

J & M Properties

**Land at Unit 108,
Abbey Road South,
Wrexham Industrial Estate**
Drainage Strategy

95011-RP-D-0001

Rev: P01

May 2023

Document History

Job Number: 95011		Document Ref: 95011-RP-D-0001		
P01	Drainage Strategy	JR	RAH	31/05/2023
Revision	Purpose Description	Originated	Authorised	Date

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This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

1 Introduction

1.1 Commission

JP Structural Design were appointed by J & M Properties to carry out a Drainage Strategy for the proposed erection of a new industrial building on Land at Unit 108, Abbey Road South, Wrexham Industrial Estate, Wrexham, LL13 9RF.

1.2 Limitations

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The findings of this Strategy have been based on data available at the time of the study and on the review of available information that has been undertaken to date. They relate to the current development proposals as outlined in **Appendix A**. Should the proposed end use of the site change after the completion of this assessment, then the findings of this report will need to be reviewed and updated accordingly.

2 Existing Site and Proposed Development

2.1 Site Location

The proposed development is located within Wrexham Industrial Estate, approximately 5.0km to the east of Wrexham city centre. The site is at Ordnance Survey National Grid Reference SJ 386 497.

2.2 Site Description

The proposed site covers an area of 0.205ha as shown on the site information drawing in **Appendix B**.

The immediate boundaries of the site are formed by buildings and associated infrastructure of the industrial estate. The western boundary of the site is formed by Abbey Road South. The eastern boundary of the site is formed by an agricultural field.

A review of the topographical survey shows that the site is typically comprised of concrete surfacing in the northern section adjacent to existing units and an unbound stone surface in the southern section which is used for vehicle parking. The survey indicates that the site has a high point of 32.040m (Above Ordnance Datum) AOD located in the southeast of the site. The low point of the site is located in the northeast of the site at 30.120m AOD, however, this is situated at the base of an embankment the level at the top of which is 31.760m AOD. The site has levels of 31.770m AOD and 31.610m AOD in the southwest and northwest respectively. The survey also indicates several structures currently present throughout the site. The existing topographic and utility survey, is provided within **Appendix C**.

Access to the site is provided in the west from Abbey Road South.

2.3 Existing Drainage

Public sewer records were obtained from Dŵr Cymru Welsh Water (DCWW) and are provided in **Appendix D**. The records indicate a 375mm diameter public combined sewer that flows in a western and southern direction parallel to Abbey Road South approximately 50m south of the site boundary.

The JPS drawing 07757-0502-P02 for a previous development on site has been reviewed as part of this assessment (refer to **Appendix E**). The drawing indicates the following:

- A combined drain of unconfirmed diameter (assumed to be 150mm) situated to the west of the existing unit as shown on the existing drainage layout in **Appendix F**. The drain appears to serve the existing unit and discharge to the south in the direction of the previously mentioned 375mm diameter public combined sewer.
- A 150mm diameter foul drain situated to the south of the existing unit as shown on the existing drainage layout in **Appendix F**. The drain serves the welfare facilities installed as part of the previous development and discharges to the combined drain to the south west of the site that ultimately discharges in the direction of the 375mm diameter public combined sewer.

At this stage there is no detailed surface water drainage survey information available for the site. It is assumed that the existing hardstanding areas drain to the combined drain of unconfirmed diameter situated to the west of the site.

2.4 Existing Waterbodies

The site lies approximately 0.5km north of Redwither Brook which is classed as a 'Main River'.

The site lies approximately 0.1km south of an unnamed watercourse that appears to flow in a northern direction.

There are no canals or reservoirs within the vicinity of the site.

2.5 Ground Conditions

The surface geology of the site has been reviewed from the British Geological Survey (BGS) online geology maps. The geology map indicates that the site is superficially underlain by "Till, Devensian - Diamicton. Sedimentary superficial deposit formed between 11.6 and 11.8 thousand years ago during the Quaternary period." The bedrock geology is described as "Salop Formation - Mudstone, sandstone and conglomerate. Sedimentary bedrock formed between 309.5 and 272.3 million years ago during the Carboniferous and Permian periods.

According to the Soilscales soils dataset (<http://www.landis.org.uk/soilscales/>), soil conditions at the site and within the surrounding area are slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage.

The geology of the site has also been reviewed from the following report:

- Smith Grant LLP - 108 Abbey Road South, Wrexham Industrial Estate – Stage 2 Contamination Assessment For: J&M Properties – April 2023

From the information provided within the report, the following can be summarised:

- *"The site investigation revealed that the general succession of strata can be represented by made ground, underlain by natural superficial strata of Glacial Till."*
- *"Made ground was encountered in all five test locations from ground level to depths of between 0.5m and 2.0m, represented by brown sandy gravelly clay with frequent bricks, gravel and anthropogenic wastes (wires, glass, plastic, etc). No organic or degradable materials were encountered."*
- *"Very stiff orange/brown clay (Till) with grey streaks and occasional cobbles was present immediately beneath made ground deposits to the base of the trial-pits."*

Smith Grant LLP carried out soakaway testing on 29 March 2023 in accordance with BRE365 to determine infiltration rates of the site. The Smith Grant report states the following:

- *"The soil infiltration testing was undertaken within the Glacial Till in TPI. The test was completed over a 2.5hr period, during which time the water level did not fall. As such it was not possible to reproduce the test or calculate a soil infiltration rate. It is concluded that the Glacial Till is highly impermeable and unlikely to be suitable for soakaway."* (Refer to **Appendix G** for soakaway results extract).

2.6 Existing Flood Risk

Figure 1 of TAN15 defines three development advice zones as follows:

- Zone A: Considered to be of little or no risk of fluvial or tidal/coastal flooding.
- Zone B: Areas known to have been flooded in the past evidenced by sedimentary deposits.

- Zone C: Based on (the Natural Resources Wales) flood outline, equal to or greater than 0.1% (river, tidal or coastal). Zone C is subdivided into the following two zones:
 - Zone C1: Areas of the floodplain which are developed and served by significant infrastructure, including flood defenced.
 - Zone C2: Areas of the floodplain without significant flood defence infrastructure.

The development advice zones are shown on the Development Advice Map and are defined by the predicted extent of the 1 in 1,000 (rivers and sea) annual exceedance probability (AEP) event (Zone C) and British Geological Survey drift data (Zone B).

The Development Advice Map is shown on the site information drawing in **Appendix B** and indicates that the site is in Zone A.

The surface water flood risk map is also shown on the site information drawing in **Appendix B**. The information indicates that the site is currently at a “Very low” risk of surface water flooding from overland flows caused by intense rainfall. NRW define “Very Low” surface water flood risk as:

- “Very low” risk means that each year, the area has a chance of flooding of greater than 1 in 1000 (0.1%).

2.7 Proposed Development

The scheme consists of the construction of a new industrial building to the south of the site. The proposed building is to be constructed in an existing hard standing area, therefore, there will be no increase in impermeable area as part of the development.

The existing impermeable area of the site is 0.185 ha, as shown on the site information plan in **Appendix B**. **Appendix A** contains the site proposals, **Appendix H** the preliminary drainage layout and **Appendix I** the surface water calculations.

3 Drainage Proposals

3.1 Foul Drainage

The foul drainage disposal is proposed to follow the requirements of Building Regulations 2010 Part H (2015 Edition), Drainage and Waste Disposal and Sewers for Adoption 7th Edition. Part H1 of the above document contains the following requirements:

“An adequate system of drainage shall be provided to carry foul water from appliances within the building on to the following, listed in order of priority.”

- a) A public sewer or where that is not reasonably practicable
- b) A private sewer communicating with a public sewer, or where that is not reasonably practicable,
- c) Either a septic tank which has appropriate form of secondary treatment or another wastewater treatment system; or, where that is not reasonably practicable,
- d) A cesspool

The proposed peak foul discharge generated by the development has been calculated in accordance with Sewers for Adoption (7th Ed.), using a peak flow rate of 0.6 l/s/ha of developable land for domestic flows, the expected peak flow rate from the development would be 0.1 l/s. It is anticipated that this will not have a negative impact on the existing drainage network.

It is proposed to discharge foul flows from the site to the existing 150mm diameter foul drain located in the southwest corner of the site. The existing 150mm diameter foul drain is currently situated within the proposed building footprint; therefore, it will need to be diverted around the perimeter of the proposed building. The proposals are indicated on the preliminary drainage layout presented in **Appendix H**.

3.2 Surface Water Drainage

3.2.1 Surface Water Drainage Guidance and Policy

The aim of the surface water drainage strategy is to mimic the natural catchment processes as closely as possible and adopt the principles of water management scheme as stated in section 2 of the “Statutory National Standards for Sustainable Drainage Systems (Wales)” (SNSSUDS) document 2018.

From the 7th January 2019 Schedule 3 of the Flood and Water Management Act has been implemented by the Welsh Government which requires any development of more than 1 unit or where the construction area is greater than 100m² to comply with the SuDS Approval Bodies (SAB's) design guidance and minister's standards which will require all sites to adopt SuDs in their design. The standards are listed below;

- S1 – Surface Water Runoff Destination
- S2 – Surface Water Runoff Hydraulic Control
- S3 – Water Quality
- S4 – Amenity
- S5 – Biodiversity
- S6 – Design of Drainage for Construction, Operation and Maintenance

S6 – Design of Drainage for Construction, Operation and Maintenance

The Standards listed will need to be met by the design to comply with the SNSSUDS. S1 is a hierarchy standard with standards S2-S6 being fixed.

3.2.2 S1 – Surface Water Runoff Destination

In accordance with Welsh Government guidance, surface water runoff should be disposed of according to the following hierarchy:

- a) Rainwater collected for use;
- b) Infiltrated to ground;
- c) To a surface water body;
- d) To a surface water sewer, highway drain or another drainage system;
- e) To a combined sewer.

It is necessary to identify the most appropriate method of controlling and discharging surface water. The design should seek to improve the local run-off profile by using systems that can either attenuate run-off and reduce peak flow rates or positively impact on the existing flood profile.

3.2.2.1 Rainwater Collected for Use

It is proposed to use rainwater butts as a means of capturing rainwater for irrigation and washing purposes.

3.2.2.2 Infiltrated to Ground

It is envisaged that there will be occasions where precipitation exceeds the need for surface water to be used from the rainwater butts. Due to this, an alternative option for surface water will be proposed so that there is a strategy for surface water in these circumstances.

As detailed in Section 2, soakaway testing was undertaken by Smith Grant LLP, on 29 March 2023. The result of the test is located within **Appendix G**. Based on this information it has been concluded that the disposal of surface water via infiltration will not be viable in this instance and as such has been discounted.

3.2.2.3 To a Surface Water Body

As detailed in Section 2, there are no watercourses in the immediate vicinity of the site.

3.2.2.4 To a Surface Water Sewer, Highway Drain or Another Drainage System

There are no known surface water sewers, highway drains or any other drainage system within the immediate vicinity of the site.

3.2.2.5 To a Combined Sewer

In the absence of a reasonably accessible surface water sewer, highway drain or any other drainage system, it is proposed to discharge surface water runoff to the 150mm diameter drain to the south of the existing unit. It is noted that at present the drain would be classified as a foul drain, however, approximately 9m downstream it appears to discharge to the combined drain in the west of the site.

Therefore, the downstream section of the connection should now be designated as a combined drain as well. The proposals are indicated on the preliminary drainage layout presented in **Appendix H**.

3.2.3 S2 - Surface Water Runoff Hydraulic Control

This standard requires surface water to be managed to prevent as far as possible any discharge from the development for rainfall events of less than 5mm and that the surface water runoff rate and volume for up to a 1 in 100-year return period should be managed to protect people, properties and the receiving water body. Consideration is also required to the risk associated with runoff from events greater than 1 in 100-year return period with mitigating proposals developed for the scheme.

3.2.3.1 Interception of Runoff

Rainwater butts are proposed which will provide interception of runoff for small rainfall events, in these instances the demand will likely outweigh the first 5mm of collection so it is assumed that storm water would be intercepted. Due to the industrial nature of the site we would not advocate the inclusion of a permeable paving system within the proposed hard standing areas.

3.2.3.2 Hydraulic Control

Runoff rates from the existing impermeable area in the location of the proposed building have been calculated using the Modified Rational Method within the “Pre-development discharge” function of Causeway Flow. The following parameters were used in the calculation.

- The site has a total area of 0.205ha of which the impermeable area currently comprises 0.185ha. However, the existing hard standing areas to remain are expected to continue to drain as existing and therefore are not accounted for in the calculations (refer to **Appendix B**).
- The proposed building has an area of 0.041ha.
- C_v is the volumetric runoff coefficient = $Pr/PIMP = 0.75$ where Pr is Percentage Runoff and $PIMP$ is Percentage Impermeable Area.
- The time for runoff to flow to the discharge point has been set at 15 minutes.

The peak discharges of surface runoff from impermeable areas of the existing site are shown in the table 1 below:

Above Exceedance Probability of rainfall event	Existing Discharge Rate (l/s)
1:1	2.7
1:2	3.4
1:30	6.4
1:100	8.3

Table 1.0 – Peak Runoff Rate – Existing Site

It is proposed to restrict surface water runoff from the roof area of the proposed building to the existing 1:1 event rate as presented in Table 1.0, with a 30% betterment post development thus equating to 1.9l/s.

Attenuation storage will be provided to restrict surface water runoff generated across roofs and hardstanding. The attenuation storage has been modelled using Causeway Flow and sized to cater for the 1 in 100 year rainfall event plus 30% climate change (refer to **Appendix I**).

Based on a peak discharge rate of 1.9l/s, a total storage volume of 3.2m³ would be required. It is proposed that this storage is provided within a network of 300mm diameter pipework approximately 70m in length and manholes / inspection chambers. The proposed pipework is to be located around the perimeter of the proposed building. A preliminary surface water drainage layout is provided in **Appendix H**.

3.2.3.3 Exceedance Flows and Flood Pathways

Where flows exceed the capacity of the storage, flows will overtop the system and be contained within the car park, the design of which shall be such to direct flows to the preferential exceedance route.

3.2.3.4 Flood Risks to People

To minimise overland flows towards the building, the level design of the external areas should seek to contain flows within the car park where possible.

3.2.4 S3 – Water Quality

This standard requires treatment of surface water runoff to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems including sewers.

The roof water has a low pollution hazard level, with low levels of contamination. The proposed catch pit is deemed to be sufficient to remove the suspended sediments from the roof water prior to discharge to the combined drain.

3.2.5 S4 – Amenity

This standard requires that the design of the surface water management system should maximise amenity benefits.

As these proposals are for the construction of a new industrial unit, which is “closed off” from the public, it is not possible to add amenity benefits enjoyable by the public within the confines of the proposed development.

Additionally, due to the nature of the development in relation to the existing site and the constraints of the topography, there is limited available space for additional SuDS features within to provide additional amenity.

3.2.6 S5 – Biodiversity

This standard requires that the surface water management system should maximise biodiversity benefits. The SuDS scheme biodiversity strategy should revolve around the creation of significant and varied habitat to increase the overall biodiversity of the site and ecological value.

However, as previously stated, there is limited available space for SuDS features within the site to provide additional biodiversity.

The attenuated discharge can help reduce the impact of heavy flows on the downstream system and this can help facilitate biodiversity delivery in those areas.

3.2.7 S6 – Design of Drainage for Construction, Operation and Maintenance and Structural Integrity

The proposed system will not be required for adoption as it does not serve more than one property. However, it will still be designed to the standards set out in CIRIA C753.

The construction of most of the surface water drainage will only require the use of standard civil engineering and landscaping operations, e.g. excavation, filling, grading, pipe-laying, chamber construction, topsoiling, seeding and planting, which a competent contractor would be expected to be able to undertake.

Maintenance will be carried out by on site staff as part of their regular duties. Exact details of the maintenance regime will be determined through workshops with the client at detailed design stage.

The surface water drainage proposals for this site should include the following maintenance measures:

- Cleaning and maintenance of rainwater butts to maintain effective drainage.
- Cleaning and maintenance of flow control device and its sump to maintain effective drainage.

4 **Conclusions**

4.1 **Recommendations**

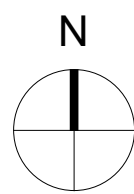
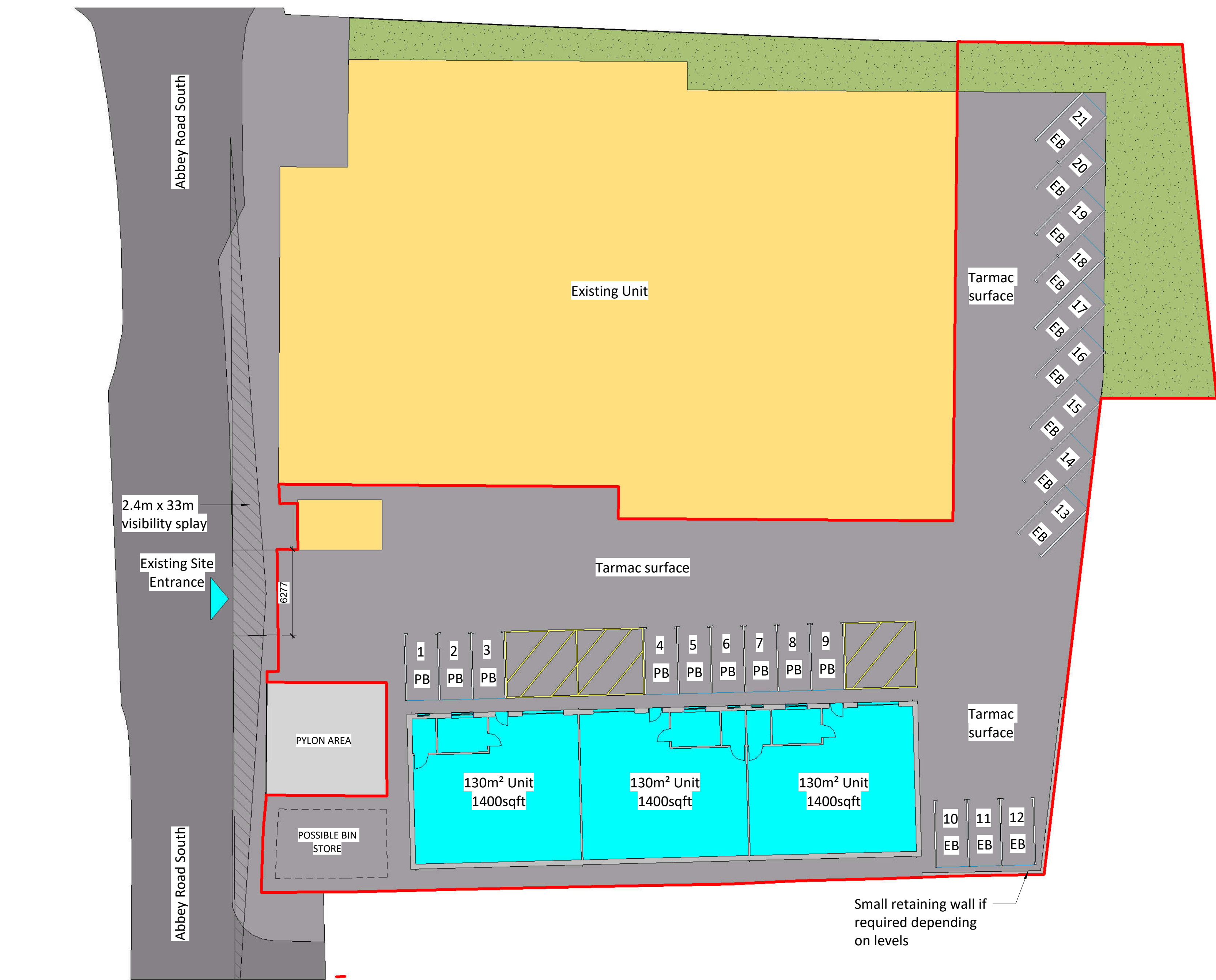
It is recommended that investigations of the existing drainage network within the site are undertaken to confirm the viability of the sewers as points of discharge for the proposed development.

4.2 **Conclusions**

The proposed site is free from any existing flood risk and there are suitable points of connection for the disposal of the foul effluent and surface water run-off generated by the proposed development. We would expect the proposed development to be free from general objections in respect to draining the site. There will also be suitable conditions imposed to ensure that the drainage proposals are designed and constructed in accordance with relevant statutory requirements.

5 Appendices

Appendix A – Development Proposals



Proposed Site Plan
1 : 200



- Existing Buildings
- Proposed Building

- Parking
- EB - Existing Building parking spaces
 - PB - Proposed Building parking spaces

- General Notes
1. Contractor to verify all dimensions and check level datums on site
 2. All of the designs are the sole property of TACP Architects Ltd and may not be used without their written agreement
 3. All prints, specifications and their copyright are the property of TACP Architects Ltd
 4. Do not scale off drawings
 5. All dimensions shall be checked on site before commencement of shop drawings, manufacture and all discrepancies must be reported to TACP Architects Ltd

Revisions					
Rev	Date	Description	By	Check	
P01	27/04/20	Visibility splay indicated and parking spaces indicated for each building	ACR	MG	

Consultants

Client
J & M Properties

Project Title
Industrial Unit, Abbey Road South

Drawing Title
Proposed Site Plan

Scale 1 : 200@A1 Date 29/01/20 Drawn By ACR Checked By MG Office Wrexham

Job Number 19064 Project•Originator•Zone•Level•Type•Role•Number ARD -TACP- PS- 00-DR- A- 702 Revision P01

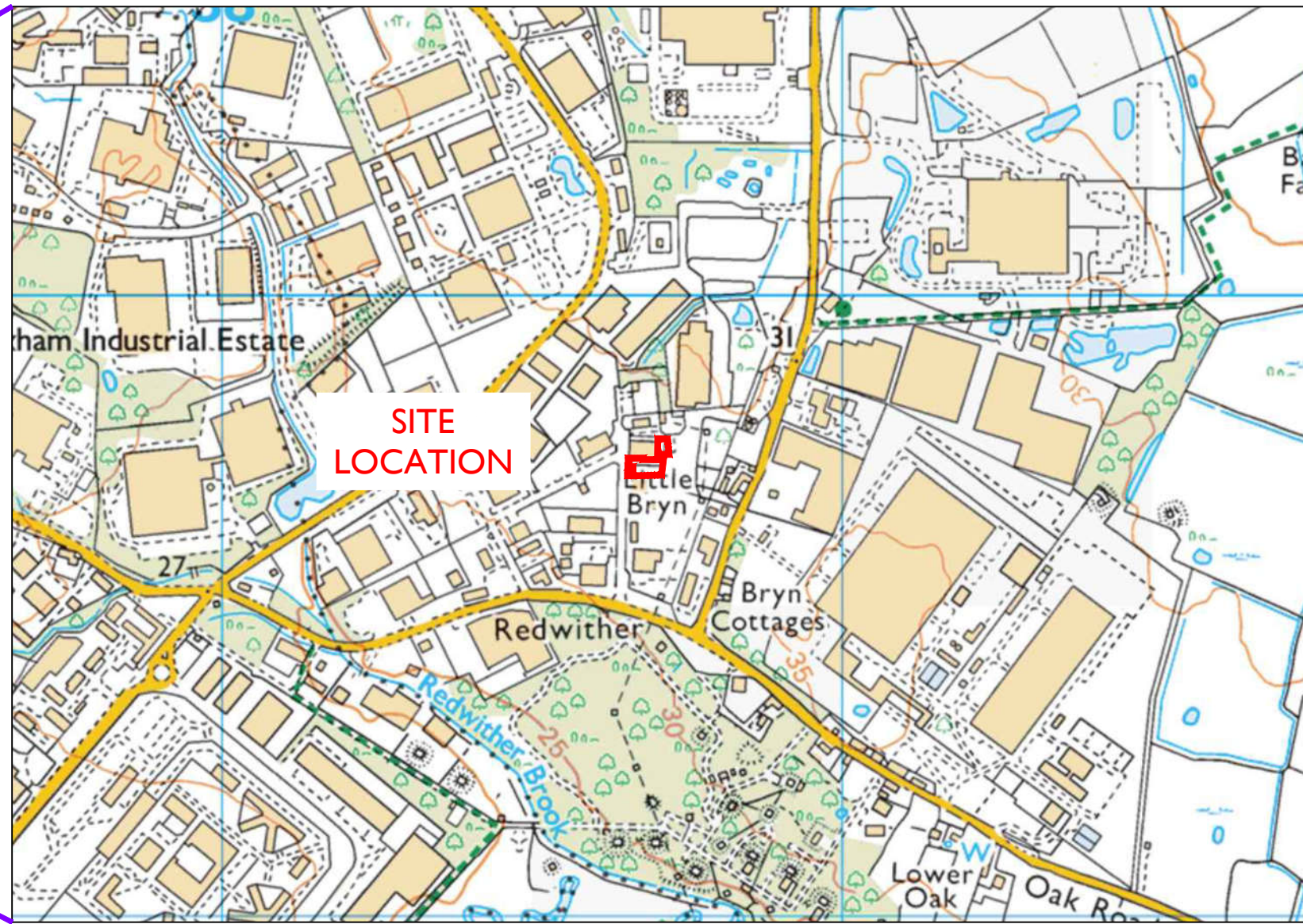
TACP Architects Ltd
Pembroke House
Ellice Way, Wrexham Technology Park,
Wrexham, LL13 7YT
01978 291161
admin@tacparchitects.co.uk
www.tacparchitects.co.uk
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Appendix B – Site Information Drawing



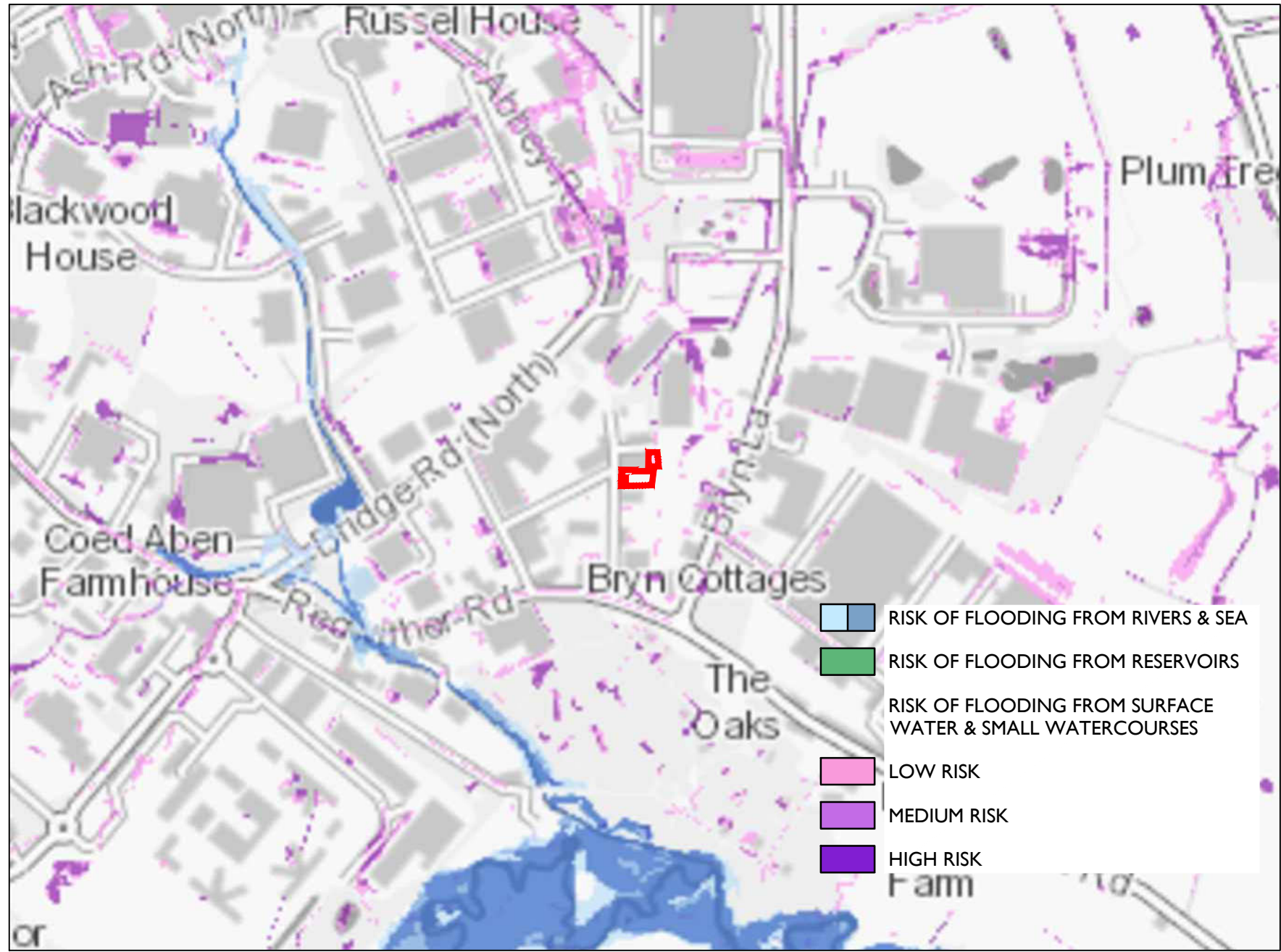
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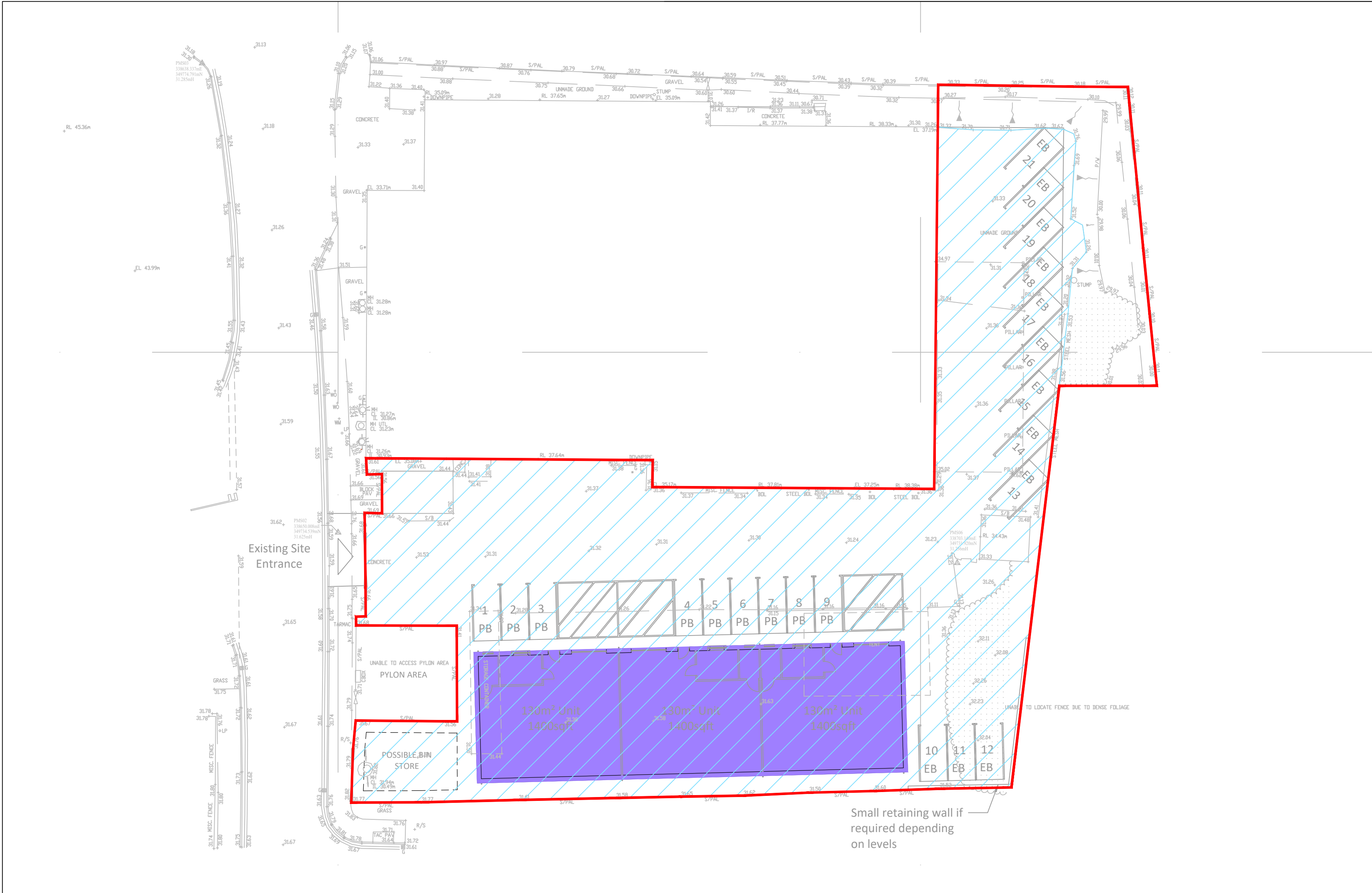
APPROX SCALE 1:10,000



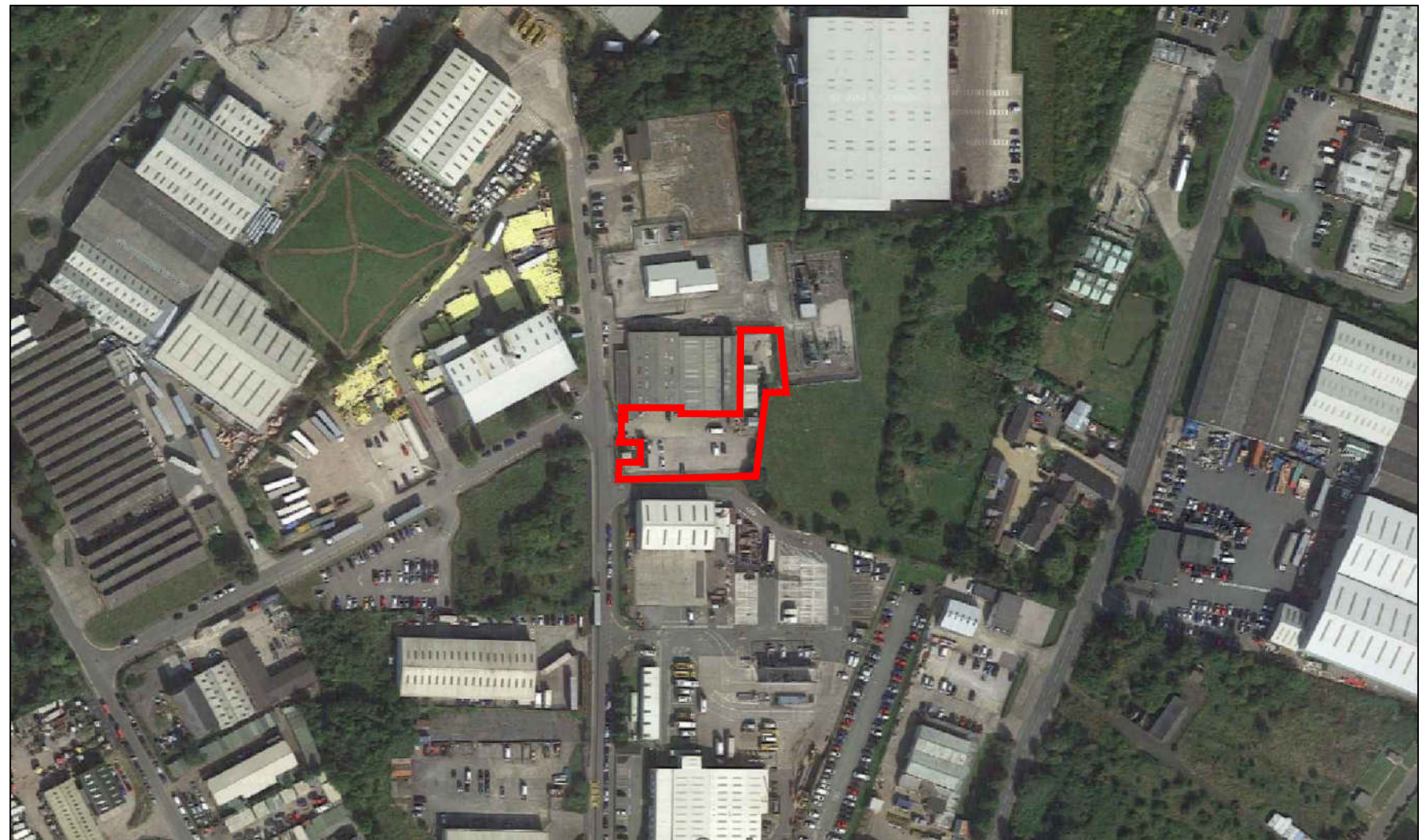
DEVELOPMENT ADVICE MAP
APPROX SCALE 1:10,000



SURFACE WATER FLOOD RISK MAP
APPROX SCALE 1:10,000



EXISTING / PROPOSED IMPERMEABLE AREA
APPROX SCALE 1:250



EXISTING SATELLITE IMAGE
APPROX SCALE 1:4,000

SITE CO-ORDINATES
OS X (Eastings) 338679
OS Y (Northings) 349755
Nearest Post Code LL13 9UY
Nat Grid SJ386497 / SJ3867949755



AREAS
SITE BOUNDARY
2,050m² (0.205 ha)
EXISTING IMPERMEABLE AREA
1,850m² (0.185 ha)
PROPOSED UNIT
410m² (0.041 ha)

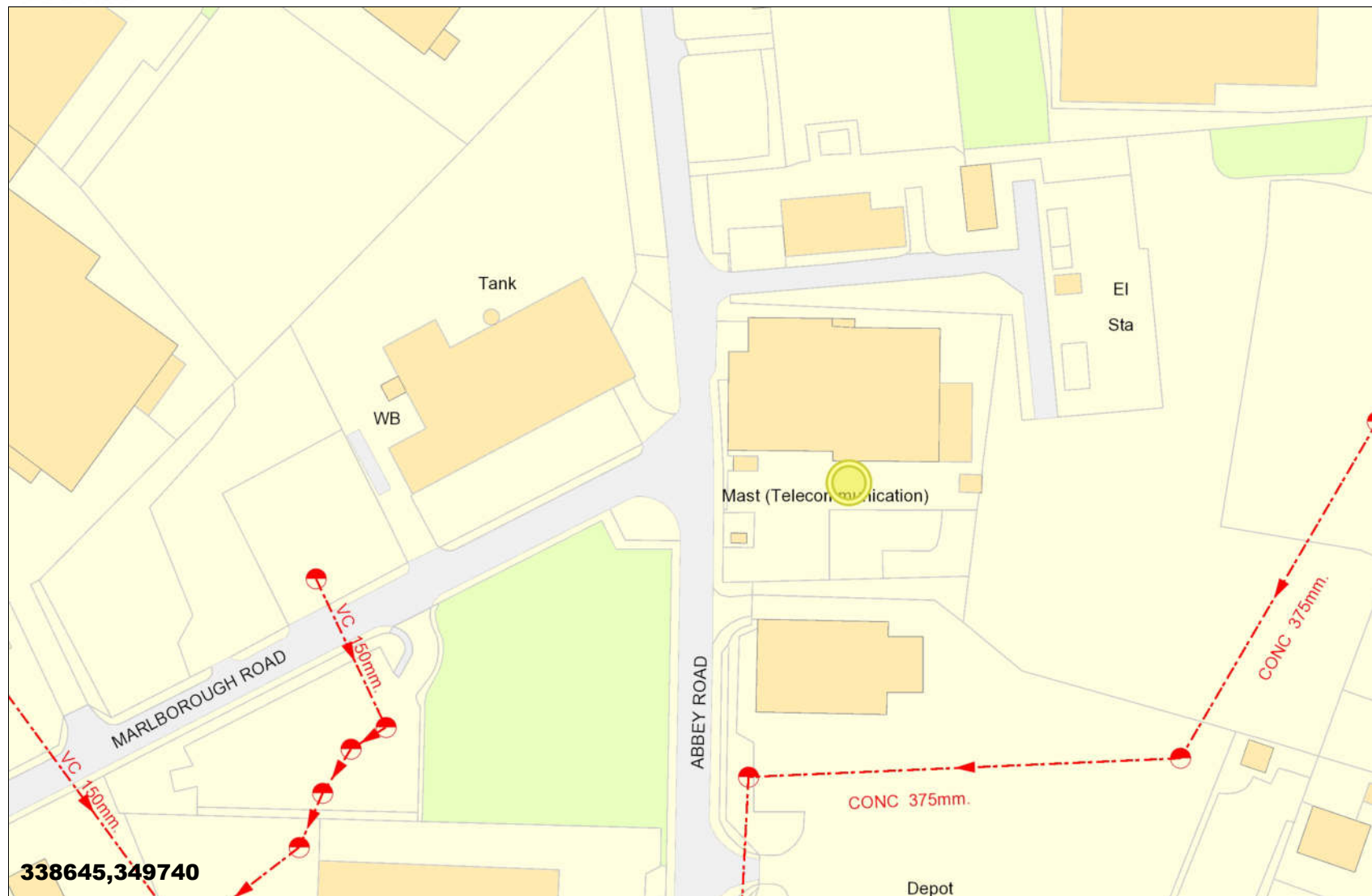
REV	DESCRIPTION	BY	CHK	APR	DATE
-	-	-	-	-	-

+44 (0)1244 893430 www.jpstructural.co.uk info@jpstructural.co.uk	
PURPOSE OF ISSUE	STATUS
PRELIMINARY	P
PROJECT	
LAND AT UNIT 108 ABBAY ROAD SOUTH WREXHAM INDUSTRIAL ESTATE	
TITLE	
DRAINAGE SCHEME SITE INFORMATION	
CLIENT	
J & M PROPERTIES	
DRAWN BY	CHECKED BY
JR	RH
APPROVED BY	JP
DATE	SCALE (@ A1)
25.05.2023	As Shown
PROJECT NUMBER	95011
DRAWING NUMBER	REV
1001	P01

Appendix C – Topographic Survey



Appendix D – Public Sewer Records



LEGEND

Clean Water

- Sluice Val
- Air Val, SINGLE
- Tap
- Pressure Reducing Valve
- Meter
- BULK Meter
- FH
- Cap
- Existing Main
- NON COMPANY

Sewerage External

- Foul
- Surface Water
- Combined
- Rising Main
- Private
- Treatment Works
- Pumping Station
- Special Purpose
- Unknown End
- Change, Combined Overflow
- Outfall, FOUL
- Lamp Hole, Foul
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

338645,349740

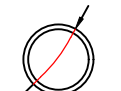
Dwr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is based upon the best information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus 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 this information 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 damage to its apparatus.

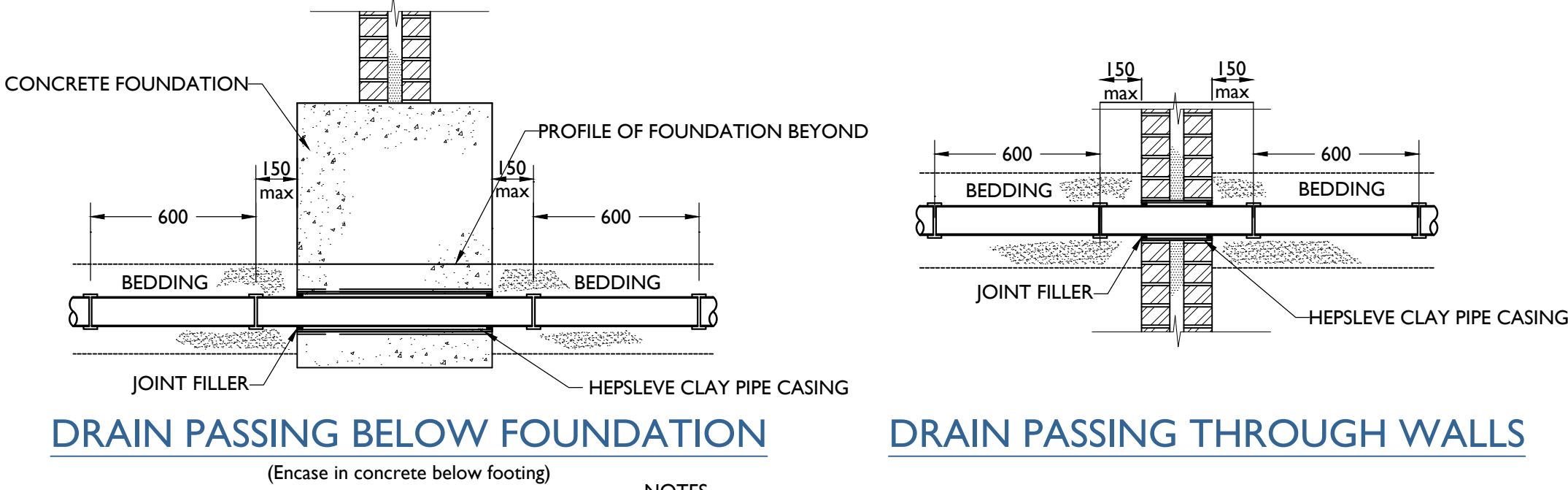
**EXACT LOCATION OF
ALL APPARATUS TO
BE DETERMINED ON
SITE**

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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

Appendix E – Previous Scheme Drainage Layout

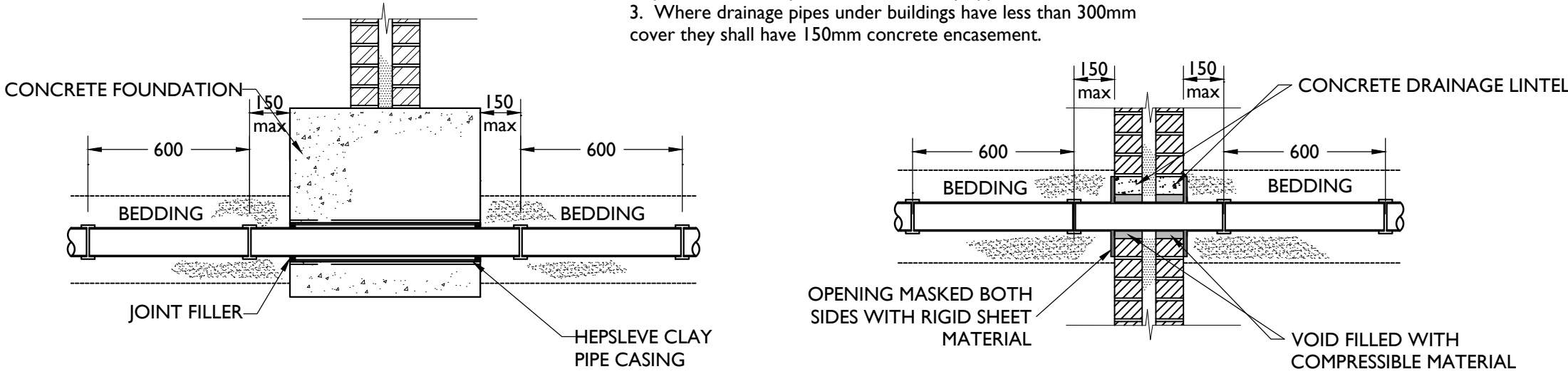
FOUL MANHOLES															
MH Ref.	MANHOLE DETAILS					COVER DETAILS			PIPE DETAILS				MANHOLE LAYOUT	COMMENTS / DETAILS	
	Internal Size	Brick	Type Conc	PPIC	Levels Cover	Invert	Depth (m)	BS EN 124 Cover Ref.	Cover Size Clear Opening	Type of Pipe	Size in	Size Out			Invert Level
FMH 01	900Ø		*		31.330	30.830	0.500	D400	600x600	CLAY	100a		30.780		
	TYPE B									CLAY		150b	30.830		



DRAIN PASSING BELOW FOUNDATION

(Encase in concrete below footing)

DRAIN PASSING THROUGH WALLS

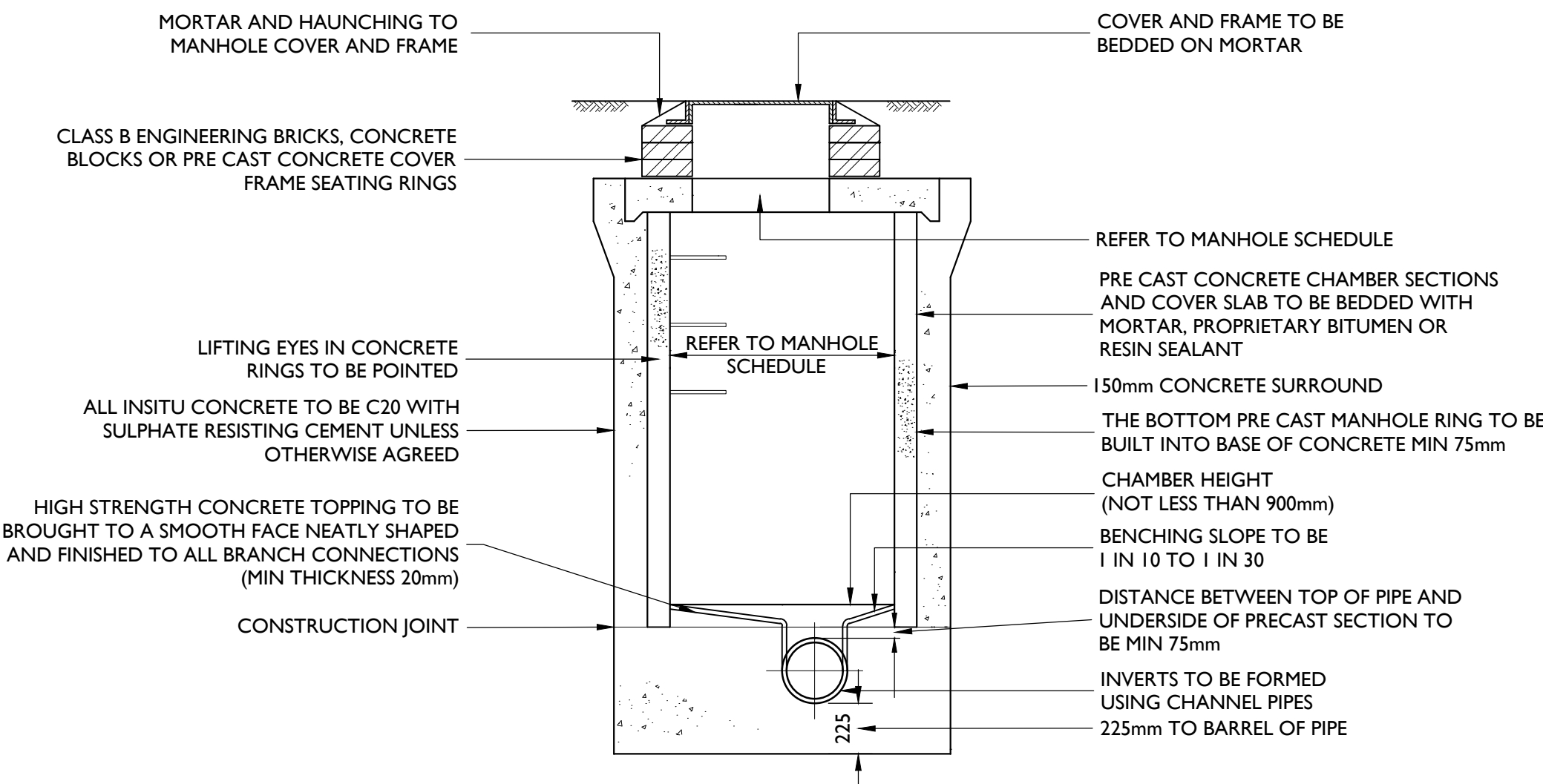


DRAIN PASSING THROUGH FOUNDATION

SCALE 1:20

DRAIN PASSING THROUGH WALL USING LINTEL

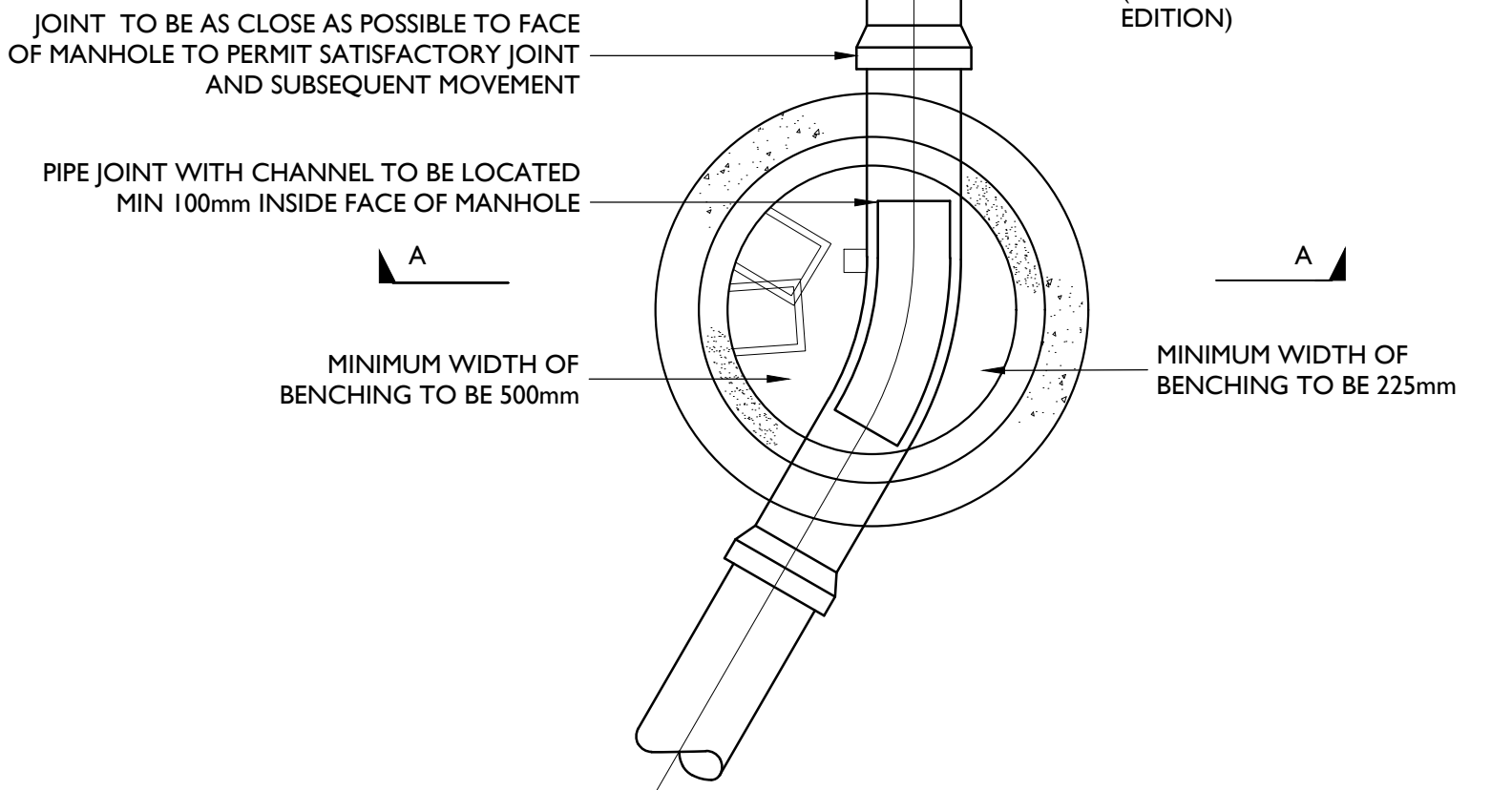
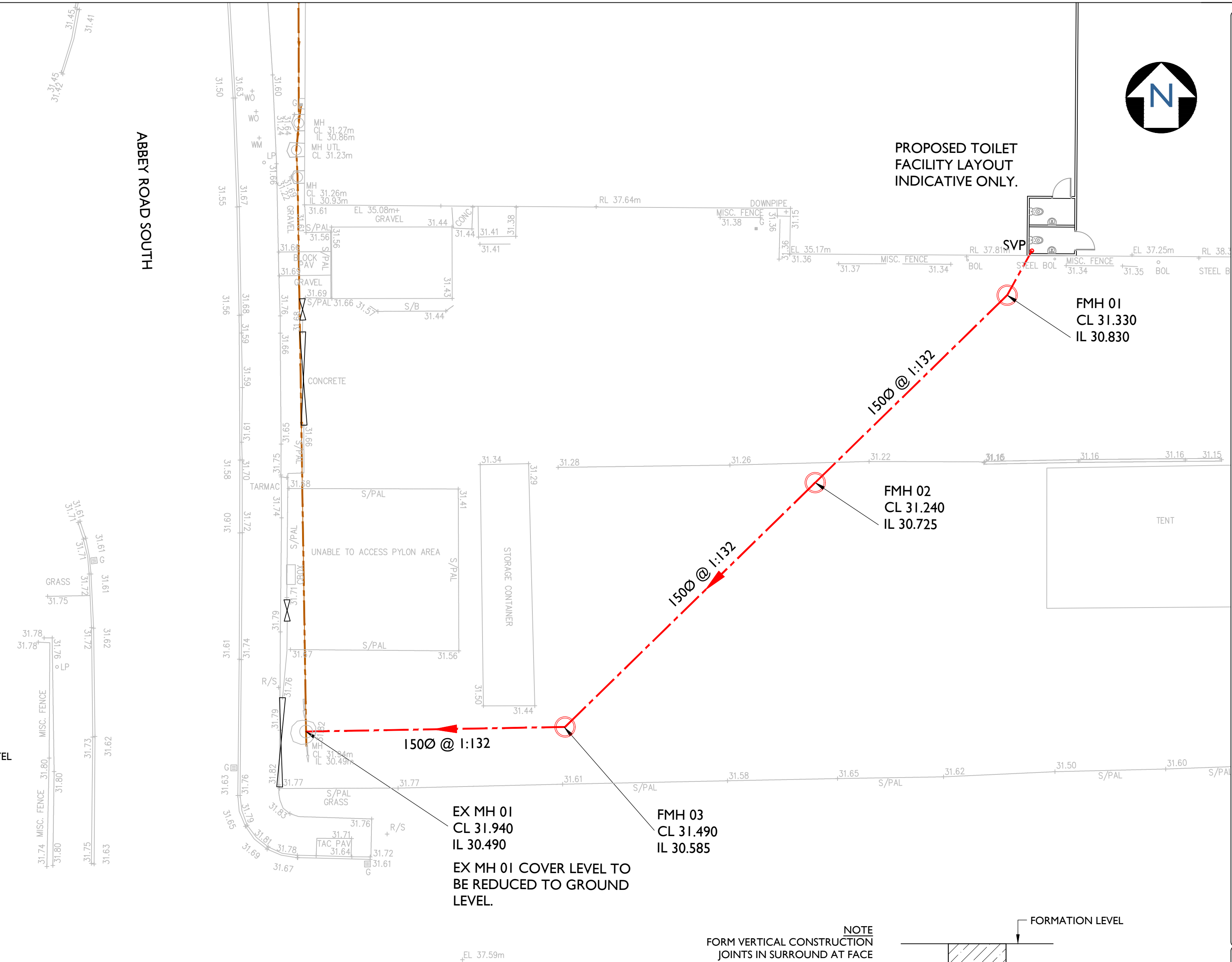
SCALE 1:20



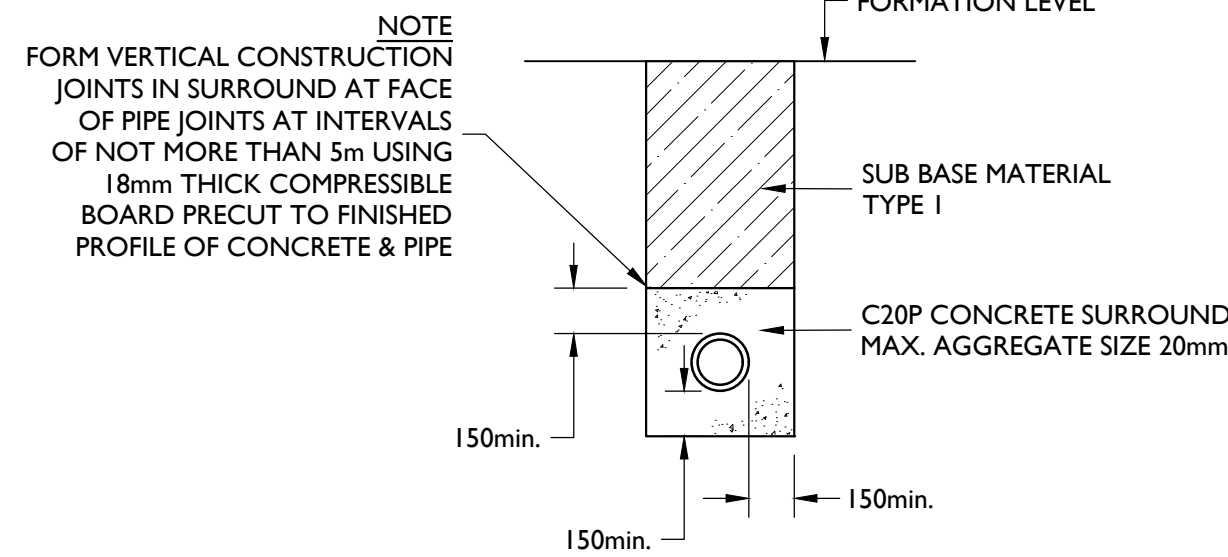
TYPICAL MANHOLE DETAIL - TYPE B

MAXIMUM 3m DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE

SCALE 1:25

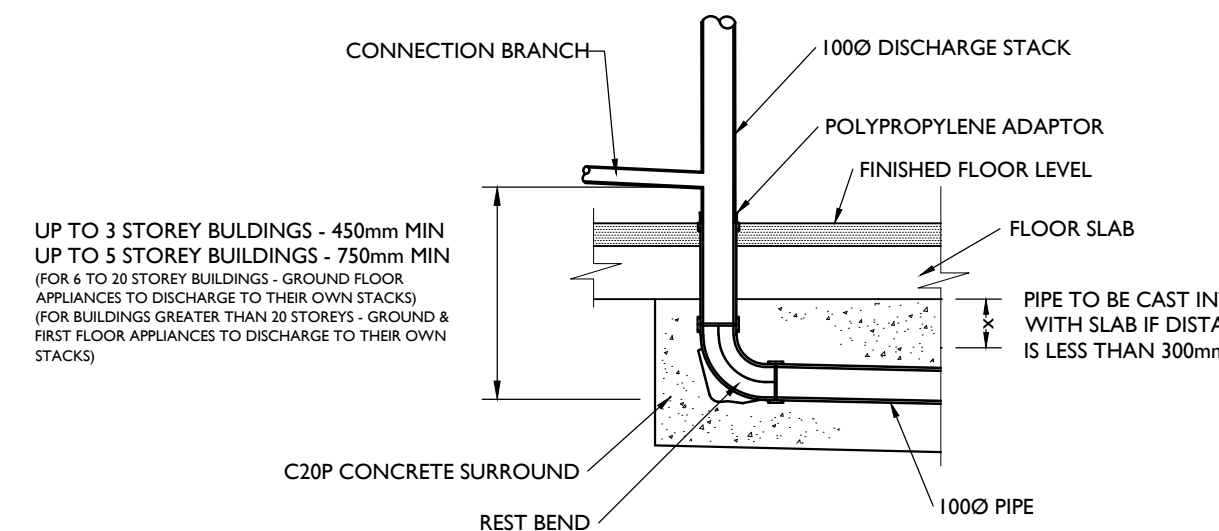


PLAN OF TYPICAL MANHOLE



PIPE BEDDING - TYPE Z

SCALE 1:25



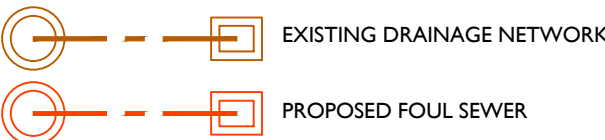
FOUL OUTLET CONNECTION DETAIL

SCALE 1:20

DRAINAGE NOTES:

- ALL WORKS TO BE CONDUCTED IN STRICT ACCORDANCE WITH SPECIFICATION OF THE LOCAL AUTHORITY, BS8301 1985 & BSEN752-1.
- ALL PIPE RUNS NEAR BUILDINGS TO COMPLY WITH THE BUILDING REGULATIONS 2002 PART H1. WHERE A PIPE IS WITHIN 1M OF A FOUNDATION THE TRENCH SHALL BE FILLED WITH CLASS GEN3 CONCRETE UP TO THE LOWEST LEVEL OF THE FOUNDATION. WHERE THE TRENCH IS FURTHER THAN 1M FROM THE FOUNDATION, THE TRENCH SHALL BE FILLED WITH CLASS GEN3 CONCRETE TO A LEVEL BELOW THE LOWEST LEVEL FOR THE FOUNDATION EQUAL TO THE DISTANCE FROM THE FOUNDATION LESS 150MM IN BOTH CASES THE PIPE SHALL BE BEDDED AND SURROUNDED IN 150MM THICK CLASS GEN3 CONCRETE.
- WHERE PIPES, EXTERNAL TO THE STRUCTURES, HAVE A DEPTH TO SOFFIT FROM GROUND LEVEL OF LESS THAN 600mm THEY SHALL HAVE A CLASS GEN3 CONCRETE ENCASEMENT (150mm THICK).
- WHERE PIPES ARE BEDDED AND SURROUNDED IN CONCRETE, FLEXIBLE JOINTS SHOULD BE PROVIDED. COMPRESSIBLE BOARDS (FIBREBOARD OR POLYSTYRENE) SHALL BE PROVIDED AT A MAXIMUM OF 8M CENTRES (COINCIDING WITH PIPE JOINTS). THE BOARDS SHALL BE PRE-CUT TO PIPE DIAMETER AND TO A HEIGHT AND WIDTH EQUAL TO THE CONCRETE CROSS SECTION. A BOARD THICKNESS OF 18mm FOR PIPES UP TO 450MM NOMINAL DIAMETER AND 36mm FOR PIPES OVER 450MM NOMINAL DIAMETER.
- ALL PRIVATE BUILDING DRAINAGE SHALL BE CONSTRUCTED IN STRICT ACCORDANCE WITH BSEN752-1.
- UNLESS OTHERWISE SPECIFIED, BUILDING DRAINAGE TO BE 100mm INTERNAL DIAMETER.
- ALL STUB STACKS TO BE FITTED WITH AIR ADMITTANCE VALVES WHERE BRANCH DRAIN EXCEEDS 12m EXCEPT AT THE HEAD OF THE RUN. SOIL VENT PIPES LOCATED AT THE HEAD OF A RUN TO BE INSTALLED WITH ROOF TILE VENT.
- ALL CONNECTIONS TO BE MADE FROM SOFFIT TO SOFFIT UNLESS WERE NOTED OTHERWISE
- TRENCH TEMPORARY FORMWORK IS REQUIRED TO ALL EXCAVATIONS EXCEEDING 1.2m DEPTH TO PROVIDE ADEQUATE SUPPORT AND STABILITY AT ALL TIMES.
- SEWERS ARE TO BE CONSTRUCTED IN SINGLE SECTIONS BETWEEN MANHOLES ONLY. TRENCHES TO BE BACKFILLED PRIOR TO EXCAVATING THE SUCCEEDING SEWER RUN.
- ALL CONCRETE AND CONCRETE PRODUCTS TO BE IN ACCORDANCE WITH BRE 363 FOR SULPHATES.
- WHERE SEWER OR DRAINS ARE TO BE ABANDONED THEY SHALL BE REMOVED OR INFILLED BY GROUTING IN ACCORDANCE WITH THE CIVIL ENGINEER SPECIFICATION FOR THE WATER INDUSTRY 7TH EDITION, CLAUSE 5.23.

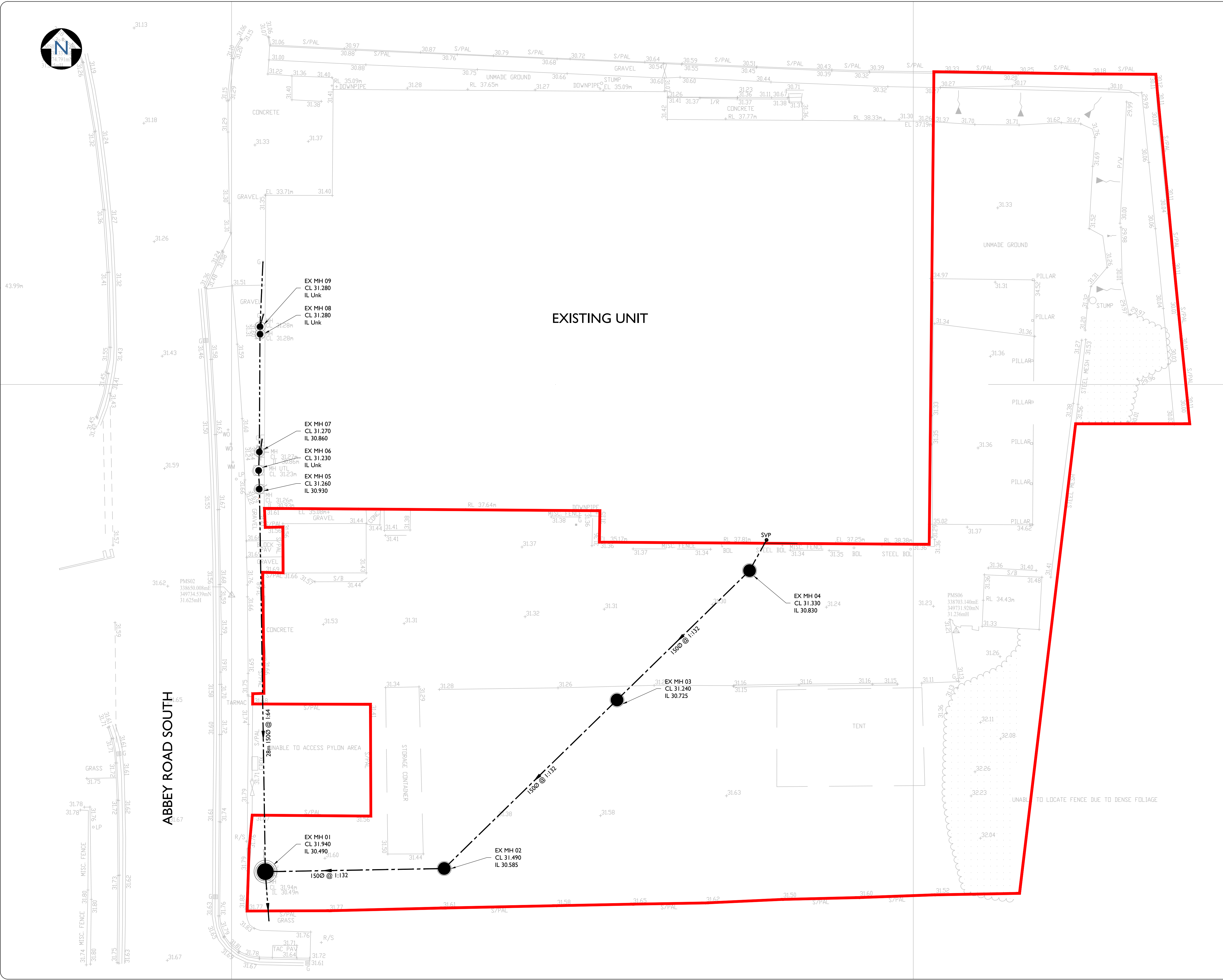
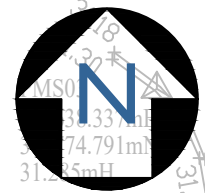
LEGEND:



P02	ADDITIONAL MH ADDED	MNM	RAH	JP	24.02.2021
REV	DESCRIPTION	BY	CHK	APR	DATE

PURPOSE OF ISSUE	STATUS
FOR INFORMATION	S2
PROJECT	ABBEY ROAD SOUTH, WREXHAM
TITLE	PROPOSED DRAINAGE LAYOUT & DETAILS
CLIENT	MARK & JACKIE HUXLEY
DRAWN BY	CHECKED BY
MNM	RAH
APPROVED BY	JP
DATE	SCALE (@ A1)
09.02.2021	1:150
PROJECT NUMBER	07757
DRAWING NUMBER	REV
0502	P02

Appendix F – Existing Drainage Layout



EXISTING DRAINAGE NOTES

THE LOCATION LINE & LEVEL OF ALL KNOWN EXISTING DRAINAGE PIPEWORK INDICATED ON THIS DRAWING IS APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY.

IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXACT LINE AND LEVEL BY WAY OF HAND EXCAVATED TRIAL PITS. PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS AND MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE INSTALLATIONS.

KEY

- EXISTING FOUL DRAIN
- EXISTING COMBINED FLOW DRAIN

NOTE
THE EXISTING DRAINAGE AND CONNECTIONS AS SHOWN HAVE BEEN TAKEN FROM A NUMBER OF SOURCES INCLUDING JPS DRAWING 07757 - 0502 (09.02.21) REV P02 AND WILL NEED TO BE VERIFIED ON SITE.

REV	DESCRIPTION	BY	CHK	APR	DATE
-	-	-	-	-	-



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PURPOSE OF ISSUE		PRELIMINARY		STATUS	P
PROJECT		LAND AT UNIT 108 ABBAY ROAD SOUTH WREXHAM INDUSTRIAL ESTATE			
TITLE		DRAINAGE SCHEME EXISTING LAYOUT			
CLIENT		J & M PROPERTIES			
DRAWN BY	JR	CHECKED BY	RH	APPROVED BY	JP
DATE	25.05.2023	SCALE (@ A1)	1:125	PROJECT NUMBER	95011
DRAWING NUMBER		501			REV P01

Appendix G – Soakaway Results Extract

Table 4.3 Total Potential Sulphate

Sample	Soluble Sulphate (mg/l)	pH	Total Sulphur (%)	Total Potential Sulphate (%)	Corrected Design Sulphate Class	Corrected ACEC Class
BH1-S3 (1.9-2.65m bgl)	130	8.6	0.026	0.078	DS-1	AC-1
BH2-S3 (2.0-2.4m bgl)	68	8.4	0.074	0.222	DS-1	AC-1
BH3-S3 (0.5-1.7m bgl)	10	8.8	0.032	0.095	DS-1	AC-1
BH4-S3 (0.7-1.4m bgl)	10	8.7	0.014	0.028	DS-1	AC-1
BH5-S3 (1.0-1.8m bgl)	10	8.6	0.054	0.162	DS-1	AC-1

4.5.4. The TPS within all 5 samples of proposed foundation bearing soils are below the 0.3% threshold at which pyrite is likely to be present. Due to the TPS values, it is considered unlikely that pyritic conditions could exist, and the design recommendation is retained at the Design Sulphate class of DS1 and Aggressive Chemical Environment for Concrete of AC-1.

4.6. Results of soil infiltration test

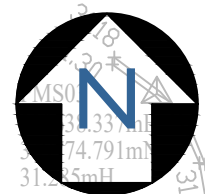
4.6.1. SGP were instructed to carry out soakaway testing on site to determine soil infiltration rates across the site and assist in the determination of the feasibility of soakaways. The work was carried out in accordance with the principles of BRE 365².

4.6.2. In accord to the abovementioned specifications, one run of the soakaway test was carried out within one trial pit (TP1). The trial pit was excavated to 2.65m bgl which was then filled with water via an IBC to a depth of 2.17m bgl. Periodic measurements were taken with the test completed after a 2.5-hour period. Water levels over this period had not fallen with water levels remaining at 2.17m at the end of the test.

4.6.3. Given the absence in any change in water height the test demonstrates that the boulder clay is impermeable and so could not be repeated and so soil infiltration rates have not been calculated.

² Building Research Establishment; Soakaway Design. Digest 365

Appendix H – Preliminary Drainage Layout



ABBEY ROAD SOUTH

EXISTING UNIT

NOTES

1. THE WORKS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS, NATIONAL BUILDING SPECIFICATION (NBS) AND SEWERS FOR ADOPTION, 7TH EDITION.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS DRAWINGS, ARCHITECTS DRAWINGS, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
3. THE LOCATION, LINE & LEVEL OF ALL KNOWN EXISTING BURIED SERVICE MAINS AND DRAINAGE PIPEWORK INDICATED ON THE DRAWINGS ARE APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR EXACT LINE & LEVEL, BY WAY OF HAND EXCAVATED TRIAL PITS, PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE MAINS / DRAINAGE INSTALLATIONS.
4. THE CONTRACTOR MUST COMPLY WITH ALL CURRENT LEGISLATION RELATING TO HEALTH & SAFETY.
5. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL TEMPORARY WORKS, AND IS ALSO RESPONSIBLE FOR THE SAFE MAINTENANCE AND STABILITY OF EXISTING BUILDINGS AT ALL TIMES.
6. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE MITIGATION OF ALL OCCURRENCES OF GROUND WATER DURING THE CONSTRUCTION PERIOD.
7. THE CONTRACTOR SHALL MAKE ALLOWANCE FOR RAISING / LOWERING ALL EXISTING ACCESS COVERS & FRAMES TO SUIT NEW FINISHED LEVELS.
8. ALL SOFT / HARD PAVED AREAS AFFECTED BY THE WORKS SHALL BE FULLY REINSTATED UPON COMPLETION OF THE WORKS. ALL SURFACE MARKINGS DAMAGED BY THE WORKS SHALL BE FULLY REINSTATED.
9. ALL SURPLUS EXCAVATED MATERIAL SHALL BE DISPOSED OF OFF SITE.
10. ALL LEVELS ARE TO ORDINANCE DATUM
11. CLASS S BEDDING & SURROUND TO BE USED WHEN PIPE COVER EXCEEDS 0.9m. UNLESS OTHERWISE NOTED.
12. CLASS Z BEDDING & SURROUND TO BE USED WHEN PIPE COVER IS BELOW 0.9m. UNLESS OTHERWISE NOTED.
13. ALL GULLY CONNECTIONS SUBJECT TO TRAFFIC LOADING TO HAVE CLASS Z BEDDING & SURROUND.
14. ALL MANHOLES SHALL BE WATERTIGHT.

KEY

- — ■ EXISTING FLOW DRAIN
- — ■ EXISTING COMBINED FLOW DRAIN
- x x x x x - EXISTING DRAIN TO BE GRUBBED UP
- — ■ PROPOSED COMBINED DRAIN
- — ■ PROPOSED FOUL DRAIN
- — ■ PROPOSED SURFACE WATER DRAIN
- WB PROPOSED WATER BUTT

NOTE
THE EXISTING DRAINAGE AND CONNECTIONS AS SHOWN HAVE BEEN TAKEN FROM A NUMBER OF SOURCES INCLUDING JPS DRAWING 07757 - 0502 (09.02.21) REV P02 AND WILL NEED TO BE VERIFIED ON SITE.

REV	DESCRIPTION	BY	CHK	APR	DATE
-	-	-	-	-	-

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PURPOSE OF ISSUE	PRELIMINARY	STATUS	P
PROJECT	LAND AT UNIT 108 ABBEY ROAD SOUTH WREXHAM INDUSTRIAL ESTATE		
TITLE	DRAINAGE SCHEME PROPOSED LAYOUT		
CLIENT	J & M PROPERTIES		
DRAWN BY	JR	CHECKED BY	RH
DATE	25.05.2023	SCALE (@ A1)	1:125
DRAWING NUMBER	501	PROJECT NUMBER	95011
REV	P01		

Appendix I – Surface Water Calculations

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.300	Additional Storage (m ³ /ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
100	30	0	0

Node 1.3 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.003	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0070-1900-0700-1900
Invert Level (m)	30.700	Min Outlet Diameter (m)	0.100
Design Depth (m)	0.700	Min Node Diameter (mm)	1200
Design Flow (l/s)	1.9		

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1.0	21	31.027	0.027	1.2	0.0292	0.0000	OK
30 minute winter	1.3	28	30.759	0.059	1.2	0.1489	0.0000	OK
15 minute summer	CMH	1	30.630	0.000	0.9	0.0000	0.0000	OK
30 minute winter	1.2	25	30.857	0.027	1.2	0.0476	0.0000	OK
30 minute winter	1.1	23	30.917	0.027	1.2	0.0076	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1.0	1.000	1.1	1.2	0.390	0.016	0.0783	
30 minute winter	1.3	Hydro-Brake®	CMH	1.1				1.4
30 minute winter	1.2	1.002	1.3	1.2	0.345	0.017	0.1957	
30 minute winter	1.1	1.001	1.2	1.2	0.392	0.016	0.0417	

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1.0	21	31.030	0.030	1.5	0.0324	0.0000	OK
30 minute winter	1.3	29	30.771	0.071	1.5	0.1817	0.0000	OK
15 minute summer	CMH	1	30.630	0.000	1.1	0.0000	0.0000	OK
30 minute winter	1.2	25	30.860	0.030	1.5	0.0528	0.0000	OK
30 minute winter	1.1	23	30.920	0.030	1.5	0.0085	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1.0	1.000	1.1	1.5	0.414	0.021	0.0918	
30 minute winter	1.3	Hydro-Brake®	CMH	1.4				1.7
30 minute winter	1.2	1.002	1.3	1.5	0.348	0.021	0.2524	
30 minute winter	1.1	1.001	1.2	1.5	0.416	0.020	0.0489	

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1.0	22	31.041	0.041	2.9	0.0444	0.0000	OK
30 minute winter	1.3	31	30.867	0.167	2.9	0.4245	0.0000	SURCHARGED
15 minute summer	CMH	1	30.630	0.000	1.8	0.0000	0.0000	OK
30 minute winter	1.2	24	30.871	0.041	2.9	0.0722	0.0000	OK
30 minute winter	1.1	23	30.931	0.041	2.9	0.0117	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1.0	1.000	1.1	2.9	0.501	0.040	0.1467	
30 minute winter	1.3	Hydro-Brake®	CMH	1.9				3.3
30 minute winter	1.2	1.002	1.3	2.9	0.365	0.040	0.6975	
30 minute winter	1.1	1.001	1.2	2.9	0.503	0.039	0.0779	

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1.0	23	31.054	0.054	5.0	0.0582	0.0000	OK
60 minute winter	1.3	50	30.973	0.273	4.1	0.6945	0.0000	SURCHARGED
15 minute summer	CMH	1	30.630	0.000	1.9	0.0000	0.0000	OK
60 minute winter	1.2	52	30.973	0.143	4.5	0.2523	0.0000	OK
60 minute winter	1.1	51	30.973	0.083	4.4	0.0235	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1.0	1.000	1.1	5.0	0.592	0.068	0.2465	
60 minute winter	1.3	Hydro-Brake®	CMH	1.9				7.5
60 minute winter	1.2	1.002	1.3	4.1	0.366	0.057	1.5573	
60 minute winter	1.1	1.001	1.2	4.5	0.562	0.061	0.3274	