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# Ground Investigation Report

Proposed LED Floodlit Artificial Grass Pitch (AGP)

Brian Holden Memorial Playing Field, Longridge

January 2026

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# Project Details

| | |
|---|---|
| Site: | Brian Holden Memorial Playing Field, Longridge |
| Document Title: | Ground Investigation Report |
| Document no.: | STX7134-R02-Rev_A |
| Date: | January 2026 |
| Client: | Labosport Ltd |
| Issuing office: | Soiltechnics Ltd<br>Unit 9, Clarence Avenue, Westpoint Enterprise Park, Trafford Park, Manchester M17 1QS<br>Tel: 0161 9470270 E-mail: mail@soiltechnics.net |

# Document history and status

| Revision | Date | Description | Author | Checker | Reviewer |
|---|---|---|---|---|---|
| A | January 2026 | First Issue | OH | DH | SCD |
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## Drawing Register

| Title | Produced by | Date | Reference |
|---|---|---|---|
| Exploratory Hole Location Plan | Soiltechnics Limited | Dec 2025 | STX7134-D01-A |

## List of Tables



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# Non-technical Summary

| Topic | Commentary |
|---|---|
| Site description | The proposed AGP/car park and wider site currently are formed by grassed playing fields (Mardale Playing Fields), with associated car parking and a pavilion located in the north of the wider site. Mardale Road provides access to the site from the north. |
| Development proposals | The proposed development is for construction of an 11v11 3G Artificial Grass Pitch (AGP), including potential extension of the existing car park. |
| Site history | In the late 1800s the majority of the site comprised agricultural land, with two ponds noted in the south of the wider site, one partially crossing into the south of the proposed AGP. By 2000, the pond was noted to be infilled and the southern extent of the adjacent car park is noted in the north of the wider site. The remaining wider site comprises playing fields, which it has remained to the present day. |
| Ground conditions | Ground conditions comprised Topsoil to a typical depth of 0.25m bgl. A thin layer of Made Ground was generally observed underlying Topsoil, comprising clays with gravels of brick up to depths of 0.5m bgl. In WLS01 (area of former pond), Made Ground was encountered to a depth of 3.0m bgl comprising firm clays, with very soft organic clay below depths fo 1.9m b gl.<br>Devensian Till (firm to stiff clays) was observed underlying Made Ground in all exploratory positions beyond the maximum excavation depth of 5.45m bgl.<br>Groundwater seepages were encountered below 0.95m across the site. |
| Mining and ground stability risk | The site falls outside of a Coal Mining Reporting Area. |
| Floodlight foundation solution | The Devensian Till deposits are considered suitable to support the proposed floodlights on traditional shallow pad type foundations and example bearing capacities are provided in Section 7.<br>However, localised Made Ground deposits 3.0m deep have been identified within a former backfilled pond in the south of the proposed AGP. Should the deposits extend into the south-eastern corner of the AGP, formation of a traditional pad type foundation for the floodlight here could be difficult to successfully achieve at such depths. In reality, given the recorded location of the pond, and allowing for some inaccuracy in mapping, the deepest part is likely to be local to WLS01, and the pond is likely to shallow towards the southeast corner of the AGP. Our assessment assumes excavations for pad type foundations could be extended through any Made Ground and into the underlying Devensian Till.<br>A concrete class of DS-1 and AC-1s is required. |
| CBR assessment and pitch park foundations | Based on the anticipated founding depth and DCP results, a CBR design value of 5% can be adopted for soils that are likely to be representative of those which remain at or near pitch/ car park formation levels.<br>Geosynthetic reinforcement of pitch formation should be utilised in the vicinity of the backfilled pond to minimise the potential effects of differential settlement. |
| Drainage potential | Devensian Till deposits are considered to be effectively impermeable for the purposes of drainage design. On this basis, disposal of stormwater via a soakaway is not considered viable.<br>As an alternative, it is possible that the AGP drainage could key into the existing surface water drainage system currently used by the pavilion/car park, existing surface water ditches to the south and east or the 525mm combined sewer which runs through the north-eastern part of the proposed car park extension. |
| Chemical contamination | Topsoil in-situ would be chemically suitable for reuse onsite, or offsite within a residential development.<br>Made Ground deposits are not considered to present a significant contamination risk to construction operatives. |
| Waste characterisation | Made Ground soils are considered to be non-hazardous and suitable for disposal to an inert landfill site.<br>Natural soils can be disposed as inert waste.<br>Topsoil is considered to be non-hazardous and typically unsuitable for disposal to inert landfill sites due to high organic carbon content. |
| Recommendation for further works | At this stage further investigations are not considered to be necessary. |

# 1 Introduction

## 1.1 Scheme Outline

1.1.1 The proposed development is for construction of an 11v11 3G Artificial Grass Pitch (AGP), including potential extension of the existing car park. The approximate footprint of the proposed AGP and car park extension area is presented in Figure 2-A below.

1.1.2 The report is based on the project proposals and information outlined above; should the scheme change then it will be necessary to review the conclusions and recommendations presented in this report.

1.1.3 A Desk Study report was previously completed for the site, ref STX7134-R01-Rev_A, issued in August 2025. Desk study information has been presented in Section 2 of this report for completeness, and has been updated with additional information where necessary.

## 1.2 Brief

1.2.1 This report has been prepared following instructions received from our client, Labosport Ltd.

1.2.2 The scope of works has been completed in accordance with the 2024-2028 AGP framework for a ground investigation utilising windowless sampling (borehole) methods and hand pitting methods. The principal objectives of the ground investigation are to establish ground conditions at the site sufficient to assess the infiltration potential and provide information necessary to allow design of the artificial sports pitch floodlight foundations. The report will also advise on abnormal ground conditions and provide recommendations for further investigation works where applicable.

1.2.3 In addition to the above, an electrical capacity survey and topographical survey have been commissioned for the project. Copies are presented in Appendix I and Appendix J respectively.

## 1.3 Limitations

1.3.1 Soiltechnics disclaims any responsibility to our Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence in accordance with the terms of our contract, taking account of the resources, investigations and testing devoted to it by agreement with our Client. This report is confidential to our Client and Soiltechnics accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

# 2 Desk Study

## 2.1 Sources of Information

2.1.1 Reference has been made to the following sources of information:

- British Geological Survey (BGS) GeoIndex – Onshore database.
- BGS Sheet 68 (Scale 1:50 000 and 1:63 360) – Clitheroe (1990 drift and 1971 solid).
- Ordnance Survey OpenData.
- Coal Authority Development and Specific Risk databases.
- Environment Agency open-source databases.
- Google mapping services.
- Interrogation of search engines for anecdotal information on the site history and other readily available online resources.

## 2.2 Site Location and Description

2.2.1 The proposed development lies within Longridge, approximately 1km southwest of the town centre, at the following postal address:

Brian Holden Memorial Playing Field
Mardale Drive
Longridge
PR3 3FQ

2.2.2 An aerial image showing the approximate site boundary and approximate development footprint is presented below, followed by a table summarising the key site features. A site plan is provided within Appendix A.


*Figure 2-A: Aerial photograph of site boundary (red), AGP footprint (blue) and car park extension (green)*

| Theme | Feature |
|---|---|
| Current site use | The proposed AGP/car park and wider site currently are formed by grassed playing fields (Mardale Playing Fields), with associated car parking and a pavilion located in the north of the wider site. Mardale Road provides access to the site from the north. |
| Local area land use | Adjacent sites comprise an industrial/commercial units to the west (with fields beyond), agricultural fields to the south and residential properties to the north and east. |
| Topography | The topography of the surrounding area generally falls gently to the southwest.<br>On the wider site, levels fall by ~4m from northeast to southwest, with levels falling by 2m across the AGP and car park area. |
| Buildings, surfacing and other permanent features | The AGP and car park extension locations comprise grassed playing fields. A hardstanding car park and pavilion are located in the north of the wider site. |
| Boundary features | The proposed AGP and parking area boundaries are not physically defined, with the exception of the north of the proposed parking area, which is defined by the current car park. The eastern boundary of the AGP lies immediately adjacent to the eastern boundary of the wider site. |
| Vegetation | No significant vegetation is present within the proposed AGP location.<br>A bank of mature trees and hedges are present adjacent to the eastern boundaries of the proposed AGP/car park extensions. |
| On-site / adjacent surface water features | A suspected drainage ditch is located along the southern and eastern boundary of the wider site. Savick Brook is located ~45 m west of the wider site, two ponds are located 50 m and 170 m east of the wider site and Alston Reservoirs lie ~480 m to 1.1 km east of the wider site. |
| Injurious and invasive weeds | No invasive weeds were identified during the site reconnaissance. |
| Evidence for ground instability | None observed. |

*Table 2-A: Site Description*

2.2.3 The observations provided above are made by a Geoenvironmental Engineer, who is not a specialist in asbestos surveying or invasive weed identification. Any associated comments are intended for use by this report only, and not for any other purpose.

2.2.4 A selection of site photographs are presented below.

*Figure 2-B: Photograph from the centre of the AGP area, facing northeast towards existing pavilion*

*Figure 2-C: Photograph from western corner of AGP area, facing southwest*

*Figure 2-D: Photograph from centre of the AGP area, facing southeast*

## 2.3 Site History

2.3.1 An attempt to trace the history of the site has been carried out by reviewing readily available ordnance survey maps. A chronological summary of the site's history is provided below.

| Date | On-site | Off-site |
|---|---|---|
| Late 1800s to early 1900s | During this period, the majority site comprises agricultural land. Two ponds are noted in the south of the wider site, with the eastern most pond partially crossing into the proposed AGP's southern boundary. An area of marsh is observed in the southern corner of the wider site, as shown below in Figure 2-E. | The surrounding areas is largely agricultural during this time. Several ponds are observed between 50 m and >250 m east and south of the wider site. Earthworks associated with a railway line (Preston & Longridge) are noted adjacent to the wider site's western boundary. Longridge Sewage Works are observed ~170 m north (see Figure 2-E below). |
| Mid to late 1900s | From the mid-20th century, collects are noted in the southern corner. A marsh is recorded adjacent to the proposed parking's northwestern corner. | A spring is observed directly northeast of the wider site, running along the eastern boundary. Longridge Sewage works are noted as being disused during this period and overhead electrical lines are observed ~20m north of the wider site (refer to Figure 2-F). |
| Early-2000s to present day | By 2000, the southern extent of the adjacent car park is observed in the north of the wider site. The remaining wider site area comprises playing fields. A public right of way is shown running northwest-southeast across the proposed AGP. The ponds are no longer noted and assumed infilled. | By 2000, a car park and pavilion are noted directly north of the site and industrial/commercial units are noted directly west of the wider site. The area directly north and east becomes residential during this period and the railway adjacent to the western boundary is dismantled. |

*Table 2-B: Summary of site history*

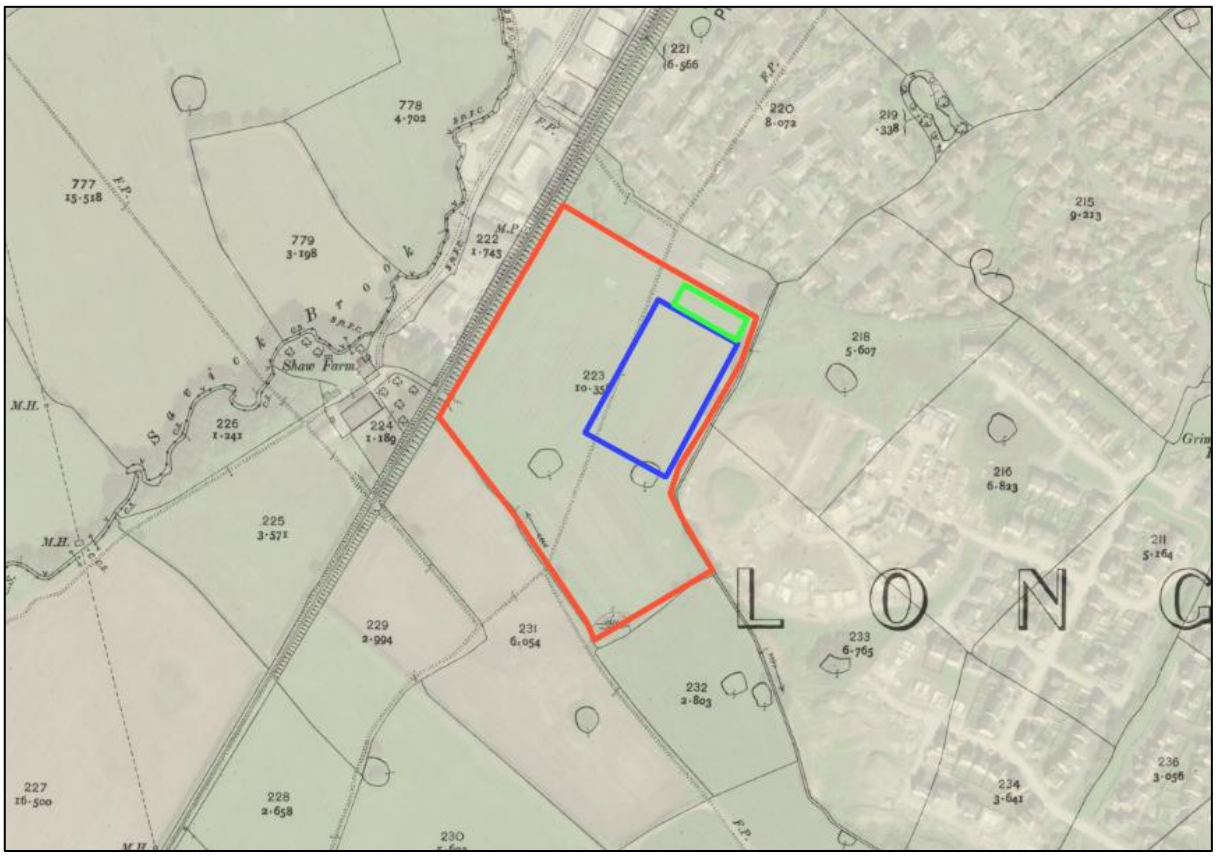


*Figure 2-E: 1892-1914 Historical map extract overlay for the site*

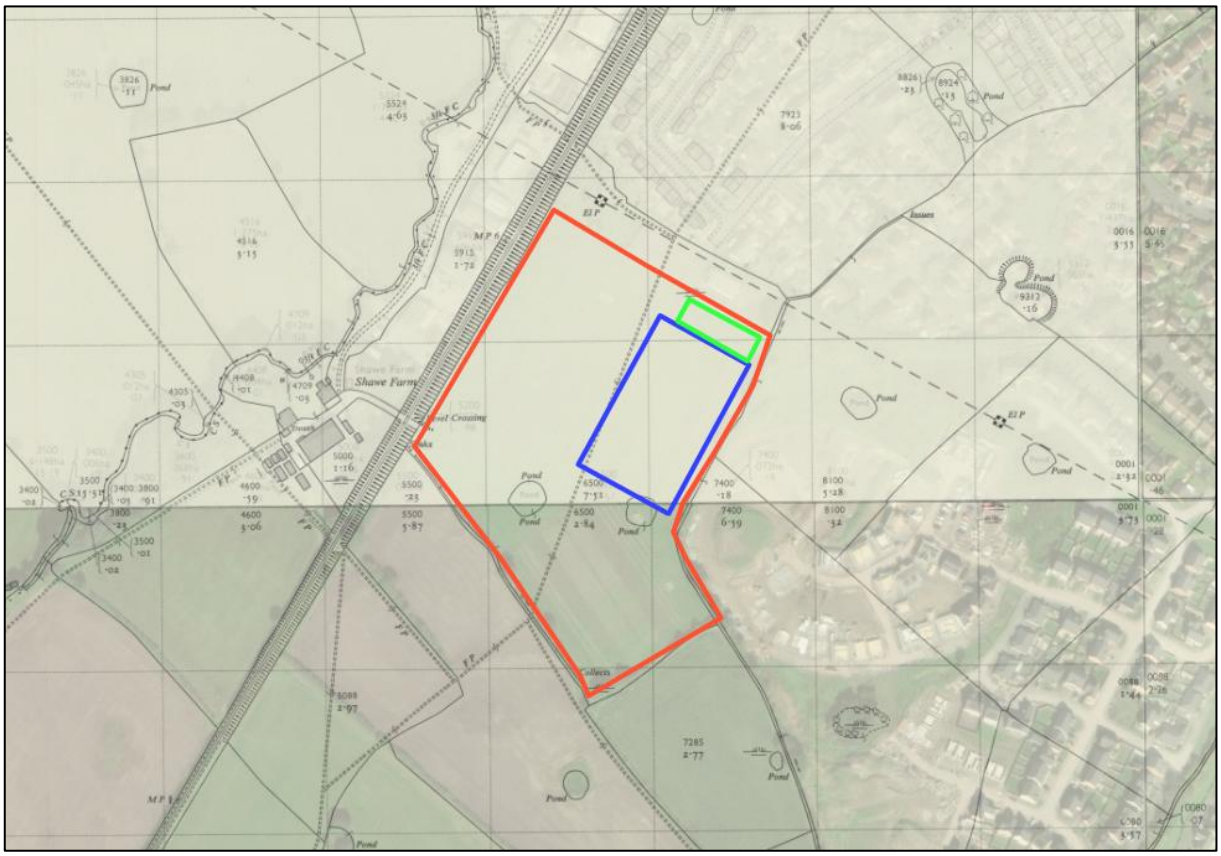


*Figure 2-F: 1944-1974 Historical map extract overlay for the site*

## 2.4 Anticipated Geology and Hydrogeology

2.4.1 Based on a review of available records, the site is anticipated to be underlain by superficial deposits of Devensian Till, comprising clay. (refer to Figure 2-G below).

2.4.2 Made Ground is not anticipated beneath the proposed AGP however, deposits associated with the construction of the hardstanding car park may be present along the northern boundary of the proposed car park extension area. Furthermore, Made Ground associated with infilling of the historic pond on the southern boundary of the proposed AGP could be present.

2.4.3 The BGS also record the site within a buried/hidden valley, indicating there could be up to 10-20m of superficial deposits presenting at the site.

2.4.4 The underlying bedrock is recorded as the Bowland Shale Formation across the entirety of the site, comprising mudstone (refer to Figure 2-H below).


*Figure 2-G: Extract from BGS showing superficial geology at the site*


*Figure 2-H: Extract from BGS showing bedrock geology at the site*

2.4.5 A summary of the anticipated geology underlying the site is summarised as follows:

| Stratum | Bedrock/ superficial | Approximate thickness (m) | Typical soil type | Aquifer Designation | Likely permeability |
|---|---|---|---|---|---|
| Topsoil | - | ~0.3 | Organic soil | - | - |
| Made Ground (infilled pond) | - | <2 | Variable | - | Variable |
| Devensian Till | Superficial | 10-20 | Clay | Secondary (undifferentiated) | Low |
| Bowland Shale Formation | Bedrock | Basal unit | Mudstone | Secondary A | Low |

*Table 2-C: Summary of anticipated geology and hydrogeology*

2.4.6 The site is not located within a Source Protection Zone (SPZ).

## 2.5 Flood Risk

2.5.1 The site falls within a Flood Zone 1 area. This designation indicates there is less than a 0.1% chance of flooding from rivers or the sea in any year (refer to Figure 2-I below).

2.5.2 The south-western corner of the proposed AGP, the western corner of the proposed parking extension, and parts of the wider site are recorded in areas with the potential for surface water flooding during a 1 in 1000-year flood event. The western and south-western corner of the wider site are also recorded with the potential for surface water flooding during a 1 in 100-year flood event (refer to Figure 2-I below).


*Figure 2-I: Extract of EA flood risk mapping for the site*

2.5.3 It should be noted that this information does not constitute a site-specific Flood Risk Assessment, and one may be required for the scheme.

## 2.6 Mining and Ground Stability

2.6.1 The site is not located within a Coal Mining Reporting Area.

## 2.7 Landfill and Infilled Ground

2.7.1 The site does not lie within 250m of a permitted or historical landfill site however, historical records indicate two ponds were located in the southern extent of the wider site (one potentially in the south of the proposed AGP) which were assumed to be infilled in the late 20$^{th}$ century. Given the nature of the development (open pitch, no enclosed spaces) the risk of ground gases affecting the proposed development is considered to be very low.

## 2.8 Underground Infrastructure

2.8.1 Copies of all utility plans obtained are presented as Appendix B. The plans are provided for information only and should not be relied upon to be accurate. In addition, it is worth noting that the public utility plans provided by the asset owners typically exclude private service runs.

2.8.2 A review of the plans indicates a 525mm diameter combined sewer runs through the northern part of the proposed car park extension. An abandoned sewer also runs through the north-eastern corner of the proposed AGP footprint. The asset holder should be consulted at the earliest opportunity to identify any construction constraints that may apply.

## 2.9 Unexploded Ordnance (UXO) Hazard Screen

2.9.1 A UXO hazard screen has been undertaken by Soiltechnics (as a non-specialist) in accordance with CIRIA C785 to determine if further specialist risk assessment is required. This has been carried out with reference to the Zetica bomb density maps, area-specific bomb strike maps (where available), and a review of historical mapping and possible military sites in the area. A summary is presented below.

| Hazard | Outcome | Discussion |
|---|---|---|
| Question 1: Are there any indicators of former military land use on site? | No | A review of the site's history has not identified indicators of former military use on site. |
| Question 2: Are there any indicators of historical bombing on or near the site? | No | The site falls within a low bombing density area and no military sites or likely Luftwaffe targets have been identified in the surrounding area. A review of historical mapping records did not reveal any indicators of bombing in the area. |

*Table 2-D: UXO Hazard Screen*

2.9.2 The Hazard Screen concluded that there was not a credible risk of encountering UXO during ground investigations. It should be noted that this preliminary risk review does not consider risks to the construction phase.

# 3 Ground Investigation

## 3.1 Objectives

3.1.1 The ground investigation scope and location of exploratory holes was determined by Soiltechnics Ltd, based upon the overall brief outlined in Section 1.

3.1.2 The objectives of the fieldwork were to:

a) Establish ground and groundwater conditions at the site.
b) Obtain samples for subsequent laboratory testing.

## 3.2 Fieldwork Summary

3.2.1 Fieldwork was undertaken on 25th November 2025.

3.2.2 A summary of the works completed is set out in the table below, along with the location of the exploratory records. The exploratory hole location plan is presented within Appendix A.

| Exploratory records | Method | Qty | Final Depth Range (m bgl) | Comments |
|---|---|---|---|---|
| Appendix C | Hand Pits | 3 | 1.00-1.20 | HP01 to HP03<br>Terminated at scheduled depth. |
| Appendix D | Dynamic Cone Penetrometer Tests | 7 | 0.53-0.84 | DCP01 to DCP07<br>Terminated at scheduled depth. |
| Appendix C | Dynamic windowless sampling boreholes | 4 | 5.45 | WLS01 to WLS04<br>Boreholes terminated at scheduled depth. |

*Table 3-A: Summary of fieldwork undertaken*

3.2.3 All soils encountered were described in accordance with BS EN ISO 14688 "Identification and Classification of soil".

## 3.3 Unexploded Ordnance (UXO)

3.3.1 As outlined in Section 2.9, the risk review concluded that the UXO risk to the ground investigation works is low within the site boundary and therefore no special precautions were required.

## 3.4 Sampling

3.4.1 During the fieldwork, sampling of soil, rock and groundwater for geotechnical purposes has been undertaken in accordance with BS EN ISO 22475-1 *"Geotechnical Investigation and testing – sampling by drilling and excavation and groundwater measurements".*

3.4.2 Samples collected for chemical analysis have been taken and handled in accordance with BS ISO 18400-105:2017 *"Soil quality — Sampling Part 105: Packaging, transport, storage and preservation of samples".*

3.4.3 Various sampling and sub-sampling methodologies have been adopted as appropriate, with the primary aim of obtaining the highest quality sample class practicable.

3.4.4 Untested chemical and geotechnical samples will be held for a period of 4 weeks from the date of the first report issue, after which they will be disposed of with no further notice.

## 3.5 In-situ Testing

3.5.1 The following table summarises the field testing carried out. The results are summarised on individual exploratory hole logs where appropriate and detailed within the Appendices indicated.

| Tests | Qty | Applicable standard / guidance | Location of Results |
|---|---|---|---|
| Standard penetration test (SPT) | 20 | BS EN ISO 22476-3 | Included within logs<br>Detailed in Appendix D |
| Pocket penetrometer | 31 | Manufacturer's instructions | Included within logs<br>Detailed in Appendix D |
| Dynamic cone penetrometer (DCP) using TRL probe | 7 | DMRB: CS229 | Detailed in Appendix D |
| Soakaway test | 1 | Principles of BRE 365 | Detailed in Appendix D |

*Table 3-B: Summary of field testing undertaken*

## 3.6 Investigation Constraints

3.6.1 The surface of the site was very soft during the investigation, which resulted in the tracked windowless sampler rig leaving ruts around the existing football pitch. As a result, a hand excavated trial pit was completed in the centre of the pitch to minimise surface damage.

## 3.7 Electrical Capacity Survey

3.7.1 An electrical capacity survey was commissioned to determine the capacity of the existing electrical supply onsite to power proposed floodlighting. A copy is presented in Appendix I.

3.7.2 The results indicate that the site has enough spare capacity for the new installation, along with a ready made supply coming from the electric cupboard within the pavilion. The cable route is straightforward, across the car park and within soft dig, the distance being approx. 60-70 m.

## 3.8 Topographical Survey

3.8.1 A topographical survey was commissioned for the proposed pitch and areas immediately adjacent. A copy is presented in Appendix J and has been issued under separate cover (including .dwg file).

# 4 Laboratory testing

## 4.1 Overview

4.1.1 Samples obtained from exploratory holes were sent to independent accredited laboratories for geotechnical and chemical testing.

## 4.2 Geotechnical Testing

4.2.1 The geotechnical testing schedule was prepared by Soiltechnics using a targeted and judgemental approach, based upon the scheme proposals and ground conditions encountered.

4.2.2 Geotechnical laboratory test results are presented in Appendix E, and the total number of geotechnical tests undertaken is summarised below:

| Geological Unit | Test | Quantity |
|---|---|---|
| Made Ground | Moisture Content | 1 |
| | Atterberg Limits | 1 |
| | BRE SD1 Suite C | 1 |
| Devensian Till | Moisture content | 2 |
| | Atterberg limits | 2 |
| | BRE SD1 Suite C | 2 |

*Table 4-A: Summary of geotechnical laboratory testing*

## 4.3 Chemical Testing

4.3.1 The chemical testing schedule was prepared by Soiltechnics using a targeted and judgemental approach, based upon fieldwork observations.

4.3.2 Chemical laboratory test results are presented in Appendix F, and the total number of chemical tests undertaken is summarised below:

| Geological Unit | Testing Suite | Quantity |
|---|---|---|
| Topsoil | ST Basic classification suite (Metals, inorganics, PAH, banded TPH, asbestos) | 1 |
| Made Ground | ST Basic classification suite (Metals, inorganics, PAH, banded TPH, asbestos) | 1 |
| | Full WAC Suite (solid and 2-stage leachate) | 1 |
| | STS Basic hydrocarbons (PAHs (USEPA 16) + phenol + TPH CWG + BTEX) | 1 |

*Table 4-B: Summary of chemical laboratory testing*

# 5 Ground Investigation Findings

## 5.1 Ground Model

5.1.1 Ground conditions encountered were relatively consistent across the site and were broadly in line with those anticipated from the desk study.

5.1.2 The table below interprets the geological conditions at the site. Unless otherwise stated in subsequent interpretive report sections, this represents the adopted ground model.

| Stratum | Brief description | Top depth range (m bgl) | Adopted model top depth (m bgl) | Thickness (m) |
|---|---|---|---|---|
| Topsoil | Grass onto brown slightly sandy clay with rootlets | G.L | G.L. | 0.10 – 0.25 |
| Made Ground | Soft greyish brown and brown, slightly gravelly clay with gravels of brick. | 0.10 – 0.25 | 0.20 | 0.20 – 0.35 |
| | Very soft dark brown clay with frequent wood and relict rootlets (WLS01 only) | 0.20 | 0.20 | 2.80 (WLS01 only) |
| Devensian Till | Firm to stiff brown mottled grey, gravelly clay. | 0.10 – 0.25 (3.0 in WLS01 only) | 0.40 | ND |

*Table 5-A: Ground Model*

5.1.3 Further detail about the ground conditions encountered is provided in the relevant sub-sections below.

## 5.2 Topsoil

5.2.1 Topsoil was encountered from ground level in all exploratory positions, ranging from 0.10 m to 0.25 m in thickness. Topsoil was observed as grass onto a brown, slightly sandy clay with rootlets.

5.2.2 A photograph of the Topsoil encountered is presented below.

*Figure 5-A: Topsoil deposits extracted from HP01*

## 5.3 Made Ground

5.3.1 Made Ground was encountered in all exploratory positions underlying Topsoil with the exception of HP03, where Made Ground was absent.

5.3.2 Generally, where Made Ground was present it comprised soft greyish brown sandy gravelly clay with some plastic and brick, to a depth of between 0.40 m to 0.50 m.

5.3.3 In the southern corner of the proposed AGP (WLS01), Made Ground was locally deeper extending to a depth of 3.00 m bgl, comprising soft to firm clay from depths of 0.70 m to 1.90 m overlying a very soft, dark brown, clay, with frequent fragments of wood and a strong organic odour throughout. A faint hydrocarbon odour was also noted between depths of 1.4-1.6 m bgl.

5.3.4 This deeper area of Made Ground in WLS01 corresponds to the historical location of a backfilled pond. As a result the deep Made Ground is only expected to be present within the footprint of the old pond, and is not anticipated to be widespread across the southern area of the site.

5.3.5 Photographs of the Made Ground encountered on site are presented below.

*Figure 5-B: Made Ground extracted from WLS01, encountered between depths of 1.90 m to 3.00 m bgl*

*Figure 5-C: Made Ground extracted from WLS02.*

## 5.4 Devensian Till

5.4.1 Devensian Till was encountered in every exploratory position underlying Made Ground and extended to depths of at least 5.45 m bgl, the maximum depth investigated. The Devensian Till typically comprised firm to stiff brown mottled grey gravelly clay.

5.4.2 Photographs of the Devensian Till generally encountered on site are presented below.

*Figure 5-D: Devensian Till extracted from WLS02*

## 5.5 Groundwater

5.5.1 A summary of the groundwater level data obtained during the fieldworks phase is presented below.

| Exploratory hole ID | Groundwater observation |
|---|---|
| HP01 | Groundwater encountered at 0.95 m depth, with no significant rise after 20 minutes. |
| HP03 | Groundwater encountered at 1.20 m depth, rising to 1.10 m upon completion |
| WLS01 | Groundwater encountered at 1.50 m depth, rising to 1.20 m upon completion |
| WLS02 | Groundwater strike at 4.80 m depth, with no significant rise after 20 minutes. |
| WLS03 | Groundwater strike at 2.50 m depth with no significant rise after 20 minutes. |

*Table 5-B: Summary of groundwater observations during the fieldworks*

5.5.2 Groundwater levels are expected to vary seasonally and in response to recent weather conditions. Long term monitoring will provide a reasonable quantification of such variation.

## 5.6 Evidence of Possible Contamination

5.6.1 During the ground investigation works, a faint hydrocarbon odour was noted within Made Ground soils from 1.20 m to 1.40 m. A sample was taken for subsequent laboratory testing, the results of which are reported in Section 6.1. Elsewhere, no significant visual or olfactory evidence of contamination was noted except for the presence of anthropogenic materials contained within the Made Ground (brick and plastic).

## 5.7 Obstructions and Instability

5.7.1 The progress of the ground investigation works was not generally affected by below ground obstructions or instability.

# 6 Chemical Assessment

## 6.1 Topsoil Suitability

6.1.1 A composite sample of the Topsoil was obtained and tested for the sole purpose of assessing the suitability of such soils for either reuse onsite within the existing playing fields or offsite, potentially within a residential development. As such generic screening values have been adopted based upon a 'residential with home grown produce' as a precaution.

6.1.2 Assessment of laboratory test data has been carried out using published generic assessment criteria (GACs). The GACs act as screening values to provide a 'trigger' to an assessor that soil concentrations above these limits might present an unacceptable risk. Specific details regarding the published GAC sources chosen and any parameter refinements made are summarised within Appendix G, along with the order of preference where multiple GAC sources are available.

6.1.3 Asbestos does not currently have published GACs which can be used for generic assessment purposes, at this stage a present / absent trigger limit has been adopted.

6.1.4 A table analysing the test data is presented in Appendix G, and the following table summarises the outcome of the analysis.

| Receptor group | CLEA model | Inorganic contaminants | Organic contaminants |
|---|---|---|---|
| Residential users (child) | Residential with plant uptake | No exceedances | No exceedances |

*Table 6-A: Summary of chemical analysis*

6.1.5 In addition, no asbestos was detected within the reworked Topsoil sample analysed and no suspected asbestos containing materials were observed during the site works.

6.1.6 Based on the above, the testing indicates that the Topsoil in-situ would be chemically suitable for reuse onsite, or offsite within a residential development.

## 6.2 Basic Construction Operative Risk Assessment

6.2.1 The Topsoil/Made Ground deposits are not considered to present a significant contamination risk to construction operatives. The contamination assessment screening sheets are presented within Appendix G.

6.2.2 Standard hygiene precautions and dust mitigation is, as is good practice on any redevelopment site, recommended throughout the construction phase.

## 6.3 Waste Disposal

6.3.1 Sampling has been undertaken to characterise the in-situ soils encountered on site for the potential disposal to landfill. The classification of soils for disposal to landfill is undertaken in accordance with WM3 (v1.2GB), and a Waste Acceptance Criteria assessment (WAC) undertaken in accordance with the limits in Annex II of the Landfill Directive (Directive 1999/31/EC).

6.3.2 A single composite sample of the Made Ground was obtained using soils from each exploratory hole, referenced as CS01.

6.3.3 The assessment sheets are enclosed within Appendix H, and a summary of the findings is presented in the table below.

| Potential waste population | Hazardous classification (LoW code) | Landfill classification |
|---|---|---|
| Topsoil | Non-Hazardous (17-05-04) | Topsoil is typically unsuitable for disposal to inert landfill sites due to high organic carbon content. |
| Made Ground (CS01) | Non-Hazardous (17-05-04) | Inert landfill. |
| Natural soils | Non-Hazardous (17-05-04) | Inert based on soils being of natural origin and unaffected by artificial contamination. |

*Table 6-B: Summary of waste characterisation*

## 6.4 Materials Management

6.4.1 In terms of the development, where reasonably practicable, landfill disposal should be minimised through the reuse of site-won materials on site, or off-site transfer of surplus soils to other development schemes or Soil Treatment Facilities. Early consideration of the site's overall material balance at the design stage is also critical in reducing the need for off-site disposal, limiting costs, and increasing the overall sustainability of the development.

6.4.2 Where Made Ground soils are to be reused onsite or materials transferred between sites, a Materials Management Plan (MMP) or Waste Exemption is recommended.

6.4.3 The process of an MMP allows soils that are suitable for reuse and have a certainty of use to not be considered a waste, and therefore not fall under the waste regulations. This scheme is self-regulated within the industry and is supported in principle by the Environment Agency.

# 7 Geotechnical Discussion

## 7.1 Scheme Overview

7.1.1 The following assessments are made on the investigatory data presented in the preceding sections of this report and are made with reference to the specific nature of the development. Should scheme proposals change then it is recommended that the validity of the conclusions of this report in relation to the revised scheme are checked.

7.1.2 The proposed development is for construction of an 11v11 3G Artificial Grass Pitch (AGP), including potential extension of the existing car park.

7.1.3 In view of the scheme proposals, the geotechnical elements considered in this report are outlined below:

a) Floodlight and pitch foundations
b) Drainage

## 7.2 Key Geotechnical Issues

7.2.1 In view of the ground conditions, the following list summarises the key geotechnical issues that may i mpact the scheme and will therefore need to be appropriately managed during the lifecycle of the project:

- Made Ground
- Groundwater

## 7.3 Made Ground

7.3.1 Made Ground Deposits were recorded up to depths of 3.00 m bgl in the southern portion of the proposed AGP (WLS01). The Made Gound in this area is likely localised and associated with the infilling of a pond (c.2000) identified on the earliest historical maps (late 1800s). Made Ground material between depths of 1.9-3.0 m bgl where noted to be very soft in consistency with an SPT N-value of 0 (i.e. SPT sinking under its own weight).

7.3.2 Such deposits are not considered suitable for supporting concentrated foundation loads due to their compressible nature. Accordingly, floodlight foundations should extend, as a minimum, through such deposits. Should the deposits extend into the south-eastern corner of the AGP, formation of a traditional pad type foundation for the floodlight here could be difficult to successfully achieve at such depths. In reality, given the recorded location of the pond, and allowing for some inaccuracy in mapping, the deepest part is likely to be local to WLS01, and the pond is likely to shallow towards the southeast corner of the AGP.

7.3.3 Such deposits could affect the pitch formation, however, with limited increase in stress from the pitch formation, given the upper horizons of the Made Ground material (<1.9m depth) in the pond area was recorded as firm, formation in this area could simply be reinforced to limit potential issues of differential settlement.

7.3.4 Elsewhere across the site Made Ground deposits were encountered to a maximum depth of 0.5m and therefore are unlikely to affect foundations.

## 7.4 Groundwater

7.4.1 It is anticipated that groundwater may be encountered during foundation excavations, with seepages of groundwater below depths of 0.95 m across the site. The inflow of groundwater into excavations may lead to instability and excavation collapse. However, flow rates are anticipated to relatively minor, and it may be possible that groundwater can be controlled via conventional sump pumping techniques, and shoring used to maintain the stability of excavation sides where necessary.

7.4.2 Groundwater levels are expected to vary seasonally and in response to weather events.

## 7.5 Foundation Strategy

7.5.1 In view of the key geotechnical issues discussed above and anticipated loadings spread (pad) type foundations are considered suitable for the project.

## 7.6 Floodlight Foundations

7.6.1 Due to the depth of Made Ground present within the southern part of the proposed AGP to depths of 3 m bgl, as discussed in in Section 7.3 above, formation of a traditional pad type foundation for the south-western most floodlight could be difficult to successfully achieve at such depths. However, the following assessment is based on the assumption that the infilled pond is unlikely to extend significantly into the area of the proposed floodlight (probable based on mapping), and excavations for pad type foundations could be extended through any Made Ground and into the underlying Devensian Till.

7.6.2 The cohesive deposits of Devensian Till are likely to provide adequate support to the proposed floodlight bases on pad type foundations. Excavations for foundations are likely to encounter clay deposits as described above. The following assessments are therefore based on foundations located within cohesive soils.

7.6.3 Laboratory testing indicates that the soils are of medium volume change potential and thus, foundations should extend a minimum of 0.9m depth below the proposed ground level, subject to penetrating the naturally deposited soils by a minimum of 0.3m.

7.6.4 Based on ground conditions and in-situ pocket penetrometer testing, a conservative undrained shear strength of 75 kN/m$^2$ has been adopted for design purposes.

7.6.5 The results of calculations undertaken to determine the bearing values for pad type foundations in cohesive Devensian Till are presented below;

| Plan size of pad (m) | Ultimate bearing value (kN/m$^2$) | Presumed bearing value (kN/m$^2$) | Allowable bearing pressure (kN/m$^2$) |
|---|---|---|---|
| 1.0 x 1.0 | 705 | 245 | 185 |
| 1.5 x 1.5 | 670 | 235 | 125 |
| 2.0 x 2.0 | 650 | 225 | 100 |

*Table 7-A: Bearing values for floodlight foundations*

7.6.6 The presumed bearing values have been derived from the ultimate bearing value by applying a factor of safety of 3.

7.6.7 The allowable bearing capacity is derived assuming a constant, uniformly applied load, with a settlement limit of 25mm.

7.6.8 The above assessment assumes floodlights will be located centrally on the pad and eccentric loading has not been considered. This should be accounted for by the foundation designer where necessary.

## 7.7 Artificial Pitch and Car Park

7.7.1 It is anticipated that the proposed AGP and car park will be located at or about existing ground levels, with the formation located on Devensian Till, and possibly a veneer of Made Ground following removal of any Topsoil type material. Deeper Made Ground deposits are present in the area of WLS01 associated with the infilled pond.

7.7.2 CBR value has been determined for the proposed AGP and car park using in-situ Dynamic Cone Penetrometer testing following the methodology defined by the Highways England Document CS229 Data for Pavement Assessment. The results are presented in Appendix D and the location of test positions are shown on Drawing 01.

7.7.3 Based on the anticipated founding depth and DCP results, a CBR design value of 5% can be adopted for soils that are likely to be representative of those which remain at or near pitch formation levels.

7.7.4 It is recommended that the formation level is trimmed and rolled following the requirements outlined in the Specification for Highway Works Series 600. Such a process will identify any soft/loose areas, which should either be excavated out and backfilled with a suitable well compacted material similar to those exposed in the sides of the resulting excavation, or large cobbles of a good quality stone rolled into the formation to stabilise the 'soft/loose' area.

7.7.5 Consideration will need to be given to the area of deeper Made Ground in the area of WLS01 and the impact this could have the pitch formation long term. Whilst DCP results (<1m bgl) were consistent with depth across the site, and the near surface clay deposits exhibited a degree of compaction in WLS01 to depths of 1.9m bgl, the deposits below are extremely soft and organic, and may consolidate further overtime. We recommend the use of a geosynthetic reinforcement in this area of the site to minimise the potential effects of differential settlement which may occur between deeper Made Ground in the area of WLS01 and the surrounding natural soils.

7.7.6 The Devensian Till/Made Ground deposits soils are considered frost susceptible and this may override the CBR criteria for pavement foundation design purposes.

## 7.8 Drainage

7.8.1 Infiltration testing has been undertaken at the site following the principles of BRE 365: Soakaway Design (2016). The results are presented in Appendix D.

7.8.2 The deposits of the Devensian Till were encountered as a cohesive material. Indicative testing was undertaken within HP01, considered representative of the natural soils site wide, however only one cycle could be undertaken during the fieldwork due to the very slow dissipation of water added. Due to insufficient infiltration over the test period, permeability could not be determined.

7.8.3 As a result, such soils are considered to be effectively impermeable for the purposes of drainage design. On this basis, disposal of stormwater via a soakaway is not considered viable.

7.8.4 As an alternative, it is possible that the AGP drainage could key into the existing surface water drainage system currently used by the pavilion/car park. If this is considered an option for the development a comprehensive drainage assessment will be required to determine the potential impact on the capacity of the existing systems, to identify the invert levels of existing features, and to confirm drainage gradients achievable across the proposed AGP area.

7.8.5 Surface water ditches were also noted along the southern and eastern boundaries of the wider site which could potentially be utilised as a disposal point, subject to relevant permissions being sought.

7.8.6 In addition, a 525mm diameter combined sewer is present adjacent to the northeast of the site (refer to Section 2.8). Given the proximity of the combined sewer, this could be considered a feasible and practical option for the disposal of surface water collected by the proposed pitch development, subject to obtaining relevant permissions. However, a comprehensive drainage assessment will be required to determine the potential impact on the capacity of the existing systems and to confirm drainage gradients will be achievable across the proposed pitch area.

## 7.9 Aggressiveness of the Ground to Buried Concrete

7.9.1 The aggressiveness of the ground with respect to buried concrete has been assessed in accordance with Building Research Establishment Special Digest 1: Concrete in Aggressive Ground Third Edition (2005).

7.9.2 The site is interpreted to be a brownfield site where pyrite is unlikely to be present.

7.9.3 The classification of the strata is tabulated below:

| Stratum | Disturbed / Undisturbed | Design sulphate class | Aggressive chemical environment for concrete class |
|---|---|---|---|
| Made Ground | N/A | DS-1 | AC-1s |
| Devensian Till | N/A | DS-1 | AC-1s |

*Table 7-B: Summary of the aggressiveness of the ground to buried concrete*

# 8 Recommendations for Further Works

8.1.1 At this stage further investigations are not considered to be necessary.

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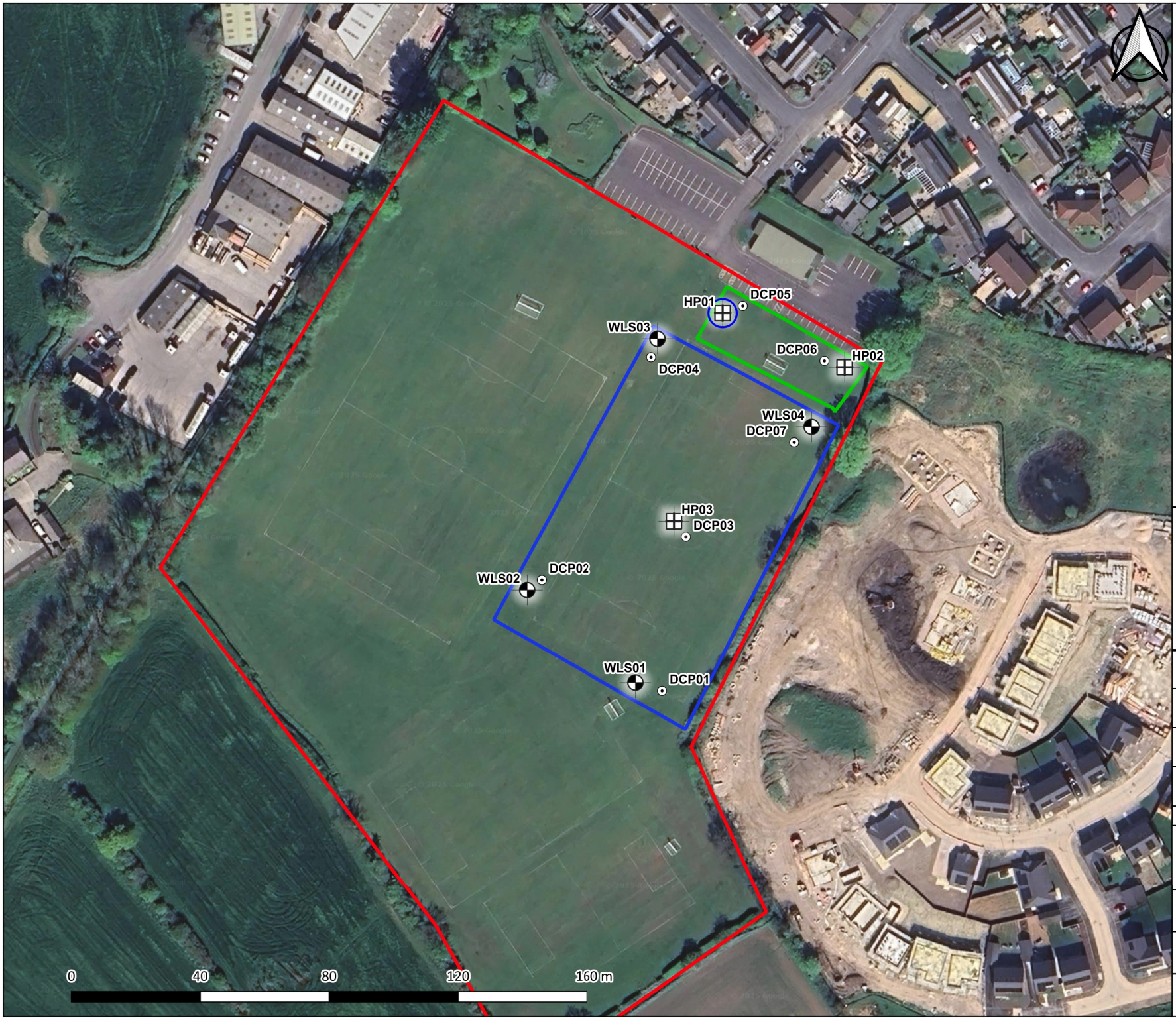
# Appendix A Drawings




Key:

- Site Boundary
- Proposed AGP Footprint
- Propsed Car Park Extension
- Windowless Sampling (WLS)
- Dynamic Cone Penetrometer (DCP)
- Soakaway Testing

**Notes**

1) Base image provided by Google.

2) All drawn features are approximate.



| REV | DATE | COMMENT ON VARIATION |
|---|---|---|
| | | |
| | | |
| | | |
| A | Dec 2025 | First issue |

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PROJECT
Brian Holden Memorial Playing Fields

TITLE
Exploratory Hole Location Plan

DRAWING No.
STX7134-D01-A

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# Appendix B Utility Service Plans

United Utilities
Water for the North West

**How to contact us:**

**United Utilities Water Limited**
**Property Searches**
**Haweswater House**
**Lingley Mere Business Park**
**Great Sankey**
**Warrington**
**WA5 3LP**

**Telephone: 0370 7510101**

**E-mail: propertysearches@uuplc.co.uk**

**Your Ref: STX7134**
**Our Ref: UUPS-ORD-664870**
**Date: 17/07/2025**

**Soiltechnics**

**Soiltechnics**
**Cedar Barn,**
**Walgrave,**
**NN6 9PY**

**FAO:**

**Dear Sirs**

## Location: Brian Holden Memorial Playing Field

I acknowledge with thanks your request dated 14/07/2025 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. http://www.unitedutilities.com/work-near-asset.aspx .

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please contact us .

Yours Faithfully,

Karen McCormack
Property Searches Manager



*United Utilities Water Limited*
*Registered In England & Wales No. 2366678*
*Registered Office Haweswater House, Lingley Mere Business Park,*
*Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP*

Water for the North West

# TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

**TERMS AND CONDITIONS:**

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



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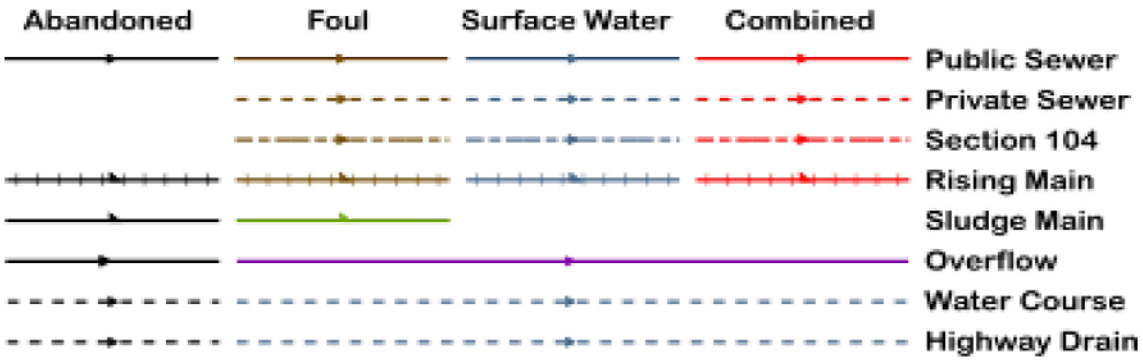
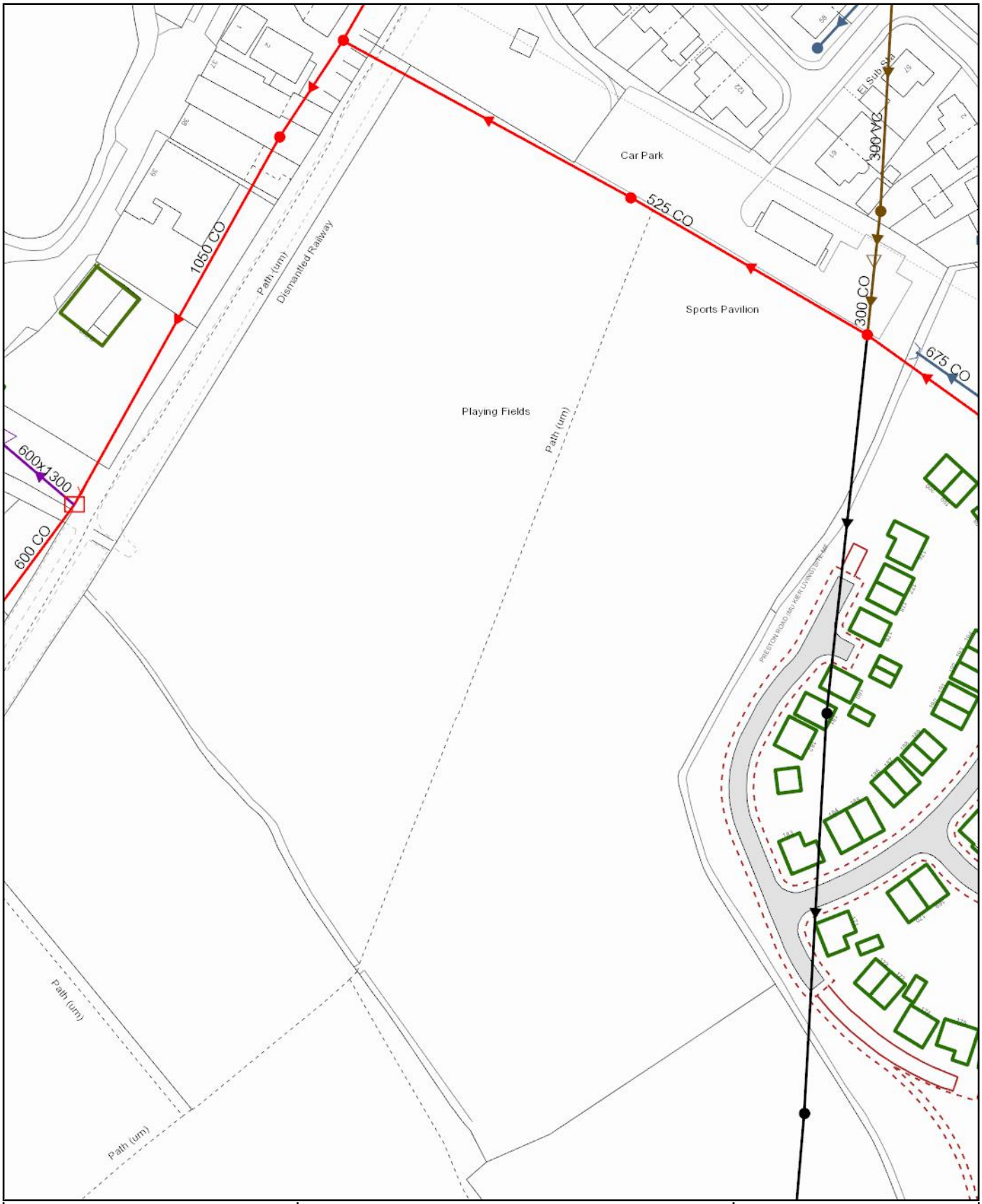
United Utilities
Water for the North West

# Wastewater Symbology




All point assets follow the standard colour convention: red – combined, brown - foul, blue – surface water, purple - overflow

- Manhole
- HS Head of System
- ES Extent of Survey
- RE Rodding Eye
- IN Inlet
- DP Discharge Point
- HY Vortex
- PE Penstock
- WO Washout Chamber
- VA Valve
- AV Air Valve
- NRV Non Return Valve
- SO Soakaway
- GU Gully
- CA Cascade
- FM Flow Meter
- HA Hatch Box
- OI Oil Interceptor
- SM Summit
- DS Drop Shaft
- OP Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- IC Inspection Chamber
- Bifurcation Chamber
- LH Lamp Hole
- T Junction / Saddle
- CA Catchpit
- VC Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- T Network Storage Tank
- V Sewer Overflow
- WwTW Ww Treatment Works
- Ww Pumping Station
- ST Septic Tank
- CK Control Kiosk
- DNM Network Monitoring Point
- Change of Characteristic

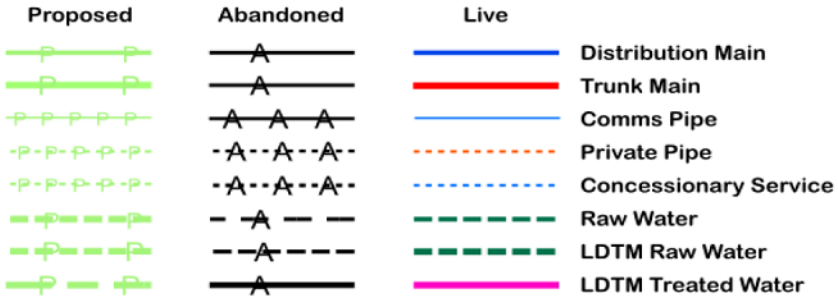



| | | | |
|---|---|---|---|
| **Scale:** | 1:1446 | **SEWER RECORDS** | United Utilities<br>Water for the North West |
| **Date:** | 17/07/2025 | | |
| **Address or Site Reference:** | Brian Holden Memorial Playing Field | | |
| **Printed by:** | Property Searches | | |

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

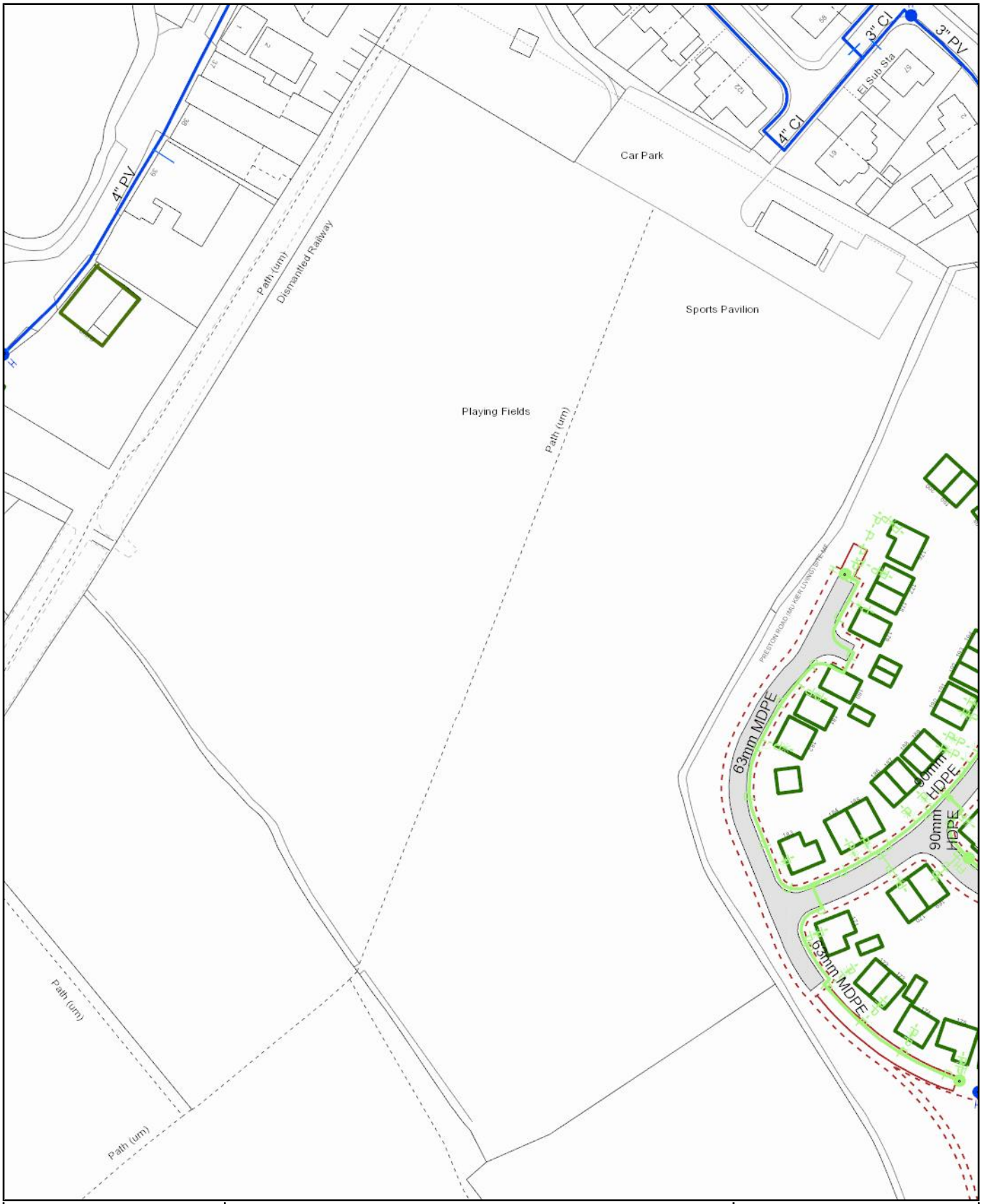
United Utilities
Water for the North West

# Clean Water Symbology





Symbology for proposed assets is the same as above, but shown in green
Symbology for abandoned assets is the same as above, but shown in black



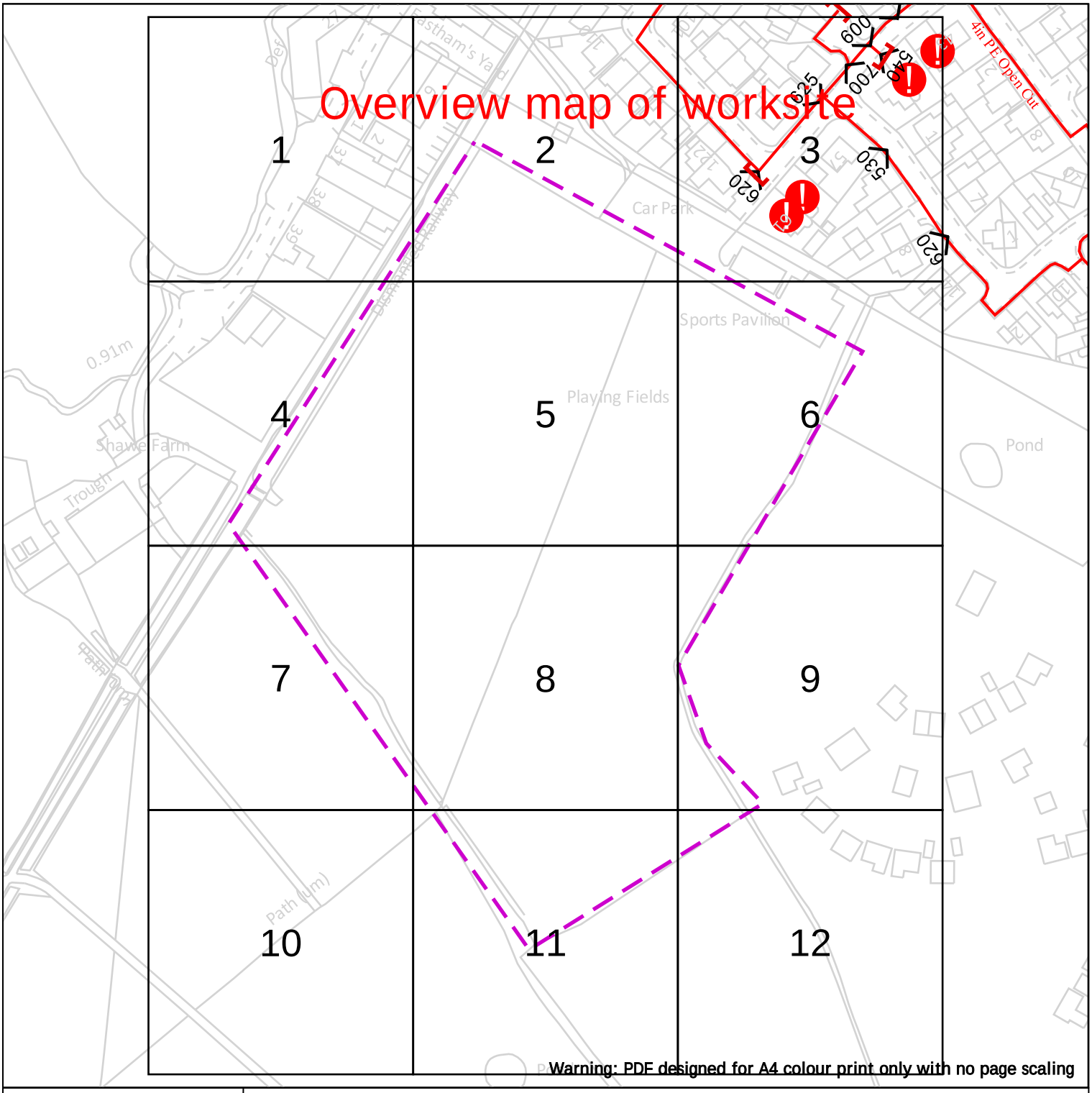

| | | | |
|---|---|---|---|
| **Scale:** | 1:1446 | **WATER MAINS RECORDS** | United Utilities<br>Water for the North West |
| **Date:** | 17/07/2025 | | |

**Address or Site Reference:** Brian Holden Memorial Playing Field

**Printed by:** Property Searches

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

# Overview map of worksite




Warning: PDF designed for A4 colour print only with no page scaling

Cadent
Your Gas Network

Dig Sites Area: Line:

- LP Mains
- MP Mains
- IP Mains
- LHP Mains
- Valve
- Depth of cover
- Syphon
- Diameter Change
- Material Change
- Out of Standard Service

Where an out-of-standard service is present please contact plant protection 0800 688 588 for further information.
Out-of-standard service symbology may be used to indicate one or more of the following:
• Identification of shallow services
• Identification of dual services
• Recording of non-perpendicular services
A perpendicular service/connection is laid in a straight line from the entry point at the property to the connection at the main – this includes a pipe that has a perpendicular connection and is not straight but does not deviate more than 1m off centre line.

Date Requested: 14/07/2025
Job Reference: 37978840
Site Location: 359716 435984
Requested by: Miss Lauren Wenham
Your Scheme/Reference: STX7134

View extent: 100m, 100m

Scale: 1:2050 (When plotted at A4)

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