



Drainage Strategy

Tesco Car Park, Parrs Wood Lane, East Didsbury

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Version History

This report has been prepared by Apex Consulting Engineers with all reasonable skill, care and diligence, within the best practice and guidance current at the time of issue, within the scope of works which have been agreed with the client.

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The report is written in the context of the development proposals submitted to Apex Consulting Engineers by the Client as part of the appointment. Any changes to the development proposals may necessitate significant revisions to this report.

Revision	Date	Notes	Prepared by	Checked by	Approved by
001	30/11/2021	First Issue	G. Boden	D. Burrows	M. Quinn
002	09/12/2021	Updated to comments	D. Burrows	G. Boden	M. Quinn
003	28/01/2022	Updated to suit revised site layout	G. Boden	M. Quinn	W. Ballance

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1.0 Introduction

This report is prepared in accordance with instructions from Dandara Living to support a full planning application to Manchester City Council (MCC) for the redevelopment of part of the existing Tesco car park, comprising erection of a 6 storey residential building (Use Class C3) comprising 75 new homes together with ground floor flexible community space, car parking, cycle parking as well as landscaping, highways and other associated works at Parrs Wood Lane, East Didsbury, Manchester, M20 5NP.

2.0 Scope and Objectives

The purpose of the report is to determine the means of collection and discharge of the foul and surface water from the proposed development and to ensure the volume of surface water runoff from the development is reduced, therefore, reducing flood risk elsewhere. The report will also consider the use and efficiency of Sustainable Drainage Systems (SuDS) and how they can be potentially implemented on the site.

3.0 Planning Policy and Guidance

National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG)

The National Planning Policy Framework (NPPF) and its associated technical guidance (replacing PPS25 in 2012) sets out the Government’s planning policies for England and how these are expected to be applied. The purpose of the policy is to contribute to the achievement of sustainable development and states that priority should be given to sustainable drainage and discusses the impact of new development on flood risk. The NPPF maintains strong policy on avoiding and managing flood risk, based on local planning authorities preparing local plans and deciding planning applications and granting planning permissions.

Strategic Flood Risk Assessment Level (SFRA) 2: Manchester City, Salford City and Trafford Councils (2011)

The Level 2 SFRA provides a detailed assessment of all known sources of flooding that may affect existing and future development across Manchester, Salford and Trafford. The SFRA recommends appropriate land uses that will not unduly place people or property at risk of flooding and possible flood mitigation measures that may be incorporated into the development.

Manchester's Local Development Framework Core Strategy (2012)

The Planning and Compulsory Purchase Act 2004 and National Planning Policy Framework (NPPF) require local planning authorities to produce a Local Plan, setting out a spatial strategy and policies and proposals for the development and other use of land within their borough. The following policies from the Core Strategy Development Plan are relevant to this document:

- Policy EN 8 Adaptation to Climate Change
- Policy EN 9 Green Infrastructure
- Policy EN 14 Flood Risk
- Policy EN 15 Biodiversity and Geological Conservation
- Policy EN 17 Water Quality

Manchester City Council's Local Flood Risk Management Strategy (LFRMS)

The MCC LFRMS, published in 2014, aims to ensure that local flood risk is properly managed by using the full range of options in a co-ordinated way by achieving the following objectives:

- Reduce the likelihood, severity and consequences of flooding from Ordinary Watercourses, from Groundwater, and from Surface Water Runoff.
- Seek opportunities to improve water quality and biodiversity through flood risk management activities.

4.0 Site Description

4.1 Location

The existing site area is approximately 0.24ha in size and comprises a triangular shaped parcel of developed land located approximately 7km south of Manchester City Centre at Parrs Wood Lane, East Didsbury. The site is currently occupied by an existing car park used for the Tesco Superstore located north of the site. Immediately north of the site is the main car park for the Tesco. The site is bound to the east and south by the A34 Kingsway and Parrs Wood Lane with an existing clock tower located adjacent the site boundary. To the west of the site lies the existing Tesco access off Parrs Wood Lane with the Styal Line Railway beyond.

The National grid reference (NGR) for the approximate centre of the site is SJ854904. A location plan is included within Appendix A.

4.2 Topography

Site ground levels are generally flat with the highest level at +38.70m AOD located at the south of the site and +3.22m AOD in the west. The site has a varied gradient with an existing retaining wall sat the south which delineates the site with Parrs Wood Lane at an approximate level difference of 1.5m. A topographical survey is included within Appendix C.

4.3 Watercourses

The nearest receiving watercourse is the River Mersey, a main river approximately 593m to the south of the site.

4.4 Existing Sewerage

According to the United Utilities sewer records included within Appendix D, there is a 1200mm brick combined sewer within Kingsway which runs in a southerly direction. This sewer then turns in an easterly direction along Parrs Wood Lane south of the site. The records also show a 225mm diameter combined sewer within Parrs Wood Lane which runs parallel adjacent the 1200mm trunk sewer.

The topographical survey included within Appendix C indicates there is some of existing private drainage within the existing Tesco car park and access. A utilities and CCTV survey will be required and the detailed design stage to identify the routes of the existing onsite services. It is assumed all existing drainage within the site boundary serves the car park only.

4.5 Geology

According to the British Geological Survey (BGS) Geology of Britain Viewer, the site is located on Chester Formation – Sandstone, Pebbly (gravelly) at the bedrock formation with Glaciofluvial Sheet Deposits, Devensian – Sand and Gravel superficial deposits. The DEFRA Magic Maps indicate the site to have ‘slowly permeable seasonally wet acid loamy and clayey soils’.

The site is shown to be located within a Secondary A Aquifer and has a medium groundwater vulnerability. Site investigations are required to confirm the underlying strata.

4.6 Proposed Development

The proposal includes the redevelopment of the site for the Erection of a 6-storey residential building (Use Class C3) comprising 75 new homes together with ground floor flexible community space, car parking, cycle parking as well as landscaping, highways and other associated works.

The new building will comprise a plan area of approximately 1406m² (approximately 58% of the total site area). Externally, there will be a mixture of hard and soft landscaping and associated car parking. The proposed site layouts is shown in Appendix B.

5.0 Foul Sewerage Proposals

5.1 Design Guidance

The foul drainage system will be designed in accordance with the following documents:

- BS EN 752:2008 Drain and sewer systems outside buildings
- BS EN 10256-2:2000 Gravity drainage systems inside buildings
- Building Regulations Part H: Drainage and waste disposal

In the event that sewers are to be adopted, the design will conform to guidance provided in the latest Water UK Design and Construction Guidance (DCG) Code for Adoption.

5.2 Foul Strategy

The foul sewerage for the proposed development will consist of a new dedicated below ground foul drainage network that will collect the foul water from the proposed development. The preferred method of foul disposal is discharge to the 1200mm combined sewer within Parris Wood Lane as feedback from a pre-development enquiry from United Utilities. The preferred connection type will be a saddle connection onto the existing sewer. An upstream and downstream manhole depth is required to confirm the connection level from the development.

5.3 Proposed Foul Flows

The foul drainage system has been sized based on the British Water Code of Practice flows and loads (see figure 5.3.1), where residential accommodation states 150 litres flow rate per person per day.

Table of Loadings for Sewage Treatment Systems			
Per person / activity / day (unless otherwise specified)	FLOW	BOD	Ammonia as N
DOMESTIC DWELLINGS (Grams)	(Litres)	(Grams)	
Standard residential	150	60	8
Mobile home type caravans with full services	150	60	8

Figure 5.3.1: British Water Code of Practice, Flows and Loads - 4

The calculation assumes all bed spaces are to have full occupancy as per the accommodation schedule shown within Appendix F. Therefore, the development has capacity to accommodate a maximum of 205 people. Based on all rooms at full occupancy, a peak foul discharge rate of 4.27 l/s will be generated with an average of 0.71 l/s/day. Refer to Appendix F for the foul flow calculation.

5.4 Approvals

At the detailed design stage, a Section 106 application will be made to United Utilities under the Water Industry Act 1991 for consent to discharge foul drainage from the proposed development to the public sewerage system.

A pre-development enquiry has been made to United Utilities to examine the availability of the public sewers. They have confirmed there is sufficient capacity within the 1200mm combined sewer within Parrs Wood Lane at an unrestricted rate. The correspondence has been included within Appendix G.

All relevant authorities will be kept informed regarding the design of the proposed foul system. It is standard practice for detailed drainage design for foul systems to be subject to the approval of the local planning authority subsequent to the grant of planning permission and this will be sought from Manchester City Council at the appropriate time.

6.0 Surface Water Proposals

6.1 Design Guidance

The surface water drainage system will be designed in accordance with the following documents:

- BS EN 752:2008 Drain and sewer systems outside buildings
- BS EN 10256-2:2000 Gravity drainage systems inside buildings
- Building Regulations Part H: Drainage and waste disposal
- CIRIA C522 document 'Sustainable Drainage Systems – Design Manual for England and Wales'
- CIRIA C753 document 'The SuDS Manual'

In the event that sewers are to be adopted, the design will conform to guidance provided in the latest Water UK Design and Construction Guidance (DCG) Code for Adoption.

6.2 Discharge Hierarchy

There are four possible options to discharge the surface water runoff in accordance with the hierarchy defined within the Planning Practice Guidance:

- Into the ground (Infiltration)
- To a surface water body;
- To a surface water sewer, highway drain or another drainage system;
- To a combined sewer.

1. Infiltration – Preferred

The preferred method for the disposal of surface water in the hierarchy is infiltration to ground. The BGS maps indicate Glaciofluvial Sheet Deposits, which can potentially be deemed as permeable infiltration media. Infiltration methods such as soakaways are potentially feasible on account of permeable ground conditions at the surface. However, if any clay layers below the sand and gravel were to be encountered, it will restrict the depth of soakaways.

The Groundwater Source Protection Zone mapping from the DEFRA maps show that the site is not within any identified protection zones. However, the site is located on a Secondary A Aquifer with a medium groundwater vulnerability so the water table depth will need to be confirmed through a ground investigation. Soakaway testing is to be carried out in accordance with BRE Digest 365 to assess the soil permeability.

2. Surface Water Body - Unfeasible

The nearest receiving watercourse is the River Mersey located approximately 600m to the west of the site. This is considered impractical and uneconomical to install a new public network within the surrounding roads of the site. The costs and disruption associated with this outweighs the benefits of discharging surface water to other alternative sources, therefore has not been considered within the outfall options for the site.

3. Surface water sewer, highway drain or another drainage system - Unfeasible

The sewer records do not identify a public surface water sewer in reasonable proximity to the site. It is assumed there is no separate highway drainage system in place and the adjacent highways drain to the combined sewer. This option is therefore not deemed feasible for the disposal of surface water.

4. Combined Sewer – 2nd preferred option

There are combined sewers adjacent to the site within Parrs Wood Lane. If soakaways are proven unfeasible then a direct connection to the 1200mm combined sewer is proposed. This will be in the form of a single combined lateral connection from the site.

6.3 Pre and Post Development Discharge Rates

The Modified Rational Method (Volume 4) has been used to calculate runoff from existing developed areas. The Modified Rational Method uses the following formula to calculate peak runoff:

$$Q = 2.78 \times C_v \times C_r \times i \times A$$

Where: **Q** = Flow Rate (l/s)
C_v = Volumetric Runoff Coefficient
C_r = Routing Coefficient
i = Rainfall Intensity (mm/hr)
A = Area (ha),

The current site has an impermeable area of 0.22ha.

Under summer rainfall conditions, *C_v* ranges from 0.6-0.9, with the lower values representative of rapidly drainage soils and higher values of heavy clay soils. For fully impermeable areas an average *C_v* value of 0.75 has been used.

The routing coefficient *C_r* varies between 1 and 2 and accounts for the effect of rainfall characteristics and catchment shape on the peak runoff magnitude. The SuDS Manual (CIRIA c697) recommends a fixed value for *C_r* of 1.3 for design.

Rainfall Intensity has been calculated based on rainfall statistics obtained from FSR maps and a check from maps contained within the Wallingford Procedure Volume 4. These are as follows:

60 minute, 5 year (M5-60) = 18mm

r = 0.363

D = 5 minute

T = 1 year return period

M5-5 = 0.363 x 18 = 6.53mm

MT-D = 0.64 x 6.53 = 4.18mm

I = MT-D/*D*(hrs) = 4.18/(0.083) = **50.36 mm per hour**

Q = 2.78 x 0.75 x 1.3 x 50.36 x 0.24 = **33.3 l/s (1 year event)**

The discharge rates for the pre and post development runoff in litres per second are summarised in the table below:

Return Period	Existing Runoff (l/s)
1 year	33
30 year	122
100 year	160

Post Development Attenuated Rate

As infiltration will replace the existing gravity drainage system, surface water flows will be reduced from site by 100%. This will satisfy the Manchester Trafford and Salford Strategic Flood Risk Assessment who require a 50% reduction in run-off rate compared to existing rates. If a connection to sewer is proposed, the discharge from site will be reduced by 50% from the current discharge rates to ensure that there is a betterment to the surrounding surface water environment.

On this basis a discharge rate of 16 l/s is proposed if soakaways are proven unfeasible following infiltration testing. A utility and CCTV survey is to be undertaken to prove existing connectivity.

6.4 Sustainable Drainage Systems (SuDS)

Surface water runoff should be controlled as near to its source as possible through a sustainable drainage approach to surface water management. SuDS are an approach to managing surface water runoff which seeks to mimic natural drainage systems and retain water on or near the site. SuDS offer significant advantages over conventional piped drainage systems in reducing flood risk by attenuating the rate and quantity of surface water run-off from a site, promoting groundwater recharge, and improving water quality and, amenity and ecological value.

Manchester City Council's and Trafford Council's Sustainability Appraisal have a flood risk objective to 'reduce the impacts of climate change', with the sub-objective to minimise risk of flooding and increase use of SUDS'.

It is necessary to identify the most appropriate method of controlling and discharging surface water. The SuDS techniques in Table 6.4.1 below assesses suitability for the proposed development using the selection process defined in CIRIA C753 The SuDS Manual.

SuDS Category	SuDS Technique	Viability	Explanation
Infiltration/Filtration	Infiltration Trenches	✓	Due to the nature of the ground conditions, the use of infiltration systems may be feasible, pending further investigation.
	Infiltration Basins	✗	Not considered appropriate due to the volume requirements and nature of the development.
	Soakaways	✓	Due to the nature of the ground conditions, the use of infiltration systems may be feasible, pending further investigation.
	Bioretention/Filter Strips	✓	Due to the nature of the ground conditions, the use of infiltration systems may be feasible, pending further investigation.
Source Control	Green Roof/Living wall	✓	A green roof is proposed for the site. This will mimic the natural environment by managing rainfall at source, gradually releasing rainwater whilst providing amenity and biodiversity to the development.
	Permeable Paving	✓	There is an option to use permeable paving within the car parking areas. If soakaways are proven unfeasible then a 'Type C' non-infiltration system could be used for storage and treatment.
	Rainwater Harvesting	✗	There is no significant demand for non-potable water on site throughout its design life.
Conveyance	Swales	✗	Not considered appropriate due to the nature of the development with limited space to provide the benefits of a swale.
	Filter Drains	✗	Not considered appropriate due to the nature of the development with limited space to provide the benefits of a filter drain.
	Rain Gardens/Tree Pits/Rills	✓	The use of bioretention areas such as rain gardens and tree pits could be utilised on site. Additional SuDS planting techniques such as this will be confirmed at detailed design.
Retention/Detention	Detention Basin/Retention Pond	✗	Not considered appropriate due to the volume requirements and nature of the development.
	Geo-cellular Storage	✓	Geo-cellular storage is proposed for the site to accommodate the attenuation volume required from the soakaway.

Table 6.4.1: Summary of the SuDS options appraisal

6.5 Surface Water Attenuation Requirements

6.5.1 Infiltration

A pre-existing drainage strategy for a development nearby indicates an average infiltration value of 0.249m/h – which is equivalent to 6.9×10^{-5} m/s. For the purpose of the attenuation estimates the impermeable area has been taken as 100% of the total site area and therefore 0.244ha has been included within the calculations included within Appendix F.

As a result of the infiltration rate above, the volume of the required infiltration tank has been estimated using Tekla Tedds. In line with Document H, Drainage and Waste Disposal, of the latest Building Regulations, soakaways should be designed to accommodate a minimum of a 1 in 10-year return period event for the critical storm duration. For an infiltration rate of 6.9×10^{-5} m/s, a width of 5m, a length of 17.5m and a depth of 1.1m creates the required total storage volume of 78m³ to achieve the required half empty time within 24 hours. The majority of geo-cellular storage systems come in modular units of 0.4m, therefore the depth will be increased to 1.2m.

Hydraulic calculations using Causeway Flow have been included within Appendix F and show a requirement of 105m³ to accommodate the 1 in 100 year storm event plus 40% climate change, which can readily be achieved within the site boundary.

The infiltration storage volumes have been calculated based on the infiltration value within nearby land, therefore is not necessarily reflective of the infiltration within the site boundary. The feasibility of an infiltration tank is therefore subject to further investigation. Surface water attenuation estimations for a discharge to sewer have also undertaken.

6.5.2 Discharge to Sewer

Based on a discharge rate of 16 l/s providing a 50% betterment to the existing 1 in 1 year storm event, attenuation volumes have been estimated using the HR Wallingford Storage Estimation Tool where a volume of 40m³ is required to accommodate the 1 in 100 year storm event plus 40% climate change.

6.6 Water Quality

Although the drainage principles proposed will conform to the basic level of treatment control as a minimum by using more traditional techniques such as silt traps, additional SuDS features can provide another treatment stage.

Green Roof: The water quality benefits of a green roof are associated with the removal of sediment and buoyant materials, but levels of nutrients, heavy metals, toxic materials, and oxygen-demanding materials may also be significantly reduced.

Permeable Paving: Pollutants can be retained on the surface of permeable pavements (especially where there is little or no fall), before being carried through to the laying course and sub-base layers during a rainfall event, where they can be trapped and degraded over time. CIRIA, the leading body in the research for SuDS, states that 60-95% of suspended solids and 70-90% of hydrocarbons can be removed by permeable pavements in this way. The development proposals have capacity to accommodate permeable paving within the car parking bays. This option will be explored at the detailed design stage.

As per the CIRIA SuDS Manual Table 4.3 the pollution hazard level for residential roofs is considered 'Very low' and the pollution hazard level for the rest of the site is considered 'Low'. The treatment provided can be considered adequate on this site and exceeds the pollution hazard indices for suspended solids, metals and hydrocarbons.

6.7 Approvals

At the detailed design stage, a Section 106 application will be made to United Utilities under the Water Industry Act 1991 for consent to discharge surface water drainage from the proposed development to the public sewerage system.

A pre-development enquiry has been made to United Utilities to examine the availability of the public sewers. In summary, United Utilities will consider a connection to the 1200mm diameter public combined sewer within Parrs Wood Lane located south of the proposed site (if agreed by the Lead Local Flood Authority), if evidence can be demonstrated the preferred methods within the hierarchy are proven unfeasible.

All relevant authorities will be kept informed regarding the design of the proposed surface water system. It is standard practice for detailed drainage design to be subject to the approval of the local planning authority subsequent to the grant of planning permission and this will be sought from Manchester City Council at the appropriate time.

7.0 Exceedance Events

7.1 Managing Exceedance

Below ground conveyance such as pipes cannot be built large enough for all types of extreme storm events. As a result, there will be times when surface water runoff will exceed the capacity of sewer networks. This can occur when the receiving drainage system becomes overloaded or when the outfall is restricted due to flood levels in the receiving water. The drainage system will be designed to cater for the following storm events:

- No surcharging in the 1 in 1 year rainfall event
- No flooding in the 1 in 30 year rainfall event
- No flooding (or minimal and contained on site) in the 1 in 100 year rainfall event plus a climate change allowance of 40%.

The drainage system will ensure that so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in conveyance routes that minimise the risks to people and property.

7.2 Pathways and Conveyance

The proposed habitable rooms at ground floor level are approximately 1m higher than the external ground level with the non-residential units (car park and plant rooms) are at a level similar to existing ground. The residential units at ground floor will provide a FFL of 39.300m AOD, which in turn raises the building further above existing ground levels. The topography of the proposed site ensures the more vulnerable areas are not at risk from an exceedance event, therefore, surface pathways will be linked together in the same way a conventional drainage system works to effectively convey these flows. The proposed pathways will have sufficient draining gradients towards landscaping and car parking areas.

8.0 Conclusions

Surface water will discharge to ground within the car parking areas subject to infiltration testing. If soakaway tests prove this is unfeasible, then a discharge to public sewer is proposed at a discharge rate of 16 l/s, providing a 50% betterment on pre-development rates in line with Manchester Trafford and Salford Strategic Flood Risk Assessment and the Local Flood Risk Management Strategy.

Infiltration tank hydraulic calculations have shown no, or negligible amounts of flooding for the worst case 1 in 100 year storm period with 40% climate change. The infiltration tank achieves a half emptying time of less than 24 hours, providing a net storage volume of 105m³.

Foul water will discharge to the 1200mm public combined sewer within Parrs Wood Lane. A sewer survey is required to determine the depth of the proposed connection point.

Overland flooding for storm events exceeding the worst case 1 in 100 year event + 40% climate change will be retained on site within car parking areas by incorporating engineered topography and kerbs.

The surface water drainage system will use SuDS attenuation techniques where possible such as a green roof.

With regard to drainage and consequential flood risk, the site is suitable for the proposed use. Subject to the implementation of this Drainage Strategy, the development may be occupied safely and adequately drained while reducing flood risk overall.



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Appendix A – Location Plan

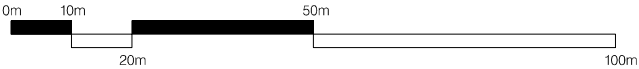


hoddler+partners
SGI Studios
1 Kelso Place
Manchester M15 4LE

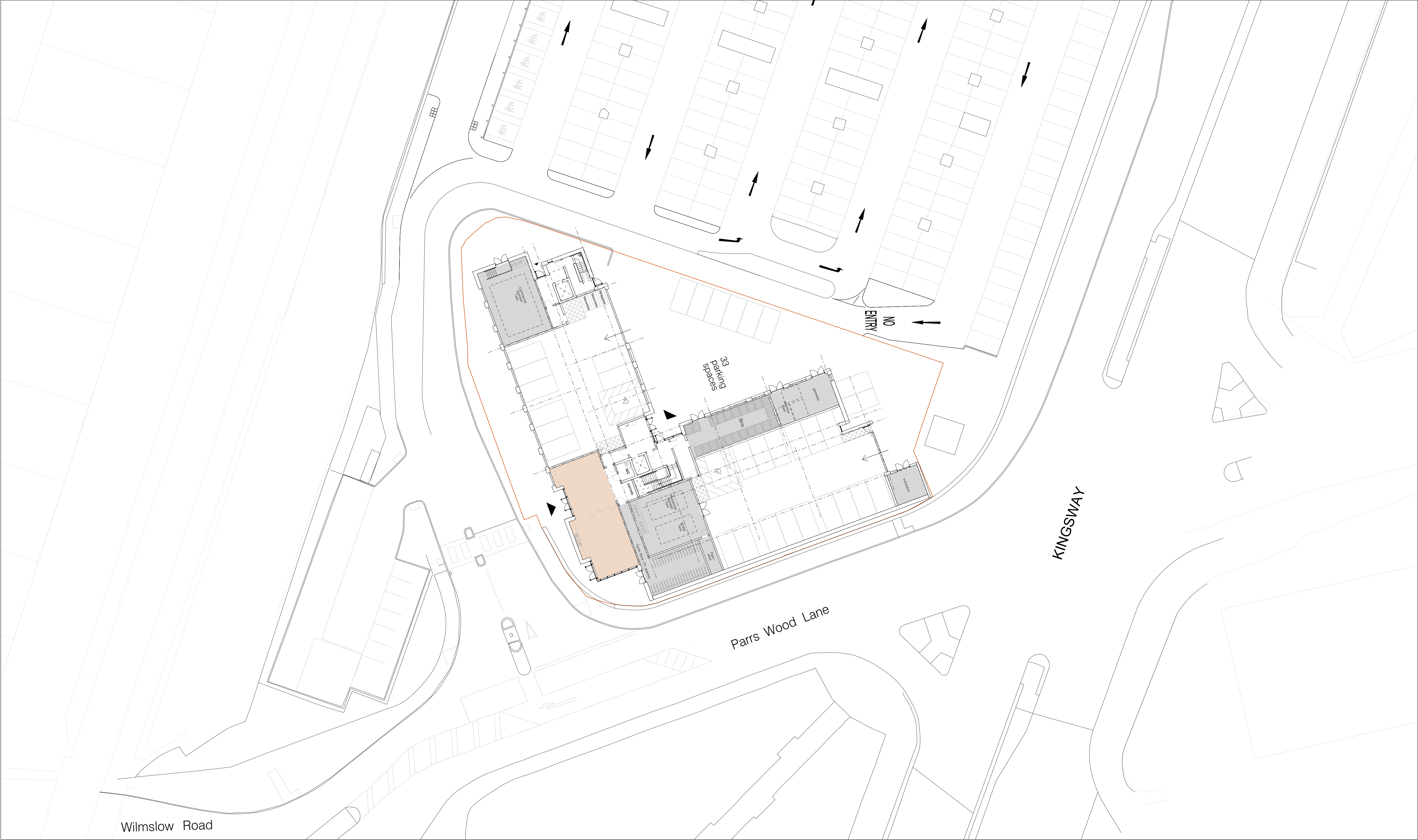
t: +44(0)161 832 9842
e: mail@hoddlerandpartners.com
w: www.hoddlerandpartners.com

revisions + notes:

DO NOT SCALE
Work to annotated dimensions only.
Read drawing in conjunction with relevant specification,
Structural Engineers' and Services Engineers' drawings.
Confirm all dimensions before commencement of any
work on site or fabrication.



client: DANDARA		date: SEPTEMBER 2021	
project: TESCO PARRS WOOD, DIDSBURY		scales: 1:1250 at A3	drawn by: NW
title: Site Location Plan		drawing number: L(—)900	
status: PLANNING		job number: 0629	revisions: —



hodder+partners

SGI Studios
1 Kelso Place
Manchester M15 4LE

t: +44(0)161 832 9842
e: mail@hodderandpartners.com
w: www.hodderandpartners.com

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REV. A 2012/2021 Filter Lane Added
REV. B 11/01/2022 Client information update

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DANDARA

date:

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TESCO
PARRS WOOD, DIDSbury

scale:

1:500 at A3

drawn by:

RC

title:

Site Location Plan_Proposed

drawing number:

L(-)901

status:

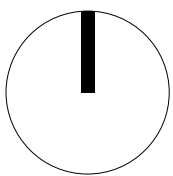
PLANNING

job number:

0629

revision:

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Appendix B – Proposed Site Plans



hodderepartners
SGI Studios
1 Kelso Place
Manchester M15 4LE
t: +44(0)161 832 9842
e: mail@hodderepartners.com
w: www.hodderepartners.com

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REV. A 15/07/2021 AMENDED EXTERIOR WALL WINDOWS AND BALCONIES
REV. B 30/07/2021 AMENDED PLAN
REV. C 28/10/2021 Massing Update
REV. D 05/11/2021 Consultant information update

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1B1P
1B2P
2B3P
3B4P

client: Dandara date: NOVEMBER 2021
project: Didsbury, Pairs Wood scale: 1:125 at A1 drawn by: NW
title: FIRST FLOOR PLAN drawing number: L(-)-001
status: PLANNING job number: 0629 revision: D

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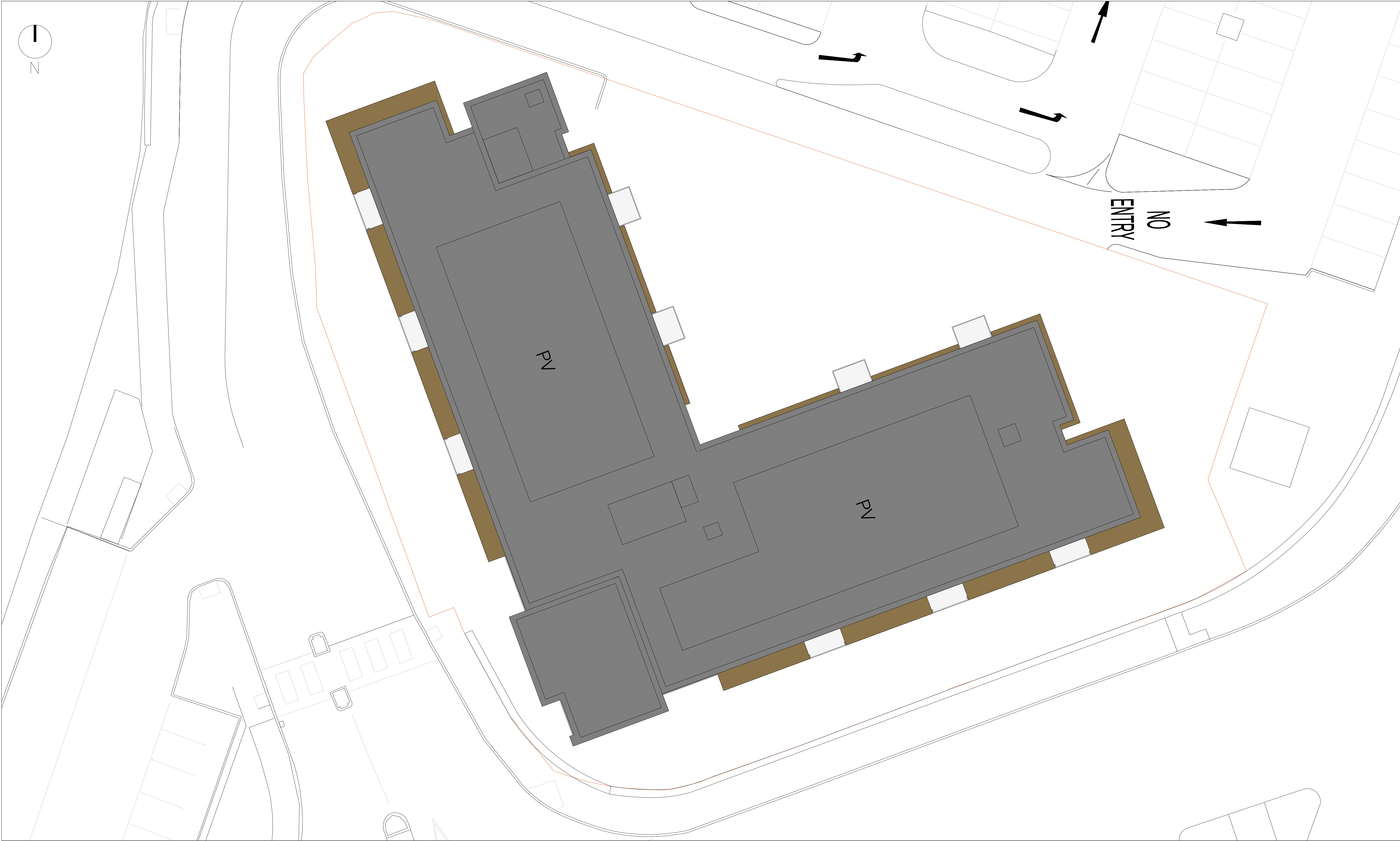
hodd+partners
SQI Studios
1 Kelso Place
Manchester M15 4LE
t: +44(0)161 832 9842
e: mail@hoddandpartners.com
w: www.hoddandpartners.com

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REV. A 30/07/2021 AMENDED PLAN (previously level 6)
REV. B 28/10/2021 Massing Update (previously level 6)
REV. C 07/12/2021 Substation new position (previously level 6)
REV. D 11/01/2022 Client information update

- 1B1P
- 1B2P
- 2B3P
- 3B4P

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hodd+partners

SQI Studios
1 Kelso Place
Manchester M15 4LE

t: +44(0)161 832 9842
e: mail@hoddandpartners.com
w: www.hoddandpartners.com

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REV. B 11/01/2022 Client information update

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Dandara

date:

NOVEMBER 2021

project:

Didsbury, Parris Wood

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1:125 at A1

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NW

title:

ROOF PLAN

drawing number:

L(—)00R

status:

PLANNING

job number:

0629

revision:

B



hodder+partners
SGI Studios
1 Kelso Place
Manchester M15 4LE
t: +44(0)161 832 9542
e: mail@hodderandpartners.com
w: www.hodderandpartners.com

DO NOT SCALE
Work to annotated dimensions only.
Read drawing in conjunction with relevant specification,
Structural Engineers' and Services Engineers' drawings.
Confirm all dimensions before commencement of any
work on site or fabrication.

revisions + notes:
REV. A 28/10/2021 Massing Update
REV. B 05/11/2021 Consultant information update
REV. C 30/11/2021 Client information update
REV. D 15/12/2021 Client information update

client: Dandara	date: SEPTEMBER 2021	
project: Didsbury, Parris Wood	scale: 1:100 at A1	drawn by: RC
title: South Elevation	drawing number: L(-)212	
status: PLANNING	job number: 0629	revision: D

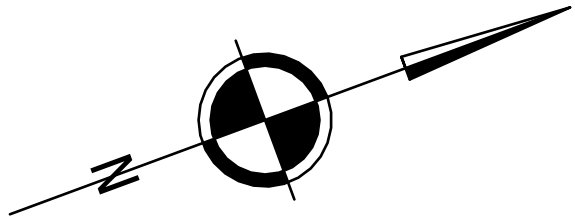


Appendix C – Topographical Survey

Provisional

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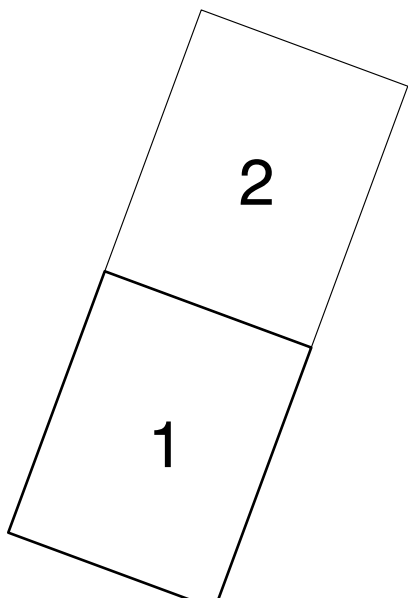
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The survey is plotted on a plane local Grid. Orientation to National Grid.
All levels relate to Ordnance Datum, achieved using the OS National GPS Network.

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SURVEY STATIONS			
Name	Easting	Northing	Height
S01	385426.47	390471.51	38.36
S02	385444.78	390575.64	38.10
S03	385471.92	390567.00	38.45
S04	385495.61	390566.64	38.17
S05	385525.53	390566.28	38.28
S06	385496.50	390463.17	38.43
S07	385467.79	390475.50	38.42
S02A	385478.12	390646.77	38.02
S02A1	385496.21	390662.19	38.18
S02A2	385505.51	390657.66	37.87
S02A3	385507.67	390636.67	38.25
S02A4	385456.19	390602.02	37.95
S07A	385510.78	390479.68	40.53
S07B	385489.73	390467.59	39.99
S07C	385442.25	390452.35	38.75
S07D	385407.01	390432.14	38.23

Sheet Layout



Survey
OPERATIONS

Smith Street, Skelmersdale, Lancs. WN8 8LN
Tel: 01695 725662 Fax: 01695 51816
Email: mail@survops.co.uk - www.survops.co.uk

Client

Hodder & Partners

Drawing Title

Topographical Survey of Land at:

Tesco East Didsbury

Manchester

Sheet 1 of 2

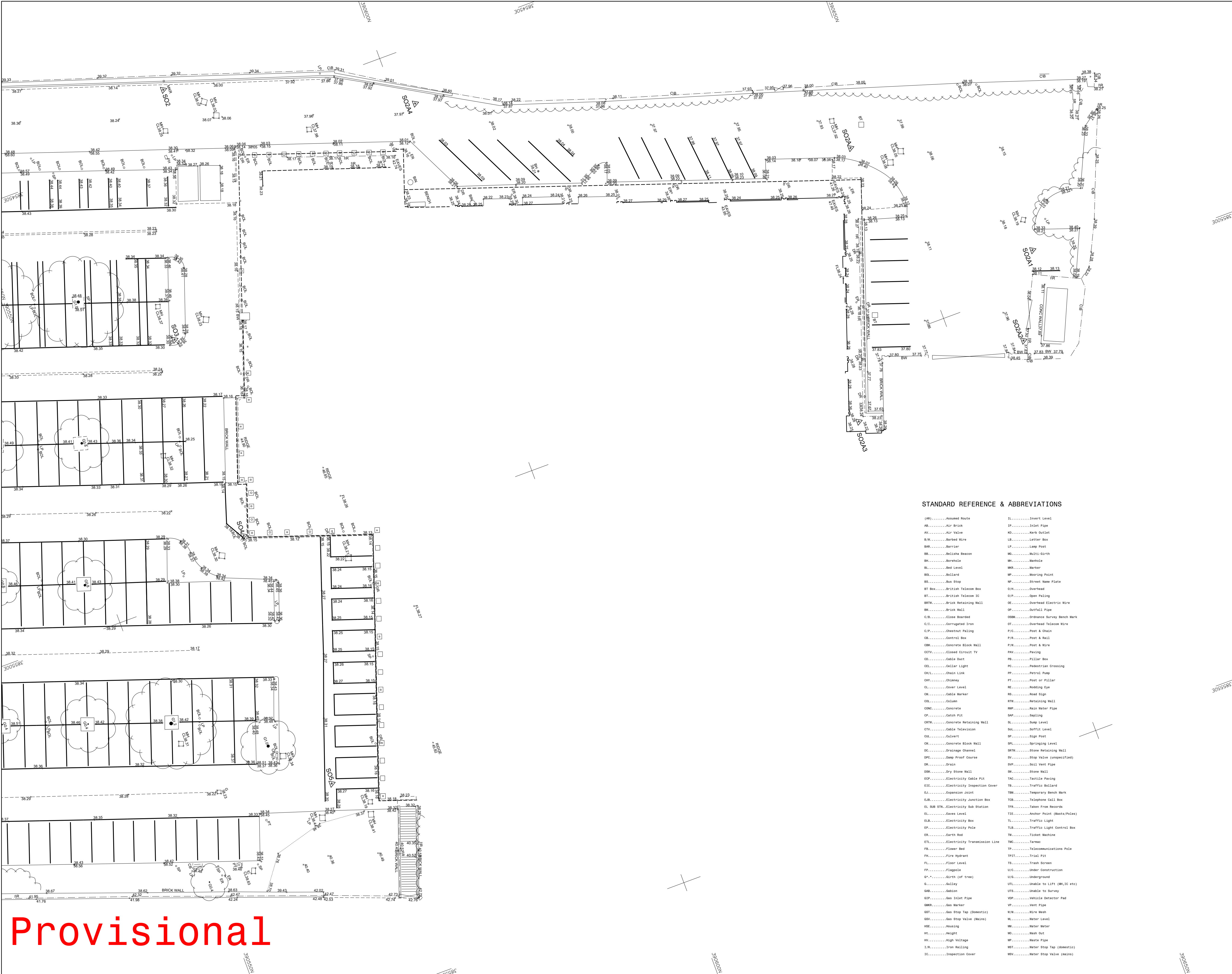
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Date	Jan 20	Drawn	OKS
Job Number	19L120	Checked	888

Sheet Size & Drg Number & Revision

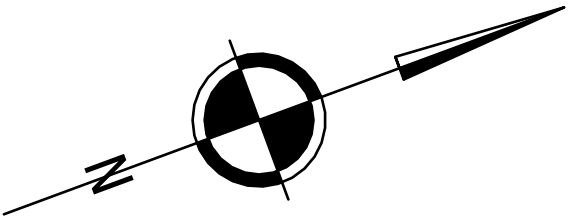
A1 19L120/001

STANDARD REFERENCE & ABBREVIATIONS

(AR).....Assumed Route	IL.....Invert Level
AB.....Air Brick	IP.....Inlet Pipe
AV.....Air Valve	KO.....Kerb Outlet
B/W.....Barbed Wire	LB.....Letter Box
BAR.....Barrier	LP.....Lamp Post
BB.....Belisha Beacon	MU.....Multi-Girth
BN.....Borehole	MN.....Manhole
BL.....Bed Level	MR.....Murrer
BL.....Bollard	MP.....Mooring Point
BS.....Bus Stop	NP.....Street Name Plate
BT Box.....British Telecom Box	O/H.....Overhead
BT.....British Telecom IC	O/P.....Open Paving
BRW.....Brick Retaining Wall	OE.....Overhead Electric Wire
BR.....Brick Wall	OP.....Outfall Pipe
C/B.....Close Boarded	OSBM.....Ordnance Survey Bench Mark
C/I.....Corrugated Iron	OT.....Overhead Telecom Wire
C/P.....Cesspool Piling	P.....Post & Chain
CB.....Control Box	P/W.....Post & Wall
CBW.....Concrete Block Wall	P/W.....Post & Wire
CCTV.....Closed Circuit TV	PAW.....Paving
CD.....Cable Duct	PB.....Pillar Box
CEL.....Cellar Light	PC.....Pedestrian Crossing
CHL.....Chain Link	PP.....Petrol Pump
CH.....Chimney	PT.....Post or Pillar
CL.....Cover Level	RE.....Roding Eye
CM.....Cable Marker	RS.....Road Sign
COL.....Column	RTH.....Retaining Wall
CONC.....Concrete	RWP.....Rain Water Pipe
CP.....Catch Pit	SAP.....Sapling
CRTW.....Concrete Retaining Wall	SL.....Sump Level
CTV.....Cable Television	SoL.....Soffit Level
CU.....Culvert	SP.....Sign Post
CH.....Concrete Block Wall	SPH.....Springing Level
DC.....Drainage Channel	SRW.....Stone Retaining Wall
DSC.....Damp Proof Course	SV.....Stop Valve (unspecified)
DR.....Drain	SVP.....Soil Vent Pipe
DSW.....Dry Stone Wall	SW.....Stone Wall
ECP.....Electricity Cable Pit	TAD.....Tactile Paving
EIC.....Electricity Inspection Cover	TB.....Traffic Bollard
EJ.....Expansion Joint	TBM.....Temporary Bench Mark
EJB.....Electricity Junction Box	TCH.....Telephone Call Box
EL SUB STN.....Electricity Sub Station	TFH.....Taken From Records
EL.....Eaves Level	TIE.....Tie Point (Masts/Poles)
EM.....Electricity Box	TL.....Traffic Light
EP.....Electricity Pole	TLCB.....Traffic Light Control Box
ER.....Earth Rod	TM.....Ticket Machine
ETL.....Electricity Transmission Line	TMO.....Tarmac
FB.....Flower Bed	TP.....Telecommunications Pole
FR.....Fire Hydrant	TPIT.....Trial Pit
FL.....Floor Level	TS.....Trash Screen
FP.....Flagpole	U/C.....Under Construction
G*.....Girth (of tree)	UG.....Underground
G.....Gully	UTL.....Unable to Lift (HM,IC etc)
GAB.....Gabion	UTB.....Unable to Survey
GIP.....Gas Inlet Pipe	VDP.....Vehicle Detector Pad
GMK.....Gas Marker	VP.....Vent Pipe
GST.....Gas Stop Tap (Domestic)	W/M.....Wire Mesh
GSV.....Gas Stop Valve (Mains)	WL.....Water Level
HSE.....Housing	WM.....Water Meter
HT.....Height	WO.....Wash Out
HV.....High Voltage	WP.....Waste Pipe
I.R.....Iron Railing	WST.....Water Stop Tap (domestic)
IC.....Inspection Cover	WSV.....Water Stop Valve (mains)



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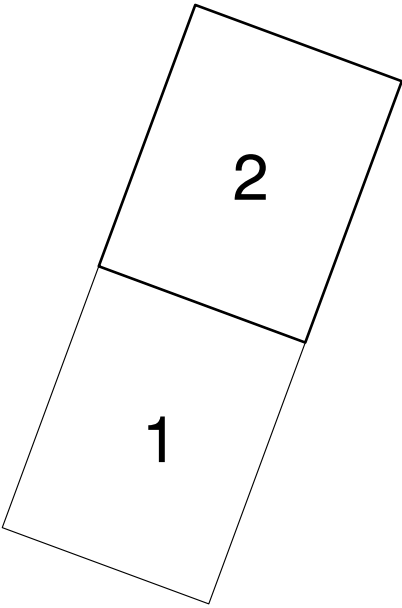


Note:
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All levels relate to Ordnance Datum,
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Sheet Layout



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Tel: 01695 725662 Fax: 01695 51816
Email: mail@survops.co.uk – www.survops.co.uk

Client Hodder & Partners	
Drawing Title Topographical Survey of Land at: Tesco East Didsbury Manchester Sheet 2 of 2	
Scale(s) 1:200	Surveyor TW/SB
Date Jan 20	Drawn OKS
Job Number 19L120	Checked 888
Sheet Size & Drg Number & Revision A1 19L120/002	



Document Title: Drainage Strategy Report
Document No.: 1023-ACE-ZZ-XX-RP-C-1001
Revision: 003
Date: December 2021

Appendix D – Existing Sewer Records

Apex Consulting Engineers

Unit 3
Unit 3 Acres Hill Business Park, Apex Consulting
Engineers
Sheffield, South Yorkshire
S9 4LR

FAO:

How to contact us:

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

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

Your Ref: Tesco Car Park
Our Ref: UUPS-ORD-297208
Date: 17/06/2021

Dear Sirs

Location: Tesco Car Park Parrs Wood Lane, Didsbury, M20 5NP

I acknowledge with thanks your request dated 11/06/2021 for information on the location of our services.

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

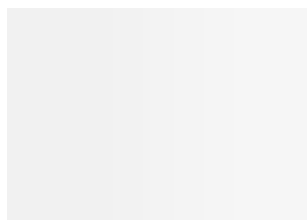
The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

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

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

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

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

TERMS AND CONDITIONS:

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





SEWER RECORDS

Address or Site Reference

Tesco Car Park Parrs Wood Lane,
Didsbury,
M20 5NP

Scale: 1:2500
Date: 17/06/2021

Printed by: Property Searches

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

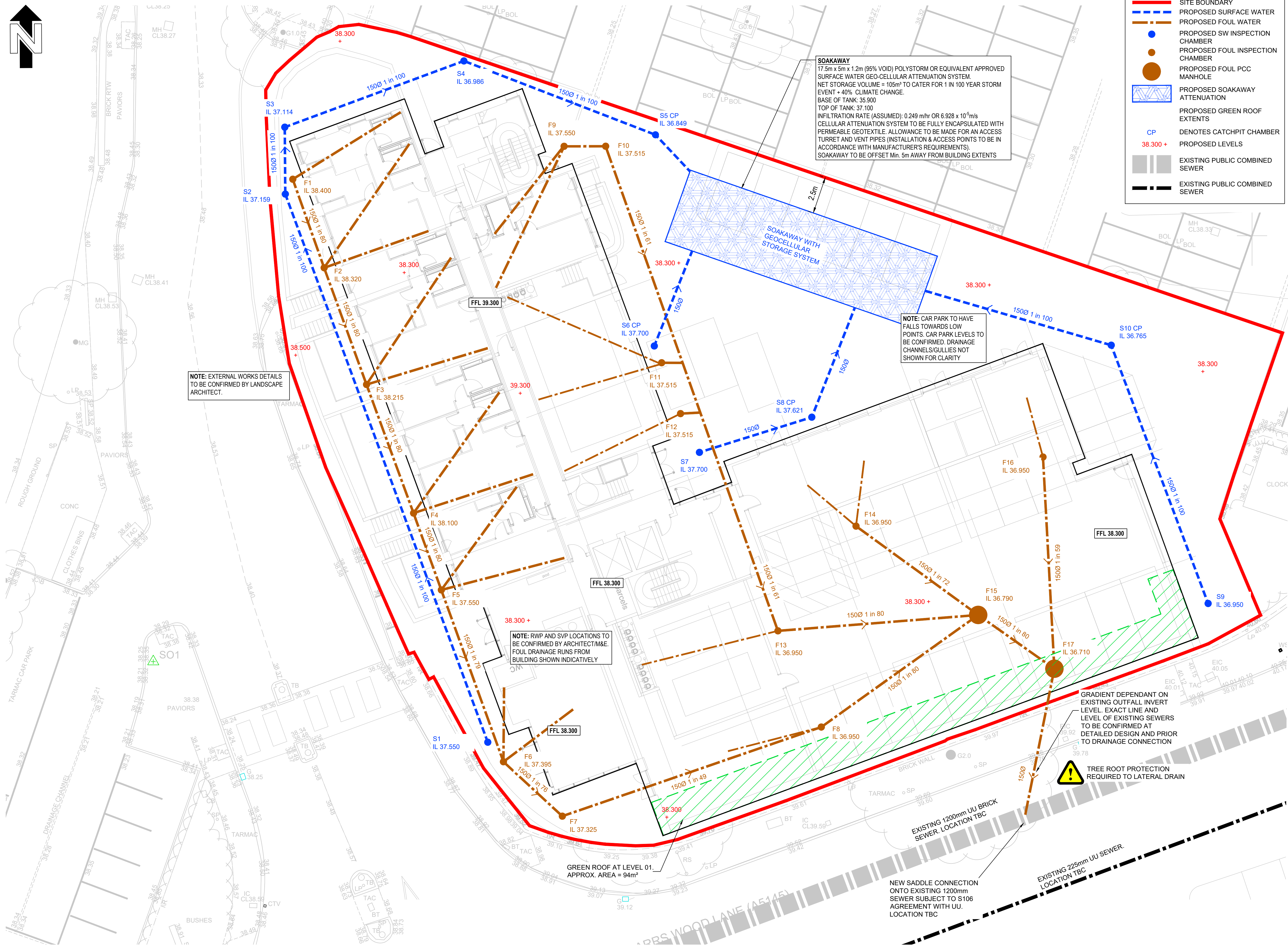
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Document Title: Drainage Strategy Report
Document No.: 1023-ACE-ZZ-XX-RP-C-1001
Revision: 003
Date: December 2021

Appendix E – Drainage Drawings



KEY

- SITE BOUNDARY
- PROPOSED SURFACE WATER
- PROPOSED FOUL WATER
- PROPOSED SW INSPECTION CHAMBER
- PROPOSED FOUL INSPECTION CHAMBER
- PROPOSED FOUL PCC MANHOLE
- PROPOSED SOAKAWAY ATTENUATION
- PROPOSED GREEN ROOF EXTENTS
- CP DENOTES CATCHPIT CHAMBER
- 38.300 + PROPOSED LEVELS
- EXISTING PUBLIC COMBINED SEWER
- EXISTING PUBLIC COMBINED SEWER

SOAKAWAY
17.5m x 5m x 1.2m (95% VOID) POLYSTYROM OR EQUIVALENT APPROVED SURFACE WATER GEO-CELLULAR ATTENUATION SYSTEM.
NET STORAGE VOLUME = 105m³ TO CATER FOR 1 IN 100 YEAR STORM EVENT + 40% CLIMATE CHANGE.
BASE OF TANK: 35.900
TOP OF TANK: 37.100
INFILTRATION RATE (ASSUMED): 0.249 m/hr OR 6.928 x 10⁻⁴ m/s
CELLULAR ATTENUATION SYSTEM TO BE FULLY ENCAPSULATED WITH PERMEABLE GEOTEXTILE. ALLOWANCE TO BE MADE FOR AN ACCESS TURRET AND VENT PIPES (INSTALLATION & ACCESS POINTS TO BE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS).
SOAKAWAY TO BE OFFSET Min. 5m AWAY FROM BUILDING EXTENTS

SOAKAWAY WITH GEOCELLULAR STORAGE SYSTEM

NOTE: CAR PARK TO HAVE FALLS TOWARDS LOW POINTS. CAR PARK LEVELS TO BE CONFIRMED. DRAINAGE CHANNELS/GULLIES NOT SHOWN FOR CLARITY

NOTE: EXTERNAL WORKS DETAILS TO BE CONFIRMED BY LANDSCAPE ARCHITECT.

NOTE: RWP AND SVP LOCATIONS TO BE CONFIRMED BY ARCHITECT/M&E. FOUL DRAINAGE RUNS FROM BUILDING SHOWN INDICATIVELY

GRADIENT DEPENDANT ON EXISTING OUTFALL INVERT LEVEL. EXACT LINE AND LEVEL OF EXISTING SEWERS TO BE CONFIRMED AT DETAILED DESIGN AND PRIOR TO DRAINAGE CONNECTION

TREE ROOT PROTECTION REQUIRED TO LATERAL DRAIN

- Notes**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS TOGETHER WITH THE APPROPRIATE SPECIFICATIONS.
 - IT IS THE CONTRACTORS RESPONSIBILITY TO CHECK ALL DIMENSIONS ON SITE. DIMENSIONS MUST NOT BE SCALED FROM THIS DRAWING. ANY DISCREPANCIES TO BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT IN WRITING.
 - ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
 - ALL LEVELS ARE IN METRES, UNLESS NOTED OTHERWISE.
- GENERAL NOTES:**
- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE DRAINAGE STRATEGY REPORT 1023-ACE-ZZ-XX-RP-C-1001 001.
 - THIS DRAWING IS A PRELIMINARY STRATEGY AND LAYOUT ONLY. FURTHER DETAILS SHOULD BE CONFIRMED AT THE DETAILED DESIGN STAGE.
 - EXISTING SEWERS ARE SHOWN INDICATIVELY AND NEED TO BE CONFIRMED AT DETAILED DESIGN.
 - THE DRAINAGE LAYOUT IS BASED ON THE FOLLOWING DRAWINGS:
 - L1-000 GROUND FLOOR PLAN
 - L1-001 FIRST FLOOR PLAN
 - 19L120/002 TOPOGRAPHICAL SURVEY
 - THE INFILTRATION RATE FOR THE SITE HAS BEEN ASSUMED. SOAKAWAY TESTS TO BRE DIGEST 365 WILL NEED TO BE CARRIED OUT WITHIN THE PROPOSED ATTENUATION AREA TO CONFIRM. ATTENUATION VOLUME SUBJECT TO CHANGE.
 - THE FOUL OUTFALL ASSUMES A CONNECTION CAN BE MADE UNDER GRAVITY TO PUBLIC SEWER

- DRAINAGE DESIGN SUBJECT TO PLANNING/LLFA APPROVAL AND S106 AGREEMENT**
- INFILTRATION RATE ASSUMED BASED ON AVERAGE OF NEARBY DEVELOPMENT. SOAKAWAY TESTS TO BE UNDERTAKEN TO CONFIRM RATES**
- ATTENUATION REQUIREMENTS TO BE CONFIRMED AFTER INFILTRATION RATES HAVE BEEN OBTAINED**

NOTE: COVER LEVELS TO CHAMBERS NOT SHOWN. PROPOSED LEVELS TO BE CONFIRMED.

NOTE: ALLOWANCE TO BE MADE FOR SLOT DRAINS, FACADE DRAINAGE AND GULLIES

P3	28.01.21	DAB	CHAMBER NUMBERS AND SITE BOUNDARY COLOUR AMENDED	GB
P2	30.11.21	DAB	RE-DESIGN OF DRAINAGE TO SUIT NEW ARCHITECTS LAYOUT	GB
P1	06.10.21	GB	FIRST ISSUE	LF
Rev	Date	By	Description	Appd

PRELIMINARY

APEX CONSULTING ENGINEERS

Apex Consulting Engineers is the trading name of Tier Consult (SV) Limited

www.apexconsulting.co.uk | 0114 241 9360

QMS ISO 9001:2015 CERTIFIED

Client _____

Architect _____

HODDER + PARTNERS

Project _____

TESCO
PARRS WOOD LANE,
DIDSBURY

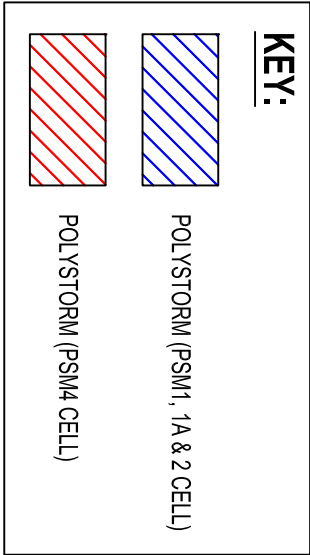
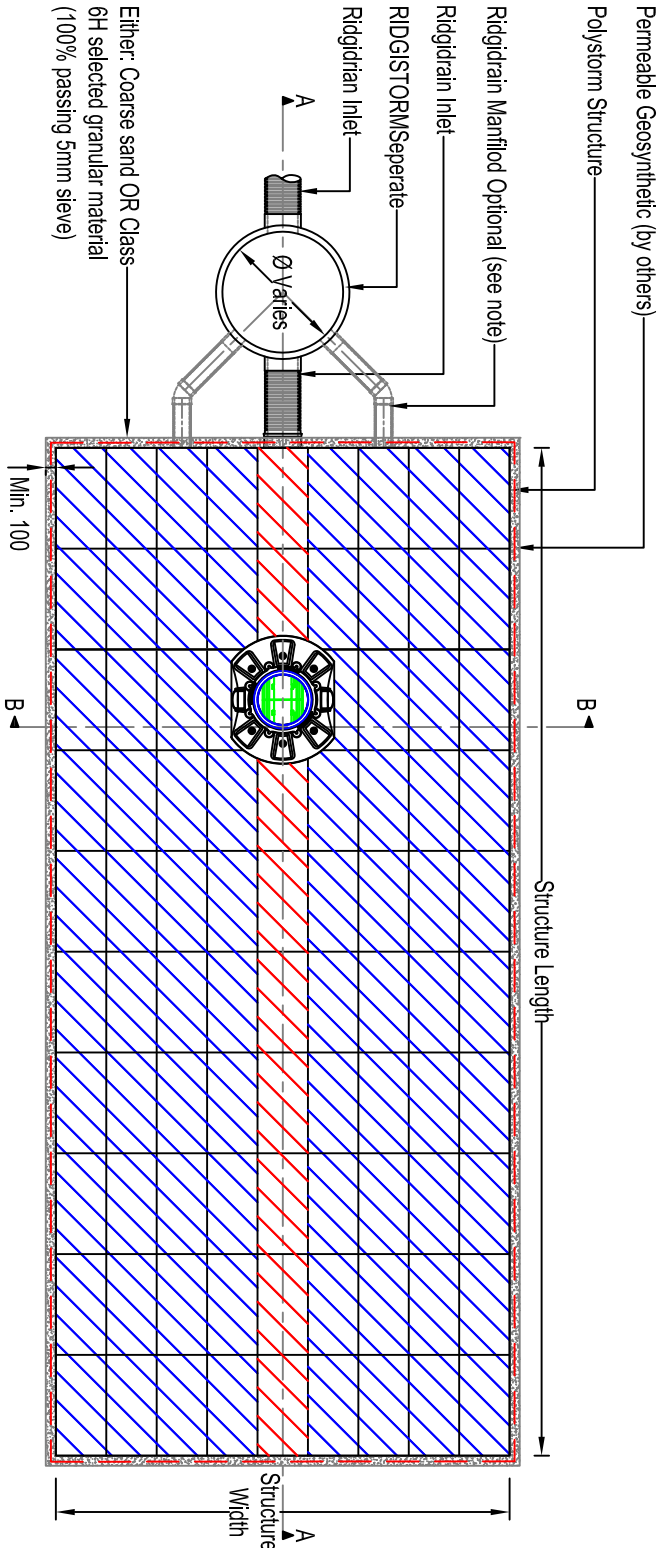
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DRAINAGE STRATEGY

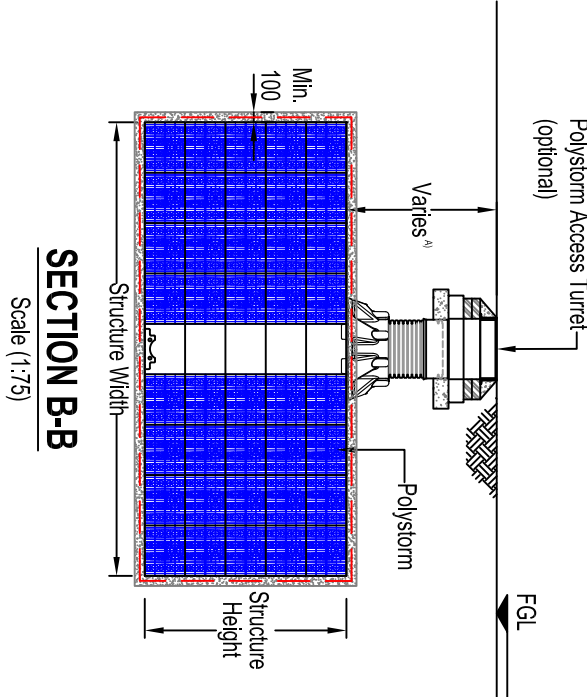
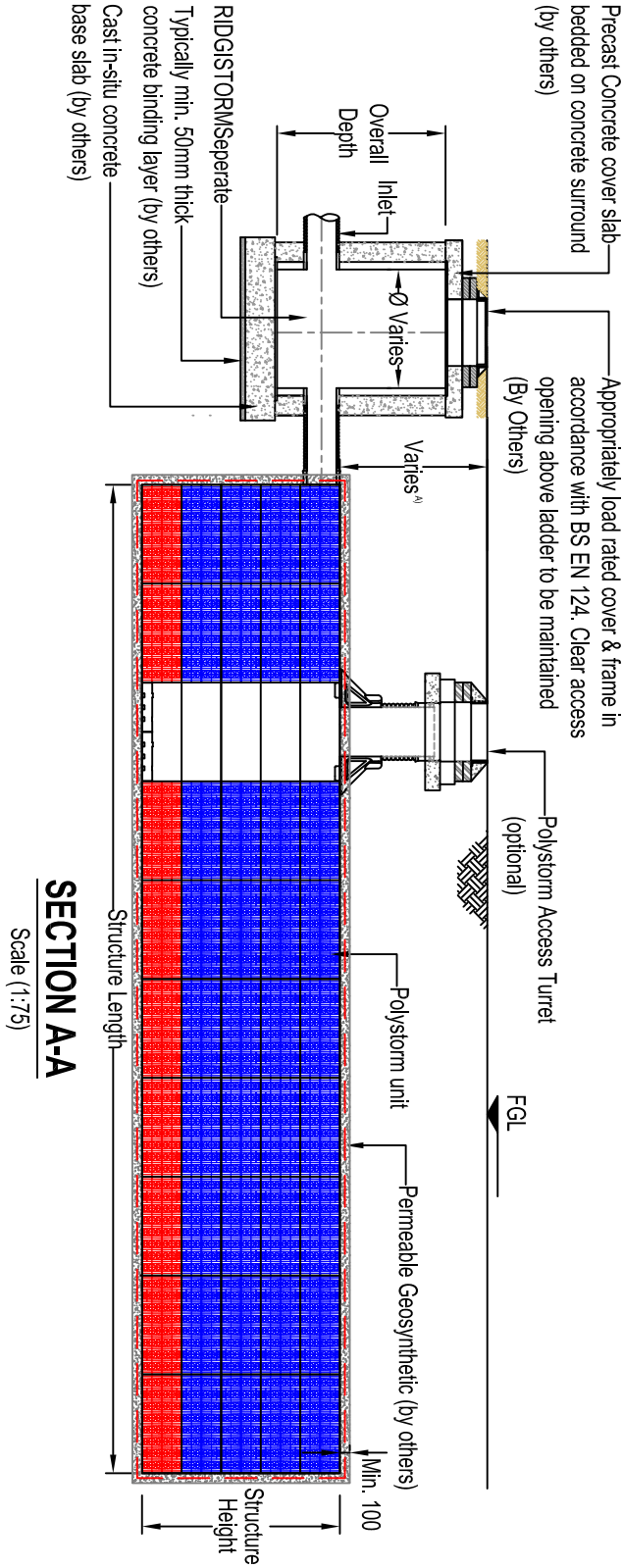
Scale 1:125 @ A1 Drawn _____ Checked _____ Revision _____

Date OCTOBER 2021 LF

1023-ACE-ZZ-XX-DR-C-8000



TYPICAL SOAKAWAY TANK PLAN
(Scale 1:75)



- POLYSTORM ACCESS NOTES**
- Refer to Polypipe drawing No. PSM_SD_PSM_004 for typical integration into Polystorm structure.

MANIFOLD NOTE

Where single pipe hydraulic capacity is exceeded manifold detail may be required. For information on Manifold connections please refer to drawing ref: PSM_SD_008

NOTE A

For information on tank cover depths please contact the Technical Team:- 01509 61500

NOTES

- All dimensions in millimetres, unless otherwise stated.
- All dimensions are nominal and may vary within manufacturing or construction tolerances.
- All site temporary and enabling works by others.
- Polypipe products to be installed in accordance with Polypipe civils recommendations (refer to Polypipe technical guidance for further information), giving due consideration to the requirements of the organisation who will be taking ultimate owner ship of the installation.
- This drawing is intended for guidance only. Confirmation of the information contained within this document should be sought from the consulting engineers before final design or construction activities commence.

The information in this document is of an illustrative nature and is supplied by Polypipe Civils without charge. This document does not form the whole or any part of a contract or intended contract with the user. The information within this document should not be solely relied upon to determine the suitability or installation requirements of our products for a proposed application and expected site conditions; expert advice should be sought in this respect. Final determination of the suitability of any information or material for the use contemplated and the manner of use is the sole responsibility of the user and the user must assume all risk and liability in connection therewith. Further information with regard to liabilities may be found at www.polypipe.com/disclaimer.

 Polypipe	PROJECT		STATUS	
	POLYSTORM STANDARD DETAILS		FOR INFORMATION	
			DATE	DRAWN BY
			17/03/16	JL
TITLE	ORIGINAL SIZE	SCALE	REV.	
POLYSTORM SOAKAWAY	A3	AS SHOWN		
	DRAWING No.			
PSM_SD_PSM_003				
Polypipe Civils Charnwood Business Park, North Road, Loughborough, Leicestershire, LE11 1LE T: 01509 615100 Fax: 01509 615215 www.polypipe.com/civils www.polypipe.com/lwms				



Appendix F – Drainage Calculations

Project East Didsbury				Job no. 1023	
Calcs for				Start page no./Revision 1 P1	
Calcs by DB	Calcs date 30/11/2021	Checked by GB	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area Manchester
Impermeable area drained to the system $A = 2440.0 \text{ m}^2$
Return period Period = 30 yr
Ratio 60 min to 2 day rainfall of 5 yr return period $r = 0.363$
5-year return period rainfall of 60 minutes duration $M5_{60\text{min}} = 18.0 \text{ mm}$
Increase of rainfall intensity due to global warming $p_{\text{climate}} = 0 \%$

Soakaway / infiltration trench details

Soakaway type Rectangular
Minimum depth of pit (below incoming invert) $d = 1094 \text{ mm}$
Width of pit $w = 15000 \text{ mm}$
Length of pit $l = 5000 \text{ mm}$
Percentage free volume $V_{\text{free}} = 95 \%$
Soil infiltration rate $f = 69.3 \times 10^{-6} \text{ m/s}$
Wetted area of pit 50% full $a_{s50} = l \times d + w \times d = 21877870 \text{ mm}^2$

Table equations

Inflow (cl.3.3.1) $I = M30 \times A$
Outflow (cl.3.3.2) $O = a_{s50} \times f \times D$
Storage (cl.3.3.3) $S = I - O$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	30 year rainfall, M30 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m³)
5	0.36;	6.5;	1.45;	9.4;	22.92;	0.45;	22.47
10	0.51;	9.2;	1.48;	13.6;	33.21;	0.91;	32.30
15	0.62;	11.2;	1.50;	16.8;	40.87;	1.36;	39.51
30	0.79;	14.2;	1.52;	21.7;	52.84;	2.73;	50.12
60	1.00;	18.0;	1.54;	27.7;	67.49;	5.46;	62.03
120	1.22;	21.9;	1.54;	33.8;	82.42;	10.91;	71.51
240	1.48;	26.6;	1.53;	40.6;	99.12;	21.82;	77.30
360	1.67;	30.0;	1.51;	45.4;	110.67;	32.73;	77.94
600	1.89;	34.1;	1.49;	50.9;	124.18;	54.56;	69.62
1440	2.41;	43.3;	1.45;	62.8;	153.35;	130.94;	22.42

Required storage volume $S_{\text{req}} = 77.94 \text{ m}^3$

Soakaway storage volume $S_{\text{act}} = l \times d \times w \times V_{\text{free}} = 77.94 \text{ m}^3$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{\text{req}} \times 0.5 / (a_{s50} \times f) = 7\text{hr } 8\text{min } 35\text{s}$

PASS - Soakaway discharge time less than or equal to 24 hours

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.363	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
✓ 1		5.00	38.300	Manhole	Adoptable	450	385448.856	390466.123	0.750
✓ 2			38.300	Manhole	Adoptable	450	385435.306	390502.786	1.141
✓ 3			38.300	Manhole	Adoptable	450	385435.270	390507.261	1.186
✓ 4			38.300	Manhole	Adoptable	450	385447.257	390511.692	1.314
✓ 5			38.300	Manhole	Adoptable	450	385460.078	390506.752	1.451
✓ Soakaway	0.244	5.00	38.300	Manhole	Adoptable	450	385469.835	390499.123	1.752
✓ Outfall			38.300	Junction					1.714
✓ 6		5.00	38.300	Manhole	Adoptable	450	385459.998	390492.626	1.350
✓ 7		5.00	38.300	Manhole	Adoptable	450	385463.018	390485.510	1.350
✓ 8			38.300	Manhole	Adoptable	450	385470.537	390487.860	1.609
✓ 9		5.00	38.300	Manhole	Adoptable	450	385497.059	390475.400	1.350
✓ 10			38.300	Manhole	Adoptable	450	385490.575	390492.679	1.535

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	39.087	100.0	150	Circular_Default Sewer Type	38.300	37.550	0.600	38.300	37.159	0.991
1.001	4.475	99.4	150	Circular_Default Sewer Type	38.300	37.159	0.991	38.300	37.114	1.036
1.002	12.780	99.8	150	Circular_Default Sewer Type	38.300	37.114	1.036	38.300	36.986	1.164
1.003	13.740	100.3	150	Circular_Default Sewer Type	38.300	36.986	1.164	38.300	36.849	1.301
1.004	12.386	100.0	150	Circular_Default Sewer Type	38.300	36.849	1.301	38.300	36.725	1.425
1.005	1.000	0.0	150	Circular_Default Sewer Type	38.300	36.586	1.564	38.300	36.586	1.564
4.000	11.789	52.4	150	Circular_Default Sewer Type	38.300	36.950	1.200	38.300	36.725	1.425
3.000	7.878	100.0	150	Circular_Default Sewer Type	38.300	36.950	1.200	38.300	36.871	1.279
3.001	11.285	100.0	150	Circular_Default Sewer Type	38.300	36.691	1.459	38.300	36.578	1.572
2.000	18.456	100.0	150	Circular_Default Sewer Type	38.300	36.950	1.200	38.300	36.765	1.385

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable
1.001	2	450	Manhole	Adoptable	3	450	Manhole	Adoptable
1.002	3	450	Manhole	Adoptable	4	450	Manhole	Adoptable
1.003	4	450	Manhole	Adoptable	5	450	Manhole	Adoptable
1.004	5	450	Manhole	Adoptable	Soakaway	450	Manhole	Adoptable
1.005	Soakaway	450	Manhole	Adoptable	Outfall		Junction	
4.000	6	450	Manhole	Adoptable	Soakaway	450	Manhole	Adoptable
3.000	7	450	Manhole	Adoptable	8	450	Manhole	Adoptable
3.001	8	450	Manhole	Adoptable	Soakaway	450	Manhole	Adoptable
2.000	9	450	Manhole	Adoptable	10	450	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.001	21.718	100.0	150	Circular_Default Sewer Type	38.300	36.765	1.385	38.300	36.548	1.602

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.001	10	450	Manhole	Adoptable	Soakaway	450	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	18.000	Drain Down Time (mins)	10080
Ratio-R	0.363	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	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 %)
1	0	0	0
30	0	0	0
100	40	0	0

Node Outfall Online Depth/Flow Control

Flap Valve	x	Replaces Downstream Link	✓	Invert Level (m)	36.586
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Depth (m)	Flow (l/s)
0.001	0.000

Node Soakaway Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.24937	Safety Factor	2.0	Invert Level (m)	35.900
Side Inf Coefficient (m/hr)	0.24937	Porosity	0.95	Time to half empty (mins)	396

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	90.0	90.0	1.200	90.0	90.0	1.201	0.0	90.0

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
15 minute summer	1	1	37.550	0.000	0.0	0.0000	0.0000	OK
15 minute summer	2	1	37.159	0.000	0.0	0.0000	0.0000	OK
15 minute summer	3	1	37.114	0.000	0.0	0.0000	0.0000	OK
15 minute summer	4	1	36.986	0.000	0.0	0.0000	0.0000	OK
15 minute summer	5	1	36.849	0.000	0.0	0.0000	0.0000	OK
60 minute winter	Soakaway	51	36.079	-0.469	15.9	15.3148	0.0000	OK
15 minute summer	Outfall	1	36.586	0.000	0.0	0.0000	0.0000	OK
15 minute summer	6	1	36.950	0.000	0.0	0.0000	0.0000	OK
15 minute summer	7	1	36.950	0.000	0.0	0.0000	0.0000	OK
15 minute summer	8	1	36.691	0.000	0.0	0.0000	0.0000	OK
15 minute summer	9	1	36.950	0.000	0.0	0.0000	0.0000	OK
15 minute summer	10	1	36.765	0.000	0.0	0.0000	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)
15 minute summer	1	1.000	2	0.0	0.000	0.000	0.0000	
15 minute summer	2	1.001	3	0.0	0.000	0.000	0.0000	
15 minute summer	3	1.002	4	0.0	0.000	0.000	0.0000	
15 minute summer	4	1.003	5	0.0	0.000	0.000	0.0000	
15 minute summer	5	1.004	Soakaway	0.0	0.000	0.000	0.0000	
60 minute winter	Soakaway	1.005	Outfall	0.0	0.000	0.000	0.0000	
60 minute winter	Soakaway	Infiltration		3.1				
15 minute summer	Outfall	Depth/Flow		0.0				0.0
15 minute summer	6	4.000	Soakaway	0.0	0.000	0.000	0.0000	
15 minute summer	7	3.000	8	0.0	0.000	0.000	0.0000	
15 minute summer	8	3.001	Soakaway	0.0	0.000	0.000	0.0000	
15 minute summer	9	2.000	10	0.0	0.000	0.000	0.0000	
15 minute summer	10	2.001	Soakaway	0.0	0.000	0.000	0.0000	

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
15 minute summer	1	1	37.550	0.000	0.0	0.0000	0.0000	OK
15 minute summer	2	1	37.159	0.000	0.0	0.0000	0.0000	OK
15 minute summer	3	1	37.114	0.000	0.0	0.0000	0.0000	OK
15 minute summer	4	1	36.986	0.000	0.0	0.0000	0.0000	OK
15 minute summer	5	1	36.849	0.000	0.0	0.0000	0.0000	OK
120 minute winter	Soakaway	118	36.494	-0.054	24.2	50.7929	0.0000	OK
15 minute summer	Outfall	1	36.586	0.000	0.0	0.0000	0.0000	OK
15 minute summer	6	1	36.950	0.000	0.0	0.0000	0.0000	OK
15 minute summer	7	1	36.950	0.000	0.0	0.0000	0.0000	OK
15 minute summer	8	1	36.691	0.000	0.0	0.0000	0.0000	OK
15 minute summer	9	1	36.950	0.000	0.0	0.0000	0.0000	OK
15 minute summer	10	1	36.765	0.000	0.0	0.0000	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)
15 minute summer	1	1.000	2	0.0	0.000	0.000	0.0000	
15 minute summer	2	1.001	3	0.0	0.000	0.000	0.0000	
15 minute summer	3	1.002	4	0.0	0.000	0.000	0.0000	
15 minute summer	4	1.003	5	0.0	0.000	0.000	0.0000	
15 minute summer	5	1.004	Soakaway	0.0	0.000	0.000	0.0000	
120 minute winter	Soakaway	1.005	Outfall	0.0	0.000	0.000	0.0000	
120 minute winter	Soakaway	Infiltration		3.1				
15 minute summer	Outfall	Depth/Flow		0.0				0.0
15 minute summer	6	4.000	Soakaway	0.0	0.000	0.000	0.0000	
15 minute summer	7	3.000	8	0.0	0.000	0.000	0.0000	
15 minute summer	8	3.001	Soakaway	0.0	0.000	0.000	0.0000	
15 minute summer	9	2.000	10	0.0	0.000	0.000	0.0000	
15 minute summer	10	2.001	Soakaway	0.0	0.000	0.000	0.0000	

Results for 100 year +40% 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
240 minute winter	1	236	37.625	0.075	0.4	0.0119	0.0000	OK
240 minute winter	2	236	37.624	0.465	1.1	0.0740	0.0000	SURCHARGED
240 minute winter	3	236	37.624	0.510	1.6	0.0811	0.0000	SURCHARGED
240 minute winter	4	236	37.624	0.638	1.9	0.1014	0.0000	SURCHARGED
240 minute winter	5	236	37.623	0.774	2.1	0.1231	0.0000	SURCHARGED
240 minute winter	Soakaway	236	37.625	1.077	27.0	102.8140	0.0000	SURCHARGED
240 minute winter	Outfall	232	37.623	1.037	1.5	0.0000	0.0000	OK
240 minute winter	6	232	37.624	0.674	0.5	0.1071	0.0000	SURCHARGED
240 minute winter	7	232	37.623	0.673	0.3	0.1070	0.0000	SURCHARGED
240 minute winter	8	232	37.623	0.932	0.7	0.1481	0.0000	SURCHARGED
240 minute winter	9	236	37.624	0.674	0.4	0.1071	0.0000	SURCHARGED
240 minute winter	10	236	37.623	0.858	0.8	0.1364	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	1	1.000	2	0.6	0.052	0.035	0.5163	
240 minute winter	2	1.001	3	-1.1	0.153	-0.064	0.0788	
240 minute winter	3	1.002	4	-1.6	-0.093	-0.089	0.2250	
240 minute winter	4	1.003	5	-1.9	-0.105	-0.105	0.2419	
240 minute winter	5	1.004	Soakaway	-2.1	-0.119	-0.118	0.2181	
240 minute winter	Soakaway	1.005	Outfall	-1.8	-0.105	-0.105	0.0176	
240 minute winter	Soakaway	Infiltration		3.1				
240 minute winter	Outfall	Depth/Flow		0.0				0.0
240 minute winter	6	4.000	Soakaway	0.8	0.045	0.032	0.2075	
240 minute winter	7	3.000	8	0.5	0.028	0.027	0.1387	
240 minute winter	8	3.001	Soakaway	0.8	-0.083	0.047	0.1987	
240 minute winter	9	2.000	10	-0.4	-0.029	-0.023	0.3249	
240 minute winter	10	2.001	Soakaway	-0.8	-0.061	-0.047	0.3823	

Calculated by:

Site name:

Site location:

This is an estimation of the storage volume requirements that are needed 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). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:

Longitude:

Reference:

Date:

Site characteristics

Total site area (ha):	0.244
Significant public open space (ha):	0
Area positively drained (ha):	0.244
Impermeable area (ha):	0.244
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.24
Net impermeable area for storage volume design (ha):	0.24
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:	1.4
Urban creep allowance factor:	1.1
Volume control approach	Use long term storage
Interception rainfall depth (mm):	5
Minimum flow rate (l/s):	16

Methodology

esti	IH124	
Q_{BAR} estimation method:	Calculate from SPR and SAAR	
SPR estimation method:	Calculate from SOIL type	
Soil characteristics	Default	Edited
SOIL type:	2	2
SPR:	0.3	0.3
Hydrological characteristics	Default	Edited
Rainfall 100 yrs 6 hrs:	--	55
Rainfall 100 yrs 12 hrs:	--	70.56
FEH / FSR conversion factor:	1.12	1.12
SAAR (mm):	840	840
M5-60 Rainfall Depth (mm):	17	17
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 10 year:	1.38	1.38
Growth curve factor 30 year:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Q_{BAR} for total site area (l/s):	0.55	0.55
Q_{BAR} for net site area (l/s):	0.55	0.55

Site discharge rates	Default	Edited	Estimated storage volumes	Default	Edited
1 in 1 year (l/s):	16	16	Attenuation storage 1/100 years (m³):	40	40
1 in 30 years (l/s):	16	16	Long term storage 1/100 years (m³):	0	0
1 in 100 year (l/s):	16	16	Total storage 1/100 years (m³):	40	40

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

0629 Parrs Wood, East Didsbury					Note: Area measures are in accordance with the RICS' Code of Measuring Practice 6th Edition. All areas and tallies are subject to standard construction tolerances and design development.
accommodation schedule					
16/12/2021					units per floor
	1B1P	1B2P	2B3P	3B4P	
0 1 2 3 4 5					0 15 15 15 15 15
	0	0	0	0	
	1	4	8	2	
	1	4	8	2	
	1	4	8	2	
	1	4	8	2	
	1	4	8	2	
					75
mix					
sub total					
block total					
7% 27% 53% 13%					
5 20 40 10					
75					

East Didsbury Foul Flows

Calculation of flowrate (using using British Water Code of Practice - Flows and Loads - 3

Proposed:	No.	Flow rate (l/day)	Total (l/day)
Rooms	205	150	61500
Bar drinkers	0	0	0
Non luxury meals	0	0	0
Staff - full time	0	0	0
Staff - part ime	0	0	0
Laundry	off-site		
Domestic washing machines	0	800	0
	Total		61500 l/day
		$Q_{\text{average}} =$	0.71 l/s
		$Q_{\text{peak}} =$	4.270833333 l/s



Document Title: Drainage Strategy Report
Document No.: 1023-ACE-ZZ-XX-RP-C-1001
Revision: 003
Date: December 2021

Appendix G – United Utilities Correspondence

George Boden

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: 19 October 2021 13:49
To: George Boden; Wastewater Developer Services
Cc: Alex Field
Subject: PDE 4200044097 TESCO PARRS WOOD LANE, DIDSBURY M20 5NP

Follow Up Flag: Follow up
Flag Status: Completed

Good afternoon George,

Pre Development Enquiry for: TESCO PARRS WOOD LANE, DIDSBURY M20 5NP UU Reference Number : 4200044097

For future reference we now have a new wastewater pre-development enquiry form designed to be easier and more user friendly which is available on our website via the following link:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/wastewater-pre-dev/>

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 3723223 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 1200mm diameter public combined sewer within Parrs Wood Lane located to the south of your proposed development at an unrestricted rate. If you propose to use the existing foul drainage network on site, we would require this network to be fully surveyed and its capacity understood as well as its final downstream connection to the public sewer. It is not clear how the anticipated rate of 5.08l/s has been calculated and does seem high- please could you clarify further. The Pre-dev form states 88 dwellings and the full bed occupancy is 244 persons. Could you confirm this development use – i.e. hotel or apartments?

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend

you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

- 1. into the ground (infiltration);**
- 2. to a surface waterbody;**
- 3. to a surface water sewer or highway drain;**
- 4. to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Waterbody

It is understood there are no waterbodies to drain to within the vicinity of your site.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 1200mm diameter public combined sewer within Parrs Wood Lane located south of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate is based on greenfield or a betterment rate in line with local authority guidelines (subject to evidence and assessment of existing positive drainage from the existing site). Please provide further information on your anticipated surface water discharge rate (calculations and plans etc.) if other more sustainable methods of discharge, as discussed above, are evidenced to be unfeasible.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Sewer Adoptions

It is not known if you intend to put the sewers forward for adoption (including any SuDS components that can come within the meaning of a sewer). Therefore I include the information below for your reference.

United Utilities assess adoption applications based on the current Design & Construction Guidance and local practices which have now replaced 'Sewers For Adoption 6th Edition'.

We recommend that you submit a pre design assessment to the sewer adoption mailbox (SewerAdoptions@uuplc.co.uk) stating pre design assessment in the title

Please refer to links below to obtain further guidance:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-adoptions/>

Site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.

If you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements set out in the Design & Construction Guidance. The proposed design should give consideration to long term operability and give United Utilities a safe and cost effective proposal for the lifetime of the assets. In these cases, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 application, has been assessed and accepted in writing by United Utilities. Any work carried out

prior to the technical assessment being approved is done entirely at the developer's own risk and could be subject to change.

SuDS

If your development proposal incorporates any SuDS component(s) which interact with a sewer network you plan on offering for adoption to United Utilities; contact should be made with our technical team at your earliest convenience, please complete the 'Section 104 pre-application form : ' and include as much relevant detail as you can. These discussions can help prevent delays later in the development process.

Section 104 Pre application form (1b)

As per the sewerage sector guidance, all SuDS should be designed in accordance with the standards within the Design & construction guidance & the CIRIA SuDS manual (C753)

Codes For Adoption

The new Codes for Adoption are outlined on the Water UK Website. The link below takes you to their webpage:

<https://www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/>

A free copy of the new Design & Construction Guidance can be downloaded via the link below:

<https://www.water.org.uk/wp-content/uploads/2020/03/SSG-App-C-Des-Con-Guide-v-2-100320-C.pdf>

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-connections/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

Appendix H – Operation and Maintenance Plan

GENERAL INFORMATION			
Site ID	Parrs Wood Lane, East Didsbury, Manchester, M20 5NP		
Site Location and co-ordinates (GIS if appropriate)	X: 385467, Y: 390478		
Elements forming the SuDS scheme	Green Roof, Permeable Paving, Geo-cellular Tank, Vortex Flow Control Device		
Inspection frequency	12 months		
Authorities	United Utilities Manchester City council		
Type of development	Residential	Drawing Reference(s)	1023-ACE-ZZ-XX-DR-C-8000
Responsible Party for Maintenance of SUDS Features	To be confirmed		

	Inspection date				Inspection date			
	Details	Y/N	Action required	Date Completed	Details	Y/N	Action required	Date Completed
SILT/SEDIMENT ACCUMULATION								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent Is removal required? If yes, state waste disposal requirements and confirm all waste management requirements have been complied with (consult Environment Agency or SEPA).								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (e.g. underdrained swale or infiltration basin)?								
SYSTEM BLOCKAGES / LITTER BUILD UP								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging/blockage of outlets or drainage paths?								

	Inspection date				Inspection date			
	Details	Y/N	Action required	Date Completed	Details	Y/N	Action required	Date Completed
INFRASTRUCTURE								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (e.g. wheel ruts?)								
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow control?								
Is there any evidence of tampering with the Attenuation Systems?								
Are gullies/channels/kerb drainage clear of debris/detritus?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
OTHER OBSERVATIONS								
Information appended (e.g. photos)								

	Inspection date				Inspection date			
	Details	Y/N	Action required	Date Completed	Details	Y/N	Action required	Date Completed
SUITABILITY OF CURRENT MAINTENANCE REGIME								
Continue as current								
Increase maintenance								
Decrease maintenance								
NEXT INSPECTION								
Proposed date for next inspection								

1.0 General Maintenance Specification

		Frequency
	REGULAR MAINTENANCE	
1	LITTER MANAGEMENT	
1.1	Pick up all litter in SuDS and Landscape areas and remove from site	12 visits monthly
2	GRASS MAINTENANCE	
2.1	Mow all grass verges, paths and amenity at 35-50mm with 75mm max. Leaving grass in situ	As required or monthly
3	HARD SURFACES	
3.1	Sweep all paving regularly. Sweep and suction brush paving in autumn after leaf fall.	1 visit
	OCCASIONAL TASKS	
4	INSPECTION AND CONTROL CHAMBERS	
4.1	Annual inspection, remove silt and check free flow	1 visit
	REMEDIAL WORK	
5	Inspect SuDS system regularly to check for damage or failure. Undertake remedial work as required.	As required

2.0 Sustainable Drainage Maintenance Specification

1.0 GENERAL REQUIREMENTS

Maintenance activities comprise • Regular Maintenance • Occasional Tasks • Remedial Work	Frequency
Generally Litter Collect all litter or other debris and remove from site at each site visit. Avoid Use of weedkillers and pesticides to prevent chemical pollution. De-icing agents wherever possible to allow bio-remediation of pollutants in permeable surfaces. Protect All permeable, porous and infiltration surfaces from silt, sand, mulch and other fine particles. Exclusions Maintenance of pumps, etc.	Monthly

DRAINAGE/SUDS COMPONENT	MAINTENANCE	FREQUENCY	REMEDIAL WORK
2.0 GEO-CELLULAR, CONTROLS AND INSPECTION CHAMBERS Inlets and outlets structures must be free from obstruction at all times. SuDS flow control structures to be accessible and easy to maintain.	- Inspect and identify any areas that are not operating correctly. If required, take remedial action. - Debris removal from catchment surface. - Inspect systems as specified by the manufacturer. - Inspect and identify any areas that are not operating correctly. If required, take remedial action. - Remove sediment from pre-treatment structures (e.g. upstream silt-traps or vortex flow control upstream) and geo-cellular system where required. - Inspect and document the presence of wildlife.	Monthly Six-monthly Annually and after leaf fall in Autumn/heavy storm events	Repair physical damage if necessary.
3.0 PLANTING AND EXISTING VEGETATION Ornamental Trees - All ornamental planting to be kept weed free and pruned using secateurs to keep the shrubs to an agreed and reasonable size. Native Trees and Shrubs – All native planting to be allowed to grow freely removing overhanging branches as required.	Amenity Grass Mow all grass verges, paths and amenity grass at 3550mm with 75mm max. All cuttings to remain in situ Rough grass Mow at 75-100mm but not to exceed 150mm. All cuttings to wildlife piles Ornamental tree & shrub planting. Weed all shrub beds as detailed spec as necessary. Cut back planting from lights, paths and visibility sight lines in late autumn and as necessary. Cut hedges slightly tapered back from base with flat top at specified height. Do not mulch planting adjacent to permeable/ porous paving surfaces.	When required	Replace trees and shrubs which fail in the first five years after planting. Carry out tree surgery as necessary.

	Remove stakes and ties from trees when no longer needed for support and within 3 years of planting. Protect from trimmer damage and remove competitive growth until well established. Native trees & shrub planting. Prune to shape in year 1. Protect trees from trimmer damage and remove competitive growth until well established. Remove stakes and ties from trees when no longer needed for support and within 3 years from planting. Existing trees Check existing trees for safety.		
4.0 GREEN ROOF	• Remove fallen leaves and debris from deciduous plant foliage. • Remove nuisance and invasive vegetation. • Mow grasses, prune shrubs and manage other planting as required. • Clippings should be removed and not allowed to accumulate. • Remove debris and litter to prevent clogging of inlet drains and interference with plant growth. • Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability. • Inspect soil substrate for evidence of erosion channels and identify and sediment sources. • Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drainage system.	Six-monthly Annually and after extreme storms	Replace dead plants as required.

	Inspect underside of roof for evidence of leakage.		
5.0 PERMEABLE PAVING	- Refer to manufacturer's specifications. - For sealed systems, inspection of outfalls should be undertaken. - Brushing and vacuuming to manufacturer requirements. - Re-grit where necessary after brushing. - Inspect all inlets, outlets, inspection chambers, surface and overflows to ensure that they are in good conditions. - Removal of weeds where required.	Monthly Six-monthly As required	Inspect and carry out essential recovery works to return the feature to full working order.

5.0 SPILLAGE – EMERGENCY ACTION

Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.

In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung(s). (A bung for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric.) Contact the Environment Agency immediately.

6.0 QUERIES REGARDING A DESIGN FEATURE.

In the event of concern over any matter to do with the SuDS please contact: Apex Consulting Engineers –Acres Hill Business Park, Acres Hill Lane, Sheffield S9 4IR Tel: (0114) 2419360



Apex Consulting Engineers

Unit 3 Acres Hill Business Park
Acres Hill Lane
Sheffield
S9 4LR
0114 241 9360