43m bgl (47.07m AOD)	Level during monitoring 13/07/2022
		4.24m bgl (46.26m AOD)	Level during monitoring 22/07/2022
		4.12m bgl (46.38m AOD)	Level during monitoring 26/07/2022
BH304	50.61	3.47m bgl (47.14m AOD)	Level during monitoring 17/06/2022
		3.88m bgl (46.73m AOD)	Level during monitoring 22/06/2022
		3.43m bgl (47.18m AOD)	Level during monitoring 06/07/2022
		3.56m bgl (47.05m AOD)	Level during monitoring 13/07/2022
		4.66m bgl (45.95m AOD)	Level during monitoring 22/07/2022
		4.42m bgl (46.06m AOD)	Level during monitoring 26/07/2022
BH305	51.55	4.50m bgl (47.05m AOD)	Level during monitoring 17/06/2022
		4.90m bgl (46.65m AOD)	Level during monitoring 22/06/2022
		4.38m bgl (47.17m AOD)	Level during monitoring 06/07/2022
		4.56m bgl (46.99m AOD)	Level during monitoring 13/07/2022
		5.73m bgl (45.82m AOD)	Level during monitoring 22/07/2022
		5.49m bgl (46.06m AOD)	Level during monitoring 26/07/2022
BH306	50.39	3.23m bgl (47.16m AOD)	Level during monitoring 17/06/2022
		3.58m bgl (46.81m AOD)	Level during monitoring 22/06/2022
		3.17m bgl (47.22m AOD)	Level during monitoring 06/07/2022
		3.36m bgl (47.03m AOD)	Level during monitoring 13/07/2022
		4.32m bgl (46.07m AOD)	Level during monitoring 22/07/2022
		4.18m bgl (46.21m AOD)	Level during monitoring 26/07/2022

Table 3.7

4.0 Foundation Assessment

- 4.1.1 The proposed development comprises the demolition of the existing on-site structures and the construction of new steel framed warehouse style buildings on the western half of the site, with the remainder of the site being developed into areas of hardstanding.
- 4.1.2 Given the depth of the Made Ground, underlying low strength Alluvial soils and varied depth to competent ground, shallow foundations are likely to experience excessive total and differential settlements. The potentially high groundwater table would also make the use of shallow foundations difficult due to the required groundwater management and trench stability issues. Significant groundwater management is also considered likely to have a potential significant impact on the local groundwater regime which in turn could also potentially mobilise any contaminants present from offsite sources and could impact the water quality at the potable abstraction point situated 190m southwest of the site.
- 4.1.3 As a result of the anticipated structural loads associated with the warehouse buildings coupled with the poor and variable underlying ground conditions, a ground improvement technique has been determined as the most appropriate foundation solution with conventional shallow foundations deemed unsuitable due to the variable and excessive predicated settlement. Attention has therefore been focussed on the use of shallow ground improvement techniques to help to transmit the foundation loads to more competent strata at depth, namely into the top of the underlying bedrock chalk.
- 4.1.4 It is understood that there is no current pile layout, however the proposed vibro stone columns will only be utilized beneath the footprint of the proposed buildings to support the floor slab.
- 4.1.5 As discussed above, the preferred foundation solution comprises the installation of vibro stone columns through the Made Ground soils and where present the Alluvium and Taplow Gravel down into the underlying bedrock chalk at depths of approximately 5.0m bgl.
- 4.1.6 The vibro stone column technique improves weak/low density soils by installing densely compacted granular columns into the ground with the use of a vibrating poker. This technique laterally displaces soils in the treatment zone and helps to densify the surrounding soils leading to enhanced bearing capacity and reduced settlement characteristics. This technique can be used with either a top feed or bottom feed process depending on the ground conditions encountered on site.

- 4.1.7 The use of vibro stone columns can be considered a sustainable foundation solution and the technique produces no excess spoil which would require off site disposal to landfill and where applicable, recycled materials can be utilized for the granular fill material.
- 4.1.8 Vibro stone columns can be considered a potential contamination risk due to the perceived formation of a potential pollutant pathway. However, the technique can reduce the mass permeability of the soils reducing the risk of migration. In this instance, the stone columns will also only be used beneath the floor slab of the proposed buildings, which will act as a barrier to downward percolation of surface water in the areas where the stone columns are proposed.

5.0 Contamination

5.1 Soils

5.1.1 The report undertaken by Ashdown Site Investigation Ltd contained a wide range of contamination testing which included heavy metals, hydrocarbons, PAH's and asbestos. The results were assessed against the Commercial/Industrial end use soil screening values (SSV's)

5.1.2 No exceedances were reported for heavy metals, a single exceedance was reported for PAH's (dibenz(ah)anthracene, 3.9mg/kg in comparison to a screening value of 3.5mg/kg), no evidence of asbestos contamination was identified and no evidence of significant hydrocarbon contamination was detected. The report concluded that where the site is to be developed in a similar manner to that of the existing site that no remedial works are deemed to be required.

5.1.3 It should be noted that the report undertaken by Ashdown Site Investigation Ltd highlighted exceedances above the new PE water supply screening values and therefore it was recommended that new water supply pipes should comprise Barrier Pipes, subject to confirmation from the local water supply company.

5.1.4 The report undertaken by Soiltechnics Ltd also contained a wide range of contamination testing which included heavy metals, hydrocarbons, PAH's and asbestos. The results were assessed against the Commercial/Industrial end S4UL's along with the acute occupational expose values for construction operatives. The report made the following conclusion:

No suspected asbestos containing materials were observed during the fieldworks. However, laboratory screening detected asbestos fibres within 2 of the 14 samples analysed. Both samples were quantified and showed concentrations of <0.001%.

Overall, this is considered to be representative of sporadic occurrences of asbestos at trace concentrations and does not pose an unacceptable level of risk to construction workers or end users of the site. No special precautions are required.

Following the laboratory testing and GQRA assessment, no contaminants have been identified which exceed current guideline values for human receptors, including end users, construction operatives and off-site public exposure.

The soils pose a low risk to human health, and no further works or remediation is required. This assessment is in keeping with the previous ground investigation report undertaken by Ashdown Site Investigation in 2021.

5.2 Groundwater

- 5.2.1 Groundwater sampling was undertaken during both of the previous phases of ground investigation. During the Ashdown Site Investigation sampling minor exceedances in PAH's and hydrocarbons were reported above the drinking water standard (DWS)/WHO screening values, with evidence of VOC's also recorded in all samples tested. It should be noted that the samples were all from relatively shallow depths (<5.0m bgl).
- 5.2.2 Additional deeper groundwater sampling was undertaken in the cable percussive boreholes installed as part of the Soiltechnics investigation. The results from the groundwater samples recovered from within the underlying chalk aquifer indicated no exceedances above the DWS screening criteria. Minor exceedances were reported in regard to surface water quality (EQS) for Cadmium, Lead, Nickel and Zinc, however the exceedances were not considered to pose a significant risk.
- 5.2.3 Both the previous reports risk assessments concluded that although some minor elevated determinands are present within the groundwater, they are not considered to be indicative of widespread soil or groundwater impact and that no further works or remedial measures are deemed to be required.

6.0 Environmental Risk Assessment

6.1 Methodology

6.1.1 The Environment Agency (EA) has identified six scenarios within their guidance document Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention NC/99/73;

1. Creation of preferential pathways – permitting contamination to migrate through a low permeability strata and impact a sensitive aquifer;
2. Creation of preferential pathways to allow migration of landfill gas or contaminant vapours to the surface;
3. Direct contact with contaminated soils at the surface by site workers;
4. Direct contact with contaminated soils and the constructed piles causing a degradation of the construction materials;
5. Driving of solid contamination into the underlying aquifer; and
6. Contamination of groundwater and subsequently surface water by the introduction of concrete/grout.

6.1.2 The proposed site activities have been assessed against these 6 criteria in Table 6.1d using the following criteria specific to the piling works and potential receptors; Principal Aquifer, Potable abstraction well and the River Colne, Human Health (long term and short term);

Effect of risks	
Effect	Description
High	Significant mobilisation of contaminants causing significant deterioration of the groundwater or River Colne water quality (downstream) or significant risks to human health.
Moderate	Mobilisation of contaminants causing limited deterioration of the groundwater or River Colne water quality (downstream) or risks to human health.
Low	No noticeable change in existing groundwater or River Colne quality (downstream).

Table 6.1a

Likelihood of risk	
Likelihood	Description
High	Works would mobilise additional contaminants or create pathways.
Moderate	Works have the potential to mobilise additional contamination or create pathways though this would be minimal in duration and quantity.
Low	Works are unlikely to mobilise contaminants or create pathways.

Table 6.1b

Risk determination		Effect		
Likelihood		High	Moderate	Low
	High	Very High	High	Medium
Moderate	High	Medium	Low	Very Low
Low	Medium	Low	Very Low	

Table 6.1c

Risk Assessment for proposed piling works – Vibro Stone Columns

Pollution Scenario	Effect	Likelihood	Risk	Mitigation
1. Creation of preferential pathways – permitting contamination to migrate through a low permeability stratum and impact a sensitive aquifer	Moderate	Moderate	Medium	<p>Vibro stone columns are considered to potentially act as a pathway for the mobilisation of contaminants due to the granular nature of the fill material used. However, the technique can reduce the mass permeability of the soils reducing the risk of migration. In this instance, the vibro stone columns will also only be used beneath the floor slabs of the proposed buildings, which would act as a barrier to downward percolation of surface water in the areas where the stone columns are proposed.</p> <p>Across the site the ground conditions vary, with a layer of clay based alluvial soils encountered in the north western part of the site and being found to be absent elsewhere, where the made ground soils are found to directly overlie the Taplow Gravel. Therefore, whilst some areas of the site could be considered to potentially have an aquiclude, large areas of the site are in direct continuity from the surface.</p> <p>Based on the soils encountered, it is considered that the Taplow Gravel and the underlying bedrock Chalk are in hydraulic continuity and as such the proposed ground improvement works would not significantly alter the existing local groundwater regime.</p> <p>Therefore, whilst the risk is considered to be moderate in regards to the assessment factors set out above in tables 6.1a-c, site specific factors in regards to the absence of significant on site contamination and the nature of the use of the stone columns beneath buildings only is considered to offer mitigation, reducing the risk to Low.</p>
2. Creation of preferential pathways to allow migration of landfill gas or contaminant vapours to the surface	Low	Low	Very Low	<p>The Characteristic Situation in relation to gas risk has been identified to be CS1, with no elevated land gas concentrations, borehole pressures or flow rates recorded in the six land gas monitoring visits undertaken on site. As such the introduction of vibro stone columns through the identified shallow soil sequence is not considered to pose a significant risk in regards to the potential mobilisation of land gases beneath the proposed buildings.</p>

Risk Assessment for proposed piling works – Vibro Stone Columns				
Pollution Scenario	Effect	Likelihood	Risk	Mitigation
3. Direct contact with contaminated soils at the surface by site workers	Low	Low	Very Low	Vibro stone columns are a penetrative ground improvement technique, which are considered to be a form of displacement pile. As such, no arisings are created during the formation of the piles which means that the risk of ground workers coming into direct contact with arisings is considered to be negligible.
4. Direct contact with contaminated soils and the constructed piles causing a degradation of the construction materials	Low	Low	Very Low	Vibro stone columns are formed using a range of granular materials rather than concrete which reduces the risk associated with aggressive ground conditions. Testing across the site to date has identified no significantly elevated concentrations of contamination and the previous ground investigation reports have classified the sulphate class for all soil types encountered on site to be DS-1.
5. Driving of solid contamination into the underlying aquifer	Low	Low	Very Low	Penetrative ground improvement methods involve horizontal displacement and densification of the soil through which the column is constructed. In normal circumstances this will not lead to soil being dragged downwards.
6. Contamination of groundwater and subsequently surface water by the introduction of concrete/grout	Moderate	Low	Low	Vibro stone columns are formed using a range of granular materials rather than concrete and as such there would be no risk associated with the introduction of concrete/grout into the ground or groundwater.

Table 6.1d

6.2 Mitigation and Enhancement Measures

- 6.2.1 A groundwater monitoring plan (GMP), ref R-GMP-27317-01-00, has been developed for the site which details the proposed monitoring plan for the site during and post development works and also includes detail on the proposed actions to be taken with regards to existing boreholes on site to which the reader is referred.
- 6.2.2 In addition to the GMP, a remediation method statement (RMS) has also been produced for the site, ref R-RMS-27317-01-00, which details the required remedial works to be undertaken and the requirement for a watching brief during demolition works to which the reader is referred.
- 6.2.3 It is proposed to undertake additional groundwater monitoring during the works and following the works after 3 months and 6 months to enable any detrimental impact on the groundwater/surface water quality to be detected and appropriately managed should this occur.
- 6.2.4 The following table provides a summary of the monitoring wells which are to be kept onsite to form part of the future long term monitoring plan based on providing spatial coverage across the site and maintain upgradient and downgradient well locations.

Summary of Groundwater Monitoring Wells

Borehole location	Base Depth of well (m bgl)	Stratum	Observations
BH201	15.0	Chalk	Standing water level on completion of borehole 5.0m bgl.
BH202	15.0	Chalk	Standing water level on completion of borehole 8.0m bgl.
BH203	15.0	Chalk	Standing water level on completion of borehole 5.0m bgl.
WS202	3.0	Taplow Gravel/Chalk	Dry on completion
BH301	25.0	Chalk	Groundwater strike at 2.7m bgl.
BH303	25.0	Chalk	Groundwater strike at 4.4m bgl.
BH305	12.0	Chalk	No groundwater strikes recorded.
BH306	25.0	Chalk	Groundwater strike at 4.6m bgl.
WS319	5.45	Chalk	Groundwater strike at 3.0m bgl.
WS322	3.0	Chalk	Groundwater strike at 0.5m bgl.

Table 6.2

6.3 Contingency

6.3.1 In the event that a significant rise in contaminant levels is noted, or that contaminants not commonly encountered on site are identified within the groundwater compared to the baseline data, a contingency action plan will be implemented which would comprise the following;

Additional monitoring and sampling at the following locations: BH201, BH301, BH303, BH203 and BH305 to determine whether the rise in contaminant levels is constant along with a review of activities in the surrounding area to ascertain whether it is related to the site activities;

Liaison with regulators (both the EA and the council EHO) regarding suitable remedial actions considered to be reasonable in terms of cost and benefit/effect which could comprise;

- Increased monitoring in further boreholes across the site;
- Further investigation to identify the source of the impact; and
- Groundwater extraction from the existing wells or a remedial well to draw groundwater back to site and remediate the impact.

6.3.2 In the event that the arisings from earthworks identifies unforeseen contamination, works will be halted to enable the material to be assessed by a suitably qualified engineer, samples of such materials would be collected for testing to determine the level of risk posed. A remediation method statement has been produced for the site by JPP under separate cover, reference R-RMS-27317-01-00, dated October 2023.

6.3.3 In the event of any unforeseen contamination being encountered further liaison would be sort with the Environment Agency and Local Authority to ensure that any proposed remedial measures or changes to working methodologies are approved prior to be undertaken on site.

7.0 Conclusions

- 7.1.1 The identified ground conditions underlying the site are considered to have a low level of contamination as outlined in section 5.0 and such the risk posed to the underlying aquifer from the proposed ground improvement scheme is considered to be low.
- 7.1.2 It is considered, following an engineering assessment of the anticipated column loads and based on the ground conditions encountered, that a vibro stone column presents the best engineering solution beneath the proposed building floor slabs.
- 7.1.3 Overall, in regard to table 6.1d, the proposed ground improvement technique is considered to present a very low to low risk. The highest level of risk is associated with the potential to create a preferential pathway, however given the absence of identified contamination, coupled with the absence of a significant aquiclude across the site, the risk is considered to be low. In addition, the columns are due to be positioned beneath the proposed buildings only which would severely restrict the downward migration of surface water through the columns.
- 7.1.4 The proposed ground improvement technique will generate no arisings and as such removes the potential risk to ground workers and offers an environmental benefit by reducing the need to remove unwanted pile arisings offsite to authorised landfill sites.
- 7.1.5 An increased frequency of monitoring will be undertaken during the piling works and following completion to enable an assessment of any impact caused by the works.

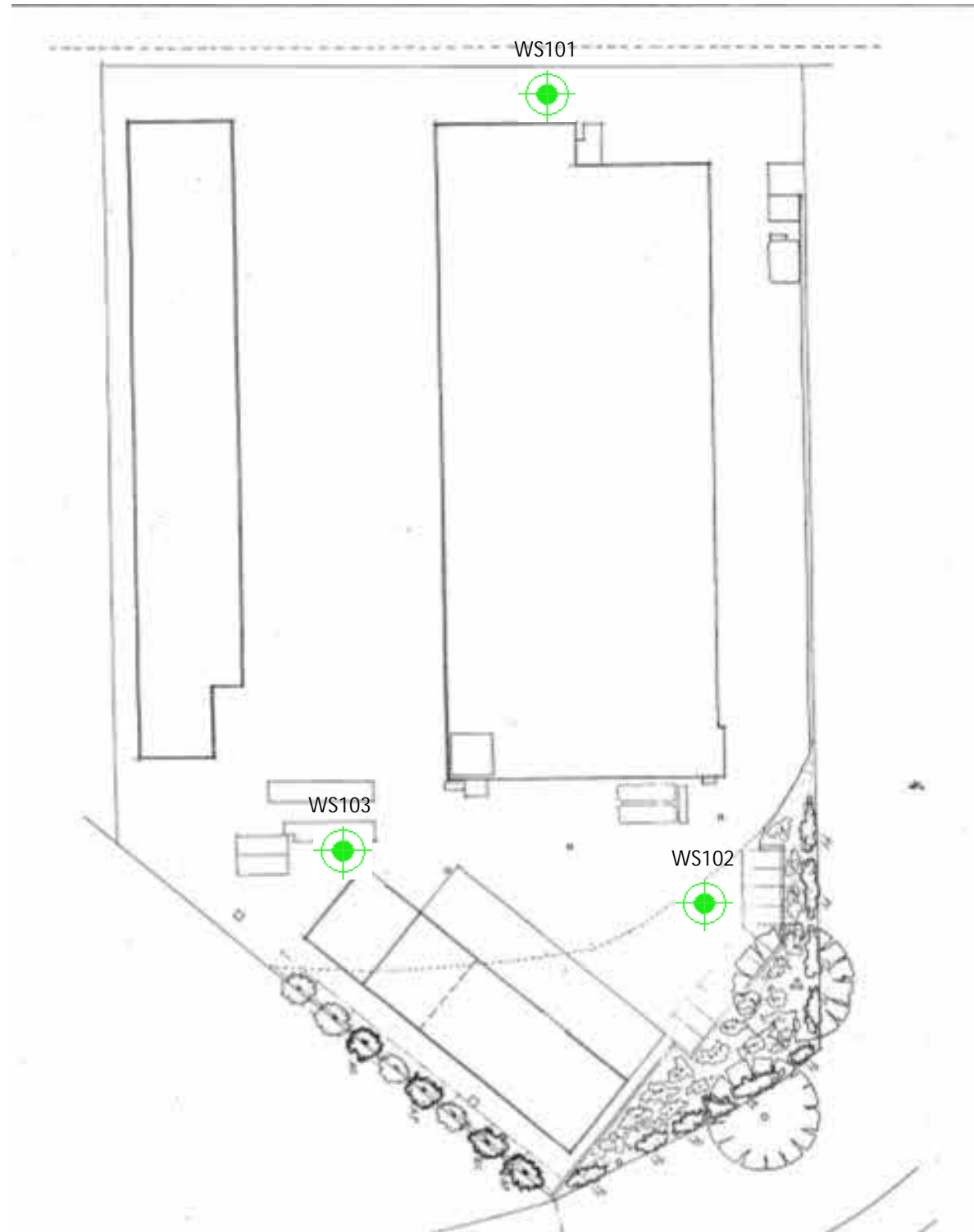


Appendix A
Groundwater Monitoring Borehole Locations

KEY:



Groundwater monitoring well



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Job No. & Title:

1CO108901
Watford Timber
Company Ltd

Client:

Watford Timber
Company Ltd

Drawn by: BR

Approved by: RL

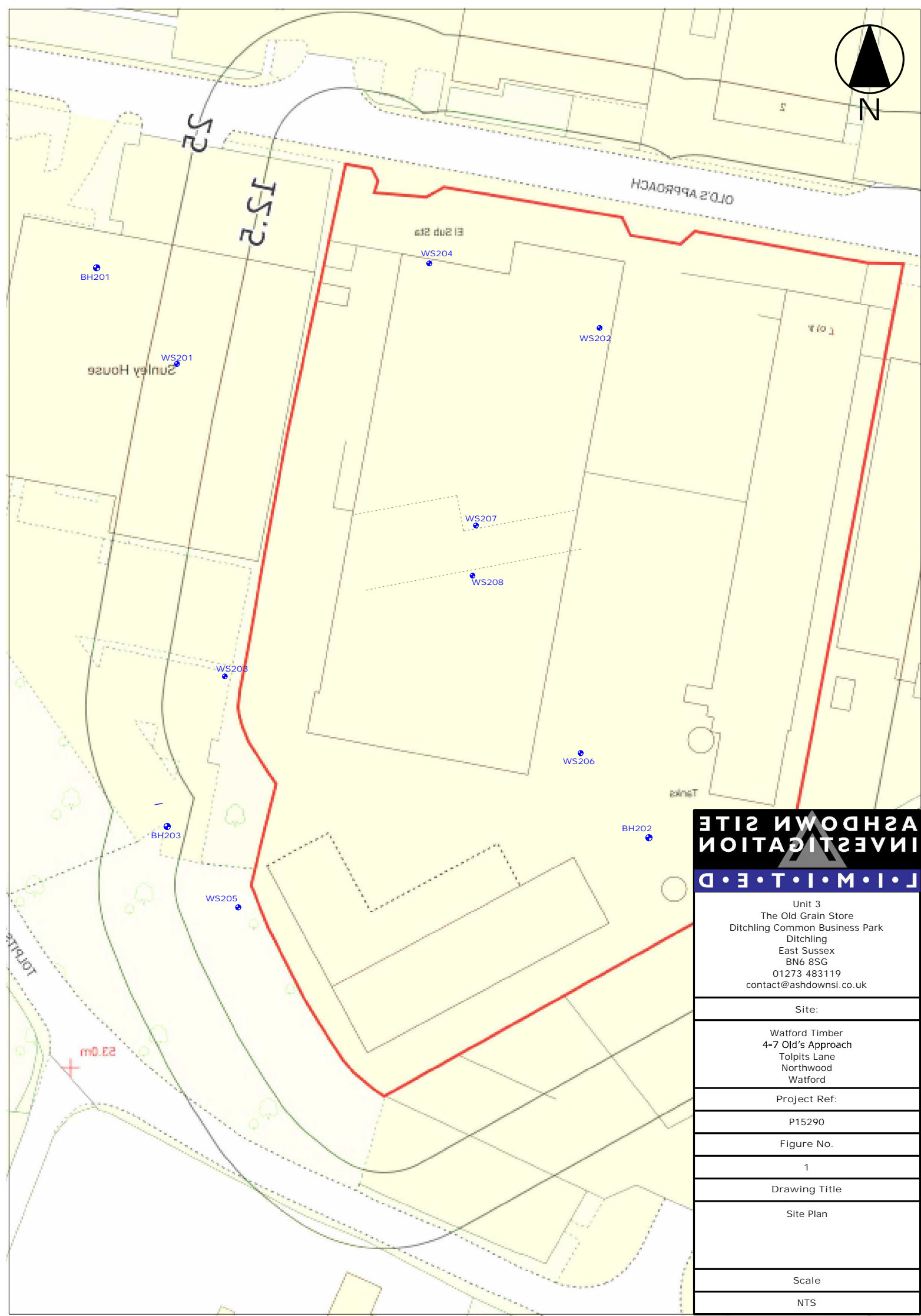
Date: April 2021

Notes:

NOT TO SCALE
Drawing supplied by
Watford Timber
Company Ltd

Drawing Title:

1CO108901-002
Groundwater sample
location plan



**A S H D O W N S I
I N V E S T I G A T I O N
S I T E**

Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG
01273 483119
contact@ashdownsi.co.uk

Site:

Watford Timber
4-7 Old's Approach
Tolpits Lane
Northwood
Watford

Project Ref:

P15290

Figure No.

1

Drawing Title

Site Plan

Scale

NTS



- Key:**
- Site Boundary
 - Cable Percussive Borehole
 - Dynamic Windowless Sampling Borehole
 - Monitoring Well Installed
 - Previous Borehole Locations

Notes

- 1) Base image provided by Google.
- 2) All drawn features are approximate.

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Map data © 2022 Google

A	August 2022	First issue
REV	DATE	COMMENT ON VARIATION

soiltechnics

environmental • geotechnical • building fabric

PROJECT TP Watford		
TITLE Exploratory Hole Plan		
PROJECT No. STU5650	DRAWING 02	REVISION A



Appendix B
EA Correspondence

David Heighton
Three Rivers District Council
Development Control
Three Rivers House Northway
Rickmansworth
Hertfordshire
WD3 1RL

Our ref: NE/2023/136022/01
Your ref: 23/0216/FUL

Date: 16 August 2023

Dear David,

Watford Timber Co Ltd, Old's Approach, 4-7 Tolpits Lane, Watford, WD18 9RE.

Demolition of existing buildings and redevelopment of site to provide builders' merchant (sui generis) for display, sale and storage of building timber and plumbing supplies, plant, and tool hire, outside display and storage including storage racking, ancillary office and staff amenity building, gatehouse, car parking and servicing arrangements, fencing and associated works.

Thank you for consulting us on the above planning application on 28 July 2023. As part of the consultation, we have reviewed the following report and supporting appendices:

Ground Investigation Report for Former Watford Timber Co Ltd, prepared by Soiltechnics and dated December 2022 (ref: STU5650-G01, revision 02)

The above report describes the site location as within a Source Protection Zone 2. Please note that the site is actually located within Source Protection Zone 1 (**SPZ1**). Areas in SPZ1 are the catchment areas for sources of potable, high quality water supplies usable for human consumption. All development proposals are carefully monitored within SPZ1. The current Ground Investigation Report and future reporting should be updated in order to reflect the SPZ1 location of the site.

We note that the Ground Investigation Report indicates that no remediation is required. However, in order to demonstrate that there will not be a deterioration of groundwater and/or land quality we request that a watching brief with respect to contamination is kept during development works. This should include a set of mitigation actions should contamination be discovered during development.

Table 8.7.1.2 of the Ground Investigation Report indicates diesel tanks present at the site. Please clarify if these diesel tanks are to be removed from the site or retained for the new development.

Considering the above, **we have no objection to the proposed development subject to the inclusion of the following conditions on any grant of decision notice.**

Without these conditions we feel that the development would pose an unacceptable risk to groundwater, and we would object.

We ask to be consulted on the details submitted for approval to your authority to

Cont/d..

discharge these conditions and on any subsequent amendments/alterations. Please note that our comments are only in relation to environmental issues. Others may need to be consulted with respect to Health and Safety or amenity issues.

Condition 1 – Remediation Strategy

No development approved by this planning permission shall take place until a remediation strategy that includes the following components to deal with the risks associated with contamination of the site shall be submitted to and approved, in writing, by the local planning authority:

1. A preliminary risk assessment which has identified:
 - all previous uses.
 - potential contaminants associated with those uses.
 - a conceptual model of the site indicating sources, pathways, and receptors.
 - potentially unacceptable risks arising from contamination at the site.
2. A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.
3. The results of the site investigation and the detailed risk assessment referred to in (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.
4. A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in the remediation strategy in (3) are complete and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.

Reason

Groundwater is particularly sensitive at this location because:

The site is located within a groundwater Source Protection Zone 1 (SPZ1)

The site is located atop a two Secondary A Superficial Aquifer (Alluvium and Taplow Gravels)

The site is located atop a principal Bedrock Aquifer (Chalk)

The site is located within a Water Framework Directive Groundwater water body with 'poor' overall classification (Mid-Chilterns Chalk GB40601G601200)

This condition will ensure that the development does not contribute to and is not put at unacceptable risk from or adversely affected by unacceptable levels of water pollution in line with paragraphs 174, 183, and 184 of the [National Planning Policy Framework](#).

Condition 2 – Verification report

No occupation of any part of the permitted development shall take place until a verification report demonstrating completion of works set out in the approved remediation strategy and the effectiveness of the remediation shall be submitted to and approved, in writing, by the local planning authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met.

Reason

To ensure that the site does not pose any further risk to human health or the water environment by demonstrating that the requirements of the approved verification plan have been met and that remediation of the site is complete. This is in line with paragraphs 174, 183, and 184 of the [National Planning Policy Framework](#).

Condition 3 - Long term monitoring and maintenance plan for groundwater

No development should take place until a long-term monitoring and maintenance plan in respect of contamination including a timetable of monitoring and submission of reports to the Local Planning Authority, shall be submitted to and approved in writing by the Local Planning Authority. Reports as specified in the approved plan, including details of any necessary contingency action arising from the monitoring, shall be submitted to and approved in writing by the Local Planning Authority. Any necessary contingency measures shall be carried out in accordance with the details in the approved reports. On completion of the monitoring specified in the plan a final report demonstrating that all long-term remediation works have been carried out and confirming that remedial targets have been achieved shall be submitted to and approved in writing by the Local Planning Authority.

Reason

To ensure that the site does not pose any further risk to the water environment by managing any ongoing contamination issues and completing all necessary long-term remediation measures. This is in line with paragraphs 174, 183, and 184 of the [National Planning Policy Framework](#).

Condition 4 – Unidentified contamination

If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the local planning authority) shall be carried out until the developer has submitted a remediation strategy to the local planning authority detailing how this unsuspected contamination shall be dealt with and obtained written approval from the local planning authority. The remediation strategy shall be implemented as approved.

Reason

No investigation can completely characterise a site. This condition ensures that the development does not contribute to, is not put at unacceptable risk from, or adversely affected by, unacceptable levels of water pollution from previously unidentified contamination sources at the development site. This is in line with paragraphs 174, 183, and 184 of the [National Planning Policy Framework](#).

Condition 5 – Borehole management

A scheme for managing any borehole installed for the investigation of soils, groundwater or geotechnical purposes shall be submitted to and approved in writing by the local planning authority. The scheme shall provide details of how redundant boreholes are to be decommissioned and how any boreholes that need to be retained, post-development, for monitoring purposes will be secured, protected and inspected. The scheme as approved shall be implemented prior to the occupation of any part of the permitted development.

Reason

To ensure that redundant boreholes are safe and secure, and do not cause groundwater pollution or loss of water supplies in line with paragraphs 174, 183, and 184 of the [National Planning Policy Framework](#) and Position Statement N Groundwater resources of '[The Environment Agency's approach to groundwater protection](#)'.

Condition 6 – Piling / foundation works risk assessment with respect to groundwater resources

Piling, deep foundations and other intrusive groundworks using penetrative measures shall not be carried out other than with the written consent of the local planning

authority. The development shall be carried out in accordance with the approved details.

Reason

To ensure that any proposed piling, deep foundations and other intrusive groundworks do not harm groundwater resources in line with paragraphs 174, 183, and 184 of the [National Planning Policy Framework](#) and Position Statement N. Groundwater Resources of the '[The Environment Agency's approach to groundwater protection](#)'.

Condition 7 – Infiltration of surface water onto the ground

No drainage systems for the infiltration of surface water to the ground are permitted other than with the written consent of the local planning authority. Any proposals for such systems must be supported by an assessment of the risks to controlled waters. The development shall be carried out in accordance with the approved details.

Reason

To ensure that the development does not contribute to, is not put at unacceptable risk from, or adversely affected by, unacceptable levels of water pollution caused by mobilised contaminants. This is in line with paragraphs 174, 183, and 184 of the [National Planning Policy Framework](#).

Advice to Local Planning Authority

Use of Sustainable Drainage Systems (SuDS)

Support for the use of SuDS to ensure development does not increase flood risk elsewhere is set out in paragraph 167 of the National Planning Policy Framework. Infiltration SUDs should not be located in unsuitable and unstable ground conditions such as land affected by contamination or solution features. Where infiltration SuDS are to be used for surface run-off from roads, car parking and public or amenity areas, they should have a suitable series of treatment steps to prevent the pollution of groundwater. For the immediate drainage catchment areas used for handling and storage of chemicals and fuel, handling and storage of waste and lorry, bus and coach parking or turning areas, infiltration SuDS are not permitted without an environmental permit. Further advice is available in the updated CIRIA SUDs manual http://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx

Further information on SuDS can be found in:

the CIRIA C697 document SuDS manual.

HR Wallingford SR 666 Use of SuDS in high density developments.

CIRIA C635 Designing for exceedance in urban drainage – good practice.

the Interim Code of Practice for Sustainable Drainage Systems – the Interim Code of Practice provides advice on design, adoption and maintenance issues and a full overview of other technical guidance on SuDS.

Competent persons

We recommend that developers should:

Follow the risk management framework provided in [Land Contamination: Risk Management](#) (formerly CLR11), when dealing with land affected by contamination.

Refer to the [Environment Agency Guiding principles](#) for land contamination for the type of information that we require in order to assess risks to controlled waters from the site. The Local Authority can advise on risk to other receptors, such as human health.

Consider using the [National Quality Mark Scheme for Land Contamination Management](#) which involves the use of competent persons to ensure that land

contamination risks are appropriately managed. The Planning Practice Guidance defines a "Competent Person (to prepare site investigation information): A person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional

organisation."(<http://planningguidance.planningportal.gov.uk/blog/policy/achieving-g-sustainable-development/annex-2-glossary>)

Refer to the [contaminated land](#) pages on GOV.UK for more information.

The proposed development will be acceptable if a planning condition is included requiring the submission of a remediation strategy, carried out by a competent person in line with paragraph 183 of the NPPF. The Planning Practice Guidance defines a "Competent Person (to prepare site investigation information): A person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation."(<http://planningguidance.planningportal.gov.uk/blog/policy/achieving-sustainable-development/annex-2-glossary/>)".

Advice to applicant

Underground Storage Tanks

The Environment Agency recommends the removal of all underground storage tanks (USTs) that are unlikely to be reused. Once the tanks and associated pipelines have been removed, samples of soil and groundwater should be taken to check for subsurface contamination. If soil or groundwater contamination is found, additional investigations (possibly including a risk assessment) should be carried out to determine the need for remediation. Refer to '[Pollution Prevention Advice and Guidance on Storing and handling materials and products](#)' and 'Defra - The Groundwater Protection Code: Petrol stations and other fuel dispensing facilities involving underground storage tanks - for England and Wales', specifically those sections relating to decommissioning redundant underground fuel storage tanks and infrastructure.

Piling

The foundation works risk assessment should consider potential risks to groundwater resources that could arise as a result of deep piling works. A groundwater monitoring programme should be designed to collect information prior to and during the works to demonstrate that any piling (or other deep penetrative) works are not having an adverse impact on groundwater quality in the area. The piling risk assessment and groundwater monitoring plan should provide a mitigation / action plan should an adverse impacts to groundwater quality be noted during the works.

A brief introduction to the potential hazards associated with piling through contaminated soils can be found:

<http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/scho0202bisw-e-e.pdf>.

Monitoring wells installed to support a piling risk assessment should be installed to at least 5m deeper than the deepest piled foundation to capture any impacts from the proposed groundworks during and post construction.

Waste off-site

Contaminated soil that is, or must be disposed of, is waste. Therefore, its handling, transport, treatment and disposal is subject to waste management legislation, which includes:

Duty of Care Regulations 1991.
Hazardous Waste (England and Wales) Regulations 2005.
Environmental Permitting (England and Wales) Regulations 2016.
The Waste (England and Wales) Regulations 2011.

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically in line with British Standard BS EN 14899:2005 'Characterization of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

If the total quantity of waste material to be produced at or taken off site is hazardous waste and is 500kg or greater in any 12-month period the developer will need to register with us as a hazardous waste producer. Refer to the [waste management](#) page on GOV.uk for more information.

Material Re-use on-site

The CL:AIRE Definition of Waste: Development Industry Code of Practice (Version 2) provides operators with a framework for determining whether or not excavated material arising from site during remediation and/or land development works are waste or have ceased to be waste. Under the Code of Practice:

- excavated materials that are recovered via a treatment operation can be re-used on-site provided they are treated to a standard such that they fit for purpose and unlikely to cause pollution

- treated materials can be transferred between sites as part of a hub and cluster project

- some naturally occurring clean material can be transferred directly between sites

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, and that the permitting status of any proposed on-site operations are clear. If in doubt the Environment Agency should be contacted for advice at an early stage to avoid any delays.

We recommend that developers should refer to:

- The [position statement](#) on the Definition of Waste: Development Industry Code of Practice

- The [waste management](#) page on GOV.uk

The control of emissions from Non-Road Going Mobile Machinery (NRMM) at major residential, commercial or industrial sites.

Where development involves the use of any non-road going mobile machinery with a net rated power of 37kW and up to 560kW, that is used during site preparation, construction, demolition, and/ or operation, at that site, we strongly recommend that the machinery used shall meet or exceed the latest emissions standards set out in Regulation (EU) 2016/1628 (as amended). This shall apply to the point that the machinery arrives on site, regardless of it being hired or purchased, unless agreed in writing with the Local Planning Authority.

This is particularly important for major residential, commercial, or industrial development located in or within 2km of an Air Quality Management Area for oxides of Nitrogen (NOx), and or particulate matter that has an aerodynamic diameter of 10 or 2.5 microns (PM10 and PM2.5). Use of low emission technology will improve or maintain air quality and support LPAs and developers in improving and maintaining local air quality standards and support their net zero objectives.

We also advise, the item(s) of machinery must also be registered (where a register is available) for inspection by the appropriate Competent Authority (CA), which is usually the local authority.

The requirement to include this may already be required by a policy in the local plan or strategic spatial strategy document. The Environment Agency can also require this same standard to be applied to sites which it regulates. To avoid dual regulation this informative should only be applied to the site preparation, construction, and demolition phases at sites that may require an environmental permit.

Non-Road Mobile Machinery includes items of plant such as bucket loaders, forklift trucks, excavators, 360 grab, mobile cranes, machine lifts, generators, static pumps, piling rigs etc. The Applicant should be able to state or confirm the use of such machinery in their application to which this then can be applied.

Water Resources

Increased water efficiency for all new developments potentially enables more growth with the same water resources. Developers can highlight positive corporate social responsibility messages and the use of technology to help sell their homes. For the homeowner lower water usage also reduces water and energy bills.

We endorse the use of water efficiency measures especially in new developments. Use of technology that ensures efficient use of natural resources could support the environmental benefits of future proposals and could help attract investment to the area. Therefore, water efficient technology, fixtures and fittings should be considered as part of new developments.

Commercial/Industrial developments

We recommend that all new non-residential development of 1000sqm gross floor area or more should meet the BREEAM 'excellent' standards for water consumption.

We also recommend you contact your local planning authority for more information.

Pre-Application Advice

Regarding future applications, if you would like us to review a revised technical report prior to a formal submission, outside of a statutory consultation, and/or meet to discuss our position, this will be chargeable in line with our planning advice service. If you wish to request a document review or meeting, please contact our team email address at HNLsustainableplaces@environment-agency.gov.uk.

Final comments

Thank you for contacting us regarding the above application. Our comments are based on our available records and the information submitted to us. Please quote our reference number in any future correspondence. Please provide us with a copy of the decision notice for our records. This would be greatly appreciated.

Should you have any queries regarding this response, please contact me.

Yours sincerely,

Elizabeth Clements

Sustainable Places Planning Advisor

E-mail: HNLsustainableplaces@environment-agency.gov.uk | Tel: 02077644285

End

- Infrastructure Design
- Development Planning
- Geotechnical & Environmental
- Structural Engineering
- Professional Advice
- Surveying



Our Ref: 27317/DK/L01
Your Ref: NE/2023/136022/01
Date: 19th October 2023

JPP Geotechnical & Environmental Ltd
Grand Union Works | Whilton Locks
Daventry | Northamptonshire | NN11 2NH

PRIVATE & CONFIDENTIAL

Environment Agency

By email only to:

Re: Proposed Ground Improvement Works at Watford Timber Co Ltd, Old's Approach, 4-7 Tolpits Lane, Watford, WD18 9RE

Dear Sirs,

The subject site is due to be developed under the planning application 23/0216/FUL (demolition approved under 22/0748/PDND) for the:

Demolition of existing buildings and redevelopment of site to provide builders' merchant (sui generis) for display, sale and storage of building timber and plumbing supplies, plant and tool hire, outside display and storage including storage racking, ancillary office and staff amenity building, gatehouse, car parking and servicing arrangements, fencing and associated works;

The Environment Agency (EA) were consulted as part of the planning application during which the EA provided a formal response dated 16th August 2023, reference NE/2023/136022/01, which stated that the EA would have no objection to the development of the site subject to the inclusion of a set of conditions which are to be addressed as part of the discharge of conditions.

Our client has requested that initial consultation be held with the EA regarding Condition 6, which is set out below for reference, and in line with the advice to applicant, to ensure that the ground improvement scheme which is being proposed for the redevelopment of the site would be considered acceptable in principle prior to undertaking the detailed design works.

Condition 6 – Piling / foundation works risk assessment with respect to groundwater resources Piling, deep foundations and other intrusive groundworks using penetrative measures shall not be carried out other than with the written consent of the local planning authority. The development shall be carried out in accordance with the approved details.

It is proposed to undertake ground improvement works to provide a suitable platform for the redevelopment of the site in line with the planning conditions. The ground improvement works, which will be undertaken by a specialist contractor, are proposed to comprise a series of circa 5.0m deep vibro replacement stone columns to support the proposed new structures only and as such the stone columns will only be positioned beneath the floor slabs of the proposed new buildings.

JPP Geotechnical and Environmental Ltd Registered in England 11117245

Registered office

NORTHANTS

Grand Union Works
Whilton Locks
Daventry, Northamptonshire
NN11 2NH

MILTON KEYNES

B2A, Denbigh Business Park
23 First Avenue
Denbigh
Milton Keynes | MK1 1DN

POOLE

Suite 8 Branksome Park House
Branksome Business Park
Bourne Valley Road | Poole
Dorset | BH12 1ED

Based on our initial review of the ground investigation reports undertaken on the site, which supported the planning application, the proposed vibro stone columns, based on a preliminary anticipated design depth of 5.0m bgl, will be deepened down through the shallow Made Ground, Alluvium and Taplow Gravel and toed into the underlying weathered, structureless Seaford Chalk.

The ground investigation reports undertaken on site to date have identified no significant evidence of gross or residual contamination across the site and the site specific GQRA has identified no plausible pollutant linkages which could impact the underlying Principal Aquifer and SPZ I which is positioned beneath the site. Therefore, the risk of mobilisation of existing contaminants within impacted soils down into the principal aquifer and SPZI through the proposed piling works and the inclusion of a potential pathway in the form of granular inclusions is considered to be very low.

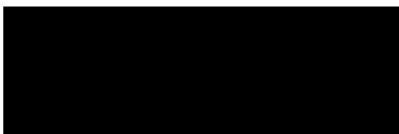
In addition, the proposed vibro stone columns are proposed to be positioned beneath the floor slab of the proposed new buildings only. The new concrete floor slab would act as a physical barrier to any potential new sources of contamination from migrating down into the principal aquifer within the chalk bedrock at depth.

The proposed piling operations/ground improvement works will be supported by the required detailed documents to address Conditions 1, 3, 5 and 6, which will include the production of a remediation strategy, long term monitoring and maintenance plan for groundwater, borehole management strategy and piling risk assessment.

Our client at this stage is seeking confirmation that based on the information provided to date through the planning process and the summary of the proposed ground improvement works detailed above, that the EA would consider the use of vibro stone columns acceptable in principle, prior to our client undertaking the detailed design works and providing the required documentation in line with the planning conditions.

We would appreciate engagement with yourselves on the matter discussed above to ensure that the project can proceed in a timely manner whilst ensuring that the development works do not pose a risk to the underlying sensitive groundwater resources.

Yours Sincerely,



Darryl Kelly MGeol FGS

Technical Director