Stride Treglown Ltd

FITZALAN HIGH SCHOOL

Lawrenny Avenue - Pitches

6653-WSP-XX-XX-RP-C-0003
NOVEMBER 2023

PUBLIC

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1 INTRODUCTION

WSP (UK) Ltd, has been appointed by Stride Treglown to undertake a drainage strategy for development at existing Fitzalan High School site at Lawrenny Avenue, Cardiff CF11 8XB. This drainage strategy will support a reserved matters application related to outline consent.

1.1 EXISTING SITE

The location of the site is illustrated in Figure 1-1 which shows the site location at Ordnance Survey National Grid Reference 315950, 176050. The site is currently occupied by the existing Fitzalan High School, accessed off Lawrenny Avenue. The site has existing houses on the north, east and west boundaries and Lawrenny Avenue to the south.

The red line boundary is some 1.6ha with ground levels identified from topographic survey as being between 6.5 m AOD to 7.3m AOD.

The site is occupied by a serval school building, paved car parks and playgrounds, and grassed playing fields.

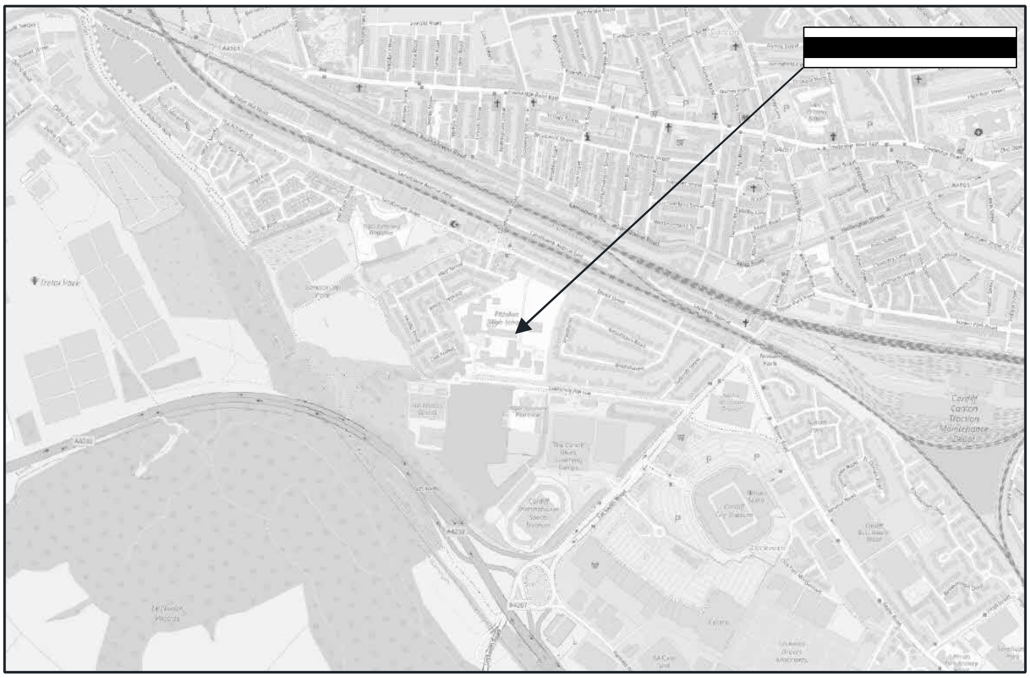


Figure 1-1: Site Location Plan

1.2 EXISTING DRAINAGE & WATERCOURSES

PUBLIC SEWERS

An existing 450mm diameter Dwr Cymru Welsh Water (DCWW) public surface water sewer runs south, along the eastern boundary of the site. The sewer then crosses Lawrenny Avenue, where it outfalls into a minor watercourse. The invert levels of the existing sewer have been taken from sewer records, and will require a detailed survey prior to detailed design.

An existing 1200mm diameter Dwr Cymru Welsh Water (DCWW) public combined sewer run south, within the western side of the site. The sewer then crosses Lawrenny Avenue, where it continues to drain south.

A copy of the DCWW sewer records are provided in Appendix B.

WATERCOURSES

There is an ordinary watercourse south of Lawrenny Avenue, which the existing DCWW surface water sewers outfall into. The watercourse flows south into the River Ely.

SURFACE WATER DRAINAGE

The existing school site is drained via a private surface water pipe network. A drainage survey undertaken on the site confirmed the details of the drainage network and offsite connection points.

From review of the drainage survey, the existing site drains through two surface water networks, each with a separate off-site connection. The catchments for each network are outlined below.

Review of the drainage survey confirmed that the surface water discharge from the site is not restricted by means of flow control, nor is any attenuation present. The site therefore discharges freely into the offsite system.

Catchment 1

Catchment 1 drains to the west via a pipe network, which is believed to discharge into the existing 450mm DCWW surface water sewer through a 150mm diameter pipe. The impermeable areas for this catchment, within the planning application boundary, total 0.720ha. Through assessment of the existing impermeable area and the capacity of the existing drainage network, the maximum off-site discharge rate has been calculated at 24 l/s. This discharge rate has been calculate based on the capacity of the 150mm diameter pipes that connect into the existing 450mm DCWW surface water sewer. A summary of the catchment is given in Table 1-1 below.

Catchment 2

Catchment 2 drains to the west via a pipe network, which is believed to discharge into the existing 1200mm DCWW combined sewer through a 300mm diameter pipe. The impermeable areas for this catchment, within the planning application boundary, total 0.470ha. Through assessment of the existing impermeable area, the maximum off-site discharge rate has been calculated at 65 l/s. The discharge rate for this catchment has been calculated based on the impermeable area draining through a number of pipes runs which have a capacity larger than the inflow. The existing pipe layout is shown on the existing drainage plan. A summary of the catchment is given in Table 1-1 below.

Table 1-1 – Existing surface water catchments within site boundary

Catchment	Impermeable Area	Offsite Connection	Maximum Off-site Discharge Rate
Catchment 1	0.720 ha	DCWW 450Ø surface water sewer	24 l/s
Catchment 2	0.470 ha	DCWW 1200Ø combined sewer	65 l/s

The existing drainage network and catchment areas are shown on drawing 6653-WSP-ZZ-ZZ-DR-CV-05000 in Appendix C.

FOUL DRAINAGE

The existing school building are drained through an on-site foul drainage network, which discharges to the DCWW public combined sewer within the site.

1.3 GEOLOGY

According to the British Geological Survey 50k mapping the site is believed to be on Mercia Mudstone Group overlain by tidal flat / alluvial deposits (Clay, Silt, Sand, Gravel) with the expected soil consistency clay to sandy loam; however it should be noted that the site is surrounded by known artificial deposits which may encroach into the site over Lansdowne Avenue.

1.4 FLOOD RISK

The existing and post development flood risk associated with the site has been assessed within the WSP Flood Consequence Assessment report (ref 6653-FR-RP-001).

2 PROPOSED DEVELOPMENT

The proposed works consist of demolishing a number of existing buildings and constructing a new grass rugby/sports pitch, two Multi Use Games Areas (MUGAs) and cycle parking shelter, in the eastern half of the site. A pedestrian and cycleway link is also to be constructed between Broad Street and Lawrenny Avenue. The proposals are shown in Figure 2-1 below and in Appendix A.

The sport pitch will be grass and MUGAs permeable play surfacing. The cycleway and areas surround the cycle store will be impermeable asphalt.

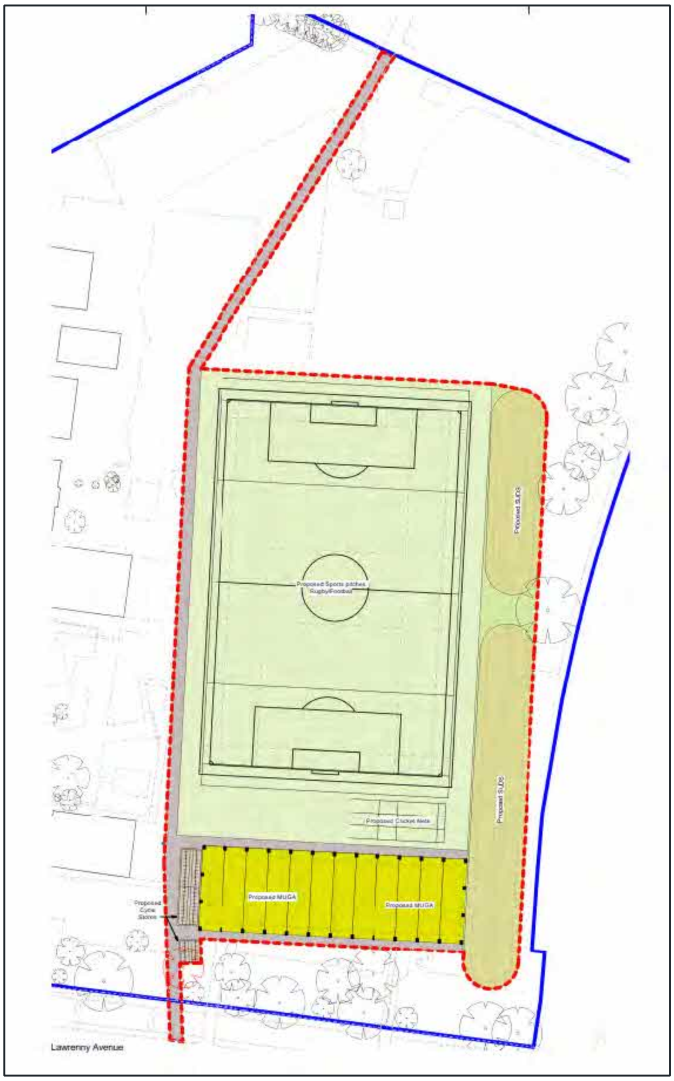


Figure 2-1: Proposed Layout

3 SURFACE WATER DRAINAGE STRATEGY

The proposed drainage strategy has been considered in relation to Wales Statutory Standards for Sustainable Drainage Systems. The drainage strategy is detailed the sections below, with reference to each of six standards.

3.1 S1 RUNOFF DESTINATION

Due to the nature of the proposed permeable sports pitches, rainfall on the pitches will naturally infiltrate through its surfacing. The anticipated cohesive ground conditions mean that the pitches are likely to need have an undrain network to help discharge surface water during high rainfall events. Therefore, a positive surface water outfall is also proposed to serve the pitches. As per the sites existing drainage regime, proposed drainage system will continue to discharge into the existing DCWW 450mm surface water sewer on the eastern boundary of the site, through 2 separate outfalls. Proposed connections to the existing DCWW sewer will require approval from DCWW through a Section 106 application.

The runoff destination hierarchy was considered, however priority levels 1 (re-use), 2 (infiltration) and 3 (water body) were deemed unfeasible. Given there are no buildings or irrigation systems proposed, there is no suitable use for water recycling. Due to the sites geology, infiltration cannot be used as the site primary means of surface water disposal. There are also no watercourses within or near the site, suitable for a surface water outfall.

3.2 S2 HYDRAULIC CONTROL

The proposed drainage layout is shown on drawing 6653-WSP-ZZ-ZZ-DR-CV-05002, which is included in Appendix C.

The sports pitches, MUGA and pedestrian/cycleway all drain to the east, ultimately discharging into the DCWW surface water sewer. Whilst some infiltration may potentially occur, the pitches and MUGA are likely to need to have a underdrain system, to convey surface water in high rainfall events. The proposed site has been split into two catchments, with separate drainage networks, attenuation swale and outfall. The pitch drainage networks will discharge into an attenuation swale on the eastern boundary of the site. Each swale will have a vortex flow control, to restrict the offsite discharge into the DCWW sewer. In accordance with the outline drainage strategy, the combined offsite rate will be restricted to 5l/s. Compared to the estimated discharge rate from the existing site (see table 1-1) catchment 1, this will provide an overall betterment of approximately 79%.

The proposed drainage network and attenuation swales have been designed to accommodate rainfall events up to and including the 1 in 100 year plus additional 40% allowance for affects of climate change. Hydraulic modelling software has been used to confirm the capacity of the drainage network and attenuation, the results of which are provided in Appendix D.

Table 3-1 below, provides details of each catchment.

Table 3-1 – Proposed drainage strategy

Catchment	Drained Area	Proposed Discharge Rate	Attenuation Volume (1 in 100 year +CC)
Catchment 1	0.536 ha	2.2 l/s	88.2 m^3
Catchment 2	0.808 ha	2.7 l/s	123.2 m^3

In the event that the proposed drainage system is block or exceeded by an extreme rainfall event, the resultant overland flow paths are indicated on drawing no. 6653-WSP-ZZ-ZZ-DR-CV-05003.

3.3 S3 WATER QUALITY

As the land use of the proposed site is sport pitches and a cycleway, the proposed pollution hazard level is considered very low. In accordance with the Wales Statutory standards, pollution prevention through SuDS is limited to sediment removal. As the sport pitches are permeable surfaces, with a granular substrate, surface water runoff will drain through the pitch build up, filtering out solids and sediment. The proposed attenuation swales will provide further treatment and capture of sediments before reaching the off-site discharge point.

3.4 S4 AMENITY

The sports pitch, MUGA and cycle parking will provide amenity for the school pupils and the public.

3.5 S5 BIODIVERSITY

Wildflower planting is proposed within the swales/basins and surrounding landscaped areas, providing more biodiversity than the existing paved and grass areas of the existing site. Refer to Landscape plans for details.

3.6 S6 CONSTRUCTION, OPERATION, MAINTENANCE

The proposed drainage system will remain in private ownership.

Regular maintenance of the drainage system should be carried out in accordance with suggested schedule Appended to this report.

Proposed connections to the existing DCWW sewer will require approval from DCWW through a Section 106 application.

The proposed drainage scheme will be submitted to Cardiff Council SAB for approval, prior to construction.

The construction of the pitches and drainage should be carried out be a competent contractor with a Construction, Environmental and Management Plan (CEMP) submitted and approved by Cardiff Council.

4 FOUL DRAINAGE STRATEGY

With the land use of the development proposals, no foul flow will be generated. However, as a result of the demolition of existing building some diversions and abandonment of existing private on-site drainage may be necessary. The design of the foul drainage alteration will be undertaken at detailed detail stage.

5 CONCLUSION

- The sites existing surface water drainage regime has been assessed, which confirms the site currently drains through two private surface water networks, connecting into DCWW surface water and combined sewers.
- The existing offsite discharge rates, from areas within the proposed site boundary, are approximately 24l/s and 65l/s.
- The proposed drainage strategy has been developed in accordance with the Wales Statutory Standards for Sustainable Drainage Systems.
- The proposed surface water drainage will continue to discharge into the existing DCWW 450mm diameter surface water sewer, through two separate connections, but it will not re-use the connection to the combined sewer. Section 106 approval, for the right to connect, will be required from DCWW prior to construction.
- The proposed surface water runoff will be restricted to a total of 5l/s, across both outfalls, providing a betterment of 79% compared to the existing sites runoff. Attenuation storage will be provided in the swales on the eastern boundary of the site.
- The land use pollution risk is categorised as very low. Solid and sediment removal will be achieved by filtration through the permeable pitches and within the attenuation swales.
- Prior to construction, a SAB application will be submitted to Cardiff Council for approval.
- No foul flow will be generated from the proposed site and therefore a foul drainage strategy is not required.

Appendix A

PROPOSED LAYOUT

Key:

—	**Cardiff City Council ownership boundary**
- - -	**Development Redline boundary**

Hard Landscape

▨	**Proposed Hard surface** Proposed tarmac footpath
▨	**Proposed Bike Store** Proposed secure covered bike store for 102 bikes
▨	**Proposed Hard Surface** Proposed permeable tarmac MUGA
☐	Existing site buildings retained during Phase 2 & 3

Soft Landscape

▨	**Proposed Sports field** Proposed grass rugby/football pitch and cricket nets
▨	**Proposed SUDS**
▨	**Proposed wildflower** Proposed wildflower meadow seed mix to SUDS and redline boundary
✲	Existing site trees
✲	Removed tree
	Exist Levels
	Prop Levels

STATUS	REV	DATE	DESCRIPTION
S1	P09	26/10/2023	Team coordination

CLIENT
Cardiff City Council

REVISED BY
LC

CHECKED BY
CS

ORIGINATOR NO
155461

CONSULTANT
STRIDE TREGLOWN
www.stridetreglown.com

PROJECT
Fitzalan Old School Site
Lawrenny Avenue

DRAWING TITLE
Landscape General Arrangement

STATUS CODE
S1 : Suitable for coordination

SCALE
1 : 500@A1

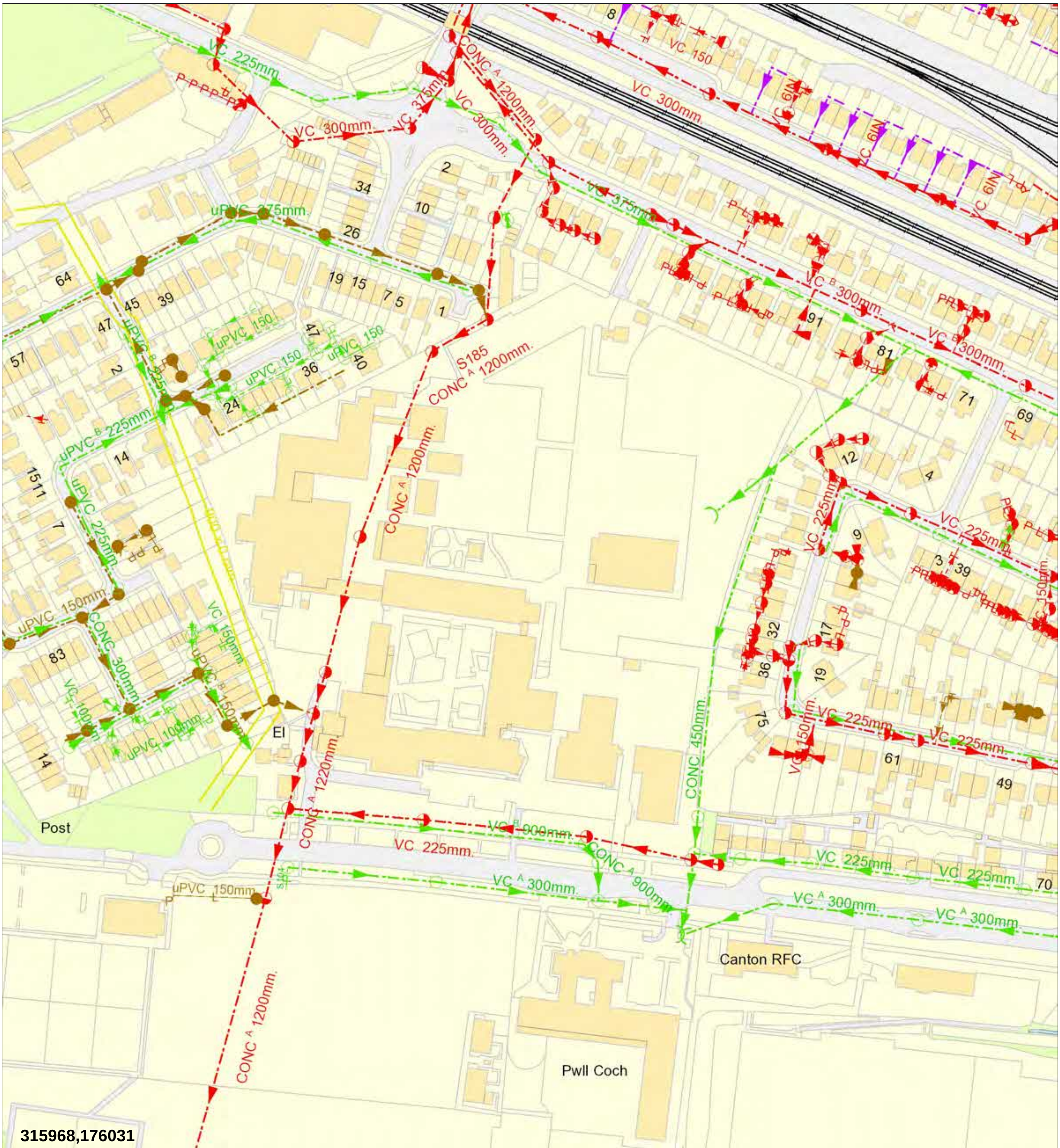
DRAWING USAGE:

PROJECT - ORIGINATOR - VOLUME - LEVEL - TYPE - ROLE - CLASS. - NUMBER
155461-STL-XX-00-DR-L-ZZZZ-9002

STATUS _ REVISION
S1_P09

Appendix B

DCWW SEWER RECORDS



Fitzalan School Sewerage

Scale: 1:2500

18/01/2022

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

Dŵr Cymru
Welsh Water

LEGEND

- ⋈ Sluice Valve
- ◆ Air Valve SINGLE
- × Tap
- Pressure Reducing Valve
- □ Meter
- 🟥 Bulk Meter
- ● FH Fire Hydrant
-] Cap
- Non Dwr Cymru
- Existing Distribution Main
- 🟧 Inspection Chamber
- Gravity Sewer
- Rising Main
-) Outfall
- △ Pumping Station
- LH □ Lamphole
- C O □ Combined Sewer Overflow
- SPC □ Special Purpose Chamber
- Treatment Works
- Private Sewer Transfer
- Lateral Drain

NB:
Sewer symbol colour indicates the sewer type.

RED - Combined
GREEN - Surface Water
BROWN - Foul

N
W E
S

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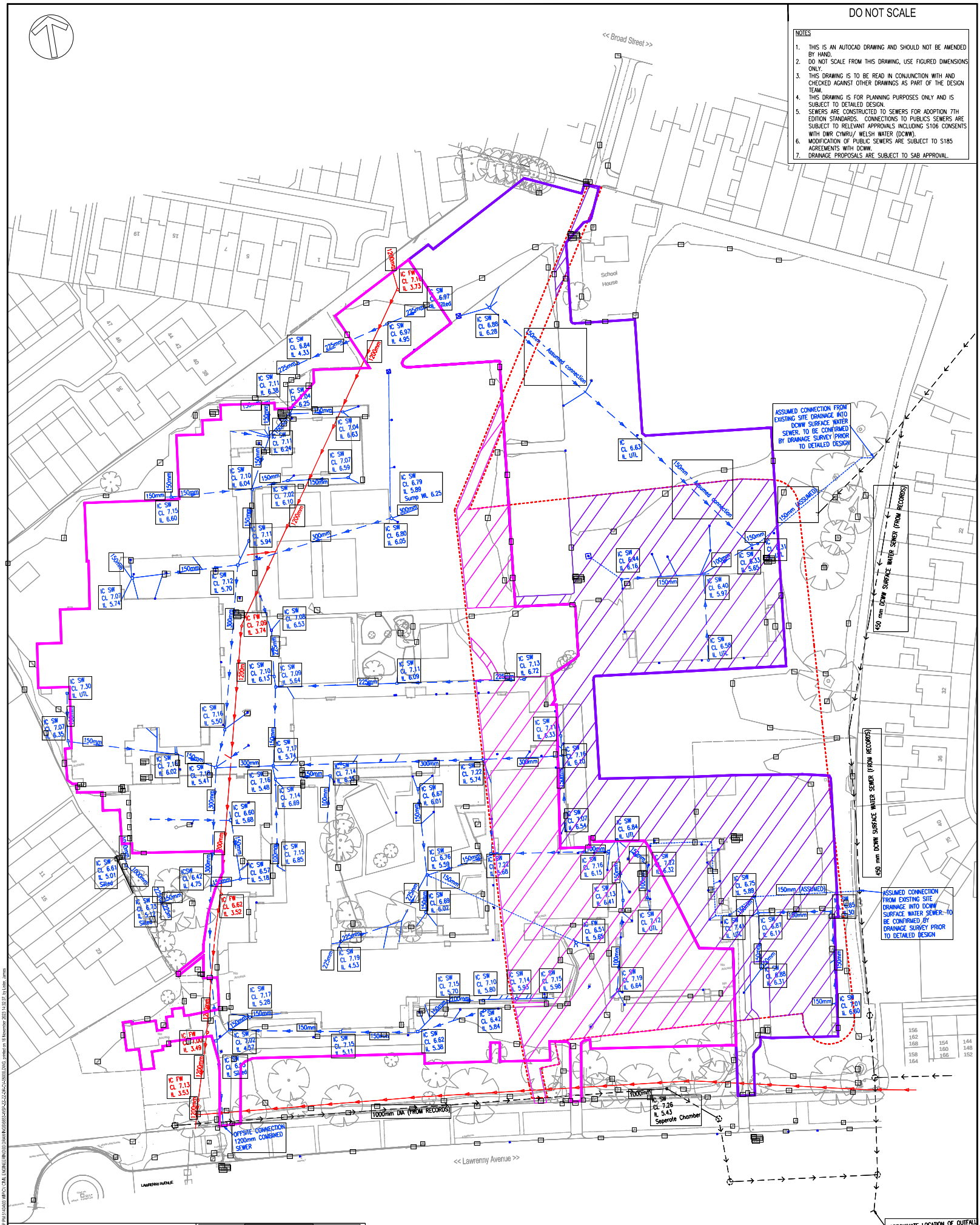
Dwr Cymru Cyfyngedig ('the Company') gives this infirmation as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is supplied hereby by the company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 based particular, but without prejudice to be generality of that foregoing, it should be noted that the records that are available to the company may not disclose the existence of a drain sewer or disposal main laid before 1 September 1989, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of thisinformation is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the company's right to be compensated for any damageto its apparatus.

Appendix C

DRAINAGE STRATEGY PLANS



DO NOT SCALE

NOTES

1. THIS IS AN AUTOCAD DRAWING AND SHOULD NOT BE AMENDED BY HAND.
2. DO NOT SCALE FROM THIS DRAWING, USE FIGURED DIMENSIONS ONLY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CHECKED AGAINST OTHER DRAWINGS AS PART OF THE DESIGN TEAM.
4. THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND IS SUBJECT TO DETAILED DESIGN.
5. SEWERS ARE CONSTRUCTED TO SEWERS FOR ADOPTION 7TH EDITION STANDARDS. CONNECTIONS TO PUBLICS SEWERS ARE SUBJECT TO RELEVANT APPROVALS INCLUDING S106 CONSENTS WITH DWR CYMRU/ WELSH WATER (DCWW).
6. MODIFICATION OF PUBLIC SEWERS ARE SUBJECT TO S185 AGREEMENTS WITH DCWW.
7. DRAINAGE PROPOSALS ARE SUBJECT TO SAB APPROVAL.

KEY

- - - -	SITE BOUNDARY
──	TOTAL EXISTING CATCHMENT 1 AREA
▨	CATCHMENT 1 EXISTING IMPERMEABLE AREA WITHIN SITE BOUNDARY
──	TOTAL EXISTING CATCHMENT 2 AREA
▨	CATCHMENT 2 EXISTING IMPERMEABLE AREA WITHIN SITE BOUNDARY
─▷─	EXISTING DCWW COMBINED SEWER
○	EXISTING DCWW COMBINED SEWER MANHOLE
- → - -	EXISTING DCWW SURFACE WATER SEWER
○	EXISTING DCWW SURFACE WATER MANHOLE
- ▷ -	EXISTING SURFACE WATER DRAINAGE
□	EXISTING SURFACE WATER MANHOLE
- - - -	ASSUMED EXISTING SURFACE WATER DRAINAGE
⊠	EXISTING GULLY

EXISTING CATCHMENT AREA

	CATCHMENT AREA 1 (OUTFALL EAST)	CATCHMENT AREA 2 (OUTFALL WEST)
EXISTING IMPERMEABLE AREA PROPOSED WITHIN SITE BOUNDARY	0.720ha	0.470ha

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	10/11/2023	PM	FIRST ISSUE	WF	WF

DRAWING STATUS:
S2 - FOR INFORMATION

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CLIENT:	CARDIFF CITY COUNCIL
PROJECT:	FITZALAN HIGH SCHOOL (LAWRENNY AVENUE) PITCHES
ARCHITECT:	STRIDE TREGLOWN
TITLE:	EXISTING SURFACE WATER DRAINAGE AND CATCHMENT PLAN
SCALE @ A1:	1:500
CHECKED:	WF
APPROVED:	WF
PROJECT No:	70096653
DESIGNED:	PM
DRAWN:	PM
DATE:	November 23
DRAWING No:	6653-WSP-ZZ-ZZ-DR-CV-05000
REV:	P01

File name \\UK.WSPGROUP.COM\CENTRAL DATA\PROJECTS\70096XXX\70096653 - FITZALAN HS WSP PM 51404\03 WIP\CV CIVIL ENGINEERING\03 DRAWINGS\6653-WSP-ZZ-ZZ-DR-CV-05000.DWG, printed on 16 November 2023 14:32:37, by Lister, James