CONSULTING ENGINEERS

[CONSULTING CIVIL & STRUCTURAL ENGINEERS]

Dorothy Hyman Sports Centre
New AGP

Surface Water Strategy

R - 00191 – 001 – SDS – A
April 2024

Report Originator(s)

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Revision Record

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A	30.05.24	Drainage Layout amended	WRA	WRA

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1.0 Introduction

1.1 Design Brief

1.1.1 The client, McArdle SportTec requires a surface water drainage design for the installation of new artificial sports pitch at Dorothy Hyman Sports Centre.

1.1.2 This report provides design proposals to ensure surface water is managed adequately.

1.1.3 This report has been prepared by SEA Consulting Engineers Ltd. With the benefit limited to our instructing Client, McArdle SportTec.

1.2 Site Location

1.2.1 The site is located within the ground of Dorothy Hyman Sports Centre, just east of the existing athletics track.

1.3 Current Land Use

1.3.1 The site is currently open field.

1.4 Proposed Development

The proposed development will comprise the construction of an artificial sports pitch. A site layout is presented in appendix A.

2.0 Surface Water Drainage

2.1 Existing Surface water drainage

2.1.1 There are existing surface water drains crossing the site which drain the althletics track, buildings and existing AGP to the north. A copy of the utilities survey by JPP is presented in appendix B

2.1.2 As part of the works it is proposed to divert this surface water drain around the new AGP. The drainage layout drawing E02 shows this diversion.

2.2 Proposed Storm Drainage Discharge

2.2.1 Paragraph 80 of the Planning Practice Guidance for 'Flood Risk and Coastal Change' defines the hierarchy of drainage options. Where reasonably practicable the aim should be to discharge storm water as high up the following hierarchy of storm drainage options;

- Into the Ground (infiltration);
- To a surface water body;
- To a surface water sewer, highway drain or another drainage system, and
- To combined sewer

2.2.2 Each of these is consider separately below;

Into the ground

2.2.3 A ground investigation has been undertaken out by Soiltechnics Ltd, with infiltration testing carried out. They have concluded that the use of soakaways at this site is unlikely to be viable. This is further backed up by the fact that no existing soakaway features are present on site and that a surface water drain crosses the site. Extracts from the ground investigation are presented in appendix C.

To a surface water body

2.2.4 There are no existing watercourses or bodies within the vicinity of the site.

To a surface water sewer, highway drain or another drainage system

2.2.5 There are existing surface water drains crossing the site which offers a viable outfall for the site surface water.

2.3 Proposed Surface Water Drainage Strategy

2.3.1 Proposals are to drain the new AGP to the existing diverted surface water drain which crosses the site.

2.3.2 The design will use FEH22 rainfall parameters and will be for all drained areas on the site to accommodate storms up to the 1 in 100 year event and allow for the increase in storm intensities up to 40%. This is based on the Environment Agency updates of May 2022 which bases peak rainfall climate change allowance on river management catchment areas. An extract from the EA website based on the site location is presented in appendix D. The sites drained areas are presented in appendix E and equates to a total area of 6490m^2.

2.3.3 Proposals are to restrict the pitches storm water to as close to greenfield runoff as possible. The online greenfield runoff tool by HR Wallingford has been used to assess the greenfield runoff rates, based on the sites drained areas. The calculations are presented in appendix F and shows that the Qbar value is 2.7l/s. Therefore flows will be restricted to 2.7l/s for all storm events.

2.3.4 The new artificial grass pitch (AGP) will consist of a synthetic surface and porous shockpad, 40mm porous macadam and 275mm permeable type 3 subbase, which will allow water to infiltration through pitch make up to a series of new lateral drains which will collect surface water before outfalling into a HydroBrake flow control device with attenuation provided within the pitches make up.

2.3.5 The system has been modelled using Causeway Flow for all storm durations up to 10,080mins. The calculations are presented in appendix G and shows that AGP build up provides adequate attenuation for the 1in100 year + 40% event.

2.3.6 A Drainage layout for the AGP is presented in appendix H.

2.4 SUDS

2.4.1 The use of SUDS and pollution control measures have been assessed using the Simple Index Approach set out within the CIRIA SUDS Manual 2015. Based on table 26.2 of the SUDS Manual, the pollution indices for the site are set out in table 2.1 below.

Pollution Hazard Indices for Different land use classifications				
Land use	**Pollution Hazard Level**	**Total Suspended Solids (TSS)**	**Metals**	**Hydrocarbons**
Residential Roofs	Very Low	0.2	0.2	0.05

Table 2.1 – Extract of table 26.2 of the SUD manual.

2.4.2 Residential roofs' is considered to be the most appropriate category, due to the minimal pollution hazard associated with the proposed AGP, which will have no vehicle movements within its extent.

2.4.3 Surface water from the area will pass through the permeable subbase. Therefore acting very similar to permeable paving.

2.4.4 Table 26.3 of The SuDS Manual shows the mitigation indices for a range of Suds components for discharges to surface waters. An extract of this is provided in Table 2.2 below for the components relevant to the proposed development.

Indicative mitigation indices			
Type of SUDS Component	**Mitigation Indices**		
	Total Suspended Solids (TSS)	**Metals**	**Hydrocarbons**
Permeable Paving	0.7	0.6	0.7

Table 2.2 – Extract from table 26.3 of the SUDS Manual

2.4.5 Based on the above it can be seen that the permeable subbase will provide adequate treatment for the sites surface water.

2.5 Maintenance

2.5.1 All new surface water will remain private and maintenance will be the responsibility of the landowner The following maintenance plan shall be implemented.

Pitch and Permeable subbase

Maintenance Schedule		
Maintenance Category	**Required Action**	**Frequency**
Regular Maintenance	Brushing (Standard cosmetic sweep over all areas)	Once a year, after the autumn leaf fall, or reduced frequency as required, based on site specific observations of clogging or manufacturers recommendations. Particular attention to be paid to areas where water into pervious areas from adjacent impermeable areas as this area is most likely to collect sediment
Occasional maintenance	Stabilise and mow adjacent contributing areas	As required
	Removal of weeds or management suing glyphosphate applied directly into the weeds by an applicator rather than spraying	As required
Remedial Actions	Remediate any landscaping which, through vegetation maintenance strip, has been raised to within 50mm of the finished surface	As required
	Remedial work to any depressions, rutting and cracked surfacing considered detrimental to the performance or hazard to users	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10-15 years, or as required (if infiltration performance is reduced due to significant clogging
Monitoring	Initial inspection	Monthly for 3 month after installation
	Inspect for areas of poor operation and/or weed growth – if required take remedial action	3-monthly, 48hrs after large storms for the first 6 months
	Establish slit accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor Inspection chambers	Annually

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3.0 Conclusion

3.1.1 Based on the above, and providing the above strategies are adopted, the developed site will not contribute further to flood risk and therefore satisfying the requirements of the National Planning Policies Framework.

3.1.2 **References**

- Department for Communities and Local Government (July 2021) - National Planning Policy Framework.
- The Building Regulations (2015) - Drainage and Waste Disposal - Approved Document H.
- BS 8533:2011 Assessing and managing flood risk in development – Code of Practice.
- CIRIA Report C635 Designing for exceedance in urban drainage – good practice.
- The SUDS Manual
- BS 8533:2011 Assessing and managing flood risk in development – Code of Practice.
- Design and Analysis of Urban Storm Drainage – The Wallingford procedure – Volume 1.

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Client	McArdle SportTec
Project	Dorothy Hyman Sports Centre
Title	Surface Water Strategy.

Appendix A
Proposed Site Plan

Proposed 3G FA
approved synthetic pitch

grass

Maintenance equipment
storage container

Matwell grate

Boot scraper

Matwell grate

Boot scraper

Matwell grates

Spectator area

PLC

DG

SG

FP

3m high divide net

4.5m high fencing
with 500mm high
infill retaining boards

Mowing margin

GSA

11v11

3000

91000

55000

25000

Goal posts

Porous asphalt

3G synthetic turf
playing area

SG Single Gate

DG Double Gate

FP Feeder Pillar

PLC Pitch Light Column
(15m high)

BL Bollard Light

GSA Goal Storage Area

1.2m high fencing
(timber post and rail)

1.2m high fencing
with 250mm high
infill retaining boards

4.5m high fencing
with 500mm high
infill retaining boards

4.5m high fencing

For pitch line markings see
drawing MCA-MUK3149-11

0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m 22m 24m 26m 28m 30m 32m 34m 36m 38m 40m

Scale bar 1 : 200

Rev	Amendment	Date	By
–	Initial Issue		

Client
DOROTHY HYMAN
SPORTS CENTRE
S72 8LH

Project
3G STP
FA FRAMEWORK PROJECT

Drawing
Proposed Pitch Plan

McARDLE
SPORT TEC

Drawn	Date	Scales
NJM	11-10-23	1:200
Checked	Plot No	Prelim / Check / Final
	01	

Job No	Drawing No	Rev
	MCA-MUK3149-02	B

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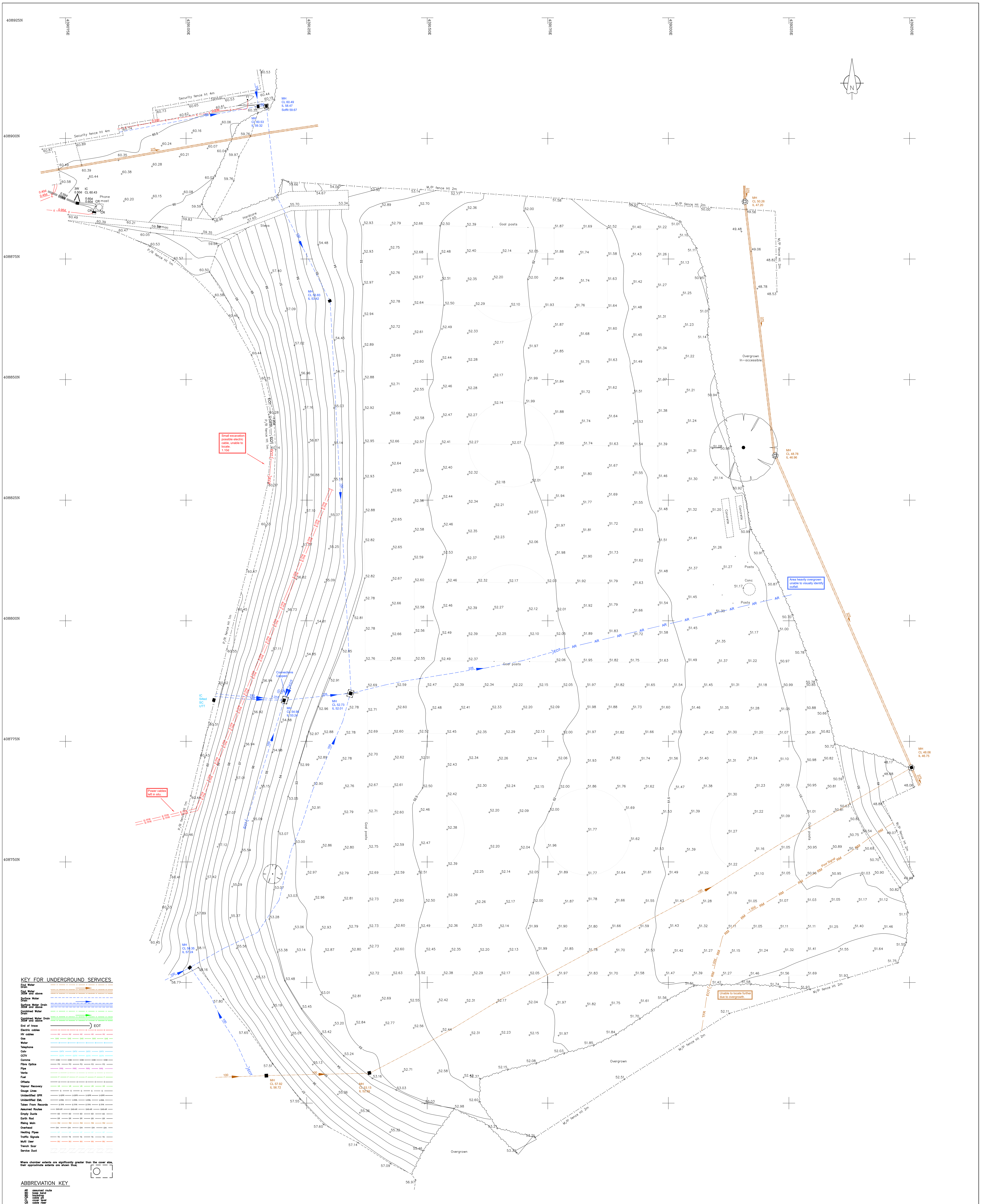
Appendix B

Utilities Survey



KEY FOR UNDERGROUND SERVICES

- Foul Water Drain
- Foul Water 300ø and above
- Surface Water Drain
- Surface Water Drain 300ø and above
- Combined Water Drain
- Combined Water Drain 300ø and above
- End of trace — EOT
- Electric cables — E
- HV cables — HV
- Gas — GAS
- Water — W
- Telephone
- Catv — CATV
- CCTV — CCTV
- Comms — COM
- Fibre Optics — FO
- Pipe — PIPE
- Vents — V
- Fuel — F
- Offsets — O
- Vapour Recovery — VR
- Gauge Lines — G
- Unidentified GPR — U-GPR
- Unidentified EML — U-EML
- Taken From Records — E-TFR
- Assumed Routes — GAS-AR
- Empty Ducts — ED
- Earth Rod — ER
- Rising Main — RM
- Overhead — O/H
- Heating Pipes — HP
- Traffic Signals — TS
- Multi User — MU
- Trench Scar
- Service Duct

Where chamber extents are significantly greater than the cover size, their approximate extents are shown thus;

ABBREVIATION KEY

AR	assumed route
BD	base bend
BD	backdrop
CP	cable pit
CL	cover level
CR	cable riser
DP	down pipe
EOT	end of trace
EP	electricity pole
FH	fire hydrant
G	gully
GV	gas valve
HOR	head of run
HL	high level
IC	inspection chamber
IL	invert level
MH	manhole
PR	pipe riser
RE	rodding eye
RWP	rainwater pipe
SV	stop valve
SVP	soil vent pipe
TE	trapped exit
TFR	taken from records
TP	telegraph pole
UTF	unable to find
UTL	unable to lift
UTS	unable to survey
UTT	unable to trace
VP	vent pipe
WL	water level
WM	water meter
WO	wash out valve

UTILITY SURVEY NOTES

Electromagnetic and/or ground penetrating radar techniques have been used to locate and map underground utilities and features on this drawing. We have made every endeavour to make sure that the information contained within this drawing is accurate and of the highest quality. However, the results from these types of surveys are not infallible and should the location or depth of services/features be of particular importance to a project, then it is strongly advised that trial excavations should be undertaken to confirm survey results.

We have used all record drawings that were available to us by the client or by the statutory utility providers at the time of the survey. Any information taken from these drawings (ie pipe sizes, material) is not guaranteed. Services located from record drawings will be shown and annotated as taken from records (TFR). Historic record information is often incomplete/inaccurate and cannot be relied upon.

A single line indicating a utility may indicate the presence of multiple services within close proximity to each other. Where a single line type is shown we recommend hand digging within 0.5m, to expose hidden services.

Where quoted, depth information of underground services/features is stated. Depths are generally within +/- 10% accurate, but cannot be guaranteed. Any depths shown are usually to the top of the service/feature. Gravity sewers and drains are usually to invert (base of drainage channel) unless otherwise stated.

We use skilled staff and modern calibrated equipment to perform our surveys. However, the completeness of any underground survey cannot be 100% guaranteed and we cannot be held responsible for any inaccuracies beyond those that could be reasonably expected by a competent company.

Contractors utilising our drawings for intrusive work should take all reasonable measures to work safely in accordance with HSG47 guidelines "avoiding danger from underground services".

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Client	McArdle Sport		
Project	Dorothy Hyman Sports Centre		
Title	Utility Survey		
Scale at A0 1:250	Drawn by JG	Checked by TB	Date Mar 2024
Status	Project ref 27996Y	Drawing no. 02	Revision

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Client	McArdle SportTec
Project	Dorothy Hyman Sports Centre
Title	Surface Water Strategy.

Appendix C

Ground Investigation Extracts

4 Ground Conditions

4.1 Overview

4.1.1 Ground conditions typically comprised Topsoil overlying Made Ground in the south and northeast, with such deposits absent elsewhere. Natural deposits of suspected Devensian Till and weathered Mexborough Rock Formation were encountered below.

4.1.2 Topsoil was encountered in all locations between 120mm and 500mm in thickness, comprising soft brown sandy clay.

4.1.3 Made Ground typically comprised dark brown, clayey, sand and gravel of clinker, brick, and sandstone. Made Ground was encountered to depths of 0.3m to a maximum depth of 0.7m.

4.1.4 Despite being absent from the BGS records, naturally derived deposits of suspected Devensian Till were noted underlying Topsoil in WS03-WS05 & WS07 along the eastern and southern FTP boundary to a maximum depth of 2.1m. Deposits generally comprised soft to stiff, orangish brown/grey clayey sand and gravelly clays, occasionally organic in places.

4.1.4.1 Weathered deposits of Mexborough Rock were encountered, comprising, grey sand and lithorelicts of sandstone, extending to the maximum exploratory depth of 3.4m. All boreholes terminated into more competent bedrock deposits, shallowest in the west of the site, deeper to the east.

4.1.5 Photographs representing the typical ground conditions are presented in Figures 4-1 and 4-2 below.

Figure 4-1: Photo of soil profile at WS01

Figure 4-2: Photo of soil profile at WS07

4.2 Groundwater

4.2.1 Suspected perched groundwater was observed as seepages in WS03 at 1.00m, WS04 at 3.1m and WS06 at 2.00m.

4.3 Evidence of Possible Contamination

4.3.1 During the ground investigation works no significant visual or olfactory evidence of contamination was observed, beyond the presence of anthropogenic materials in the Topsoil and Made Ground.

4.4 Obstructions and Instability

4.4.1 The progress of the ground investigation works was not affected by near surface obstructions.

7 Engineering Assessment

7.1 Ground Conditions Summary

7.1.1 Beneath the Topsoil across site Made Ground was encountered in WS02-WS03, WS05 and WS07, extending to basal depths of between 0.3m and 0.7m.

7.1.2 Beneath Made Ground, Devensian Till deposits were encountered along the eastern and southern boundary of the site only (WS03-WS05 & WS07) up to a depth of 2.1m. Directly underlying Made Ground/Topsoil (and Devensian Till were present) weathered deposits of the Mexborough Rock bedrock were observed. The top of the weathered Mexborough Rock were observed in the west of the site between 0.3-0.35m bgl and 2.0-2.1m in the east of the site.

7.2 Abnormal Ground Conditions

7.2.1 The Devensian Till deposits along the eastern boundary of the site (WS03-WS05) exhibited soft and organic characteristics to depths of 1.2-1.3m below existing ground levels. Based on the fall in site levels, such deposits could represent fill material, used to terrace the site. Such soils are not considered suitable to provide adequate support to proposed floodlight foundations.

7.3 Floodlight Foundations

7.3.1 Deposits of Made Ground across the site will not provide adequate support to proposed floodlights, in addition to the soft/organic suspected Devensian Till deposits to the east of the site.

7.3.2 The naturally deposited weathered Mexborough Rock will adequately support pad foundations for the proposed floodlight bases in the west and centre of the site (the area of WS1-WS2, WS6-WS8. With the exception of WS7 these deposits comprise sands and gravels.

7.3.3 The naturally deposited clay soils of the Devensian Till will adequately support pad foundations for the proposed floodlight bases in the east of the site, providing excavations achieve minimum depths of 1.5m below existing ground levels due to the presence of overlying soft/organic soils as described in paragraph 7.2.1. above.

7.3.4 Based on soils at and below likely founding depths comprising both cohesive and granular deposits, we have calculated bearing values based on both scenarios, and presented the lower bound conservative values within our following assessment.

7.3.5 Laboratory testing indicates the clay soils are of low volume change potential and thus, foundations should extend a minimum of 0.75m depth below proposed ground level, subject to penetrating the naturally deposited soils by a minimum of 0.3m and achieving the minimum foundation depth along the eastern boundary of the site of 1.5m below existing ground levels. In addition, the mature trees which border the east and north of the site will need consideration and could have an effect on overall foundation depth.

7.3.6 Lighting column foundations will be eccentrically loaded thus stresses imparted to the ground will not be uniform. As a result of the long-term stresses, the settlement in turn may not be uniform. Such stresses are likely to be from dead loads only and not from live loads (such as wind), which will be transient and not likely to contribute to settlement. Live loads will increase the eccentricity of loads and thus increase the concentration of stresses potentially to an edge of the foundation.

7.3.7 Based on ground conditions and in-situ pocket penetrometer testing, a conservative undrained shear strength of 75kN/m^2 has been adopted for design purposes. The presumed bearing capacity to limit the effects of eccentricity should not exceed 135kN/m^2.

7.3.8 The results of calculations undertaken to determine the bearing values for pad type foundations are presented in Table 8 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	685	165	135
1.5 x 1.5	655	165	135
2.0 x 2.0	640	165	120

Table 8: Bearing values for cohesive strata

7.3.9 The presumed bearing value has been derived from the ultimate bearing value by applying a factor of safety of 3 and adopting the lesser value when compared with the eccentricity value. The presumed bearing capacities given above should not be exceeded in any loading cases. The allowable bearing capacity is derived assuming a constant, uniformly applied load, with a settlement limit of 25mm.

7.4 Artificial Pitch Foundation

7.4.1 We have determined CBR value for the proposed artificial pitch 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.

7.4.2 We anticipate that the proposed artificial sports pitch will be located on existing ground levels with the formations located variably on the natural strata following the removal of Topsoil and thin Made Ground beneath. Soils are likely to comprise granular deposits (sands and gravels) to the west, and clays to the east.

7.4.3 In addition, based on site levels, there is the possibility that c.0.5-1m of site won fill could be placed in the eastern part of the site, cut/sourced from the western part of the site, to homogenise site levels and allow construction of a uniform playing surface.

7.4.4 Based on the anticipated founding depth and DCP results, a CBR design value of 4% can be adopted for soils that are likely to be representative of those which remain at or near pitch formation levels. The placement and extent of conditioning applied to any fill placed at the site will dictate the CBR value used in design.

7.4.5 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.

7.4.6 Where the formation spans between cohesive and granular soils, it is recommended a geosynthetic reinforcement is introduced to minimise the potential effects of differential settlement between the differing soil types.

7.4.7 The Devensian Till deposits are considered frost susceptible and this may override the CBR criteria for pavement foundation design purposes.

7.4.8 The silty nature of the Devensian Till/weathered Mexborough Rock deposits will render them moisture susceptible with small increases in moisture content giving rise to a rapid loss of support to construction plant. It is therefore recommended that the sub-base is laid as soon as practicable following establishment of formation.

7.5 Drainage and Infiltration Potential

7.5.1 The weathered Mexborough Rock was encountered as a granular material. Indicative infiltration testing was undertaken in WS01 and WS04 which were stable to 1.37m and 3.40m basal depth of each borehole respectively. During the test, the WS01 was filled to 0.42m bgl and WS04 was filled to 0.51m. An infiltration rate of 2.12 x 10^{-6}m/s was recorded for WS01 (weathered Mexborough Rock) and 6.32 x 10^{-8}m/s for WS04 (Devensian Till). Records are presented in Appendix D.

7.5.2 On the above assessment of the ground conditions, the Devensian Till deposits are not considered amenable to the use of soakaway type systems, however, the weathered Mexborough Rock deposits could be.

7.5.3 It should be noted that infiltration testing in boreholes uses notably less water than tests undertaken within soakaway trial pits. Accordingly, results within the weathered Mexborough Rock should be considered as an indication of the potential viability of soakaways. It is recommended that full soakaway tests should be undertaken at the site in accordance with BRE 365, to facilitate detailed drainage design.

7.5.4 No existing soakaway features were observed on site during our ground investigation works however, a full drainage survey was not undertaken.

7.5.5 As an alternative, it is possible that the FTP drainage could key into the existing surface water drainage system currently used by the school. Manholes were noted adjacent to the northeast and northwest of the western pitch boundary and are indicated on the topographical survey for the site. 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 FTP area.

7.5.6 In addition, a 375mm diameter combined sewer is present adjacent to the east of the site (refer to Section 2.6). Given the proximity of the combined sewer, this is considered to be 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

7.6 Aggressiveness of the ground to buried concrete

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

7.6.2 The site is interpreted to be a brownfield site where pyrite is likely to be present.

7.6.3 The classification of each strata is presented below:

Stratum	Design sulphate classification	Aggressive chemical environment for concrete classification
Devensian Till	DS-1	ACEC-1s
Weathered Mexborough Rock	DS-1	ACEC-1s

Table 9: Summary of the aggressiveness of the ground to buried concrete

Key:

- WLS
- Soakaway / Permeability Testing
- DCP (CBR)
- Site Boundary
- Proposed FTP Area

Notes

1) Base image provided by Google.

2) All drawn features are approximate.

REV	DATE	Comment on variation
A	Mayl 2023	First issue

soiltechnics
environmental ▪ geotechnical ▪ building fabric

PROJECT
Dortohy Hyman Sports centre

TITLE
Exploratory Hole Location Plan

PROJECT No.	DRAWING	REVISION
STV5991	01	A

soiltechnics
environmental ▪ geotechnical ▪ building fabric

Key to legends

Composite materials, soils and lithology							
	Topsoil		Made Ground		Boulders		Chalk
	Clay		Coal		Cobbles		Concrete
	Gravel		Limestone		Mudstone		Peat
	Sand		Sandstone		Silt		Siltstone

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result		
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)	
Result	PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m^2) by applying a factor of 50. SV – Hand held shear vane result reported as an undrained shear strength (kN/m^2). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.	
	SPT – Standard Penetration Test result (N value) (uncorrected)[1,2,3] SPT(c) – Standard Penetration Test result (solid cone) (N value) (uncorrected)[1,2,3]	
	UT – Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample	

Sampling		
From (m) To (m)	Records depth of sampling	
Type	D	Disturbed sample
	B	Bulk disturbed sample
	ES	Environmental sample
	W	Water sample
	U	Undisturbed thick-walled sample 100mm diameter sampler
	UT	Undisturbed thin walled sample 100mm diameter sampler
	UTF	Failed undisturbed sample

Note 1: Seating blows recorded in brackets.

Note 2: Casing depth records depth of casing when SPT or SPT(c) was carried out.

Note 3: Water depth records depth of water when SPT or SPT(c) was carried out.

Water observations

Described at foot of log and shown in the 'water strike' column.

Water level observed after specified delay in drilling

Water strike

Installation details

	Gravel filter		Bentonite
	Slotted pipe		Unslotted pipe
	Arisings		Grout
	Extensometer magnet		Vibrating wire piezometer

Density

Density recorded in brackets determined by qualitative field assessment or inferred from density testing and soil descriptions from across the site (i.e.: [Medium dense]).

Dorothy Hyman Sports Centre, Barnsey
STV5991

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grass over brown slightly sandy CLAY with occasional rootlets. (TOPSOIL)	0.30												
	Brown sandy clayey fine to coarse angular to subangular GRAVEL of sandstone. (WEATHERED MEXBOROUGH ROCK)	0.45												
	Greyish brown sandy slightly clayey fine to medium GRAVEL of sandstone. (WEATHERED MEXBOROUGH ROCK)	0.65										0.65		D
	Very dense mottled black and brown sandy slightly clayey fine to coarse angular to subangular GRAVEL of sandstone. (WEATHERED MEXBOROUGH ROCK)					S 1.00 - 1.44	(6) 50/290mm					1.00	1.44	D
	BOREHOLE TERMINATED AT 1.44m	1.44												

Notes
Borehole terminated due to competency of weathered bedrock. Infiltration testing performed at base.

Groundwater observations
No groundwater encountered

Title
Dynamic windowless sampling record

Recovery details		Method	Logged by	Date(s)
Range (m)	Recovery (%)	Windowless sampler	CB	18/04/2023
0.00 - 1.00	100	**Level (m OD)** -	**Compiled by** KD	**Sheet number** Sheet 1 of 1
		Co-ordinates -	**Checked by** DH	**Revision** A

WS01

Dorothy Hyman Sports Centre, Barnsey
STV5991

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grass over brown slightly sandy CLAY with occasional rootlets. (TOPSOIL)	0.12												
	Dark brown very gravelly clayey SAND. Gravel is fine to medium angular to subangular clinker, ceramic, brick and sandstone. (MADE GROUND)	0.35												
	Greyish brown and light brown gravelly fine to medium SAND. Gravel is fine to medium angular to subangular sandstone lithorelicts. (WEATHERED MEXBOROUGH ROCK)	0.40										0.50	0.60	D
	Very dense greyish brown very sandy fine to coarse GRAVEL of sandstone lithorelicts. (WEATHERED MEXBOROUGH ROCK)					S 1.00 - 1.20	(25) 50/45mm							
	BOREHOLE TERMINATED AT 1.20m	1.20												

Notes Borehole terminated due to competency of weathered bedrock.	**Title** Dynamic windowless sampling record				**Date(s)** 18/04/2023
	Recovery details		**Method** Windowless sampler	**Logged by** CB	**Sheet number** Sheet 1 of 1
Groundwater observations No groundwater encountered.	Range (m) 0.00 - 1.00	Recovery (%) 100	**Level (m OD)** -	**Compiled by** KD	**Revision** A
			Co-ordinates -	**Checked by** DH	**WS02**

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grass over dark brown slightly sandy CLAY with occasional rootlets. (TOPSOIL)	0.25												
	Dark brown sandy clayey fine to medium angular to subangular GRAVEL of clinker, coal, brick and glass. (MADE GROUND)	0.40										0.40		D
	Greyish brown and light brown slightly gravelly clayey fine to medium SAND. Gravel is fine to medium subangular to subrounded sandstone. (DEVENSIAN TILL)	0.70								PP 0.75	PP=138	0.70		D
	Stiff brown mottled orangish brown slightly sandy slightly gravelly silty CLAY with some plant remains. Gravel is fine to medium subangular to subrounded sandstone and quartz. (DEVENSIAN TILL)	1.10				S 1.20 - 1.65	(2) 7					1.20		D
	...from 0.7m depth, becoming silt.	1.30								PP 1.45	PP=83	1.50		D
	...from 1m depth, becoming very soft.													
	Grey clayey SILT. Organic odour noted. (DEVENSIAN TILL)	1.80								PP 1.80	PP=113	1.80		D
	Stiff grey mottled orangish brown slightly sandy CLAY with rare plant remains. (DEVENSIAN TILL)	2.10				S 2.00 - 2.43	(6) 50/280mm							
	Stiff dark grey mottled orangish brown slightly sandy CLAY with occasional plant remains. (DEVENSIAN TILL)	2.43												
	Very dense greyish brown and light brown sandy fine to medium angular to subrounded GRAVEL of sandstone. (WEATHERED MEXBOROUGH ROCK)													
	BOREHOLE TERMINATED AT 2.43m													

Notes
Borehole terminated due to competency of weathered bedrock.

Groundwater observations
Groundwater encountered at 1m depth, filling borehole to 0.9m.

Title
Dynamic windowless sampling record

Recovery details

Range (m)	Recovery (%)
1.00 - 2.00	90

Method
Windowless sampler

Logged by
CB

Level (m OD)
-

Compiled by
KD

Co-ordinates
-

Checked by
DH

Date(s)
18/04/2023

Sheet number
Sheet 1 of 1

Revision
A

WS03

Dorothy Hyman Sports Centre, Barnsey
STV5991

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	Grass over orangish brown slightly sandy CLAY with occasional rootlets. (TOPSOIL)	0.21												
	Soft brown slightly sandy slightly gravelly CLAY with rare pockets of sand. Gravel is fine to coarse subangular to subrounded sandstone, quartz, coal and mudstone. (DEVENSIAN TILL)											0.70		B
	Firm becoming stiff brown mottled grey slightly gravelly slightly silty CLAY. Gravel is fine to coarse subangular to subrounded sandstone, quartz and mudstone. (DEVENSIAN TILL)	1.20				S 1.20 - 1.65	(2) 6			PP 1.20	PP=104	1.20		D
										PP 1.60	PP=75	1.60		D
	Firm grey occasionally organish grey mottled slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded mudstone and sandstone. Organic odour noted. (DEVENSIAN TILL)	1.80 2.00				S 2.00 - 2.45	(3) 14			PP 1.90	PP=104	1.90		D
										PP 2.20	PP=79	2.20		D
	Stiff organish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded sandstone. (DEVENSIAN TILL)									PP 2.50	PP=217	2.50		D
	Greyish brown fine to medium SAND. (WEATHERED MEXBOROUGH ROCK)	2.80 2.90												
	Orangish brown fine to medium SAND. (WEATHERED MEXBOROUGH ROCK)	3.00				S 3.00 - 3.36	(19) 50/215mm					3.00	3.36	D
	Extremely weak greyish brown SANDSTONE. (WEATHERED MEXBOROUGH ROCK)	3.36												
	BOREHOLE TERMINATED AT 3.36m													

Notes
Borehole terminated due to competency. Infiltration testing performed.

Groundwater observations
Groundwater encountered at 3.1m depth, filling borehole to 3m.

Title
Dynamic windowless sampling record

Recovery details

Range (m)	Recovery (%)
1.00 - 2.00	95
2.00 - 3.00	100

Method
Windowless sampler

Logged by
CB

Level (m OD)
-

Compiled by
KD

Co-ordinates
-

Checked by
DH

Date(s)
18/04/2023

Sheet number
Sheet 1 of 1

Revision
A

WS04

Dorothy Hyman Sports Centre, Barnsey
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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	Grass over dark brown slightly gravelly slightly sandy CLAY with occasional rootlets. (TOPSOIL)													
	Dark brown sandy slightly clayey fine to medium angular to subrounded GRAVEL of sandstone, clinker and brick. (MADE GROUND)	0.50												
	Soft to firm orangish brown mottled greyish brown slightly gravelly sandy CLAY with rare bands of sand. Gravel is fine subangular to subrounded sandstone. (DEVENSIAN TILL)	0.70										0.80		D
												1.00	1.20	D
	Stiff orangish brown and grey slightly gravelly slightly sandy CLAY with occasional plant remains. Gravel is fine to medium subangular to subrounded sandstone. (DEVENSIAN TILL)	1.20				S 1.20 - 1.65	(3) 9			PP 1.20	PP=146			
										PP 1.50	PP=225	1.50		D
										PP 1.80	PP=208	1.80		D
	Very dense grey gravelly fine to medium SAND. Gravel is fine to medium angular to subangular sandstone lithorelicts. (WEATHERED MEXBOROUGH ROCK)	2.00				S 2.00 - 2.22	(25) 50/75mm							
	BOREHOLE TERMINATED AT 2.22m	2.22												

Notes
Borehole terminated due to competency of weathered bedrock.

Groundwater observations
No groundwater encountered.

Title
Dynamic windowless sampling record

Recovery details

Range (m)	Recovery (%)
1.00 - 2.00	95

Method
Windowless sampler

Level (m OD)
-

Co-ordinates
-

Logged by
CB

Compiled by
KD

Checked by
DH

Date(s)
18/04/2023

Sheet number
Sheet 1 of 1

Revision
A

WS05

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	Grass over dark brown slightly gravelly slightly sandy CLAY with occasional rootlets and pockets of sand. Gravel is fine to medium subangular to subrounded sandstone and coal. (TOPSOIL)													
	Medium dense grey and orangish brown silty fine to medium SAND. (WEATHERED MEXBOROUGH ROCK)	0.50										0.55	0.85	B
						S 1.00 - 1.45	(6) 13					1.00		D
												1.20		D
	Orangish brown and brown fine to medium SAND. (WEATHERED MEXBOROUGH ROCK)	1.40												
	Very dense grey mottled brown fine to medium SAND. (WEATHERED MEXBOROUGH ROCK)	1.60			▼									
						S 2.00 - 2.20	(25) 50/55mm							
	BOREHOLE TERMINATED AT 2.20m	2.20												

Notes
Borehole terminated due to competency of weathered bedrock.

Groundwater observations
Groundwater encountered at 2m depth, filling borehole to 1.8m.

Title
Dynamic windowless sampling record

Recovery details		Method	Logged by	Date(s)
Range (m)	Recovery (%)	Windowless sampler	CB	18/04/2023
0.00 - 1.00	100			Sheet number
1.00 - 2.00	80			Sheet 1 of 1
		Level (m OD)	Compiled by	Revision
		-	KD	A
		Co-ordinates	Checked by	**WS06**
		-	DH	

Dorothy Hyman Sports Centre, Barnsey
STV5991

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grass over dark brown slightly sandy CLAY with occasional rootlets. (TOPSOIL)	0.20												
	Dark brown sandy clayey fine to medium angular to subangular GRAVEL of sandstone, clinker, brick and coal. (MADE GROUND)	0.30								PP 0.50	PP=200	0.50		D
	Stiff orangish brown mottled grey slightly sandy CLAY. (DEVENSIAN TILL)					S 0.80 - 1.00	(25) 50/45mm			PP 0.90	PP=225	0.80		D
	Stiff multicoloured slightly gravelly slightly sandy CLAY. Gravel is fine to medium angular to subangular sandstone. (WEATHERED MEXBOROUGH ROCK)	1.40										1.50		D
	Grey sandy fine to coarse angular to subangular GRAVEL of sandstone. (WEATHERED MEXBOROUGH ROCK)	1.90										1.90		D
	BOREHOLE TERMINATED AT 2.00m	2.00												

Notes
Borehole terminated due to competency of weathered bedrock.

Groundwater observations
No groundwater encountered

Title
Dynamic windowless sampling record

Recovery details

Range (m)	Recovery (%)
0.00 - 1.00	100
1.00 - 2.00	90

Method
Windowless sampler

Level (m OD)
-

Co-ordinates
-

Logged by
CB

Compiled by
KD

Checked by
DH

Date(s)
18/04/2023

Sheet number
Sheet 1 of 1

Revision
A

WS07

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grass over dark brown slightly gravelly slightly sandy CLAY with occasional rootlets. Gravel is fine to medium subangular to subrounded sandstone and coal. (TOPSOIL)	0.35										0.50		D
	Orangish brown slightly gravelly slightly clayey fine to medium SAND. Gravel is fine to medium subangular to subrounded sandstone. (WEATHERED MEXBOROUGH ROCK)	0.70										0.80		D
	Brown and greyish brown gravelly slightly clayey fine to medium SAND. (WEATHERED MEXBOROUGH ROCK)	0.95				S 1.00 - 1.45	(3) 13							
	Medium dense to very dense grey sandy fine to medium angular to subangular GRAVEL of weathered sandstone. (WEATHERED MEXBOROUGH ROCK)					S 1.80 - 2.17	(25) 50/220mm							
	BOREHOLE TERMINATED AT 2.17m	2.17												

Notes
Borehole terminated due to competency of weathered bedrock.

Groundwater observations
No groundwater encountered

Title
Dynamic windowless sampling record

Recovery details		Method	Logged by	Date(s)
Range (m)	Recovery (%)	Windowless sampler	CB	18/04/2023
0.00 - 1.00	90			Sheet number
1.00 - 1.80	0	Level (m OD)	Compiled by	Sheet 1 of 1
		-	KD	Revision
		Co-ordinates	Checked by	A
		-	DH	**WS08**

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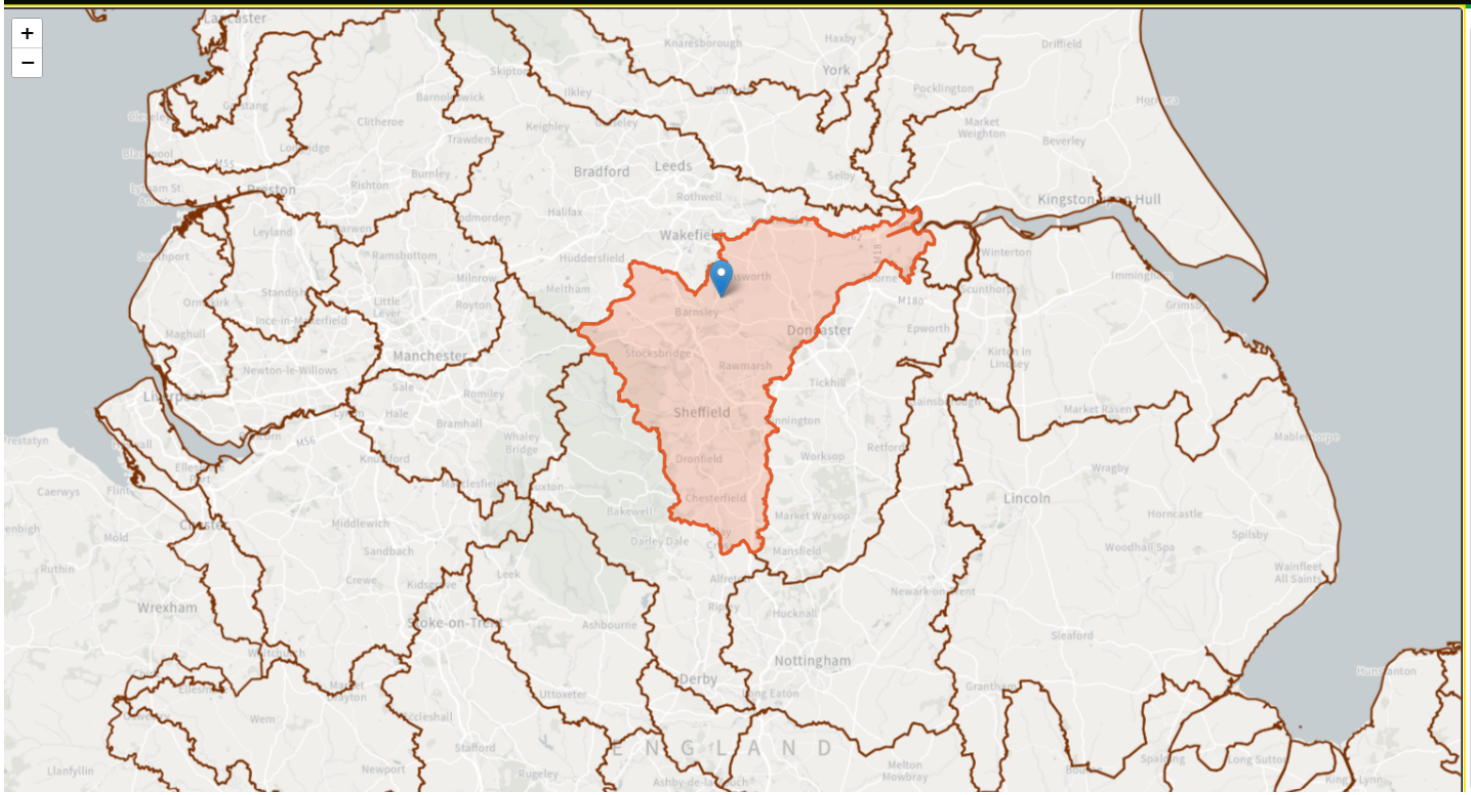
Client	McArdle SportTec
Project	Dorothy Hyman Sports Centre
Title	Surface Water Strategy.

Appendix D

EA Climate Change Allowance Extracts



Don and Rother Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch

	Central allowance	Upper end allowance
2050s	20%	35%
2070s	25%	35%

1% annual exceedance rainfall event

Epoch

	Central allowance	Upper end allowance
2050s	20%	40%
2070s	25%	40%

*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

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Client	McArdle SportTec
Project	Dorothy Hyman Sports Centre
Title	Surface Water Strategy.

Appendix E

Drained Area Plan

SEA Drawing 00191/E01

GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

All setting to be in accordance with the Architect's drawings, the Contractor is to check all dimensions and levels prior to commencement of work and report any discrepancies to the Engineer, including any encountered during construction works.

All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

In accordance with the Health and Safety at Work etc Act 1973 and the Construction (Design and Management) Regulations 2015, designs and details on this drawing have been the subject of a Designers Risk Assessment, to identify risks in construction, use, or demolition of the scheme.

It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

So as far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

None identified.

DRAWING KEY:

Proposed drained area = 6490m²

Rev.	Date	By	Description

SEA
CONSULTING ENGINEERS
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PROJECT
NEW AGP
DOROTHY HYMAN SPORTS CENTRE

DRAWING
PROPOSED DRAINED AREAS

SCALE: 1:250@A1	DATE: 25.04.2024
DRAWN BY: WRA	REV: -

STATUS: FOR APPROVAL

DWG No: 00191/E01 -

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Client	McArdle SportTec
Project	Dorothy Hyman Sports Centre
Title	Surface Water Strategy.

Appendix F

Greenfield Runoff Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Warren Allsopp
Site name:	NEW AGP
Site location:	Dotothy Hyman Sports Centre

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.57470° N
Longitude:	1.41001° W
Reference:	2894517345
Date:	Apr 24 2024 12:16

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.649

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	620	620
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	2.72	2.72
1 in 1 year (l/s):	2.34	2.34
1 in 30 years (l/s):	4.76	4.76
1 in 100 year (l/s):	5.65	5.65
1 in 200 years (l/s):	6.44	6.44

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Client	McArdle SportTec
Project	Dorothy Hyman Sports Centre
Title	Surface Water Strategy.

Appendix G

Surface Water Calculations

Nodes

Name	Area (ha)	Cover Level (m)	Diameter (mm)	Depth (m)
1	0.649	52.090	1200	0.362

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0

Node 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	50.800	Product Number	CTL-SHE-0075-2700-1250-2700
Design Depth (m)	1.250	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.7	Min Node Diameter (mm)	1200

Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	51.728	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	
Safety Factor	2.0	Width (m)	103.000	Inf Depth (m)	
Porosity	0.30	Length (m)	61.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.72%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	1	336	51.831	0.103	15.9	85.3157	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
360 minute winter	1	Hydro-Brake®	2.5	85.7

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.72%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	1	472	51.909	0.181	26.5	233.5109	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
480 minute winter	1	Hydro-Brake®	2.6	106.3

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.72%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	1	930	52.047	0.319	28.1	498.5424	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute winter	1	Hydro-Brake®	2.7	182.6

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Client	McArdle SportTec
Project	Dorothy Hyman Sports Centre
Title	Surface Water Strategy.

Appendix H

Drainage Layout

SEA Drawing 00191/E02/A

GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

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All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

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It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

So as far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

None identified.

DRAWING KEY:

- Existing surface water drainage to be abandoned within new pitch extents
- Proposed surface water diversion
- Proposed lateral drains beneath Pitch by others
- Proposed suface water drainage.
- Proposed extent of 275mm permeable subbase laid at 1in500 providing attenuation for the 1 in 100 year storm event plus a 40% allowance for climate change.
- 34.200 Proposed pitch spot levels
- 1:100 Minimum pitch gradients

52.210

52.090

1:500

1:500

1:500

Goal posts

M/P. fence Ht. 2m

Hardcore

Steps

Overgrown In-accessible

Concrete

Posts

Conc

MH
CL 53.83
IL 53.42

MH
CL 52.73
IL 52.01

MH
CL 54.98
IL 53.24

Connections Capped

150

225

225mm Ø

225mm Ø

225mm Ø

New MH
CL = 52.250
IL = 51.250

New MH
CL = 52.100
IL = 50.706

IL = 50.706 (225)
IL = 50.781 (150)

Build new MH over existing pipe
CL = 51.300
IL = 50.550
IL based on depth of last MH upstream
Must be confirmed prior to any construction.

Area heavily overgrown unable to visually identify outfall

Proposed Proprietary flow control chamber provided with a HydroBrake restricting flows to 2.7l/s for all storm events up to and including the 1 in 100 year event plus a 40% allowance for climate change.
HydroBrake Ref. SHE-0075-2700-1250-2700
CL = 52.090
IL = 50.800

Rev.	Date	By	Description
A	30.05.24	WRA	Diversion route amended

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PROJECT
NEW AGP
DOROTHY HYMAN SPORTS CENTRE

DRAWING
PROPOSED DRAINAGE LAYOUT

SCALE: 1:250@A1	DATE: 25.04.2024
DRAWN BY: WRA	REV: A

STATUS: FOR APPROVAL

DWG No: 00191/E02 | A