

70023367-DSR-001

OLD HALL STREET, LIVERPOOL - T1

DRAINAGE STRATEGY

10 NOVEMBER 2016

OLD HALL STREET, LIVERPOOL - T1

DRAINAGE STRATEGY

Project no: 70023367
Date: 10 November 2016

WSP | Parsons Brinckerhoff
Three White Rose Office Park
Millshaw Park Lane
Leeds, LS11 0DL
Tel: +44(0) 113 395 6200
Fax: +44(0) 113 395 6201
www.wspgroup.com
www.pbworld.com

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	First Issue	Second Issue		
Date	28 October 2016	10 November 2016		
Prepared by	L Barlow	L Barlow		
Signature				
Checked by	D Valla	D Valla		
Signature				
Authorised by	C Cozens	C Cozens		
Signature				
Project number	70023367			
Report number	70023367-DSR-001			
File reference	\\uk.wspgroup.com\central data\Projects\700233xx\70023367 - 122 Old Hall Street, Liverpool\C Documents\Reports\DI\Drainage Strategy			

PRODUCTION TEAM

WSP | PARSONS BRINCKERHOFF

Graduate Engineer	Laura Barlow
Principal Engineer	Deepika Valla
Associate Director	Chris Cozens

TABLE OF CONTENTS

1	EXECUTIVE SUMMARY	1
2	INTRODUCTION.....	1
3	EXISTING SITE	3
4	FOUL WATER DRAINAGE STRATEGY.....	5
5	SURFACE WATER DRAINAGE STRATEGY	6
6	CONCLUSION	9

TABLES

TABLE 3-1 - CHARACTERISTICS OF THE SITE	3
---	---

APPENDICES

A P P E N D I X A	GROUND FLOOR PLAN (DRAWING NO. 000) AND BASEMENT LEVELS PLANS (DRAWING NOS. B01 REV A AND B02 REV B)
A P P E N D I X B	SITE LOCATION PLAN
A P P E N D I X C	TOPOGRAPHICAL SURVEY (DRAWING NO. 16G059/001)
A P P E N D I X D	UNITED UTILITIES PUBLIC SEWER RECORDS
A P P E N D I X E	INDICATIVE DRAINAGE LAYOUT PLAN (70023367-D-001)

1 EXECUTIVE SUMMARY

- 1.1.1 WSP | Parsons Brinckerhoff was appointed by Indigo Planning on behalf of 122 Old Hall Street Limited to undertake a Drainage Strategy for a proposed residential multi-storey tower known as T1. The site is located at the junction of Leeds Street and Old Hall Street in Liverpool.
- 1.1.2 This report provides information and presents proposals relating to:
- Constraints imposed by the regulatory bodies;
 - Proposed foul and surface water flows and discharge points; and
 - Proposed surface water storage volumes.
- 1.1.3 A 300mm diameter public combined water sewer is shown to cross the site on the United Utilities sewer record plans. Based on the United Utilities consultation response this sewer is 2.0 – 3.5 m deep and is protected by a 6 m easement (3 m either side). The proposed T1 does not encroach on this easement.
- ## 1.2 FOUL WATER
- 1.2.1 A new foul water network will be required to serve the development.
- 1.2.2 In line with the United Utilities consultation response, foul water flows will discharge into the public combined water sewer which crosses the site.
- 1.2.3 There is no restriction imposed by United Utilities on this rate but it is expected that the site will generate approximately 3.94 l/s.
- 1.2.4 The foul water discharge will be pumped from the basement level in order to connect into the public sewer system at a combined water manhole on the sewer running through the site.
- ## 1.3 SURFACE WATER
- 1.3.1 A new surface water network will be required for the site.
- 1.3.2 Following the hierarchy for surface water disposal, since discharge by infiltration or to a watercourse are not feasible the surface water will discharge to the public combined water sewer which runs through the site.
- 1.3.3 The proposed discharge rate from the site will be restricted to 10 l/s in accordance with the United Utilities consultation response.
- 1.3.4 Attenuation storage will accommodate flows for up to the 1 in 100 year storm including a 40 % allowance for climate change.
- 1.3.5 Owing to the limited external space which is highly congested with underground services, the attenuation storage is currently proposed in the basement of the building. Surface water will be pumped from this storage tank in order to connect to the combined water sewer running through the site. However, the routing of the surface water network and location and arrangement of the attenuation storage will be confirmed following internal and external coordination at the detailed design stage.

2 INTRODUCTION

2.1 APPOINTMENT AND BRIEF

2.1.1 WSP | Parsons Brinckerhoff was appointed by Indigo Planning on behalf of 122 Old Hall Street Limited to undertake a Drainage Strategy for a proposed residential development site at the junction of Leeds Street and Back Leeds Street in Liverpool.

2.1.2 The development will consist of two multi-storey towers. This report has been prepared to support the detailed planning application for the first of these towers, known as T1.

2.2 OBJECTIVE OF THE STUDY

2.2.1 The objective of this study is to provide information and present proposals relating to the following:

- Proposed surface water and foul water discharge points
- Proposed surface water and foul water flows
- Proposed surface water storage volumes

2.2.2 A separate Flood Risk Statement has been produced by WSP | Parsons Brinckerhoff (2016) to accompany this Drainage Strategy.

2.3 PROPOSED DEVELOPMENT

2.3.1 The proposed development will consists of two multi-storey towers. This report considers the drainage strategy for the first tower (T1).

2.3.2 T1 will have 26 floors of residential development with a total of 168 apartments. There will also be a ground floor which will accommodate circulation and post room space and a transfer level for bike storage. The Ground Floor Plan (Drawing No. 000) is included in Appendix A.

2.3.3 Two floors of basement development are proposed which occupy the majority of the planning boundary. Basement level plans (Drawing Nos. B01 and B02) are included in Appendix A.

2.4 LIMITATIONS

2.4.1 The Environment Agency, Liverpool City Council and United Utilities were contacted as part of these works.

2.4.2 This report is based on the interpretation and assessment of data provided by third parties. WSP | Parsons Brinckerhoff cannot be held responsible for the accuracy of the third party data and the conclusions and findings of this report may change if the data is amended or updated after the date of consultation.

2.4.3 The recommendations made within this report may change upon receipt of further consultation responses.

3 EXISTING SITE

3.1 SITE LOCATION

- 3.1.1 The site is located at the junction of Leeds Street and Back Leeds Street in Liverpool city centre, Merseyside. Moorfields Merseyrail Station lies 0.5 km to the southeast of the site.
- 3.1.2 An approximate postcode is L3 9PY and approximate OS coordinates are 333950, 391030.
- 3.1.3 A site location plan can be found in Appendix B of this report.

3.2 SITE DESCRIPTION

- 3.2.1 Table 3-1 describes the general site characteristics.

Table 3-1 - Characteristics of the Site

Area	The site area is approximately 0.16 ha.	
Existing Use	The site is currently occupied by a surface level car park which is covered in hardstanding.	
General Topography	The topographical survey (Appendix C) indicates that the site generally slopes down from west (~ 16.4 m AOD) to east (~ 15.94 m AOD). There is limited coverage on the survey but it appears that there is a raised kerb and wall at the northern boundary. Additionally, behind the vegetation in the south and east of the site there is a retaining wall for the neighbouring car park.	
Boundaries	North	Landscaping and Leeds Street/ A5053.
	South	Surface car park and vegetation.
	East	Trees and multi-storey car park.
	West	Back Leeds Street, a future development plot (currently occupied by a data centre) and office building.
Access	Access to the site is via Back Leeds Street.	

3.3 EXISTING PRIVATE DRAINAGE

- 3.3.1 Private site drainage records were not available. The site is currently occupied by a surfaced car park and so is expected to be formally drained.

3.4 EXISTING PUBLIC SEWERS

- 3.4.1 An extract of United Utilities public sewer records dated 15 August 2016 (Appendix D) indicates one public sewer in the immediate site vicinity. A combined water sewer runs through the site to the west of T1. In addition, some lines of abandoned sewer run under Leeds Street and in close proximity to the northwest of the site.
- 3.4.2 The sewer is labelled on United Utilities Sewer Plans as 300 mm diameter and 225 mm diameter along its length in the vicinity of the site. The sewer runs to the northwest under Back Leeds Street before turning westwards under King Edward Street. The depth of the sewer within the site is not available on the United Utilities sewer record plans however at manhole 9007, shortly downstream of the site, it is indicated to be 2.21 m deep.

- 3.4.3 The United Utilities consultation response received on 18 October 2016 indicated that the sewer was 300 mm in diameter and laid at a depth of approximately 2.0 to 3.5m.
- 3.4.4 The consultation response from United Utilities also stated that the sewer should not be located within 3 m of any existing or proposed building. This width is marked on the Indicative Drainage Strategy Layout in Appendix E which demonstrates that the proposed basement for T1 does not encroach on the easement.

4 FOUL WATER DRAINAGE STRATEGY

4.1.1 A new separate foul water drainage system will be required on the site.

4.1.2 Whilst the exact configuration of the foul water drainage network and associated connection points will be determined at the detailed design stage, an indicative foul water drainage layout is illustrated in the Indicative Drainage Strategy Layout included in Appendix E.

4.2 CONNECTION TO THE PUBLIC SEWER

4.2.1 The United Utilities consultation response received on 18 October 2016 indicated that foul water drainage would be permitted to discharge to the public sewer network via the 300 mm public combined water sewer which runs through the site.

4.2.2 The Indicative Drainage Layout Plan in Appendix E shows a route to a proposed connection point at manhole 9005 on the 300 mm public combined water sewer.

4.2.3 A foul water pumping station is indicated in the basement of the building. At the detailed design stage there will be internal and external coordination which will confirm the final proposals for the foul water drainage but based on the congestion of underground services surrounding the building and the extents of the basement, the length of the proposed foul water network outside of the building has been minimised.

4.3 PROPOSED DISCHARGE RATE

4.3.1 The United Utilities consultation response received on 18 October 2016 indicated that foul water flows could drain at an unrestricted rate into the public combined water sewerage system crossing the site.

4.3.2 The foul flow rates were estimated using the accommodation schedule. Based on a population of 284 and an allowance of 200 litres/person/day with a peak factor of 6, the resulting flow from the development is calculated as 3.94 l/s.

4.4 MAINTENANCE

4.4.1 It is expected that the foul water network will be privately maintained up to and including the rising main discharge chamber. The lateral connection from this point to the public combined water sewer will be offered for adoption to United Utilities.

5 SURFACE WATER DRAINAGE STRATEGY

- 5.1.1 A new separate surface water drainage system will be required to manage water on site and discharge off site to the United Utilities sewerage system.
- 5.1.2 An indicative surface water drainage layout is illustrated in the Indicative Drainage Strategy Layout Plan included in Appendix E. The exact configuration of the surface water drainage network including attenuation storage should be confirmed at the detailed design stage.

5.2 DISCHARGE POINT

- 5.2.1 Requirement H3 of the Building Regulations (2000) requires the following hierarchy for surface water disposal:

- Disposal of surface water by infiltration methods
- Discharge to a suitable watercourse
- Discharge to public sewer

DISCHARGE BY INFILTRATION METHODS

- 5.2.2 The Environment Agency Groundwater Map on the website indicates that the superficial deposits are shown to be Secondary Aquifers indicating variable levels of permeability. Groundwater monitoring information was provided by the Environment Agency on 01 November 2016 but the monitoring stations were not in close enough proximity to provide an indication of groundwater levels under the site.
- 5.2.3 The LandIS Soilscales Viewer indicates that the soil under the site is slowly permeable and seasonally wet.
- 5.2.4 Based on this information it is not anticipated that the site has sufficient permeability. In addition, the site area in a city centre context does not have sufficient space for any meaningful infiltration solutions and therefore this method of discharge has been discounted for the site.

DISCHARGE TO WATERCOURSE

- 5.2.5 The River Mersey runs south to north approximately 0.4 km to the west of the site. The Liverpool City Council consultation response received on 14 October 2016 indicated that they had no record of watercourses (including culverted watercourses) in the immediate site vicinity.
- 5.2.6 The minimum length of sewer to be requisitioned to the watercourse would therefore be 0.4 km although it is likely to be longer given the requirement to route through adopted highways which is not considered to be practicable and this method of disposal has therefore also been discounted.

DISCHARGE TO PUBLIC SEWER

- 5.2.7 Since other preferable options are not available, surface water from the site is proposed to discharge into the public sewer. United Utilities sewer plans indicate that there are only combined water sewers in the site vicinity and so the proposed connection point will be to a combined water sewer instead of the preferable surface water sewer option.

- 5.2.8 The United Utilities consultation response received on 18 October 2016 indicated that surface water from the new development may flow into the combined water sewer crossing under the site.

5.3 ALLOWABLE DISCHARGE RATE

- 5.3.1 The area enclosed within the planning application boundary is 0.16 ha, of which the majority is surfaced with only a small section of permeable area. The red line boundary includes areas which will be developed as part of phase 2 of the Old Hall Street development and have therefore been excluded. In order to determine the allowable discharge rate for T1, the area to be developed, i.e. Back Leeds Street and the plot to the east (0.11 ha) will be used in calculations.
- 5.3.2 The proposed layout also has some landscaping proposed but in order to make calculations robust, it has been assumed that the entire proposed area is impermeable. This should guard against an underestimation of the storage requirement in the event that the proposed landscaping was reduced at the detailed design stage.
- 5.3.3 The discharge rate from the site was proposed based on the following information:
- The United Utilities consultation response received on 24 October 2016 indicated that surface water from the site may discharge at a maximum rate of 10 l/s.
 - The LCC consultation response received on 14 October 2016 indicated that the site will be classed as brownfield for drainage matters and it is assumed that the site drainage is still operational without the need for any further investigation work to prove connectivity.
 - The LCC Greenfield / Brownfield Sites Surface Water Management Guidance provided within the LCC consultation response states that a 30 % reduction in flows should be applied for brownfield sites.
- 5.3.4 The existing and proposed discharge rates (if unrestricted) are shown in Table 5-1 based on a brownfield runoff allowance of 140 l/s/ha.

Table 5-1 Existing and Proposed Runoff Rates

DEVELOPMENT STAGE	IMPERMEABLE AREA (HA)	CALCULATED BROWNFIELD RUNOFF RATE (l/s)
Existing	0.105	14.7
Proposed	0.110	15.7

- 5.3.5 The proposed discharge rate via a pump from the basement is 10 l/s. Discharging surface water flows at this rate will provide an approximately 30% reduction in surface water flows from the existing site.

5.4 ATTENUATION STORAGE

- 5.4.1 In order to attenuate surface water runoff to 10 l/s storage will be provided. In accordance with the Liverpool City Council Draft Local Liverpool Plan (September 2016) Policy R3 the implementation of SuDS on the site was considered.
- 5.4.2 The site area is 0.16 ha with limited external space in a city centre context for 'traditional' SuDS such as swales, basins or ponds with the required volume. SuDS principles have been applied in that surface water flows will be attenuated but the current proposal is for this storage to be in the form of an underground tank.

- 5.4.3 The Source Control Module of MicroDrainage was used to calculate the required volume of storage to facilitate a restriction of flows to 10 l/s in a 1 in 100 year event. In line with the new Environment Agency climate change allowances the volumes for both 20 and 40% increases in rainfall due to climate change were assessed. The requirements for these events are summarised in Table 5-2.

Table 5-2 Attenuation Storage Requirements

INCREASE IN PEAK RAINFALL DUE TO CLIMATE CHANGE	STORAGE VOLUME REQUIREMENT (m ³)
20%	20
40%	25

- 5.4.4 The larger of the two volumes has been accommodated in the layout and an indicative location is shown on the Indicative Drainage Layout Plan in Appendix E. Designing for a 40% increase in peak rainfall meets the 30% climate change allowance to be considered according to the Liverpool Greenfield / Brownfield Sites Surface Water Management Guidance.

5.5 REQUIREMENT FOR PUMPING

- 5.5.1 There is very limited space available within the site boundary for providing a gravity draining system with a below ground attenuation storage tank. The proposed development basement covers a large portion of the site and the highway boundary and congestion of the underground services surrounding the proposed building are further constraints.
- 5.5.2 Because of these restrictions, attenuation storage is proposed within the building basement in a tank installed with a pump. A rising main will discharge surface water from the tank to a discharge chamber upstream of the proposed connection point on the public combined water sewer which runs through the site.
- 5.5.3 An indicative location of the tank is shown on the Indicative Drainage Layout Plan in Appendix E which demonstrates that the volume can be accommodated on site. However, the exact location and arrangement may change following coordination at the detailed design stage.

5.6 EXTREME EVENTS

- 5.6.1 In flows exceeding the 1 in 100 year storm plus a 40% allowance for climate change the site surface water drainage network will be exceeded. A suitable method for discharging overflow safely away from the building will need to be considered at a later design stage but it is expected that exceedance flow at the surface will be routed to the adjacent highways without posing risk to people or property. As is standard practice, allowance will be made in the pumped system for system failure.

5.7 MAINTENANCE

- 5.7.1 It is expected that the surface water drainage network will be privately maintained up to and including the rising main discharge chamber. The lateral connection from this point to the public combined water sewer will be offered for adoption to United Utilities.

6 CONCLUSIONS

6.1.1 A 300mm diameter public combined water sewer is shown to cross the site on the United Utilities sewer record plans. Based on the United Utilities consultation response this sewer is 2.0 – 3.5 m deep and is protected by a 6 m easement (3 m either side). The proposed T1 does not encroach on this easement.

6.2 FOUL WATER

6.2.1 A new foul water network will be required for the site.

6.2.2 In line with the United Utilities consultation response, foul water flows will discharge into the public combined water sewer which crosses the site.

6.2.3 There is no restriction imposed by United Utilities on this rate but it is expected that the site will generate approximately 3.94 l/s.

6.2.4 The foul water discharge will be pumped from the basement level in order to connect into the public sewer system at a combined water manhole on the sewer running through the site.

6.3 SURFACE WATER

6.3.1 A new surface water network will be required for the site.

6.3.2 Following the hierarchy for surface water disposal, since discharge by infiltration or to a watercourse are not feasible the surface water will discharge to the public combined water sewer which runs through the site.

6.3.3 The proposed discharge rate from the site will be restricted to 10 l/s in accordance with the United Utilities consultation response.

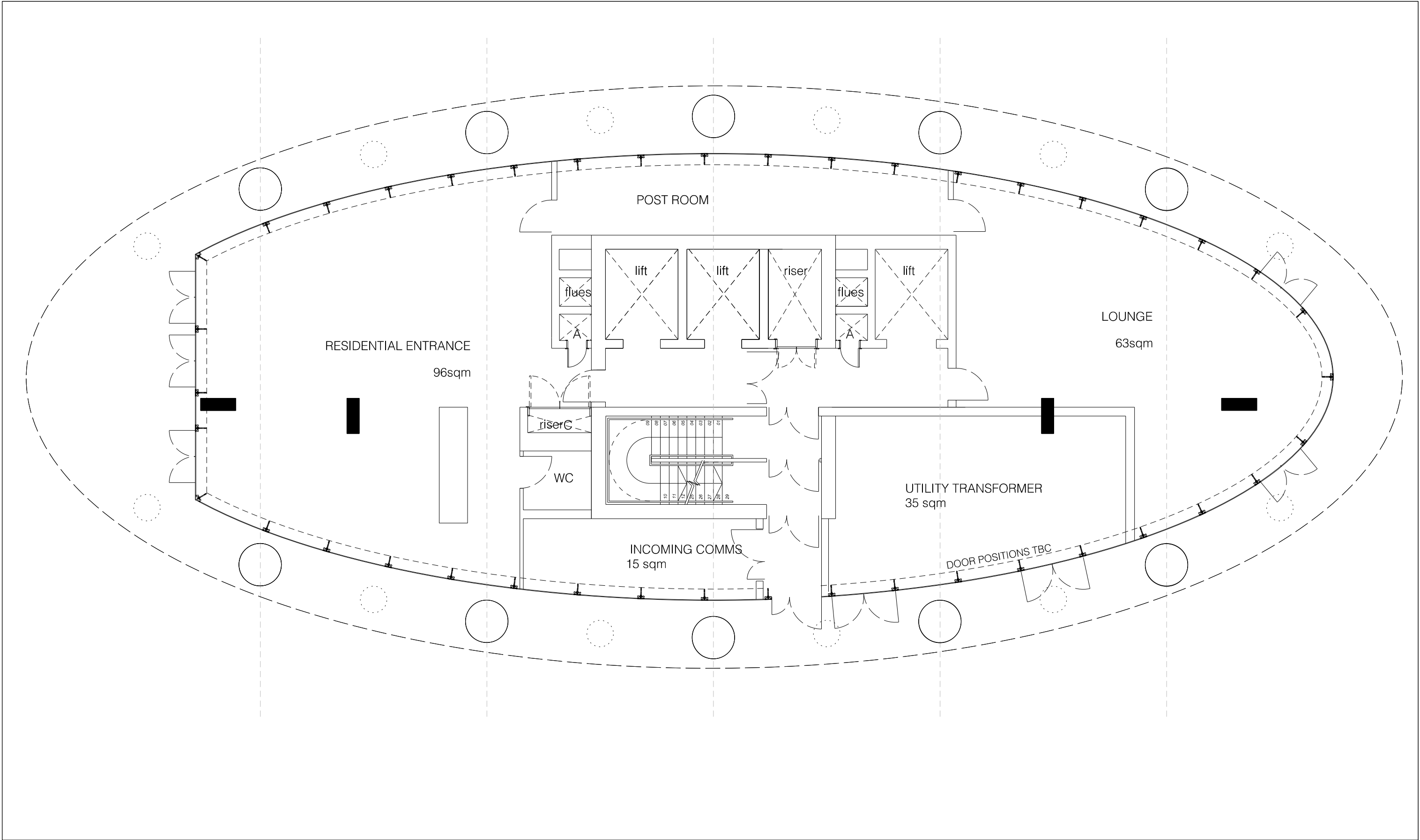
6.3.4 Attenuation storage will accommodate flows for up to the 1 in 100 year storm including a 40 % allowance for climate change.

6.3.5 Owing to the limited external space which is highly congested with underground services, the attenuation storage is currently proposed in the basement of the building. Surface water will be pumped from this storage tank in order to connect to the combined water sewer running through the site.

6.3.6 The routing of the surface water network and location and arrangement of the attenuation storage will be confirmed following internal and external coordination at the detailed design stage. However, the current location demonstrates that the volume and associated pipework can be accommodated within the basement if necessary.

Appendix A

**GROUND FLOOR PLAN (DRAWING NO. 000) AND BASEMENT
LEVELS PLANS (DRAWING NOS. B01 REV A AND B02 REV B)**



hoddler+partners

SGI Studios
1 Kelso Place
Manchester M15 4LE

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

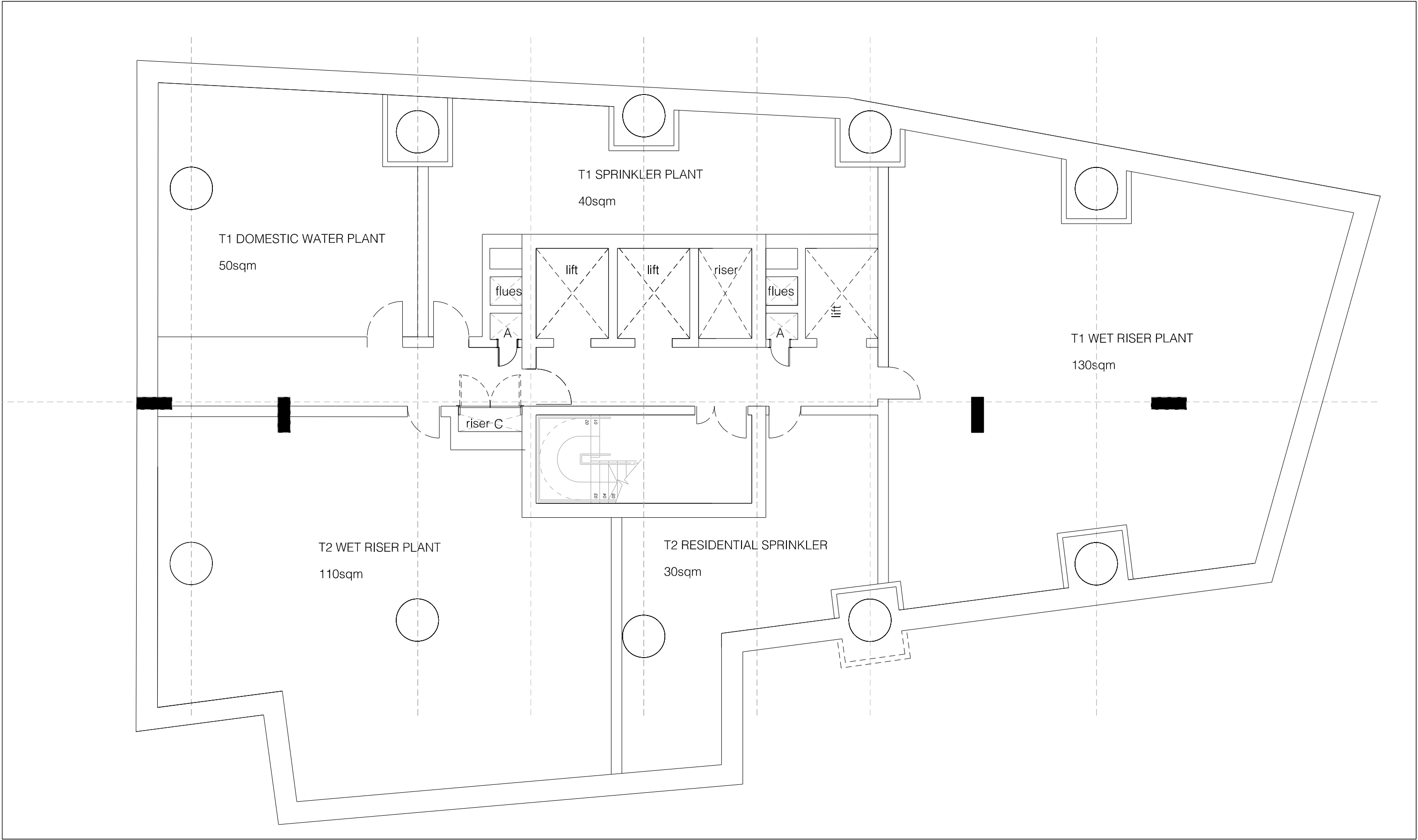
DO NOT SCALE
Work to annotated dimensions only.
Read drawing in conjunction with relevant specification,
Structural Engineers' and Services Engineers' drawings.
Confirm all dimensions before commencement of any
work on site or fabrication.

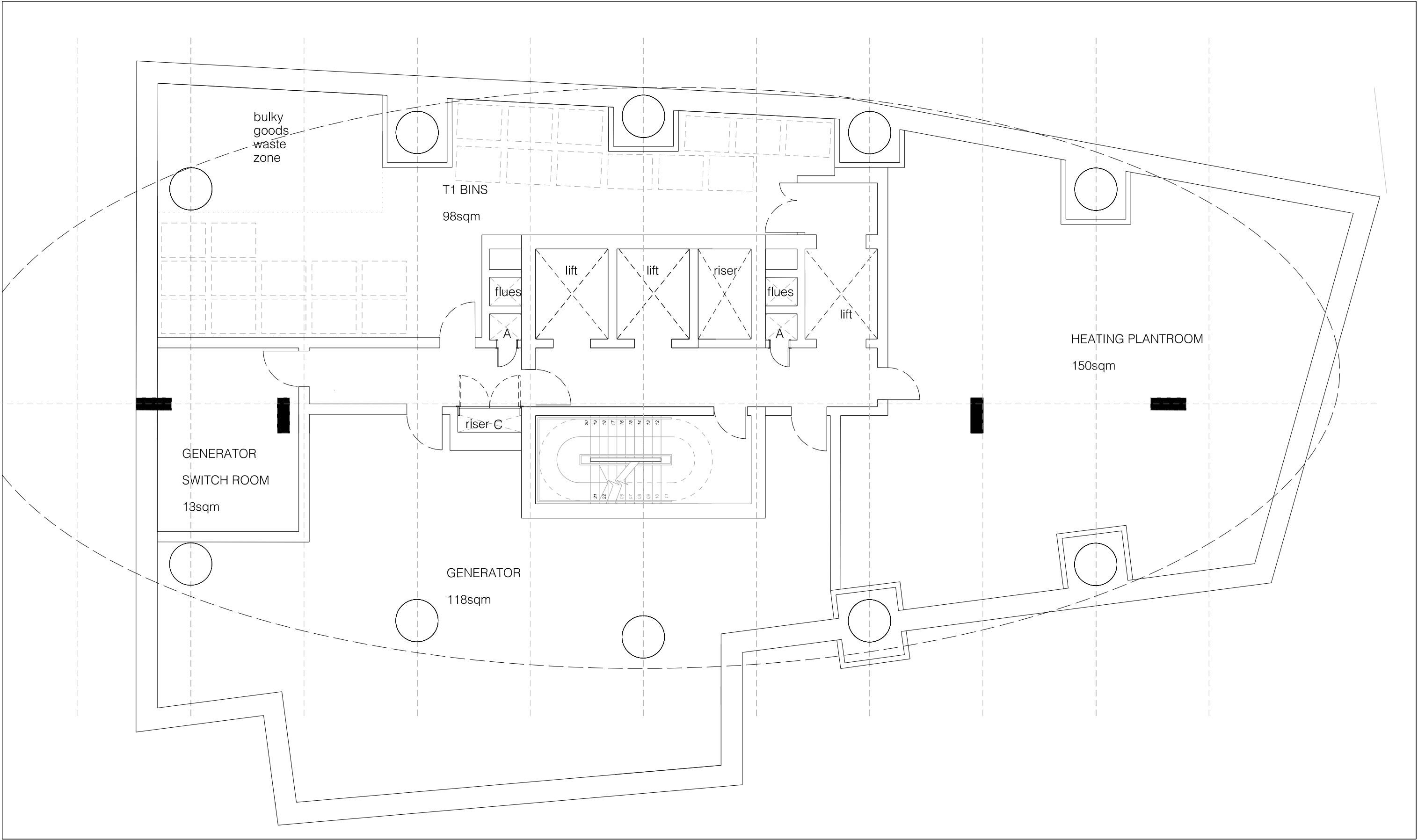
revisions + notes:

REV. A 061016 Revised structural core

client:		date:	
OLD HALL STREET LTD.		OCTOBER 2016	
project:		scale:	drawn by:
122 OLD HALL STREET, LIVERPOOL		1:100	NW /JB
title:		drawing number:	
GROUND FLOOR PLAN		000	
status:		job number	revision:
PLANNING		0593	

hoddler+partners





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

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

revisions + notes:
REV. A 06/10/16 Revised structural core, lift and bin storage amended
REV. B 14/10/16 Bin storage revised to include containment of bulky goods waste

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: OLD HALL STREET LTD.	date: OCTOBER 2016	
project: 122 OLD HALL STREET, LIVERPOOL	scales: 1:100	drawn by: JB
title: UPPER BASEMENT LEVEL	drawing number: B02	
status: PLANNING	job number: 0593	revisions: B

Appendix B

SITE LOCATION PLAN



Key
 Approximate Site Boundary

TITLE:
Old Hall Street, Liverpool - T1

FIGURE No:
Site Location Plan

Appendix C

TOPOGRAPHICAL SURVEY (DRAWING NO. 16G059/001)

Appendix D

UNITED UTILITIES PUBLIC SEWER RECORDS

**WSP Civils
3 White Rose Office Park
Millshaw Park Lane
Leeds**

LS11 0DL

FAO: Laura Barlow

Dear Sirs

Location: Old Hall Street

I acknowledge with thanks your request dated 11/10/16 for information on the location of our services.

Please find enclosed plans showing the approximate position of our 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 our 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 telephone us on 0370 7510101.

Yours Faithfully,



Amanda Simmonds
Property Searches Manager

United Utilities Water Limited
Property Searches
Ground Floor Grasmere House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP
DX 715568 Warrington
Telephone 0370 751 0101

Property.searches@uuplc.co.uk

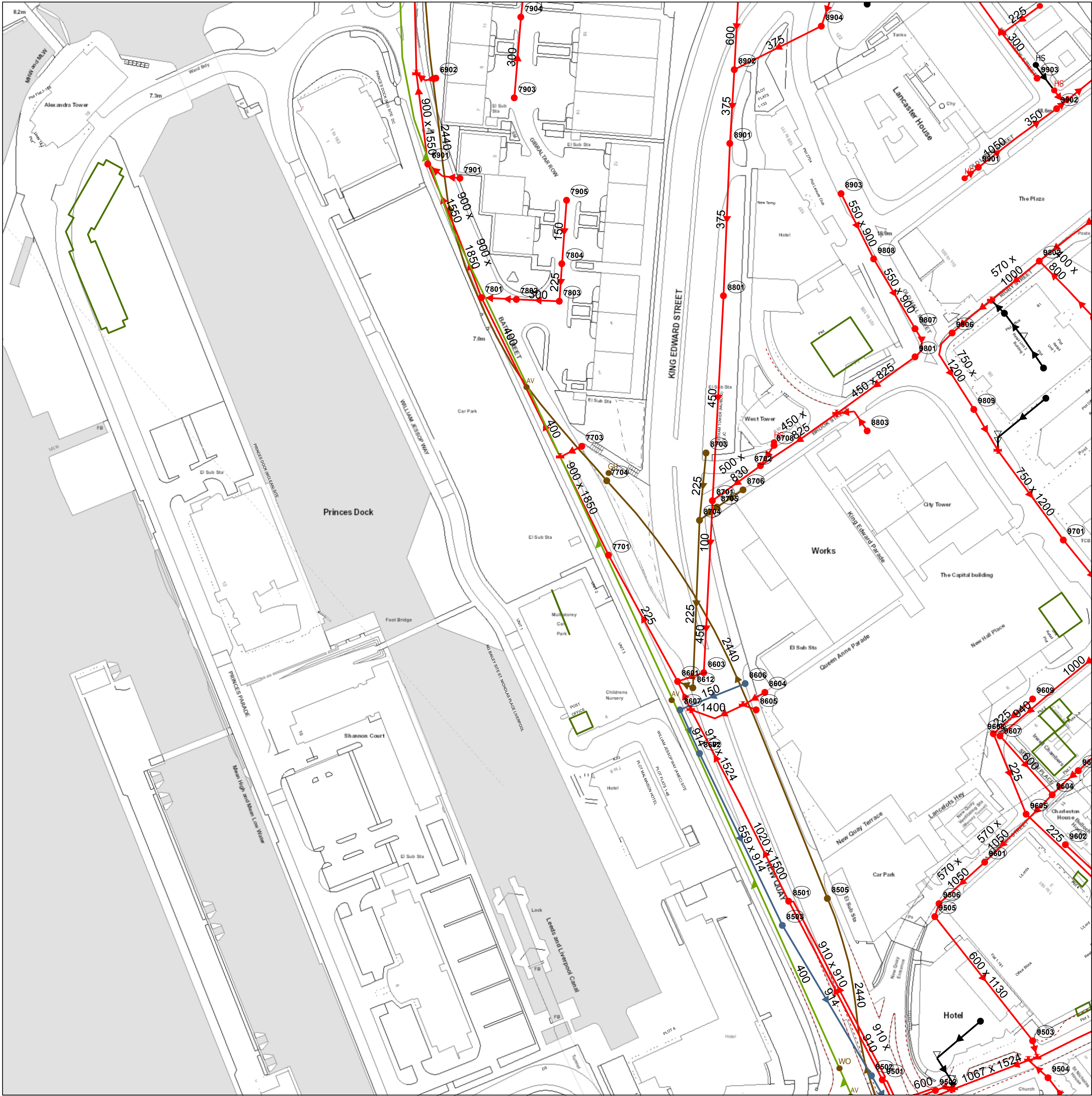
Your Ref: 70023367-403
Our Ref: 16/ 1240015
Date: 13/10/2016

TERMS AND CONDITIONS - WASTERWATER & 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:

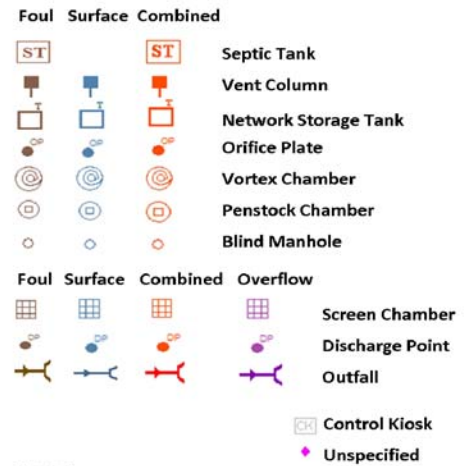
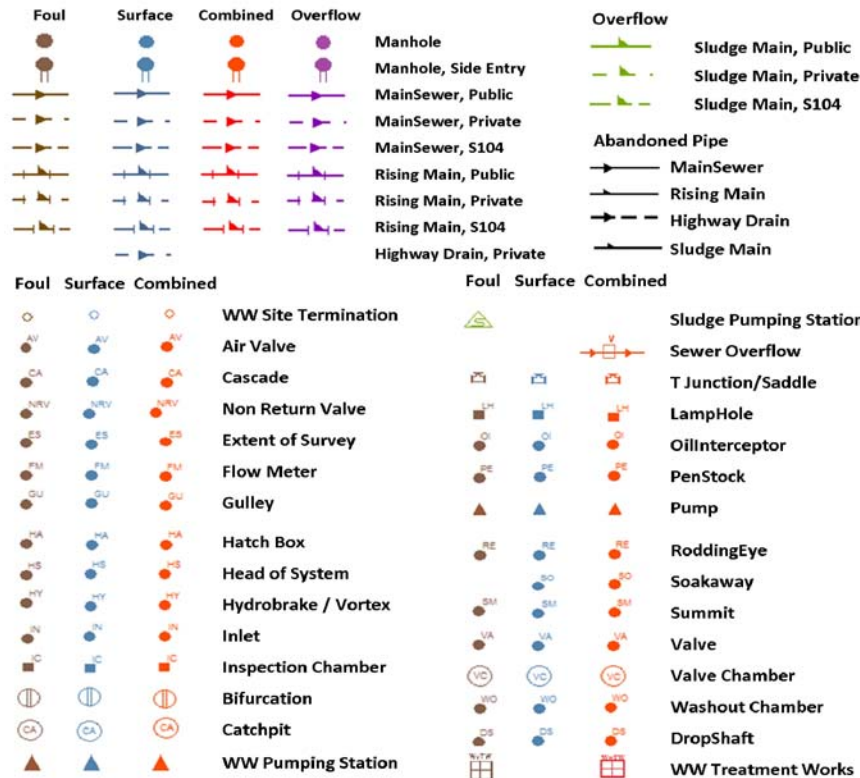
1. This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
2. 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.
3. In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only and given in accordance with the best information available. The nature of the relevant system and/or its actual position may be different from that shown on the plan and UUWL is not liable for any damage caused by incorrect information provided save as stated in section 199 of the Water Industry Act 1991. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.



Retho	Cover	Func	Invert	Size	x	Size	y	Shape	Mat	Length	Grad	Retho	Cover	Func	Invert	Size	x	Size	y	Shape	Mat	Length	Grad
6901	6.73	CO																					
6902	8.35	CO																					
7701	8.23	CO																					
7703	7.88	CO																					
7704																							
7801	7.13	CO																					
7802	7.12	CO																					
7803	7.44	CO																					
7804	7.5	CO																					
7901	0	CO																					
7903	8.38	CO																					
7904	8.8	CO																					
7905	7.78	CO																					
8501	8.38	CO																					
8502	7.76	SW																					
8503	7.71	SW																					
8505	8.22	SW																					
8506	9.46	CO																					
8602	9.37	SW																					
8603	10.6	CO																					
8604	9.85	CO																					
8605	9.55	CO																					
8606	10.13	SW																					
8607																							
8612	10.49	SW																					
8701	11.66	CO																					
8702	13.2	CO																					
8703	11.52	FO																					
8704	11.52	FO																					
8705	11.63	FO																					
8706																							
8708																							
8801																							
8803	15.84	CO																					
8901	14.69	CO																					
8902	15.62	CO																					
8903	17.83	CO																					
8904	16.83	CO																					
8901	7.81	CO																					
9502	8.27	CO																					
9503	10.61	CO																					
9504	10.94	CO																					
9505	12.89	CO																					
9506	13.23	CO																					
9601	14.42	CO																					
9602																							
9604	15.55	CO																					
9605	15.22	CO																					
9606	15.65	CO																					
9607	16.05	CO																					
9608	15.96	CO																					
9609	16.4	CO																					
9701	18.31	CO																					
9801	18.07	CO																					
9802	19.71	CO																					
9806	19.26	CO																					
9807	18.72	CO																					
9808	18.26	CO																					
9809	19.07	CO																					
9901	18.41	CO																					
9902	18.63	CO																					
9903	18.16	CO																					
9904																							
9905																							
7705																							
7805																							
7906																							
7902																							
8613																							
8707																							
8709																							
8804																							
9509																							
9516																							
9603																							
9610																							
9611																							
9617																							
9618																							
9619																							
9620																							
9821																							
9905																							
9907																							
9909																							
9910																							
9909																							
6903																							
7702																							
7807																							
8608																							
8609																							
8611																							
8602																							
8607																							
9508																							
9510																							
9514																							
9702																							
9813																							
9904																							
9906																							
9500																							
9511																							
9703																							
9803																							
9804																							
9805																							
9810																							
9816																							
9900																							

WASTE WATER SYMBIOLOGY	
------------------------	--

WASTE WATER SYMBOLOGY



Legend	
MANHOLE FUNCTION	SEWER SHAPE
FO Foul	CI Circular
SW Surface Water	EG Egg
CO Combined	OV Oval
OV Overflow	FT Flat Top
	RE Rectangular
	SQ Square
	TR Trapezoidal
	AR Arch
	BA Barrel
	HO HorseShoe
	UN Unspecified
SEWER MATERIAL	
AC Asbestos Cement	DI Ductile Iron
BR Brick	VC Vitrified Clay
CO Concrete	PP Polypropylene
CSB Concrete Segment	PF Pitched Fibre
CSU Concrete Segment	MA Masonry, Coursed
CC Concrete Box Culverted	MA Masonry, Random
PSC Plastic / Steel	RP Reinforced Plastic
GR Glass Reinforced	CI Cast Iron
GRP Glass Reinforced	SI Spun Iron
PVC Polyvinyl Chloride	ST Steel
PE Polyethylene	U Unspecified

CLEAN WATER SYMBOLOGY

PIPE WORK



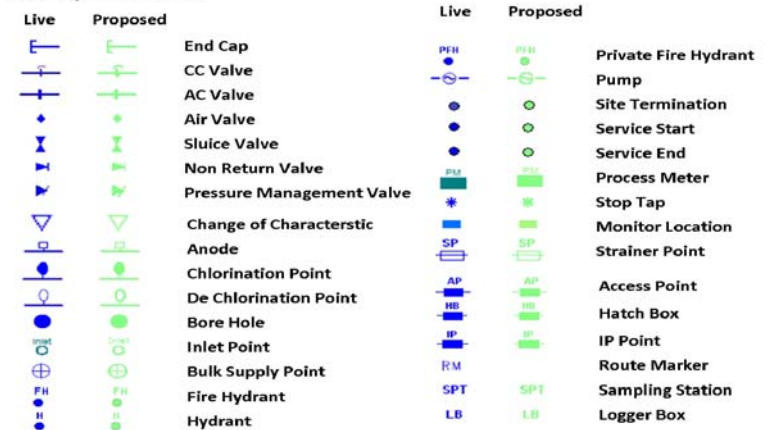
ABANDONED PIPE



PROPERTY TYPES



NODES/FURNITURES



Legend	
MATERIAL TYPES	LINING TYPES
AC ASBESTOS CEMENT	CL CEMENT LINING
CI CAST IRON	TB TAR OR BITUMEN
CU COPPER	ERL EPOXY RESIN
CO CONCRETE	
DI DUCTILE IRON	INSERTION TYPES
GI GALVANISED IRON	DD DIE DRAWN
GR GREY IRON	DR DIRECTIONAL DRILLING
OT OTHERS	MO MOLING
PB LEAD	PI PIPELINE
PV UPVC	SL SLIP LINED
SI SPUN IRON	
ST STEEL	
UN UNKNOWN	
PE POLYETHYLENE	

Appendix E

INDICATIVE DRAINAGE LAYOUT PLAN (70023367-D-001)

\\uk.wspgroup.com\central_data\Projects\700233xx\70023367 - 122 Old Hall Street, Liverpool\E Models and Drawings Development\AUTOCAD\0 Drainage\70023367-D-001 P02.dwg 10/11/2016 13:20:08 Borlow, Laura

NOTES

- 1. THIS DRAWING IS AT A DEVELOPMENT STAGE AND IS SUBJECT TO CHANGE DEPENDING ON FURTHER CONSULTATION RESPONSES.
- 2. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
 - BASEMENT LEVELS PLAN BY HODDER + PARTNERS RECEIVED 26 OCTOBER 2016
 - SEWER PLANS RECEIVED FROM UNITED UTILITIES DATED 13 OCTOBER 2016
 - TOPOGRAPHICAL SURVEY (DWG NO 16G059 REV 001) BY SURVEY OPERATIONS DATED JULY 16
- 3. THE ATTENUATION STORAGE IS SHOWN INDICATIVELY AT THIS STAGE. A REQUIREMENT OF 25m³ WAS CALCULATED BASED ON A SITE DISCHARGE RATE OF 10 l/s AS STIPULATED BY UNITED UTILITIES IN THEIR CONSULTATION RESPONSE OF 24 OCTOBER 2016. SITE RESTRICTIONS INDICATE THAT A PUMPED SYSTEM WILL BE REQUIRED WITH THE ATTENUATION STORAGE TANK LOCATED WITHIN THE BUILDING BASEMENT. SEE REPORT 70023367-DSR-001 FOR FURTHER DETAILS.

INDICATIVE LOCATION OF ATTENUATION STORAGE TANK IN BUILDING BASEMENT TO PROVIDE 25m³ OF STORAGE FOR 1 IN 100 YEAR STORM EVENT WITH CLIMATE CHANGE ALLOWANCE. ALLOWABLE DISCHARGE RATE 10l/s (EXACT LOCATION AND ARRANGEMENT TO BE CONFIRMED)

PROPOSED FOUL WATER PUMPING STATION WITH INDICATIVE RISING MAIN ROUTE

PROPOSED RISING MAIN DISCHARGE CHAMBER

PRELIMINARY SITE BOUNDARY

F6-24

PROPOSED CONNECTION POINT TO EXISTING PUBLIC COMBINED SEWER NETWORK, AT MH 9005 OF UNITED UTILITIES 300mmØ COMBINED WATER SEWER

UPPER LEVEL BUILDING LAYOUT SHOWN FOR REFERENCE ONLY. NO PROPOSED BUILDING DEVELOPMENT WITHIN SEWER EASEMENT FOR T1

LEEDS STREET

300DI

HIGHWAY BOUNDARY

KEY

- SITE BOUNDARY
- HIGHWAY BOUNDARY
- EXISTING UNITED UTILITIES COMBINED WATER SEWER
- EXISTING ABANDONED UNITED UTILITIES SEWERS
- EXISTING UNITED UTILITIES SEWER EASEMENT
- PROPOSED SURFACE WATER RISING MAIN (INDICATIVE ROUTE)
- PROPOSED FOUL WATER RISING MAIN (INDICATIVE ROUTE)
- PROPOSED COMBINED WATER SEWER GRAVITY CONNECTION
- PROPOSED SURFACE WATER ATTENUATION TANK
- INDICATIVE EXTENT OF BASEMENT

REV	DATE	BY	DESCRIPTION	CHK	APD
P02	10.11.2016	LB	SECOND ISSUE	DV	CC
P01	27.10.2016	LB	FIRST ISSUE	DV	CC

DRAWING STATUS: PLANNING APPLICATION



Three White Rose Office Park, Millshaw Park Lane, Leeds LS11 0DT
Tel: +44 (0)113 395 6200 Fax: +44 (0)113 395 6201
www.wspgroup.com www.pbworld.com

CLIENT: 122 OLD HALL STREET LIMITED

ARCHITECT: HODDER + PARTNERS

PROJECT: OLD HALL STREET, LIVERPOOL

TITLE: INDICATIVE DRAINAGE STRATEGY LAYOUT

SCALE @ A3: 1:250	CHECKED: DV	APPROVED: CC
CAD FILE: 70023367-D-001 P02	DESIGN-DRAWN: LB	DATE: November 2016
PROJECT No: 70023367	DRAWING No: 70023367-D-001 P02	REV: P02

© WSP Group Ltd

