

beneath the base of all shallow coal seams, with mass fill concrete facing the excavated coal seams. Due to the variation in the depth of the shallow coal seams below existing ground level across the site, a plot specific foundation scheme is likely to be required in order to allow the most suitable foundation options to be designed for each plot.

- 12.4.3 South of the inferred fault, foundation excavations should be taken through the topsoil and Made Ground and foundations placed within the granular soils and weathered bedrock of the Newstead Rock Member at a minimum founding depth of 0.60m bgl. An allowable bearing pressure of 125kN/m² would be available at 0.60m bgl, based upon standard 0.60 m wide foundations. The allowable bearing capacity includes an overall factor of safety of 3 against bearing capacity failure, whilst ensuring total settlements are maintained at less than 25mm.
- 12.4.4 It should be noted that the ground surface slopes gently to the north-east; therefore, some foundations may need to be stepped.
- 12.4.5 Where foundations are to be constructed across the inferred fault, in order to control differential movements/cracking where foundations are spanning cohesive and granular soils, it is recommended that steel reinforcement is incorporated into foundations, both top and bottom.
- 12.4.6 When the natural moisture content of a soil lies close or less than the value of the Plastic Limit, the soil can be considered desiccated. In addition, Driscoll (1983) suggested that desiccation is assumed to be present when the moisture content falls below a level of 40% of the Liquid Limit. The index tests indicate that four of the seven samples tested from the Pennine Upper Coal Measures Formation are desiccated, with one of the samples being significantly desiccated.
- 12.4.7 Where foundations are to be constructed within the influence of existing, felled or proposed trees, they are likely to need deepening, and heave precautions adopted in accordance with National House Building Council (NHBC) Chapter 4.2 'Building Near Trees', based upon soils of medium volume change potential. It is recommended that collapsible materials are used between foundations and cohesive soils to reduce heave pressures. JNP Group recommends that a tree species survey is undertaken, and the results are used to calculate their zones of influence, in order to define areas where foundations would require deepening.
- 12.4.8 Tree roots were not encountered during the site works; however, due to the presence of trees and hedgerows across the site, roots are likely to exist in several areas around the site. It would be prudent for all foundation excavations to be visually inspected by an appropriate engineer in order to verify that tree roots are not present.
- 12.4.9 It should be noted that trench fill foundations deeper than 2.50 m would only be acceptable by the NHBC if they were designed by an engineer.

12.5 Ground Floor Slabs

- 12.5.1 The underlying soils are considered to have medium volume change potential, and consequently may heave. Therefore, suspended ground floor slabs should be used incorporating suitable underfloor voids, based on the recommendations in NHBC Chapter 4.2, with reference to soils of medium volume change potential. In addition, where shallow coal seams are present beneath the proposed plots, a 1.00m distance must be maintained between the base of the ground floor slabs and the top of the shallow coal seams.

- 12.5.2 Due to ground gas protection requirements, suspended ground floor slabs are likely to be required. On clay soils suitable underfloor voids would be necessary, based on the recommendations in NHBC Chapter 4.2, for soils of medium volume change potential. This would be 100mm for cast in-situ concrete floor slabs, or 175mm for pre-cast concrete floor slabs.
- 12.5.3 South of the inferred fault, where the site is underlain by the Newstead Rock Member, the underlying soils are non-shrinkable, therefore, ground-bearing floor slabs can be placed directly on to the granular soils of the Newstead Rock Member. That said the current gas regime for the site requires a CS2 gas protection measure and therefore suspended ventilated floor slabs will be required.

12.6 Groundwater and Excavations

- 12.6.1 Although all trial pits remained stable during excavation, groundwater was encountered within the coal seams found in the trial pits during the investigation, and as such, JNP Group considers that groundwater inflow or excavation collapse could present practical difficulties during foundation excavation, if excavating through the shallow coal seams. In addition, due to the granular nature of the soils of the Newstead Rock Member, excavation instability is likely in this unit.
- 12.6.2 As mentioned above, groundwater was encountered at shallow depths within the coal seams during the site work and subsequent monitoring period. Groundwater control / dewatering measures, such as sump pumping / well pointing should be considered for all excavations through the coal seams.
- 12.6.3 Trial pits, trenches or boreholes carried out as part of this or previous investigations may represent soft spots and conduits/sumps for groundwater or surface water. In excavations, such materials may also be loose and unstable. Unless specifically stated, exploratory hole locations should be regarded as approximate. Consideration should be given to accurate location of such features where it is considered they may impact on the proposed development.
- 12.6.4 Conventional mechanical backhoe excavators should prove suitable for excavation through the ground conditions encountered at the site. However, should occasional large obstructions be encountered in excavations, larger capacity excavators and pneumatic/hydraulic breakout equipment may be necessary.
- 12.6.5 The shallow coal seams are in a loose state of compaction and will be subject to spalling and partial collapse within excavations. Deeper excavations through these coal seams may be prone to rapid, unpredictable, large scale collapse, particularly in the presence of groundwater inflows. Consequently, temporary support should be considered for all excavations where collapse is to be avoided. Heavier duty closed shoring should be provided for any excavation where human entry is necessary, in compliance with statutory requirements to ensure safe working conditions. Low levels of carbon dioxide have been recorded from the Made Ground, hence care should be taken when personnel enter excavations or other confined spaces, to ensure full ventilation is available and appropriate safety precautions taken.

12.7 Pavement Design

California Bearing Ratio

- 12.7.1 It is assumed that the pavement subgrade/formation would be in near surface soils at an approximate depth of 0.60 m below existing ground levels. If ground levels are to be reduced, the formation level would need to be adjusted accordingly, and the specifying geotechnical engineer informed, so that an assessment of the appropriate soil layer can be made.
- 12.7.2 A mean Plasticity Index value of 27% was recorded in the near surface soils north of the inferred fault, in the Pennine Upper Coal Measures, which indicates an equilibrium subgrade CBR value of 3% for this area of the site (based upon Table 5.1 in Interim Advice Note 73/06 Rev 1 2009), assuming average construction conditions and high water table.
- 12.7.3 The near surface soils south of the inferred fault, in the Newstead Rock Member comprise variable granular deposits, which indicates an equilibrium subgrade CBR value of 20% (based upon Table 5.1 in Interim Advice Note 73/06 Rev 1 2009), assuming average construction conditions and high water table.
- 12.7.4 It is recommended that the subgrade CBR value is verified immediately before placement of the pavement capping/subbase to confirm the minimum design CBR value. The design CBR value should not be increased based on these tests. Should testing indicate a subgrade CBR less than the design value, then measures should be taken to improve the subgrade before proceeding with pavement construction.

Frost Susceptibility

Cohesive Soils

- 12.7.5 Soils with a Plasticity Index of greater than 15% would not generally be frost-susceptible (i.e. susceptible to ice lenses formation in frosty conditions) (Croney and Jacobs, 1967). Cohesive soils were encountered across most of the site north of the inferred fault. Seven Plasticity Index tests were undertaken on cohesive soils collected from this area of the site. A mean Plasticity Index of 27% was recorded for these samples, which indicates that the cohesive soils are not frost-susceptible.

Granular Soils

- 12.7.6 Granular soils are considered frost susceptible if the fines content is greater than 10% (TRL RN 29). Gradings undertaken on the granular soils of the Newstead Rock Member south of the inferred fault indicate that the fines content is generally greater than 10%, hence, these soils are considered frost susceptible.

12.8 Ground Aggressivity to Buried Concrete

- 12.8.1 Chemical analyses of eight samples have been undertaken in accordance with BRE SD1 2005 "Concrete in aggressive ground" to determine their concrete classification.

Table 12-1: Concrete Classification Assessment

Strata	Details	Range	Concrete Class
Made Ground	Number of Tests	2	DS-1 – AC-1
	Water Soluble Sulphates (mg/l)	<10 – 25	
	pH	7.9 – 8.5	
	Total Potential Sulphate %	0.13 – 0.21	
Newstead Rock Member	Number of Tests	2	DS-1 – AC-1
	Water Soluble Sulphates (mg/l)	<10 – 250	
	pH	7.9 – 8.6	
	Total Potential Sulphate %	0.03 – 0.13	
Pennine Upper Coal Measures Formation (Clay)	Number of Tests	3	DS-3 – AC-4
	Water Soluble Sulphates (mg/l)	12 - 50	
	pH	5.9 – 7.0	
	Total Potential Sulphate %	0.03 – 0.63	
Pennine Upper Coal Measures Formation (Coal)	Number of Tests	1	DS-4 – AC-5
	Water Soluble Sulphates (mg/l)	27	
	pH	6.4	
	Total Potential Sulphate %	1.53	

- 12.8.2 Based on the above assessment, and in accordance with BRE SD1 (2005) “Concrete in aggressive ground”, a Design Sulphate Class of DS-1, with an ACEC of AC-1, would apply for all buried concrete south of the inferred geological fault across the site, within the Made Ground and Newstead Rock Member. A Design Sulphate Class of DS-3, with an ACEC of AC-4 would apply for all buried concrete within the cohesive soils and weathered mudstones of the Pennine Upper Coal Measures Formation north of the fault. A Design Sulphate Class of DS-4, with an ACEC of AC-5 would apply for all buried concrete facing the shallow coal seams within the Pennine Upper Coal Measures Formation.

13 CONCLUSIONS AND RECOMMENDATIONS

13.1 Conclusions

13.1.1 JNP Group has determined through desk-based research, intrusive investigation, laboratory testing, monitoring and assessment that:

- The ground conditions encountered during the intrusive investigation were generally consistent with the published geological map. In the farmyard at the south-western corner of the site, a variable thickness of Made Ground was found to be underlain by granular sands and weathered sandstone of the Pennine Upper Coal Measures Formation. These weathered sandstones extended across the rest of the southern portion of the site, beneath a loamy silty sand Topsoil. Most of the site (the central and northern portions) were underlain by cohesive soils and weathered mudstones of the Pennine Upper Coal Measures Formation, with thin shallow coal seams, all overlain by a loamy clay Topsoil. A fault was inferred between the two distinct bedrock units on the site, running west-north-west to east-south-east across the site, as shown on JNP Group drawing S11400-JNP-XX-XX-DR-G-1001 Rev.A.
- Where groundwater was encountered during the site works, it was within the shallow coal seams with rest levels between 0.60m and 0.95m bgl. Groundwater in the coal seams was confined by the overlying strata and will rise to above the depth of coal seam when the coal is penetrated/exposed.
- In the vicinity of the proposed drainage attenuation basins in the north-east of the site, coal seams were encountered in excess of 1.55 m to 1.60 m bgl, with the depth of the water table 0.6 m to 0.95 m bgl.
- A risk to future residential end users is present from elevated concentrations of beryllium, PAHs and asbestos in near surface Made Ground deposits across the farmyard area of the site. Asbestos quantification testing of the sample in which asbestos was detected indicated that the sample contained <0.001% (lower than the detection limit) asbestos, suggesting that although there should be a consideration of asbestos-containing soils during the demolition and remediation phases in the farmyard, no specific precautions are required (subject to approval by relevant authorities).
- A suitable clean capping system, anticipated to be 600mm, will be required within garden areas where the Made Ground is present within the former farmyard area. This will need to be formalised via an Implementation Plan and should the material be re-used on site, then a Materials Management Plan would also be required.
- There is not a risk to controlled waters from the elevated concentrations of metals, hydrocarbons, and asbestos encountered.
- Elevated flow rates along with concentrations of carbon dioxide have been recorded to a CS2 classification based on BS 8485:2015 and CIRIA C665, but a Green classification based on NHBC 2007; therefore, gas protection measures may or may not be required at the site to ensure risks are acceptable to the end users, pending the results of the further gas monitoring and assessment programme.

- There is a risk to plastic water pipeline from the shallow Made Ground deposits encountered in TP04 at 0.1m bgl (in the farmyard area). Mitigation is required subject to agreement with Yorkshire Water.
- Radon gas protection measures are not required.
- North of the inferred fault, traditional shallow strip foundations are considered feasible, placed within the cohesive soils and weathered mudstone of the Pennine Upper Coal Measures Formation at a minimum depth of 0.9m bgl, based upon soils of medium volume change. An allowable bearing pressure of 100kN/m² would be available at 0.9m bgl, based upon standard 0.60m wide foundations. Influence of trees/hedges may be controlling factor on foundation depth. However, a distance of 0.50m must be maintained between the bases of foundations and the top of the shallow coal seams beneath the site; where required foundation depths bring the bases of foundations within 0.50m of the coal seams, foundations will have to be taken through the coal seams, to a depth of 0.15m beneath the base of the shallow coal, with mass fill concrete facing the excavated coal seams.
- South of the inferred fault, traditional shallow strip foundations are considered feasible, placed within the granular soils and weathered sandstone of the Newstead Rock Member at a minimum depth of 0.60m bgl. An allowable bearing pressure of 125 kN/m² would be available at 0.60m bgl, based upon standard 0.6 m wide foundations.
- Due to ground gas protection requirements and the nature and competence of near-surface soils, suspended ground floor slabs are required for all new structures.
- Groundwater control / dewatering measures, such as sump pumping / well pointing should be considered for all excavations through the shallow coal seams.
- Special treatment of sub-outcropping coal seams would be required if encountered in foundation excavations to prevent combustion.
- The pavement subgrade at an approximate depth of 0.6m below existing ground level has an equilibrium subgrade CBR value of 3.0% north of the inferred fault in the cohesive soils of the Pennine Upper Coal Measures Formation, and 20% south of the inferred fault in the granular soils of the Newstead Rock Member. The subgrade soils north of the fault are not considered first susceptible; the subgrade soils south of the fault are considered frost susceptible.

13.2 Recommendations

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

- An Implementation Plan is to be produced for the contaminated farmyard area in the south-west corner of the site. This would include undertaking an options appraisal of potential remediation options and assess the feasibility of short-listed remedial options, designing a sustainable remediation strategy for the site and an outline validation plan.
- A tree survey be undertaken at the site, in order to be able to assess their impact upon foundation types and depths.

- Completion of the further ground gas monitoring (total of six visits over three months) and assessment programme should be undertaken, to include periods of low and falling atmospheric pressures, to fully characterise the site's ground gas regime to the satisfaction of the planning authority.
- An asbestos demolition and refurbishment survey should be undertaken of the building(s) present at the site.
- A copy of this report is submitted to the Regulatory Authorities for their approval before any further work is undertaken at the site.

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

14 REFERENCES

1. AGS: 1999 : Electronic transfer of geotechnical and geo-environmental data (3rd edition). Association of Geotechnical and Geo-environmental Specialists.
2. ASTM : 1992 : Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Designation D1586-84 (reapproved 1992). American Society for Testing and Materials, West Conshohocken, USA.
3. BRE. 1991 (revised 2003). Special Digest 365: Soakaway Design.
4. BRE. 2005. Special Digest 1 : Concrete in Aggressive Ground. Building Research Establishment.
5. BS EN 1997-1:2004 Geotechnical design - Part 1 – General rules, British Standards Institution, London.
6. BS EN ISO 14688-1 Soil – Identification and description, British Standards Institution, London.
7. BS EN ISO 14688-2 Soil – Classification principles and quantitative description characteristics, British Standards Institution, London.
8. BS EN ISO 14689-1 Rock – Identification and description, British Standards Institution, London.
9. BS 1377. 1990. Methods of Test for soils for civil engineering purposes. British Standards Institution. London.
10. BS 5930. 2015 +A1 2019. Code of practice for site investigations. British Standards Institution. London.
11. BS 8485. 2015. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. British Standards Institution. London.
12. BS 8576. 2013. Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOC). British Standards Institution. London.
13. BS 10175. 2001+A1:2013 +A2:2017. Investigation of potentially contaminated sites - code of practice. British Standards Institution. London.
14. BS ISO 17924:2018. Soil quality – Assessment of human exposure from ingestion of soil and soil material – Procedure for the estimation of the human bioaccessibility / bioavailability of metals in soil. British Standards Institution. London.
15. BS ISO 18400-202:2018. Soil quality – Sampling. Part 202: Preliminary investigations. British Standards Institution. London.
16. BS ISO 18400-202:2018. Soil quality – Sampling. Part 203: Investigation of potentially contaminated sites. British Standards Institution. London.
17. BS ISO 18400-202:2018. Soil quality – Sampling. Part 205: Guidance on the procedure for investigation of natural, near-natural and cultivated sites. British Standards Institution. London.
18. BS ISO 18400-104:2018. Soil quality – Sampling. Part 104: Strategies. British Standards Institution. London.
19. Burland J B and M C Burbidge. 1985. Settlement of foundations on sand and gravel. Proc. ICE, Part 1, Vol 78.

20. Card G, Wilson S, Mortimore S. 2012. A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17. CL:AIRE. London.
21. CL:AIRE and Chartered Institute of Environmental Health (CIEH). 2008. Guidance on Comparing Soil Contamination Data with a Critical Concentration. CL:AIRE / CIEH. London.
22. CL:AIRE. 2011. The Definition of Waste: Development Industry Code of Practice, Version 2. CL:AIRE London.
23. CL:AIRE. 2013. SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. CL:AIRE. London.
24. CL:AIRE. 2016. Control of Asbestos Regulations 2012. Interpretation for managing and Working with Asbestos in Soil and Construction and Demolition Materials. Industry Guidance. CL:AIRE. London.
25. CL:AIRE. 2017. Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies. CL:AIRE. London.
26. Clayton C R I. 1990. SPT energy transmission: theory, measurement and significance. Ground Engineering, December.
27. Chengini A and N A Trenter. 1995. The shear strength and deformation behaviour of a glacial till. Proceedings of International Conference on Advances in site investigation practice. ICE, London.
28. Clayton C R I. 1995. The Standard Penetration Test (SPT) : Methods and use. CIRIA Report 143. Construction Industry Research Information Association, London.
29. Croney D and J C Jacobs. 1967. The frost susceptibility of soils and road materials. RRL Report LR90. Transport Research Laboratory (formerly Road Research Laboratory), Crowthorne
30. CIRIA C665. 2007. Assessing Risks Posed by Hazardous Ground Gases to Buildings. CIRIA, London
31. CIRIA C733. 2014. Asbestos in Soil and Made Ground: A Guide to Understanding and Managing risks. CIRIA. London.
32. DEFRA. 2014. PB14163. Water Framework Directive implementation in England and Wales: new and updated standards to protect the water environment.
33. DEFRA. 2014. SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document. DEFRA. London.
34. de Mello V F B : 1971 : The Standard penetration Test. State of the Art Report. 4th Pan American Conference on Soil Mechanics and Foundation Engineering. Puerto Rico. Vol 1.
35. Driscoll R. 1983. The influence of vegetation on swelling and shrinking of clay soils in Britain. Geotechnique 23 (2): 93-105
36. Environment Agency. 2005. The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils. P5-080/TR3.
37. Environment Agency. 2006. Remedial Targets Methodology. Hydrogeological Risk Assessment for Land Contamination.

38. Environment Agency. 2008. Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values. Science Report SC050021/SR7.
39. Environment Agency. 2009. Human Health Toxicological Assessment of Contaminants in Soil. Science Report SC050021/SR2. Bristol.
40. Environment Agency. 2009. Updated technical background to the CLEA model. Science Report SC050021/SR3. Bristol.
41. Environment Agency. 2009. CLEA Software (Version 1.06) - Science Report SC050021/SR4. Bristol.
42. Environment Agency. 2010. Waste acceptance at landfills – Guidance on waste acceptance procedures and criteria. Bristol.
43. Environment Agency. 2013. Chemical Standards Database - <http://evidence.environment-agency.gov.uk/ChemicalStandards/ChemicalsByName.aspx>
44. Environment Agency. 2019. Land Contamination: Risk Management. UK Government Website - <https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks>.
45. Eurocode 7. 1997. Geotechnical Design - Part 3, Design assisted by field testing. Pre-standard ENV 1997-3. British Standards Institution, London.
46. Gibbs H J and W G Holtz. 1957. Research on determining the density of sands by spoon penetration testing. Proceedings of 4th International Conference on Soil Mechanics and Foundation Engineering, London.
47. HD25/94. 1994. Design Manual for Roads and Bridges Volume 7. The Department of Transport.
48. IAN 73/06. 2009. Design Guidance for Road Pavement Foundations (Draft HD25).
49. Land Quality Management & Chartered Institute of Environmental Health (2015) The LQM/CIEH S4UL for Human Health Risk Assessment - LQM CIEH. Land Quality Press, Nottingham.
50. Nixon I K. 1982. Standard penetration test. State of the art report. Proceedings of the Second European Symposium on Penetration Testing, Amsterdam.
51. Peck R B, W E Hanson and T H Thornburn. 1974. Foundation Engineering, 2nd Edition. Wiley, New York.
52. Rodin S, B O Corbett, D E Sherwood and S Thorburn. 1974. Penetration testing in the UK, State of the art report. Proceedings of Symposium on Engineering Behaviour of Glacial Materials, Birmingham.
53. Skempton A W. 1986. Standard Penetration Test procedures and the effects in sands of overburden pressure, relative density, particle size, ageing and overconsolidation. Geotechnique 36, No 3.
54. Society of Brownfield Risk Assessment. Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater. Version 1. February 2017.
55. Sowers G F. 1979. Introductory Soil Mechanics and Foundations. Macmillan.

56. Stroud M A. 1974. The standard penetration test in insensitive clays and soft rocks. Proceedings of European Symposium on Penetration Testing, Stockholm.
57. Stroud M A and F G Butler. 1975. The standard penetration test and the engineering properties of glacial materials. Proceedings of Symposium on Engineering Behaviour of Glacial Materials, Birmingham.
58. Stroud M A. 1988. The standard penetration test - its application and interpretation on Penetration Testing in the UK, Birmingham. Thomas Telford, London.
59. Terzaghi K and R B Peck. 1967. Soil Mechanics in Engineering Practice, 2nd Edition. John Wiley, London.
60. Tokimatsu K. 1988. Penetration testing for dynamic problems. Proceedings of First International Symposium on Penetration Testing.
61. TPH Criteria Working Group. 1997. Total Petroleum Hydrocarbon Group Series. Volume 3. Selection of Representative TPH Fractions Based on Fate and Transport Considerations.
62. Water Framework Directive UK Technical Advisory Group. 2014. River and Lake Assessment Method Specific Pollutants (metals); Metal Bioavailability Assessment Tool (M-BAT). Scotland.
63. Wilson S, Card G and Haines S. 2008. Ground Gas Handbook. Dunbeath. Whittles Publishing.

FIGURES / DRAWINGS

Figure 1

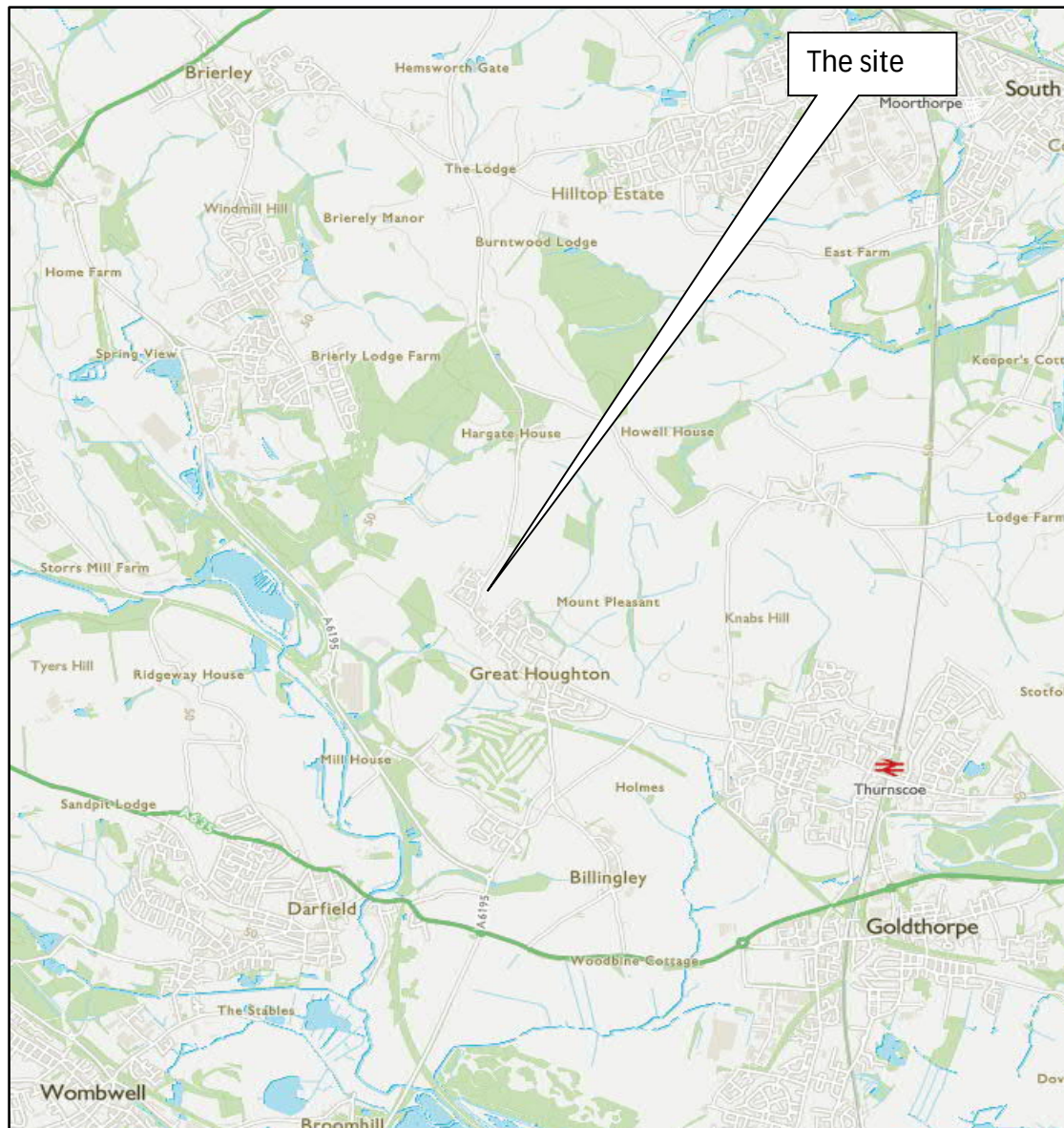
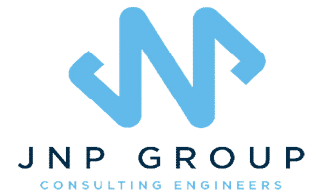
Project:

Manor Farm, Great Houghton

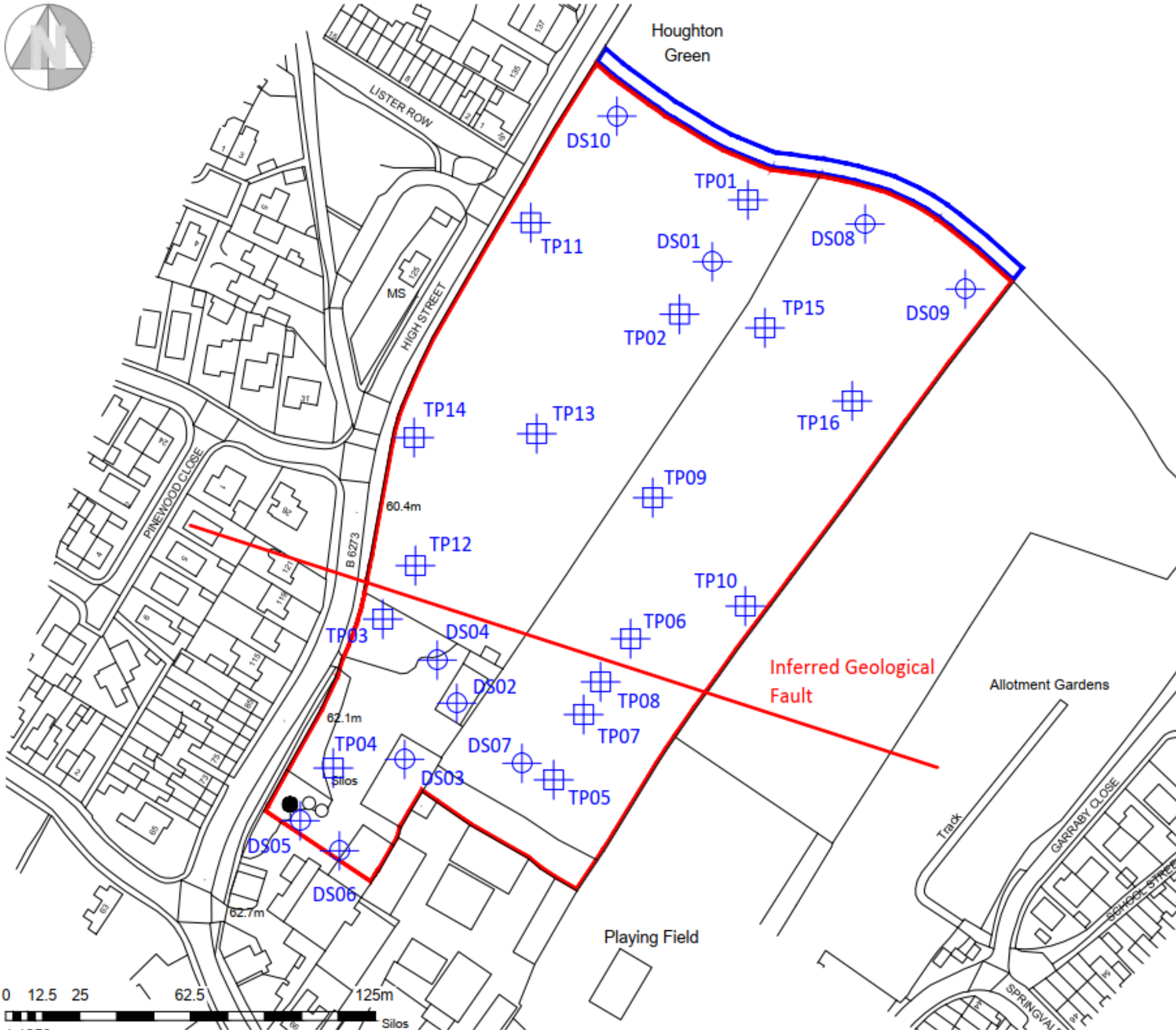
Project No:

S11400

Site Location Plan



Reproduced from Ordnance Survey with the permission of the
National Mapping Agency of Great Britain.
Crown Copyright Reserved Licence No. AL813427



Health & Safety Note

The details on this drawing have been prepared on the assumption that a competent contractor will be carrying out the works. If the contractor(s) considers that there is insufficient Health and Safety information on this drawing, this should immediately be brought to the attention of the designer.

A	04/21	Site boundary updated	CJ
-	04/21	First issue	CJ
Rev.	Date	Description	Drm / Chk'd / App'd

Suitability:
S2 - Suitable for Information



JNP GROUP
CONSULTING ENGINEERS

Chesham • Brighouse • Glasgow • Hartlepool
Leamington Spa • Sheffield

www.jnpgroup.co.uk

Client:	Harron Homes
Job:	Great Houghton
Title:	Exploratory Hole Location Plan

Classification: FI_60_20					
Scale @ A3: As Shown			Accredited Contractor		Supplier No. 000026

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number S11400-JNP-XX-XX-DR-G-1001	Revision: A
Document/Drawing Number	

Figure 2

SPT / Depth Relationship

Project:

Manor Farm, Great Houghton

Project No:

S11400

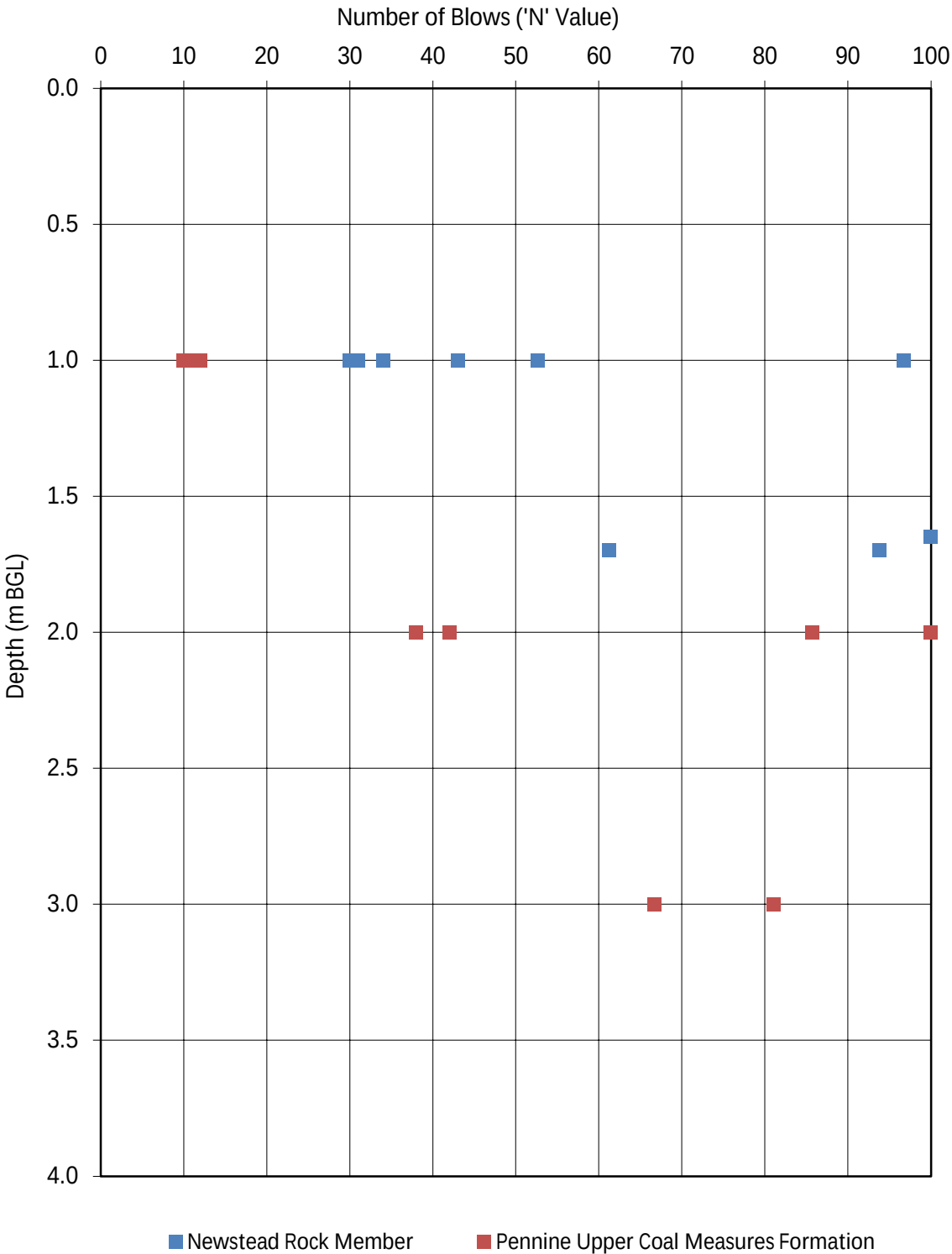


Figure 3

Undrained Shear Strength / Depth
Relationship

Project:

Manor Farm, Great Houghton

Project No:

S11400

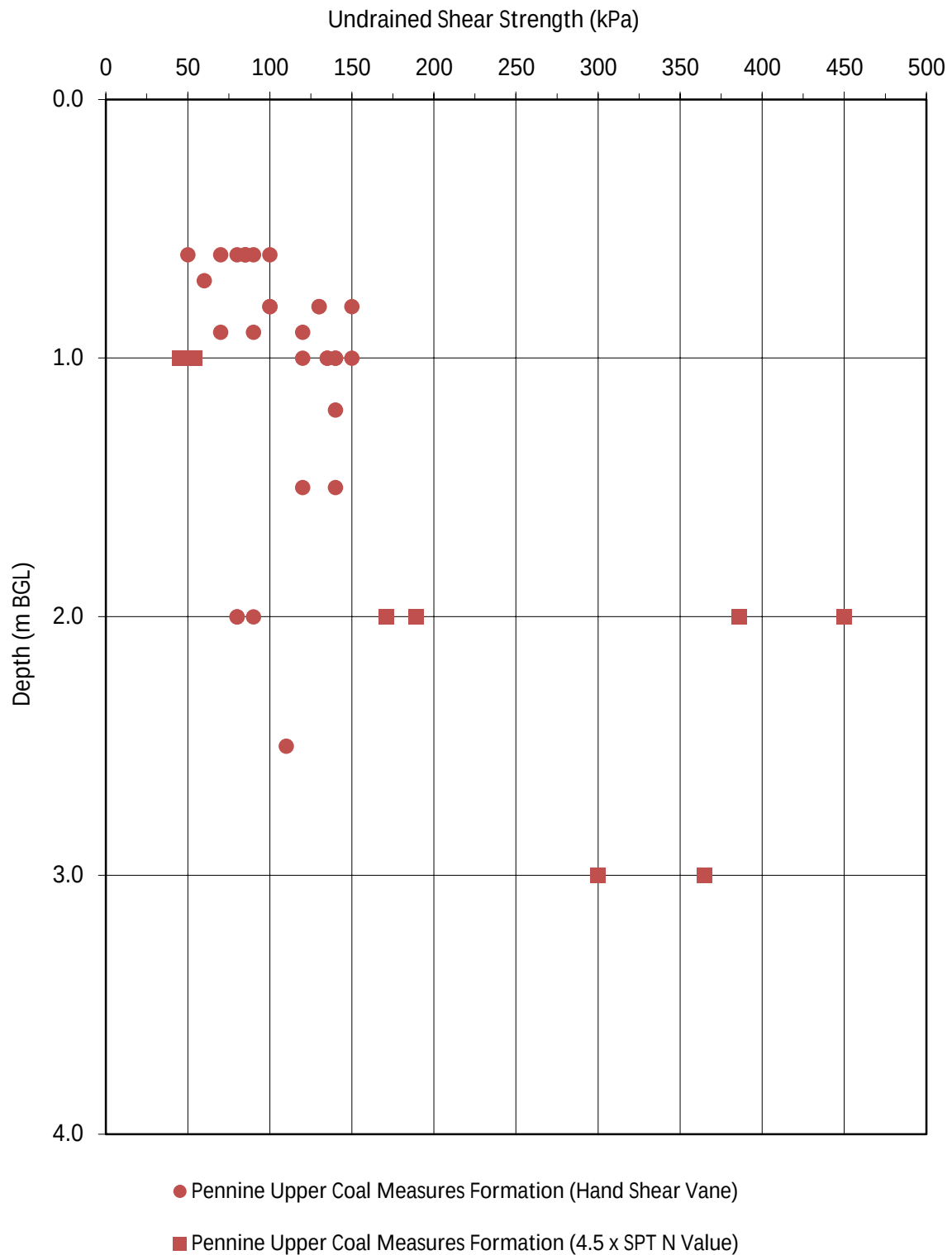


Figure 4

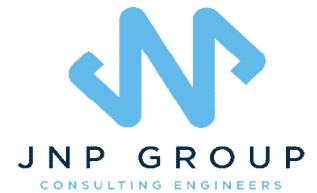
Plasticity Index Chart

Project:

Manor Farm, Great Houghton

Project No:

S11400



Key:

C Clay M Silt

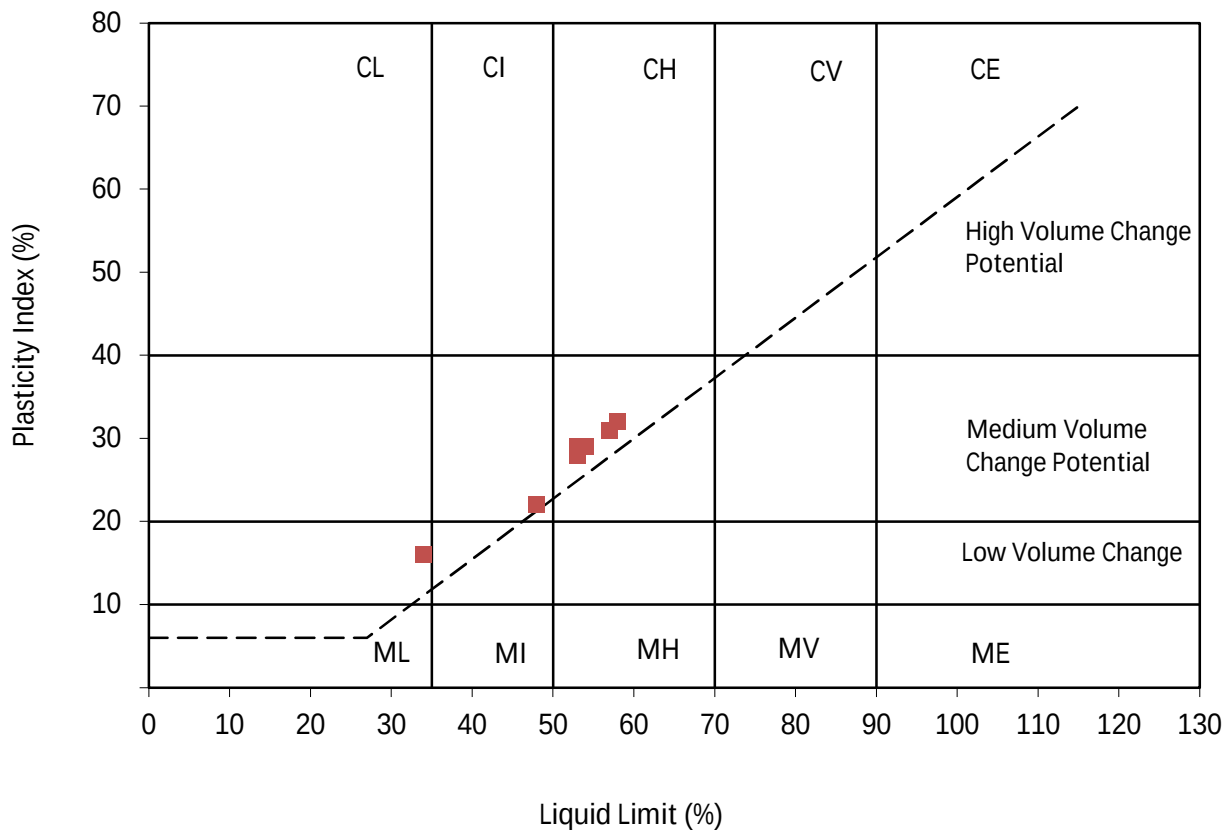
L Low plasticity

I Intermediate plasticity

H High plasticity

V Very high plasticity

E Extremely high plasticity



■ Pennine Upper Coal Measures Formation

--- A Line

Figure 5

Moisture Content / Depth Relationship

Project:

Manor Farm, Great Houghton

Project No:

S11400

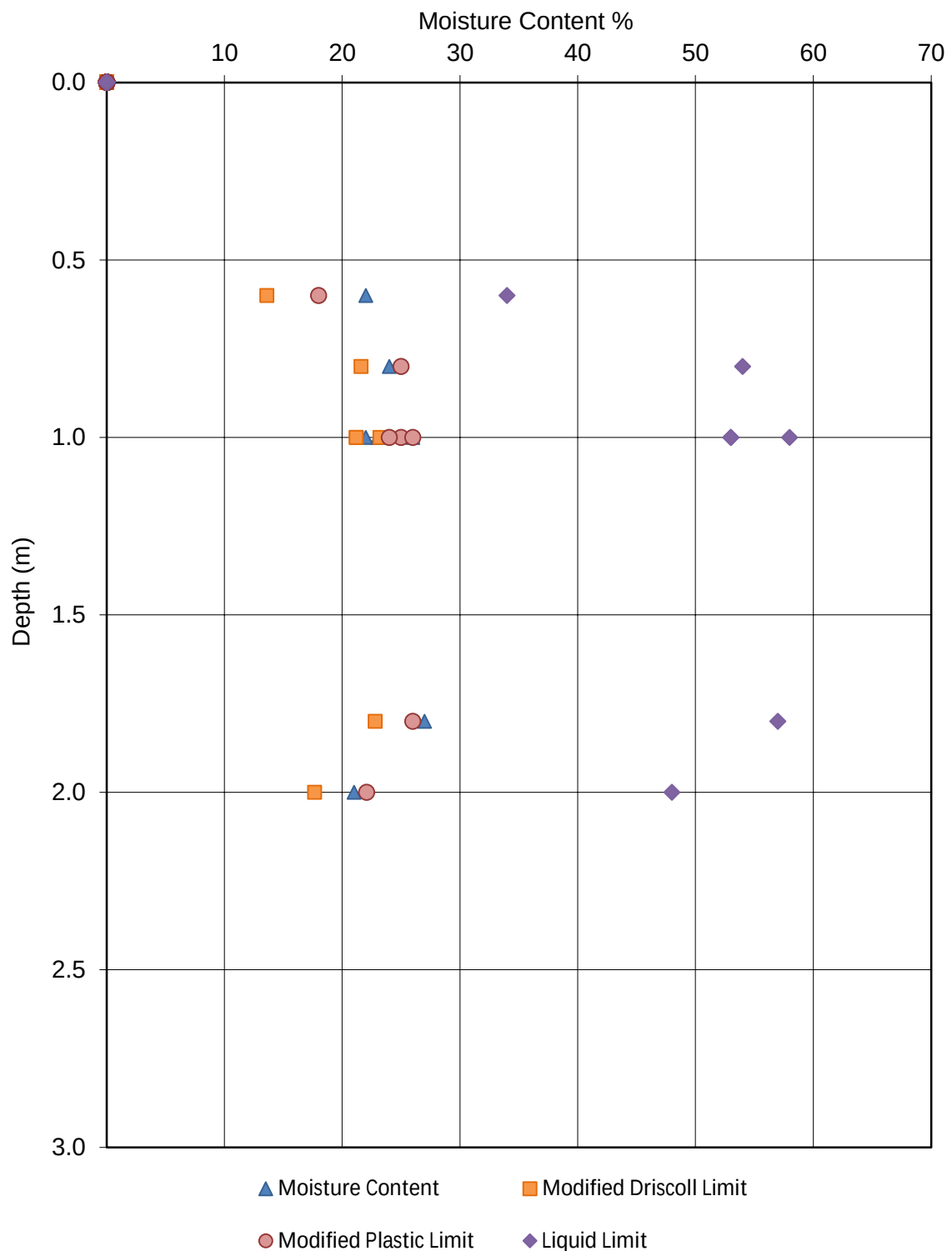
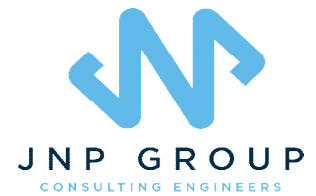
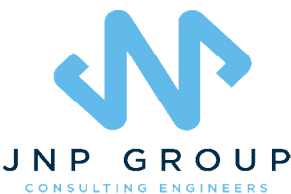


Figure 7

Particle Size Distributions

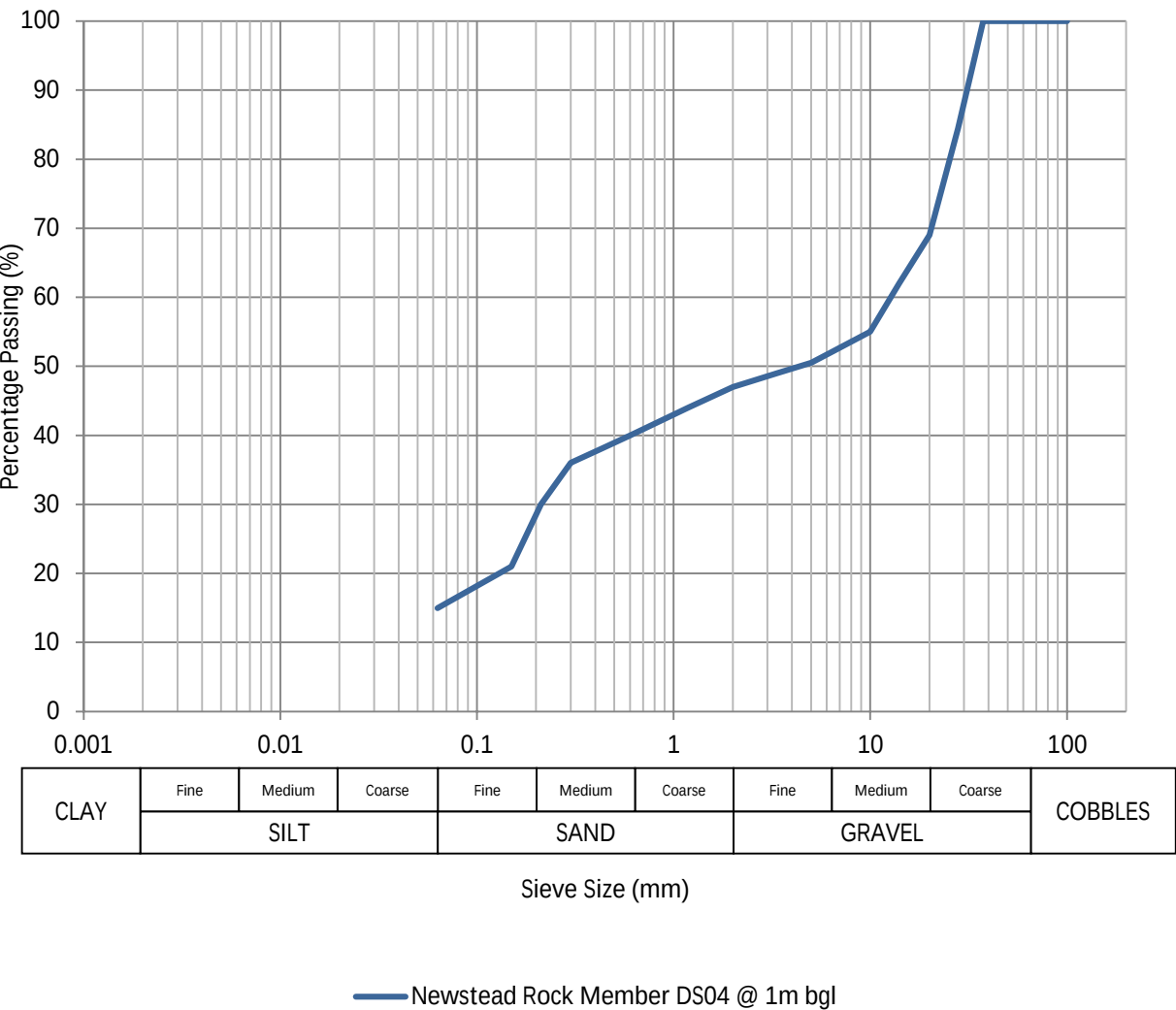
Project:

Manor Farm, Great Houghton



Project No:

S11400



APPENDIX A: LIMITATIONS

Introduction

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

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

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

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

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

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

It should be noted that the following were not included as part of the agreed scope of works with the client: detailed ecological surveys and assessment; groundwater sampling.

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

Objectives

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

that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Intrusive Investigations

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

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

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

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

Although preliminary comment has been provided by JNP Group regarding UXO and Invasive Species, JNP Group are not experts in these and as such specialist advice should be sought regarding the presence of UXO and invasive species at the site.

Gas Membranes

Where JNP Group are commissioned to undertake the inspection and validation of a gas membrane, we, at the time of inspection, will ensure that the membrane is laid in accordance with the relevant arrangements and sections. At that time we will ensure that the venting media is laid correctly in preparation of the membrane and we will ensure that any tears in the membrane or bad workmanship is reported and instructions given to be rectified. Thereafter it is the duty of the Principal Contractor to ensure that tears and defects are rectified.

Remediation and Verification Reports Limitations

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

Where intrusive investigations have been undertaken, they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature sampling, no investigation technique is capable of identifying all conditions present in all areas. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised “hotspots” of contamination where concentrations may be significantly higher than those actually encountered.

If costs have been included in relation to the site remediation these must be confirmed by a qualified quantity surveyor. The opinions given in this report have been dictated by the finite data on which

they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed from Third Party should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, JNP Group reserves the right to review such information and, if warranted, to modify the opinions accordingly.

Whilst this report and the opinion made herein are correct to the best of JNP Group's belief, JNP Group cannot guarantee the accuracy or completeness of any information provided by third parties.

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

APPENDIX B EXPLORATORY HOLE RECORDS



JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS01

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442983.00 - 407109.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

Level: 55.00

Scale
1:20

Client: Harron Homes

Dates: 17/03/2021 - 17/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES	N=12 (2,2/2,2,3,5)	0.40	54.60		Brown silty clay TOPSOIL. TOPSOIL	1
		0.60	D					Firm orange and grey mottled CLAY. PENNINE UPPER COAL MEASURES FORMATION	
		1.00	ES					Black weathered COAL. PENNINE UPPER COAL MEASURES FORMATION	
		1.20	D					Firm orange and grey mottled CLAY. PENNINE UPPER COAL MEASURES FORMATION	
		2.00		N=50 (25 for 125mm/50 for 150mm)	1.40	53.60		Black weathered COAL. PENNINE UPPER COAL MEASURES FORMATION	2
					1.50	53.50		Firm orange and grey mottled CLAY. PENNINE UPPER COAL MEASURES FORMATION	
					1.80	53.20		Black weathered COAL. PENNINE UPPER COAL MEASURES FORMATION	
					1.90	53.10		Stiff orange and grey mottled CLAY. PENNINE UPPER COAL MEASURES FORMATION	
					2.00	53.00		End of borehole at 2.00 m	

Remarks

No groundwater encountered. Refusal at 2m bgl.



JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS02

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442894.00 - 406961.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

Level: 61.00

Scale
1:20

Client: Harron Homes

Dates: 17/03/2021 - 17/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES					Brown and white GRAVEL, including fragments of brick, glass, sandstone, and ash. MADE GROUND	
		1.00 1.00	ES	N=30 (5,3/5,7,7,11)	0.80	60.20		Yellow SAND. NEWSTEAD ROCK MEMBER	1
					1.50	59.50		Yellow weathered SANDSTONE. NEWSTEAD ROCK MEMBER	
		2.00 2.00	ES	N=50 (25 for 85mm/50 for 150mm)	2.00	59.00		End of borehole at 2.00 m	2
									3
									4

Remarks

No groundwater encountered. Refusal at 2m bgl.



JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS03

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442873.00 - 406940.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

Level: 61.00

Scale
1:20

Client: Harron Homes

Dates: 17/03/2021 - 17/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	60.80		Yellow SAND with occasional brick fragments. MADE GROUND	
								Yellow SAND. NEWSTEAD ROCK MEMBER	
		1.00		N=50 (6,7/50 for 285mm)	1.00	60.00		End of borehole at 1.00 m	1
									2
									3
									4

Remarks

No groundwater encountered. Refusal at 1m bgl.



JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS04

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442885.00 - 406976.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

Level: 60.00

Scale
1:20

Client: Harron Homes

Dates: 17/03/2021 - 17/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES		0.50	59.50		Brown gravelly SAND with fragments of brick and sandstone. MADE GROUND	1
		0.20	D						
		1.00 1.00 1.00	D ES	N=34 (8,8/7,8,8,11)	1.60	58.40		Yellow SAND. NEWSTEAD ROCK MEMBER	
		1.70		N=50 (25 for 105mm/50 for 245mm)	1.70	58.30		Yellow weathered SANDSTONE. NEWSTEAD ROCK MEMBER End of borehole at 1.70 m	
									2
									3
									4

Remarks

No groundwater encountered. Refusal at 1.7m bgl.



JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS05

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442840.00 - 406922.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

Level: 62.00

Scale
1:20

Client: Harron Homes

Dates: 22/03/2021 - 22/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES					Brown gravelly SAND with fragments of brick and sandstone. MADE GROUND	
					0.40	61.60		Brown sandy loamy TOPSOIL with rootlets and roots throughout. TOPSOIL	
		0.80	ES		0.80	61.20		Yellow SAND. NEWSTEAD ROCK MEMBER	1
		1.00		N=43 (4,5/8,10,12,13)					
		1.70		N=50 (25 for 115mm/50 for 160mm)	1.60 1.70	60.40 60.30		Yellow weathered SANDSTONE. NEWSTEAD ROCK MEMBER End of borehole at 1.70 m	2
									3
									4

Remarks

No groundwater encountered. Refusal at 2m bgl.



JNP GROUP
CONSULTING ENGINEERS





JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS07

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442918.00 - 406931.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

Level: 61.00

Scale
1:20

Client: Harron Homes

Dates: 22/03/2021 - 22/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.00		N=31 (5,5/5,6,9,11)	0.40	60.60		Brown loamy silty sand TOPSOIL. TOPSOIL	1
					1.10	59.90		Orange silty SAND. NEWSTEAD ROCK MEMBER	
		1.65		N=50 (25 for 30mm/50 for 40mm)	1.60	59.40		Yellow SAND. NEWSTEAD ROCK MEMBER	
					1.65	59.35		Yellow weathered SANDSTONE. NEWSTEAD ROCK MEMBER End of borehole at 1.65 m	
									2
									3
									4

Remarks

No groundwater encountered. Refusal at 1.65m bgl.



JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS08

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 443028.00 - 407118.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

Level: 54.50

Scale
1:20

Client: Harron Homes

Dates: 22/03/2021 - 22/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	N=11 (2,2/2,3,3,3)	0.40	54.10		Brown loamy clay TOPSOIL with rootlets throughout. TOPSOIL	1
		0.50	ES					Soft to stiff orange and grey mottled CLAY with occasional ironstone gravel. PENNINE UPPER COAL MEASURES FORMATION	
		0.80	D						
		1.00							
		1.50	D	N=42 (2,4/11,11,9,11)	1.60	52.90		Black weathered COAL. PENNINE UPPER COAL MEASURES FORMATION	2
		2.00						Stiff grey CLAY. PENNINE UPPER COAL MEASURES FORMATION	
								Black weathered COAL. PENNINE UPPER COAL MEASURES FORMATION	
								Stiff grey CLAY. PENNINE UPPER COAL MEASURES FORMATION	
								Black weathered COAL. PENNINE UPPER COAL MEASURES FORMATION	
								Stiff grey CLAY. PENNINE UPPER COAL MEASURES FORMATION	
								Black weathered COAL. PENNINE UPPER COAL MEASURES FORMATION	
								Grey friable weathered MUDSTONE. PENNINE UPPER COAL MEASURES FORMATION	
		2.90	D	N=50 (8,11/50 for 185mm)	3.00	51.50			3
		3.00						End of borehole at 3.00 m	

Remarks
Refusal at 3m bgl.



JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS09

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 443061.00 - 407098.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

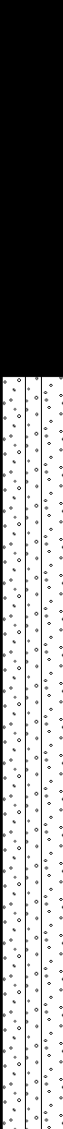
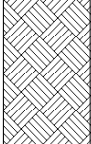
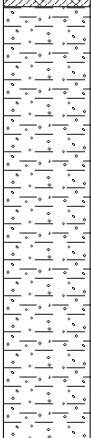
Level: 54.00

Scale
1:20

Client: Harron Homes

Dates: 22/03/2021 - 22/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.20	ES	N=11 (2,1/2,3,3,3)	0.40	53.60		Brown loamy clay TOPSOIL with rootlets throughout. TOPSOIL	1		
		0.70	D					Soft to stiff orange and grey mottled CLAY with occasional ironstone gravel. PENNINE UPPER COAL MEASURES FORMATION			
		1.00 1.00	ES								
		1.40	D								
		2.00 2.00	ES	N=38 (2,5/9,7,10,12)	1.55	52.45		Black weathered COAL. PENNINE UPPER COAL MEASURES FORMATION	2		
				2.80	D	N=50 (4,10/50 for 225mm)	3.00	51.00		Grey friable weathered MUDSTONE. PENNINE UPPER COAL MEASURES FORMATION	3
			3.00								
End of borehole at 3.00 m									4		

Remarks
Refusal at 3m bgl.



JNP GROUP
CONSULTING ENGINEERS

JNP GROUP
CONSULTING ENGINEERS

Borehole Log

Borehole No.

DS10

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442952.00 - 407154.00

Hole Type
WS

Location: Manor Farm, Great Houghton, S72 0AZ

Level: 56.50

Scale
1:20

Client: Harron Homes

Dates: 22/03/2021 - 22/03/2021

Logged By
CJ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	56.20		Brown loamy clay TOPSOIL with rootlets throughout. TOPSOIL	
		0.50	D					Soft to firm grey and orange mottled CLAY. PENNINE UPPER COAL MEASURES FORMATION	
		1.00 1.00	D	N=10 (1,1/2,2,2,4)	1.10	55.40		Interlaminated black weathered COAL and orange and grey mottled clay. PENNINE UPPER COAL MEASURES FORMATION	1
		1.50	D		1.40	55.10		Friable orange and grey mottled weathered MUDSTONE. PENNINE UPPER COAL MEASURES FORMATION	
		2.00		N=50 (8,10/50 for 175mm)	2.00	54.50		End of borehole at 2.00 m	2
									3
									4

Remarks

No groundwater encountered. Refusal at 2m bgl.

JNP GROUP
CONSULTING ENGINEERS

JNP GROUP
CONSULTING ENGINEERS

Trial Pit Log

Trialpit No

TP01

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400Co-ords: 442988.00 - 407127.00
Level: 55.34Date
16/03/2021

Location: Manor Farm, Great Houghton, S72 0AZ

Dimensions
(m):

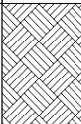
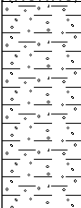
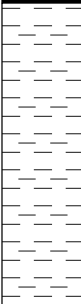
2

Depth
2.50

0.6

Scale
1:25Logged
CJ

Client: Harron Homes

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	ES	HVP=100 HVP=110 HVP=80	0.40	54.94		Brown loamy clay TOPSOIL with rootlets throughout. TOPSOIL	1
	0.60	D					Soft to firm orange and grey mottled CLAY with occasional ironstone gravel. PENNINE UPPER COAL MEASURES FORMATION	
	0.80	ES		1.10	54.24		Black COAL, weathered to sand and gravel sized fragments. PENNINE UPPER COAL MEASURES FORMATION	
				1.50	53.84		Stiff grey friable laminated CLAY. PENNINE UPPER COAL MEASURES FORMATION	2
	2.00	D	HVP=100 HVP=110 HVP=130	2.50	52.84	End of pit at 2.50 m		3
								4
								5

Remarks: No groundwater encountered.

Stability: Stable

JNP GROUP
CONSULTING ENGINEERS

JNP GROUP
CONSULTING ENGINEERS

Trial Pit Log

Trialpit No

TP02

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400Co-ords: 442965.00 - 407091.00
Level: 55.50Date
16/03/2021

Location: Manor Farm, Great Houghton, S72 0AZ

Dimensions
(m):

2

Depth
2.00

0.6

Scale
1:25Logged
CJ

Client: Harron Homes

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					Brown loamy clay TOPSOIL with rootlets throughout. TOPSOIL	
	0.35			0.35	55.15		Soft to firm orange and grey mottled CLAY with occasional ironstone gravel. PENNINE UPPER COAL MEASURES FORMATION	
	0.50	ES						
	0.60	D	HVP=50 HVP=60 HVP=80					
				0.95	54.55		Black COAL, weathered to sand and gravel sized fragments. PENNINE UPPER COAL MEASURES FORMATION	1
				1.20	54.30		Stiff grey and orange mottled CLAY, grading into laminated friable weathered mudstone. PENNINE UPPER COAL MEASURES FORMATION	
	1.50	D	HVP=130 HVP=140 HVP=150					
	2.00	ES		2.00	53.50		End of pit at 2.00 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Stable

JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Trial Pit Log

Trialpit No

TP03

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442866.00 - 406988.00
Level: 60.50

Date
16/03/2021

Location: Manor Farm, Great Houghton, S72 0AZ

Dimensions
(m):

2

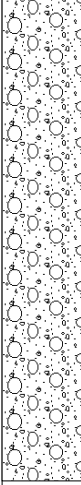
Depth
1.80

0.6

Scale
1:25

Logged
CJ

Client: Harron Homes

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.20	60.30		Brown clayey sand TOPSOIL with occasional cobble sized fragments of brick. MADE GROUND
	1.00 1.00	D ES					Yellow/grey bouldery cobbly gravelly SAND. Boulders, cobbles, and gravel are fragments of weathered sandstone. NEWSTEAD ROCK MEMBER
				1.80	58.70		End of pit at 1.80 m

Remarks: No groundwater encountered.

Stability: Stable



JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Trial Pit Log

Trialpit No

TP04

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442852.00 - 406943.00
Level: 61.60

Date
16/03/2021

Location: Manor Farm, Great Houghton, S72 0AZ

Dimensions
(m):

2

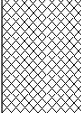
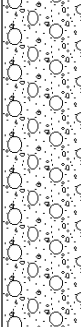
Depth
1.50

0.6

Scale
1:25

Logged
CJ

Client: Harron Homes

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES					Brown clayey gravelly sand TOPSOIL with occasional cobble sized fragments of brick. MADE GROUND
				0.40	61.20		Yellow/grey bouldery cobbley gravelly SAND. Boulders, cobbles, and gravel are fragments of weathered sandstone. NEWSTEAD ROCK MEMBER
	0.80	ES					
				1.50	60.10		End of pit at 1.50 m

1

2

3

4

5

Remarks: No groundwater encountered.

Stability: Stable



JNP GROUP
CONSULTING ENGINEERS



JNP GROUP
CONSULTING ENGINEERS

Trial Pit Log

Trialpit No

TP05

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442924.00 - 406928.00
Level: 61.00

Date
16/03/2021

Location: Manor Farm, Great Houghton, S72 0AZ

Dimensions
(m):

2

Depth
1.80

0.6

Scale
1:25

Logged
CJ

Client: Harron Homes

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.40	60.60		Brown loamy sand TOPSOIL with rootlets throughout. TOPSOIL
	1.00	ES		1.80	59.20		Yellow/grey bouldery cobbley gravelly SAND. Boulders, cobbles, and gravel are fragments of weathered sandstone. NEWSTEAD ROCK MEMBER
							End of pit at 1.80 m

Remarks: No groundwater encountered.

Stability: Stable



JNP GROUP
CONSULTING ENGINEERS

JNP GROUP
CONSULTING ENGINEERS

Trial Pit Log

Trialpit No

TP06

Sheet 1 of 1

Project Name: Manor Farm, Great Houghton

Project No.
S11400

Co-ords: 442954.00 - 406980.00

Level: 58.50

Date

16/03/2021

Location: Manor Farm, Great Houghton, S72 0AZ

Dimensions
(m):

2

Depth
2.00

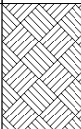
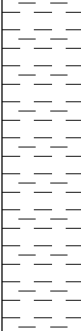
0.6

Scale

1:25

Logged
CJ

Client: Harron Homes

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					Brown sandy silty clay TOPSOIL with rootlets throughout. TOPSOIL	
				0.45	58.05		Soft, crumbly, orange/brown gravelly sandy silty CLAY. PENNINE UPPER COAL MEASURES FORMATION	
				0.70	57.80		Firm to stiff orange and grey mottled CLAY. PENNINE UPPER COAL MEASURES FORMATION	
	1.00	D	HVP=70 HVP=70 HVP=90					1
			HVP=110 HVP=120 HVP=130					
	2.00	ES		2.00	56.50		End of pit at 2.00 m	2
								3
								4
								5

Remarks: No groundwater encountered.

Stability: Stable

JNP GROUP
CONSULTING ENGINEERS