

Renaker - Crown Street Phase 3

Flood Risk Assessment and Drainage Strategy

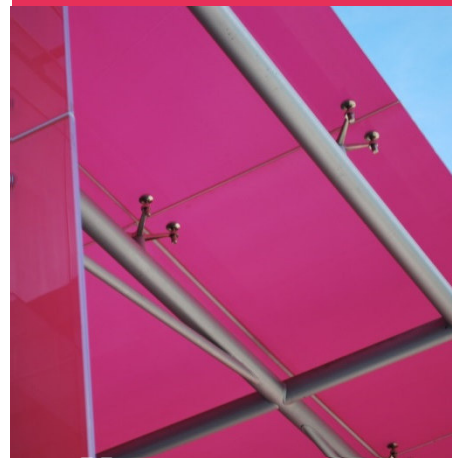
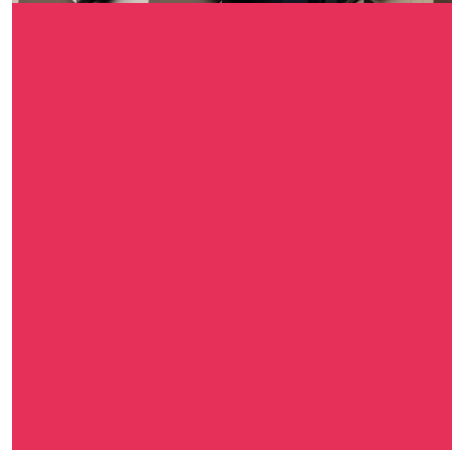
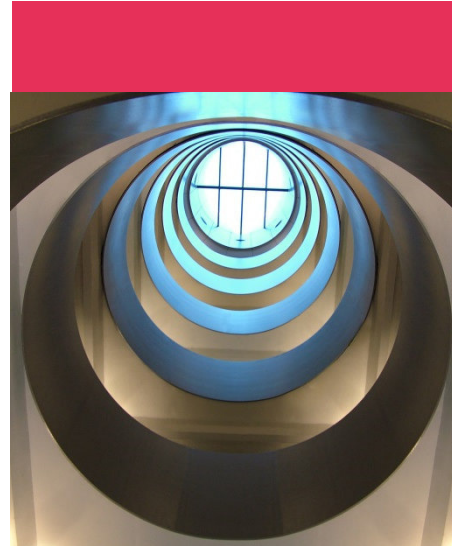
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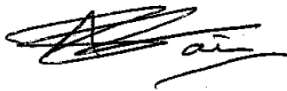
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Control Sheet

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1.0 Introduction

1.1 Project Background

- 1.1.1 Curtins was appointed by Renaker Build Ltd to provide a Flood Risk Assessment (FRA) and Drainage Strategy for the proposed works to Crown Street Phase 3, adjacent to Great Jackson Street (GJS) in Manchester.
- 1.1.2 This report provides information regarding flood risk at the development site and evaluates flood risk from all sources. This report has been prepared in accordance with local, regional, and national guidance in relation to development and flood risk.
- 1.1.3 This report is based on the development proposals at the time of writing and includes the results of preliminary discussions with the design team. Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.
- 1.1.4 Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Curtins shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Curtins.

1.2 Scope of Assessment

- 1.2.1 The assessment has been undertaken in accordance with the standing advice and requirements of the Environment Agency (EA), the Lead Local Flood Authority (LLFA) and the National Planning Policy Framework (NPPF).
- 1.2.2 The assessment will:
 - Investigate all potential risks of flooding to the site,
 - Consider the impact the development may have elsewhere with regards to flooding,
 - Consider design proposals to mitigate any potential risk of flooding determined to be present; and
 - Consider foul & surface water drainage proposals for the development site.
- 1.2.3 The total site area for Crown Street Phase 3 is approximately 0.88ha. The EA Flood Map for Planning confirms the site is situated within Flood Zone 1.
- 1.2.4 The Manchester City Council's Strategic Flood Risk Assessment (MCC SFRA, 2011) shows that the site lies within a Critical Drainage Area (CDA). A site-specific FRA is therefore required to support a planning application.

- 1.2.5 In April 2015, the Government made changes to the National Planning Policy Framework which made Sustainable Urban Drainage Systems (SuDS) a material consideration in the determination of planning applications for 'major' developments. A Drainage Strategy will therefore be required as part of the planning application for the development, as the site is classified as a 'major' development by the Town and Country Planning Order 2015.
- 1.2.6 This Flood Risk Assessment and Drainage Strategy reviews the following information:
- EA Flood Maps for planning for flooding from main rivers and the sea.
 - UK Government Flood Warning Information Service maps for surface water and reservoir flooding.
 - Manchester City, Salford City and Trafford Councils Level 1 Hybrid SFRA, March 2010.
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, May 2010.
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2011.
 - Greater Manchester Surface Water Management Plan, Stage 1 – A Strategic Assessment of Surface Water Flood Risk, January 2012
 - MCC Sustainable Drainage Systems (SuDS) Requirements for New Developments.
 - Greater Manchester Surface Water Management Plan (January 2012)
 - United Utilities (UU) Public Sewer Records
 - IWJS Ltd CCTV drainage Inspection Reports, issued in 2019 and 2020
 - The topographical surveys by Malcolm Hughes Land Surveyors (Feb 2017), Survey Operations (Nov 2016) and N D Oliver & Co (April 2021).

1.3 Proposed Development

- 1.3.1 Crown Street Phase 3 includes part of Plot C and Plot E of the Great Jackson Street Framework for the erection of four residential buildings, two at circa 47 storeys and two at circa 51 storeys providing approximately 1,666 residential units and ground floor flexible commercial use.
- 1.3.2 The Proposed Site Layout is enclosed in *Appendix A*. The development proposals are further detailed in Section 3 of this report.

2.0 Existing Site Details

2.1 Location

- 2.1.1 The Crown Street Phase 3 development comprising of plots C7, C8, E1 and E2 of the GJS Framework area. Within the general area adjacent to Crown Street Phase 3 Renaker are also proposing the development of Plot D. The location of the Crown Street Phase 3 development and the proximity of the Plot D development can be seen in Figure 1 and 2.



Figure 1 - Google Earth image of the Site Location, 2022

- 2.1.2 The approximate postcode of the application site is M15 4PA and the approximate Ordnance Survey grid reference of the site is SJ832972, with eastings and northings 383291, 397265.
- 2.1.3 Plots C7 and C8 are occupied by the Renaker Marketing Suite and an office, Carers Manchester. Plots E1 and E2 are occupied by the Olympia Trading Estate (light industrial units).
- 2.1.4 The Site is currently accessed from GJS, Mancunian Way, Silvercroft Street or Melbourne Street.
- 2.1.5 GJS runs between plots C and E, Silvercroft Street bounds the site to the north, Owen Street to the east, along with a recently developed site, Melbourne Street bounds the site to the south, and Crown Street bounds the sites to the west.

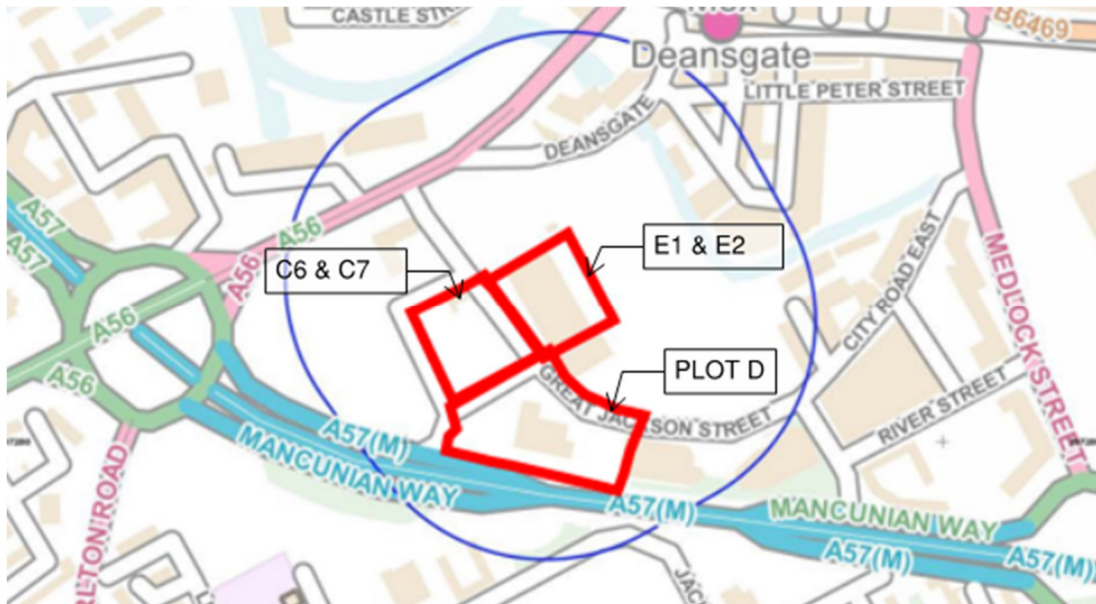


Figure 2 – Site Location Map, Archaeological Services Mapping, 2022

2.2 History and Designations

- 2.2.1 Historical maps from 1908 show the site was occupied with terraced housing and associated access roads. In the 40's, 50's and 60's some of the terraced housing was replaced with garages, Knot Mill and a car compound.
- 2.2.2 The Site does not include any designated areas afforded special protection, such as areas of ecological or biodiversity value.
- 2.2.3 The site is itself located within Manchester City Centre and the Regional Centre as defined in the Manchester City Council Local Development Framework.

2.3 Existing Watercourses and Other Waterbodies

- 2.3.1 The River Medlock is a Statutory Main River and is therefore maintained by the Environment Agency. The River Medlock is located approximately 100m east of the site at its closest point, and 160m from the centre of the site.
- 2.3.2 Located approximately 150m north of site or some 220m from the centre of the site is the Bridgewater Canal. The canal is owned and operated by The Bridgewater Canal Company Limited, part of Peel L&P, in conjunction with the Bridgewater Canal Trust.

2.4 Existing Drainage

2.4.1 An extract from the United Utilities public sewer records has been obtained for the development site and is shown in Figure 3 below. The full records can be found in *Appendix B*.



2.4.5 Various CCTV drainage surveys have been carried out by IWJS in 2019 and 2020. Additional drainage survey information was provided by the client, and this can be found in *Appendix C*. Curtins have provided civil engineering services for other plots as part of the wider GJS Framework (Plot F, Great Jackson Street and Plot C, Greengate), relevant survey information from these sites have also been reviewed and can be found in *Appendix C*.

2.4.6 The findings from these surveys are summarised in Figures 4, and 5. Additional CCTV drainage surveys will be conducted at the detailed design stages, when connection locations are confirmed.

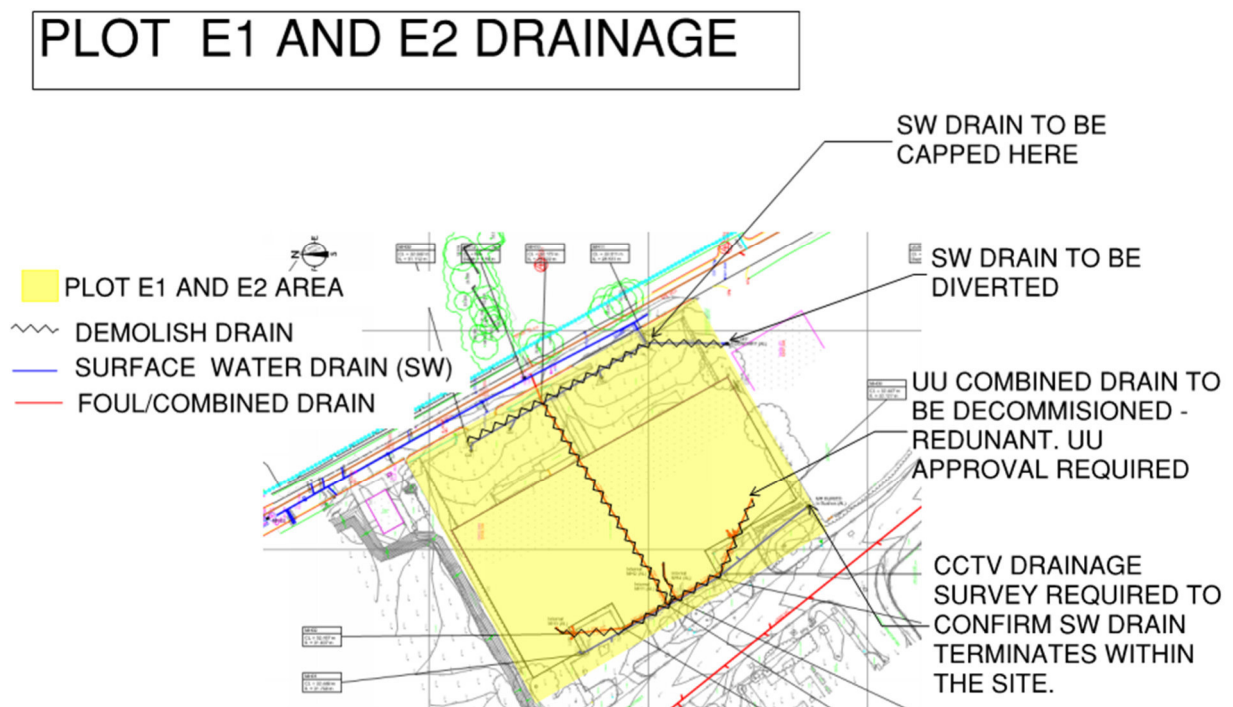


Figure 4 – CCTV drainage survey summary findings – E1 & E2

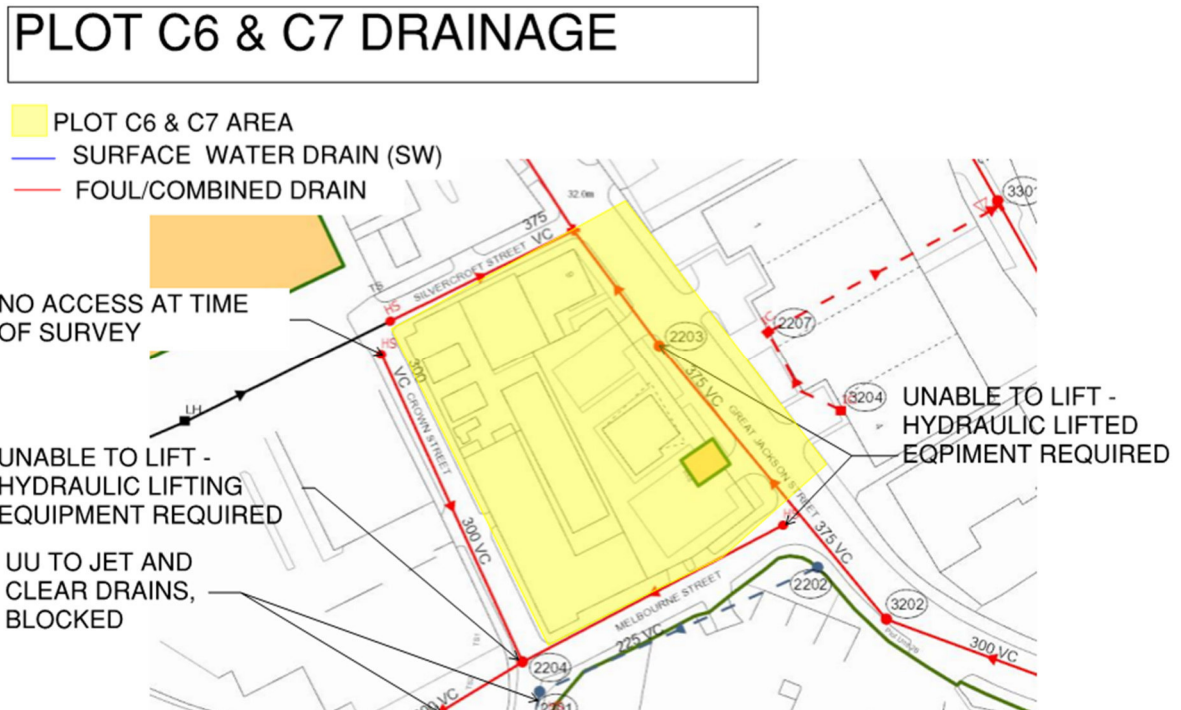


Figure 5 – CCTV drainage survey summary findings – C8 & C7

2.5 Topography

2.5.1 Topographical Surveys have been completed at the site location. This information can be found in *Appendix D*.

2.5.2 Plots E1, E2, C7 & C8 generally fall to the north-east, with levels ranging from around 33.0m AOD to 31.9m AOD. GJS runs between the blocks and falls from south to north.

2.6 Geology & Ground Conditions

2.6.1 The British Geological Survey (BGS) maps indicate that superficial deposits are formed of glaciofluvial sheet deposits – sand and gravel, underlain with bedrock geology of Chester Formation – Sandstone, however the nearby boreholes available on the BGS online mapping suggest that the primary material identified is sands and clays over sandstone. As the site has been previously it is anticipated that made ground will be encountered. The car parking areas could have a build-up of 500mm in areas where the strength of the prevailing ground is poor.

2.6.2 The site is not located within a Groundwater Source Protection Zone. The Groundwater Vulnerability Maps (MAGIC, 2017) show that the site is in an area with 'Medium-High' risk. The Aquifer Designation maps show that the bedrock is classified as a 'Principal' aquifer, while the superficial drift is classified as 'Secondary – A'.

3.0 Development Proposals and Planning Policy

3.1 Development Proposals

The development proposals can be seen in Figure 6 below and full plans can be found in *Appendix A*, along with the documents submitted with this planning application.

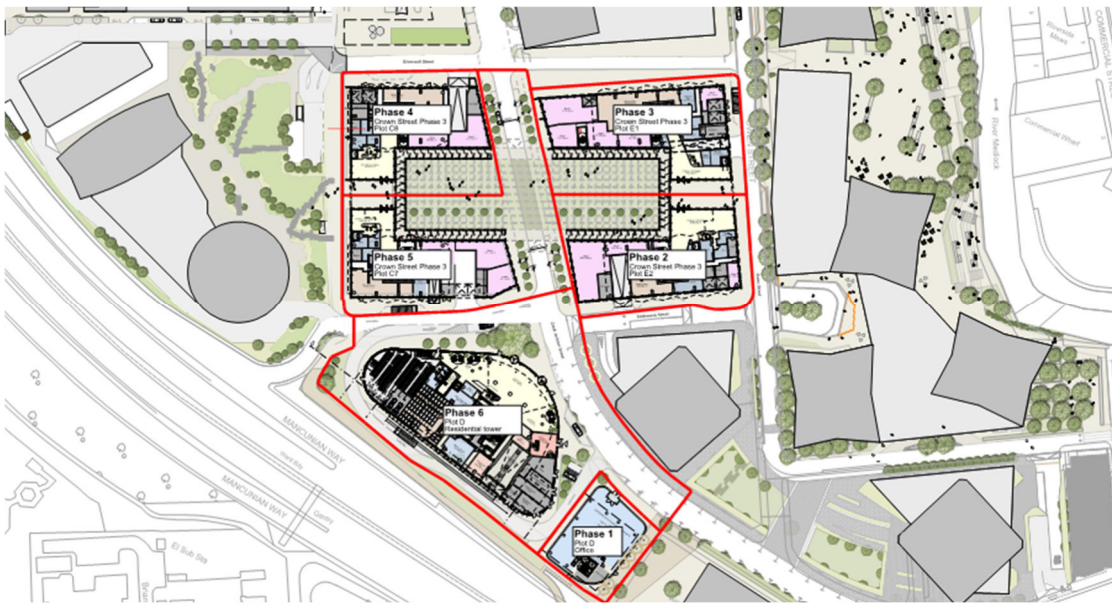


Figure 6 SimpsonHaugh Architects, 2022

3.2 NPPF and Planning Practice Guidance

- 3.2.1 In 2012 the NPPF was published and this was updated in 2018, 2019 and 2021. The supporting Planning Practice Guidance (PPG) was published in 2014 and updated in 2021 and August 2022. The PPG provides guidance on how flood risk should be assessed during the planning and development process.
- 3.2.2 The PPG states that Flood Zone 1 has a low probability of flooding, defined as land having less than a 1 in 1,000 annual probability of river or sea flooding. The development proposals are situated in Flood Zone 1. As the total site area is more than 1 hectare, a site-specific FRA is required to support the application.
- 3.2.3 The PPG classifies the flood risk vulnerability of developments; the development proposals are classified as “Building used for dwelling houses...” and is therefore ‘More Vulnerable’.
- 3.2.4 The PPG Flood Risk Vulnerability and Flood Zone compatibility table can be found in Table 1 overleaf. As the site is in Flood Zone 1 and is ‘More Vulnerable’, therefore the site passes the ‘Sequential Test’.

Table 1: (Extract from Planning Practice Guidance) Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	x	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	x	x	x	✓*

Key:

✓ Development is appropriate

x Development should not be permitted.

3.2.5 The site is located within Flood Zone 1 for which 'More Vulnerable' development is deemed to be appropriate. Therefore, an 'Exception Test' is not required.

4.0 Hydrological Assessment

4.1 Sources of Flood Risk

4.1.1 This study assesses the risk of flooding from all sources to the development site, taking into consideration climate change, as well as the effect of the development on neighbouring sites. The approach to assessing flood risk at the development site was informed by the requirements of NPPF and PPG, in conjunction with the client and Environment Agency requirements. Regional and local flood risk policies and guidance has been adhered to; this is referenced in the following sections, where applicable.

4.2 Fluvial and Tidal Flooding (Main Rivers and the Sea)

4.2.1 The EA's Indicative Flood Map for Planning shows the site is situated in Flood Zone 1, an area at low risk of flooding from rivers and the sea. Developments in this zone do not have any restrictions, provided they do not increase flood risk elsewhere. This can be seen in Figure 7 below.

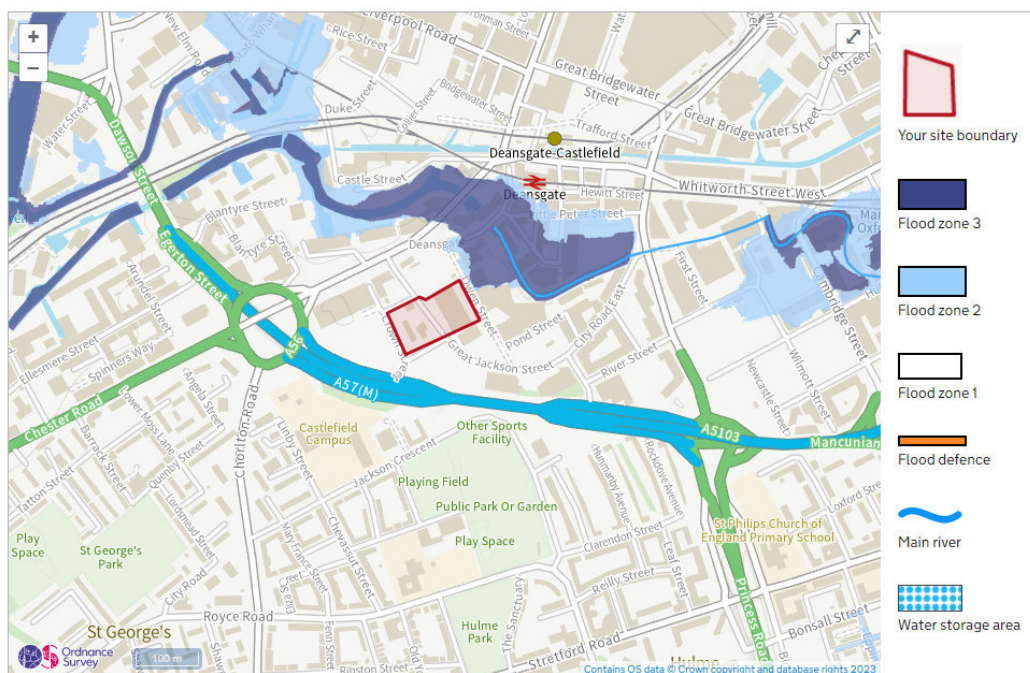
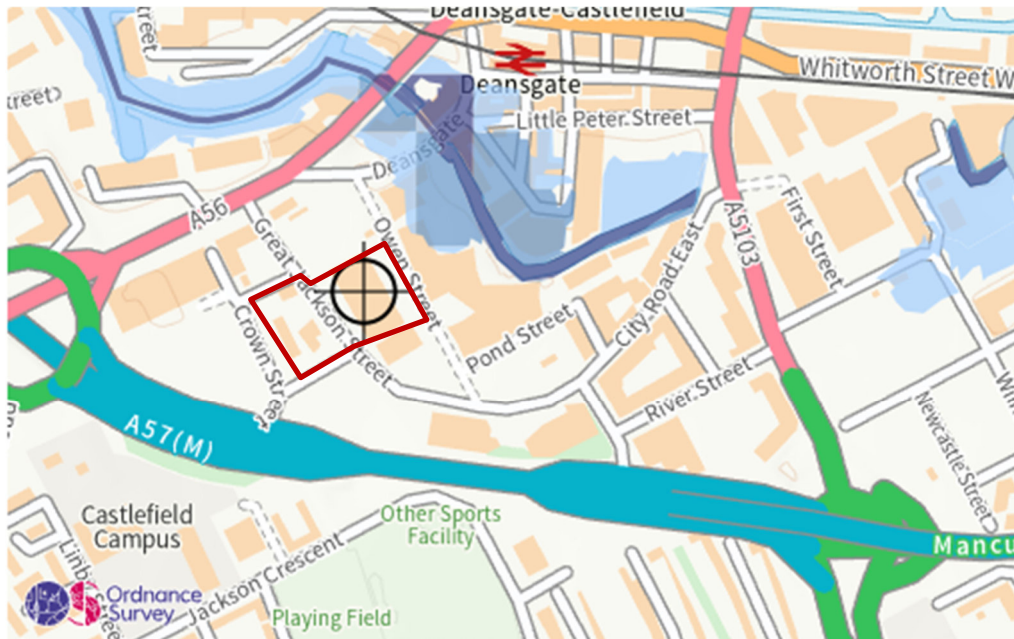


Figure 7 EA Flood Map for Planning Extract, EA 2022

4.2.2 The web based 'Long Term Flood Risk Assessment for Locations in England' has also been reviewed; this can be seen in Figure 8. This shows the site, considering long term risk, is at extremely low risk of flooding from rivers and the sea (the site area is not identified as very low risk).



Extent of flooding from rivers or the sea

● [High](#)
● [Medium](#)
● [Low](#)
● [Very low](#)
⊕ Location you selected

Figure 8 Long Term Flood Risk Service, Extent of Flooding, 2022

4.3 Reservoir Flooding

4.3.1 Reservoir flooding is unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Environment Agency is the enforcement authority and ensures that reservoirs are inspected regularly, and essential safety work is carried out. The Long-Term Flood Risk Assessment (Flood Risk from Reservoirs) map represents the worst-case scenario and this map can be seen below in Figure 9. This shows the site is at low risk of reservoir flooding.



Figure 9 Long Term Flood Risk Assessment Map – Flood Risk from Reservoirs

4.4 Canal Flooding

4.4.1 The nearest canal to the site is Bridgewater Canal, approximately 220m to the north of the site.

4.4.2 The MCC SFRA references 'Map MM_3.1 – Canal Hazard Zones' which identifies the potential extents of flooding cause by overland flows from the Canal.

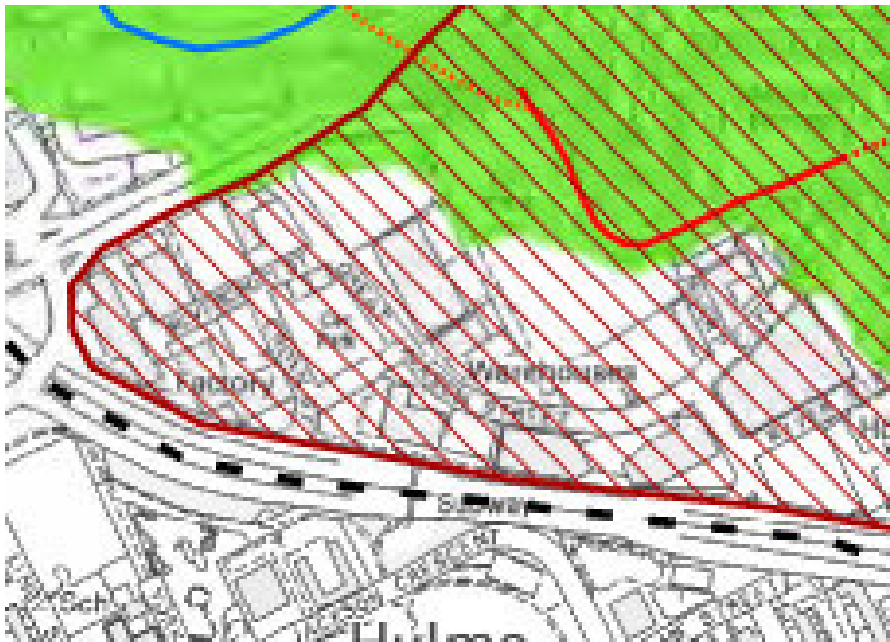


Figure 11 MCC SFRA Canal Hazard Zones Map MM_3.1 Extract, 2011

4.4.3 The green hatch extents above identifies the area potentially impacted by a canal breach. The development is located outside of the area affect and therefore would be considered as being at “Low Risk”

4.4.4 The SFRA states the Bridgewater Canal is a ‘Broad Canal’. The SFRA states “*These [broad] canals do not pose a direct flood risk as they are controlled water bodies with regulated flows. However, there are residual risks associated with lower probability events such as breaching of embankments. The residual risk associated with canals is unknown as it depends on a number of factors including: the source of water into the canal, materials used within the canal embankments and the condition of those embankments. The risk is limited due to continued maintenance by... the Manchester Ship Canal Company (Bridgewater Canal) and the controlled volume of water within an impounded length.*”

4.4.5 The SFRA states specific food risk issues to the Bridgewater Canal. One issue relevant to the site location is “*a potentially high inflow to the Bridgewater Canal from the River Medlock or Corn Brook during flood conditions*”. The site is at low risk of flooding from main rivers (the River Medlock), therefore the

accumulated flood risk is also considered low. This is reaffirmed by the SFRA Hydraulic Interactions Map HI_5.1, shown in Figure 10 below. The site is not identified as being at risk from hydraulic interactions.

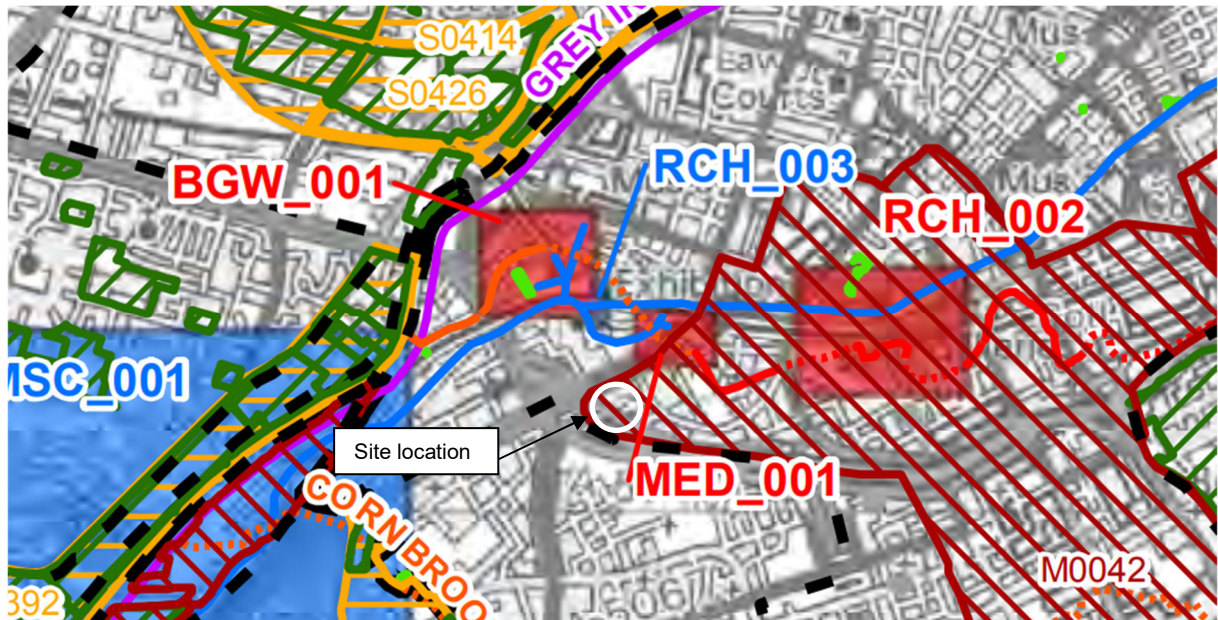


Figure 10 MCC SFRA Hydraulic Interactions Map HI_5.1 Extract, 2011

4.4.6 It is therefore concluded that the site is at low risk of canal flooding.

4.5 Groundwater Flooding

4.5.1 Groundwater flooding tends to be more persistent than other sources of flooding, typically lasting for weeks or months rather than hours or days. Groundwater flooding does not generally pose a significant risk to life due to the slow rate at which the water level rises; however, it can cause significant risk to property.

4.5.2 According to the MCC SFRA, there are no known reports of groundwater flooding in the Manchester, Trafford and Salford authorities.

4.5.3 The site is not shown to be within an area at risk of groundwater flooding according to the Groundwater Flooding Map shown within the MCC SFRA. This is shown in Figure 11 below.

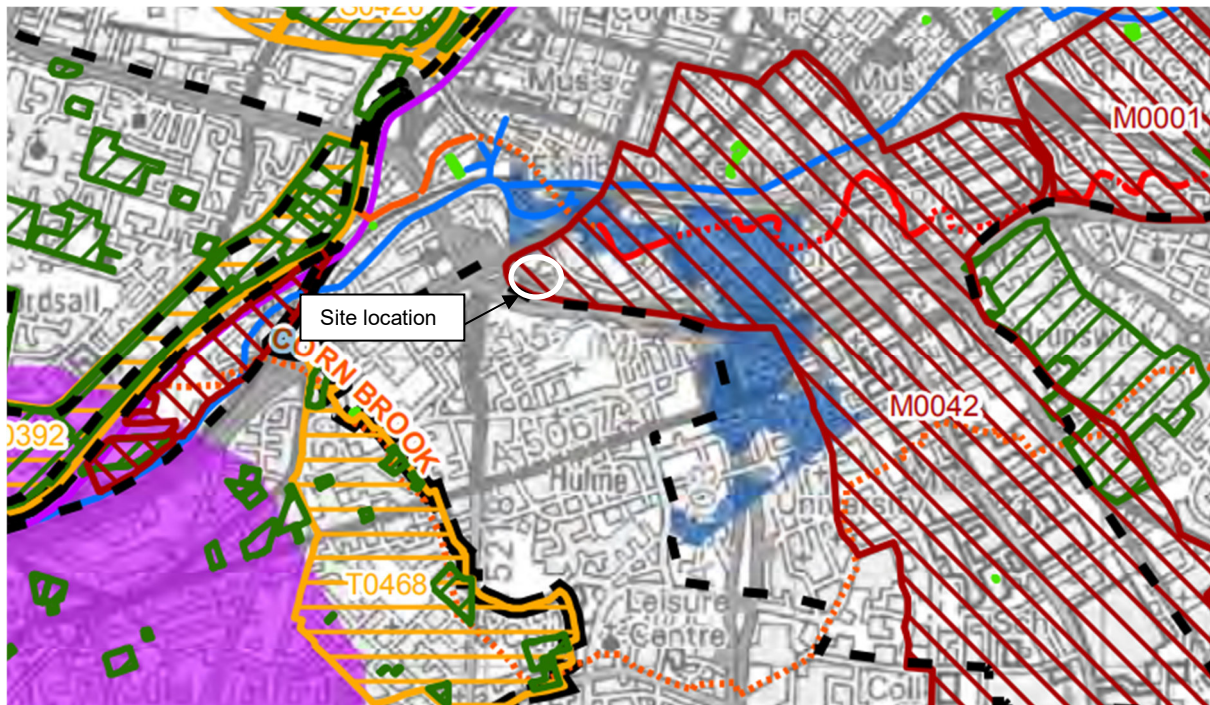


Figure 11 MCC SFRA Groundwater Flooding Map GW_2.1 Extract, 2011

- 4.5.4 The development proposals for plots C7, C8, E1 and E2 include triple storey basements. These structures will be fully waterproofed to prevent the ingress of groundwater into the building. Ground water monitoring will be carried out and the basement levels will be designed considering the results of the groundwater monitoring and detailed geotechnical investigative reports.
- 4.5.5 Based on the above, the site location is at low risk of groundwater flooding. As basement levels are proposed, as a precaution, mitigation measures are proposed in section 5, to reduce the risk of groundwater flooding further.

4.6 Flooding from Infrastructure Failure

- 4.6.1 Surcharging sewers can result in overland flows which if originating at a higher elevation than a development site can potentially pose a flood risk.
- 4.6.2 Section 2.4 of this report describes the existing public sewers at the site location. No highways drainage has been identified (owned and maintained by Manchester Highways) near to the site. It should be noted that some of the UU public sewers were found to be heavily silted when the CCTV drainage surveys took place. UU have been notified and further CCTV drainage work will take place at detailed design stages. Blocked drains will be high pressure jetted as part of this survey work.

- 4.6.3 United Utilities have not provided any records of flooding to the site or the vicinity. The CCTV drainage surveys show that the combined public sewers are deep and therefore the risk of sewers surcharging to the surface is low.
- 4.6.4 Manchester City Council have confirmed that they do not hold any flooding records for the site or in the vicinity.
- 4.6.5 Providing United Utilities and Manchester City Council maintain their drainage assets within and in the vicinity of the site, the risk of flooding to the proposed development site from public sewers or highway drainage is considered as low.

4.7 Surface Water Flooding to the Site

- 4.7.1 Surface water flooding occurs when intense rainfall is unable to soak into the ground or enter a drainage system due to blockages or the capacity of the system being exceeded. Overland flows can also be generated by burst water mains, failed dams and any failure in a system storing or transferring water.
- 4.7.2 The Long Term Flood Risk Maps represent the worst case scenario and can be seen overleaf in Figure 12. This shows that there is 'low' surface water flood risk along Silvercroft Street, Crown Street and Melbourne Street. These streets surround blocks C7 & C8. The flooding is confined to the roads, where levels are lower. Therefore, blocks C7 & C8 are at very low surface water flood risk.
- 4.7.3 There is an area of 'medium' surface water flood risk along Owen Street, to the east of plots E1 and E2. This corresponds to an area where levels are locally lower than the surrounding levels. The topographical surveys show that there are road gullies along the length of Owen Street and specifically in the area identified as at 'medium' surface water flood risk. Positive drainage therefore reduces the flood risk in this area from 'medium' to 'low'. Blocks E1 & E2 will be set at a level higher than the existing road level. Therefore blocks E1 & E2 are considered to be at low risk of surface water flooding.
- 4.7.4 Figure 12 defines the location and the level of risk of surface water flooding at the boundaries of the proposed development.

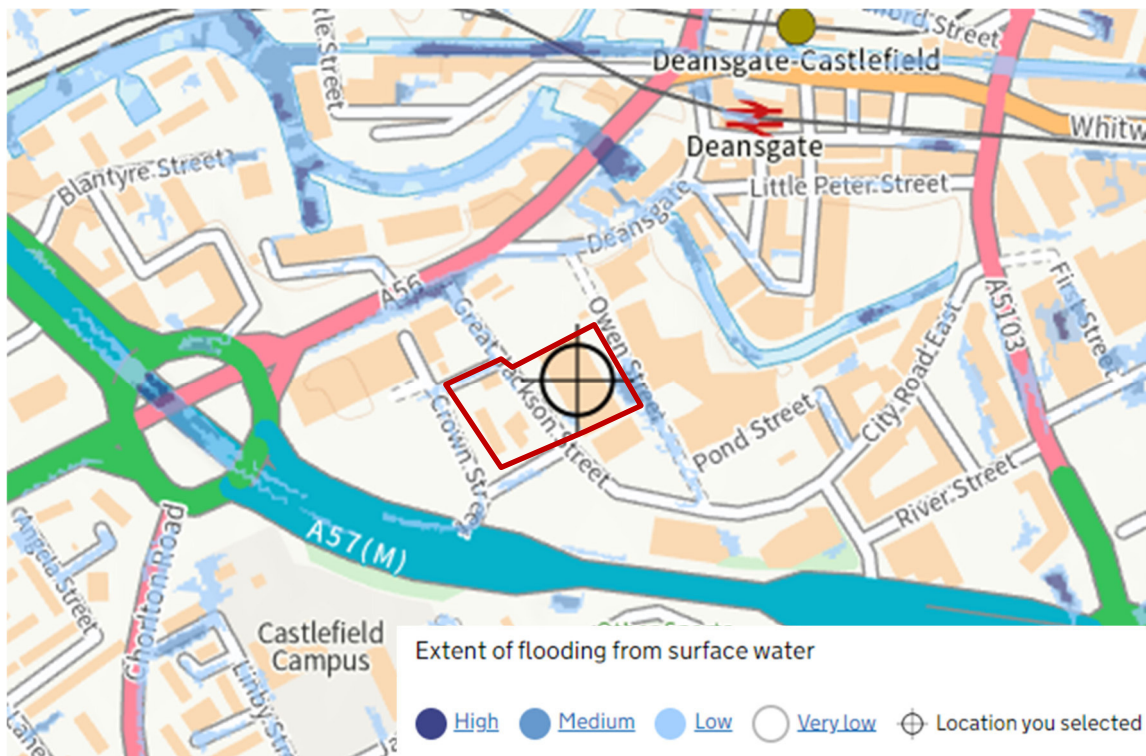


Figure 12 Long Term Flood Risk Service Map, 2022

4.7.5 Considering the above information, the risk of surface water flooding to the site is generally considered very low. As such, mitigation measures are proposed in Section 5 to ensure that the 'very low' risk can be maintained throughout the development site.

4.8 Surface Water Flooding from the Site

4.8.1 Developers are responsible for ensuring that new development does not increase the flood risk elsewhere. Where new development is proposed, the proposed surface water drainage network shall be designed to not flood for the critical 1 in 30-year storm event and flood water generated up to the critical 1 in 100-year plus climate change storm event shall be constrained within areas on site so as not to cause damage to buildings, essential services or adjoining developments and services.

4.8.2 Any development has the potential to increase flood risk where additional run-off from proposed roads, paved areas and building roofs are discharged freely into the downstream drainage network. It is therefore encouraged to propose permeable areas, landscaping areas and incorporate sustainable drainage features utilising infiltration or attenuation where possible.

4.8.3 It should be noted that the site is brownfield and impermeable areas are not being increased as part of the development proposals. Section 5 and 6 of this report details how surface water will be managed from the site, to ensure there is no determinantal effect on the surrounding developments.

4.8.4 The risk of surface water flooding from the site is therefore considered low.

4.9 Summary of Flood Risk

4.9.1 From the evidence collated, the main types of flooding that may apply to the proposed development site are as follows:

- Fluvial and Tidal – the site is in Flood Zone 1 and has a low probability of flooding (less than 0.1% annual probability of river or sea flooding).
- Reservoir Flooding – the site is at low risk.
- Canal Flooding – the site is at low risk, also considering hydraulic interactions.
- Groundwater Flooding - low, however mitigation actions will reduce this further.
- Infrastructure failure - low, however there are mitigation actions to reduce this further.
- Surface water flooding to the site – low, post-development.
- Surface water flooding from the site - low, subject to the mitigation measures.

4.9.2 Mitigation measures to control the risk of flooding are outlined in section 5.

5.0 Mitigation

5.1 Groundwater Flooding - Mitigation

- 5.1.1 Plots C7, C8, E1 & E2 have basement structures.
- 5.1.2 All basement structures will be fully waterproofed, to prevent the ingress of groundwater. Basement structures will be designed in accordance with the recommendation of the Geotechnical findings, to ensure flood risk from groundwater is 'low'.
- 5.1.3 External ground levels across the site should fall away from the proposed buildings to ensure there is no local ponding (other than those used intentionally for drainage features) in order that in the unlikely event of groundwater flooding, the flood water is safely routed away from the buildings on site.

5.2 Infrastructure Failure - Mitigation

- 5.2.1 While the risk of flooding from infrastructure failure is considered low, CCTV drainage surveys have identified that some of the UU infrastructure close to the site is heavily silted.
- 5.2.2 UU have been notified, as these drains should be jetted and cleared. As part of the detailed design stages, further CCTV drainage surveys will be commissioned. Drains will be high pressure jetted, if required.
- 5.2.3 The above mitigation measures will reduce the risk of flooding from infrastructure failure, post development.

5.3 Surface Water Flooding to the site - Mitigation

- 5.3.1 The UK Government Long Term Flood Risk Surface Water Flood Maps (Figure 12) indicate that the site is at very low to medium risk of surface water flooding.
- 5.3.2 Plots C7, C8, and E1 are at very low risk of surface water flooding. There is 'low' surface water flood risk on roads surrounding the plots, however this will be confined to the road where levels are lower.
- 5.3.3 There is an area of 'medium' surface water flood risk along Owen Street. This encroaches onto the Plot E2 area. The area of 'medium' surface water flood risk corresponds to an area where levels are locally lower than the surrounding levels. The E2 development will be designed to ensure that levels fall away from the building, preventing surface water ponding on the development site. The topographical survey shows that there is positive drainage to the road in this location, that reduces the risk from 'medium' in this location to 'low'.
- 5.3.4 It is assumed that the surface water drainage outside of the site boundary will be subject to the relevant landowner's regular drainage maintenance schedule.

5.3.5 Providing the above measures are implemented, surface water flood risk to the development site is considered low post development.

5.4 Surface Water Flooding from the site – Mitigation

5.4.1 Any new development site drainage should be designed to provide adequate capacity for the critical 1 in 30-year storm event, and flood water generated from up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments & services.

5.4.2 In May 2022, the EA updated climate change allowances for peak rainfall intensities which should be applied to new developments. Figure 13 below shows this.

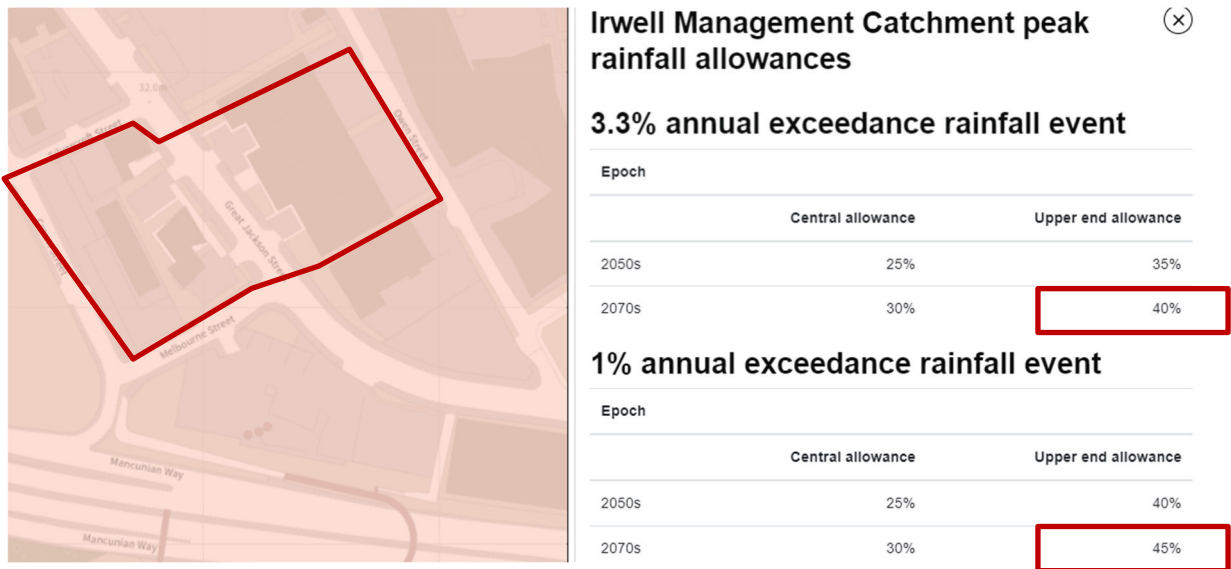


Figure 13 Defra Data Services Platform, Climate Change Allowances, Peak Rainfall Allowances Map, 2022

5.4.3 Figure 13 shows that for a development with lifetime between 2061 and 2125, a 45% allowance for climate change should be used for the 1 in 100-year storm event.

5.4.4 Section 6 outlines the surface water drainage strategy, that includes a 45% allowance for climate change and also an allowance for the drainage of surface water from the building façade's which based on the height of the building has the potential to generate significant flows.

5.4.5 To minimise localised flooding within the site, the drainage design should ensure that gullies, drainage channels and drains are all suitably sized to accommodate peak storm flows. Also, all inlet features should have suitably sized sumps to catch silts and should be subject to a documented routine maintenance and cleansing regime.

5.4.6 Providing the above measures are implemented, surface water flood risk from the development site is considered low post development.

5.4.7 Section 6 reviews the surface water management options, and it is proposed that the surface water will discharge to the combined public sewers as follows:

- E1 & E2 discharge rate 5l/s, connecting to the combined sewer in GJS
- C7 & C8 discharge rate 5l/s, connection to the combined sewer in GJS

This is subject to United Utilities approval, as well as the LLFA.

5.4.8 The LLFA and/or UU may require lower surface water discharge rates, that is turn will increase surface water attenuation requirements for each of the plots.

6.0 Drainage Strategy

6.1 Works to the Existing Sewer Network

- 6.1.1 Plot E1, E2, C7 and C8 are not impacted by the existing UU sewer network and as such there is no requirement to divert abandon or apply for right to build within the sewer easement via a “buildover agreement”

6.2 Existing Surface Water Runoff Rates

- 6.2.1 The existing runoff rate for the design storm events was calculated using the modified rationale method, as shown below:

$$Q_x = 2.78 \times i \times A$$

Where ‘A’ is the catchment area in ha and ‘i’ is the rainfall intensity in mm/hr as estimated from Micro Drainage software.

Table 2 Existing Peak Rainfall Rates

Plot	Area (ha)	Rainfall Intensity (mm/hr)			Peak rate (l/s)		
		1 in 1 year	1 in 30 year	1 in 100 year	1 in 1 year	1 in 30 year	1 in 100 year
C7	0.175	26.803	65.562	84.641	13.010	31.823	41.084
C8	0.192				14.314	35.013	45.202
E1	0.214				15.961	39.041	50.402
E2	0.204				15.178	37.127	47.931

- 6.2.2 As noted in Section 2.4, the site currently drains surface water to the UU combined public sewers. Further CCTV drainage surveys will be carried out at the detailed design stages to confirm the existing drainage arrangements in more detail.

6.3 Proposed Surface Water Runoff Rates

- 6.3.1 For this residential development, which is classed as ‘More Vulnerable’, with a design life of 100 years an allowance of an additional 45% is considered appropriate. Refer to Section 5.4 for further information on climate change allowances.
- 6.3.2 In accordance with national, regional and local policy, Sustainable Drainage Systems (SUDS) will be used to reduce peak surface water flow rates from the site.

- 6.3.3 At the time of writing, a Pre-development Inquiry had been submitted to United Utilities, to confirm the required discharge restriction applicable to the development site. The design currently restricts the discharge to 5l/s per development area. An approval in principle has also been sought from the LLFA.

6.4 SUDS Assessment

- 6.4.1 The possibility of implementing SUDS at the site was assessed using a hierarchy of preferred surface water management methods. The following paragraphs discuss the various methods in order of that hierarchy and evaluate the site's suitability for each method.

Infiltration

- 6.4.2 Plots C7, C8, E1 and E2 have basement levels that occupy much of the site area. There is insufficient space, 5m away from structures and foundations that would be acceptable for infiltration systems.

Watercourse

- 6.4.3 The River Medlock is located approximately 160m to the east of the development site. Plot A and Plot F of the GJS Framework are situated between the development site and the river. Plot A is now complete, and Plot F is programmed ahead of Crown Street Phase 3. As part of the general surface water strategy for the area there is an outfall into the River Medlock but this will be at capacity following the connection of Plot F. It is therefore not reasonably practical to form a new connection to the River Medlock, via Plot A and Plot F. Survey information also indicates Owen Street is congested with utilities – the constraints posed by the utilities further prevents the installation of a new surface water drainage pipe for the proposed developments, to outfall to the River Medlock.

Surface Water Sewer

- 6.4.4 Section 2.4 summarises the UU public sewers in proximity to the site. There are no surface water sewers that serve plots C7, C8, E1 and E2.

Combined Water sewer

- 6.4.5 There are various combined sewers in the vicinity of the site. Having reviewed the disposal of surface water from the development against the surface water hierarchy the only practical solution, is a proposed connection to the UU combined public sewers.

6.5 Proposed Surface Water Drainage Strategy

- 6.5.1 As infiltration and discharge to a watercourse is not practically feasible, surface water will be attenuated to ensure there is a significant betterment on existing surface water runoff rates to the combined public sewers.

- 6.5.2 For all buildings C7, C8, E1 and E2, an above ground cellular attenuation tank is proposed at the basement B1 level which will store water generated from the buildings. Surface water generated by the external public realm area will be attenuated within the pavement build-up, before being discharged to the public sewers via flow control. This is illustrated in Figure 14 below.

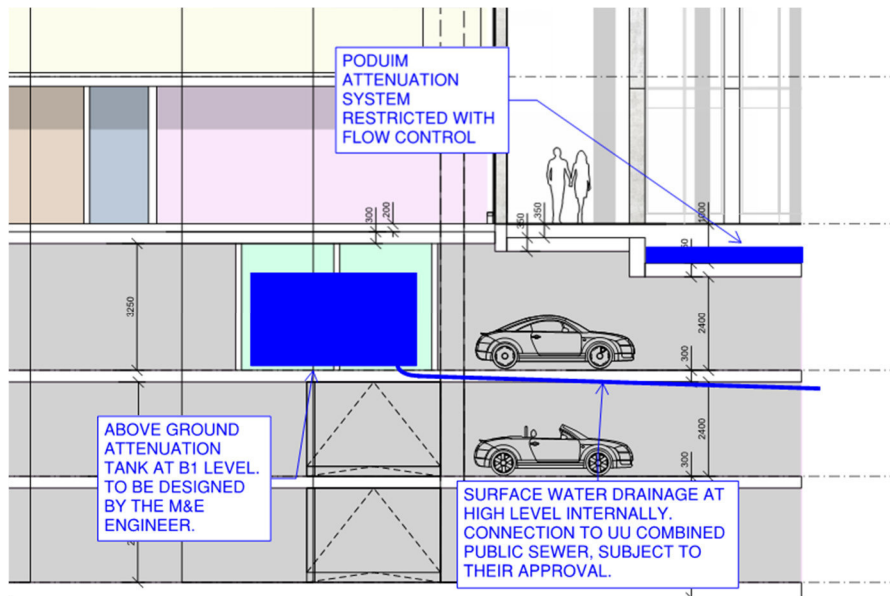


Table 3 Proposed Attenuation Volumes and Rates – 5 l/s per plot

Plot	Area Name	Area	rate	system	Attenuation volume	example
		ha	l/s		m3	
C7	building	0.138	4	tank	70	3.5x10x2m
C7	landscape	0.036	1	subbase		
C8	building	0.151	4	tank	90	4.5x10x2m
C8	landscape	0.041	1	subbase		
E1	building	0.171	4	tank	100	5x10x2m
E1	landscape	0.044	1	subbase		
E2	building	0.161	4	tank	90	4.5x10x2m
E2	landscape	0.042	1	subbase		

6.6 Proposed Foul Water Drainage Strategy

- 6.6.1 It is proposed that foul water drainage from ground floor level and above will be collected and discharged via pipework suspended below the ground floor slab and discharged to the surrounding combined public sewer network by gravity. All foul water drainage will be constructed in accordance with Building regulations, Part H.
- 6.6.2 Current basement plans do not show any requirements for foul drainage at this stage; however the following is assumed:
- Pumps in car parks are limited to firefighting lift sump – this will be pumped internally to the nearest suitable gravity outfall.
 - Dry sumps in plant rooms will have a puddle sucker type mobile pumps, provided by the FM team, which will be directed to the nearest suitable gravity outfall.
 - The car park will have strategically placed dry sumps with covers which will have a puddle sucker type mobile pumps, provided by the FM team, which will be directed to the nearest suitable gravity outfall.
- 6.6.3 In accordance with United Utilities standard advice, all foul water from basements will be pumped to ensure that surcharging of the existing sewer does not back up into the site drainage.
- 6.6.4 It is assumed that all foul water drainage will remain privately maintained. Where sewers remain private, connection to the public sewer network will be subject to a Section 106 Agreement with United Utilities. This application will be submitted as part of the detailed design stages.

6.6.5 The proposed foul water drainage strategy is provided in *Appendix E*.

7.0 Surface Water Maintenance Strategy

- 7.1.1 The successful implementation and operation of a SUDS system depends on a robust and clear maintenance strategy being implemented. The following measures should form part of the site's proposed management plan. Maintenance requirements should be prepared and submitted under pre-occupation conditions.
- 7.1.2 It is envisaged that the site drainage will be private and will be owned and maintained by a private management company. However, all shared drainage will be constructed to adoptable standards. The overall SUDS maintenance regime for the site is summarised in the following sections.
- 7.1.3 It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event. Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

SUDS Element	Maintenance		
	Maintenance Schedule	Required Action	Typical Frequency
Permeable Paving	Monitoring / Inspections	Initial inspection	Monthly for three months after installation
		Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 hours after large storms in first six months
		Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
		Monitor inspection chambers	Annually
	Regular Maintenance	Brushing and vacuuming -standard cosmetic sweep over whole surface	Once a year after autumn leaf fall
		Rubbish and litter removal	As required
	Remedial Actions	Remediate any landscaping which through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
		Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to	

SUDS Element	Maintenance		
	Maintenance Schedule	Required Action	Typical Frequency
Attenuation Tank		the structural performance or a hazard to users, and replace lost jointing material	
		Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required
	Monitoring / Inspections	Inspect all inlets, outlets, vents, overflows and control structures to ensure they are working as they should	Annually or after severe storms
	Regular Maintenance	Inspect and identify any elements that are not operating correctly.	Monthly for three months, then Half yearly or as required.
		Remove sediments / debris from catch pits / gullies and control structures	Annually, after severe storms or as required
	Remedial Actions	Repair inlets, outlets, vents, overflows and control structures.	As required

7.1.4 Effective SUDS design must assess all foreseeable risks during construction and maintenance. These must be mitigated during the detailed design stages where effective design will aim to avoid, reduce and mitigate risks.

7.1.5 This process will also require input from the principal contractor who will ensure the construction of SUDS components are carried out in a safe and sustainable manner.

8.0 Conclusions

- 8.1.1 The EA's flood map for planning shows site is situated in Flood Zone 1 and is at low risk of flooding from main watercourses. This report demonstrates that the site is at low risk of flooding from all sources, post development.
- 8.1.2 Mitigation measures have been incorporated, to reduce flood risk further, including:
- Basement structures to be fully waterproofed to prevent the ingress of surface water
 - Basement drainage to be pumped to the public sewers to prevent flooding due to sewer surcharges
 - External levels will be designed to convey water away from the building
 - United Utilities public combined sewers will be high pressure jetted, where they were found to be silted
 - The surface water drainage network has been designed to accommodate the 1 in 100 year storm event, plus 45% for climate change.
- 8.1.3 Items to be progressed following the planning submission include:
- United Utilities approval is required for the proposed foul and surface water rates.
 - Section 106 approval will be required from United Utilities at the detailed design stages.
 - LLFA approval of the advised surface water discharge rates and the point of connection into the UU adopted combined sewer network.
 - Section 278 design should commence at detailed design stages, to progress drainage design in the public highway.
 - Further CCTV drainage surveys are required, to confirm the exact locations and conditions of the existing drainage system.
- 8.1.4 The proposed redevelopment has an acceptable flood risk within the terms and requirements of NPPF.

Appendix A

Proposed Site Layout

Appendix B

United Utilities Sewer Records

Appendix C

CCTV Drainage Survey

Appendix D

Topographical Surveys

Appendix E

Surface Water Drainage Strategy

Appendix A – Proposed Site Layout

Appendix B – UU Sewer Records

Curtins Consulting Ltd

**51-55
Tithebarn Street,
Liverpool,
L2 2SB**

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: 078524 Great Jackson St
Our Ref: UUPS-ORD-275021
Date: 28/04/2021**

Dear Sirs

Location: Great Jackson Street

I acknowledge with thanks your request dated 21/04/2021 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,



Karen McCormack
Property Searches Manager

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:

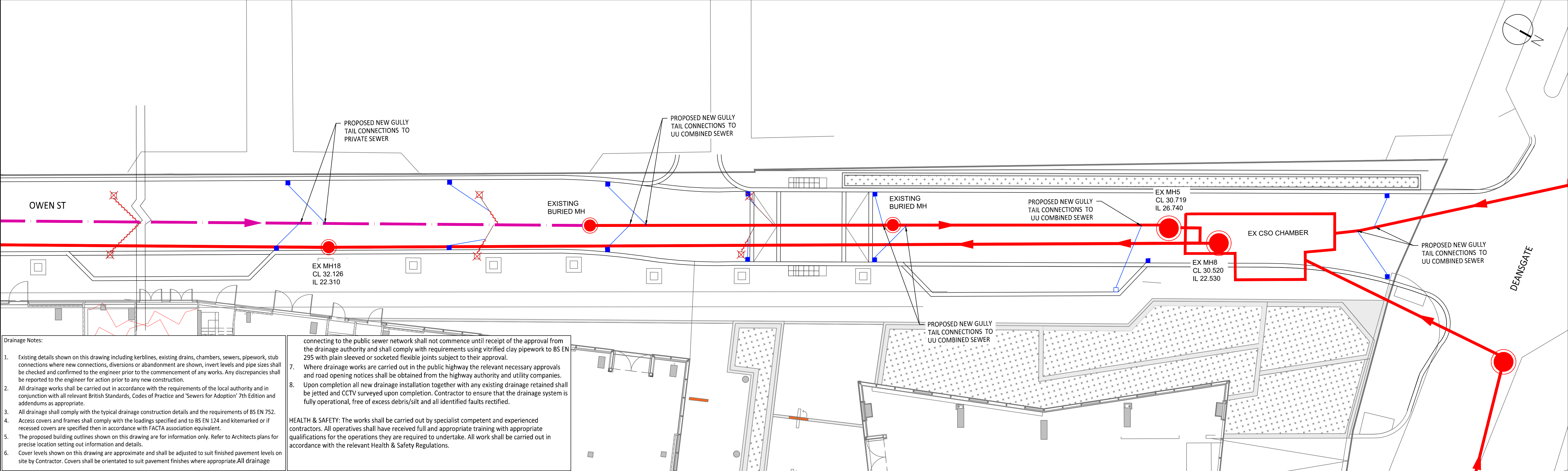
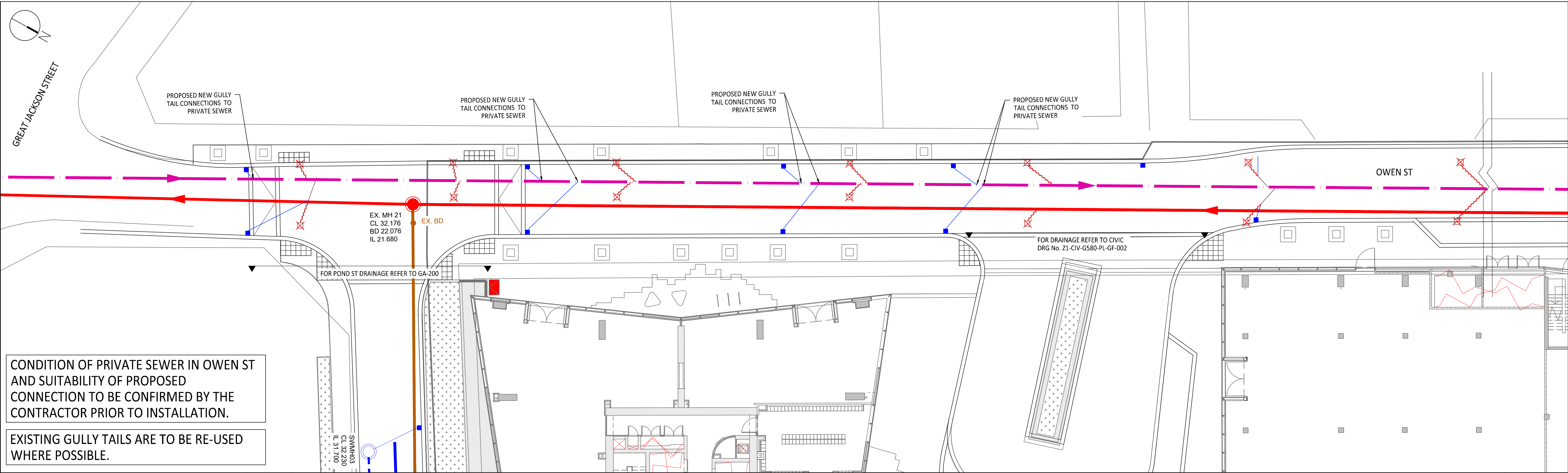
- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out 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.



Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
6914	30.31	SW	23.99	100			VC	2.400157	
2201	32.8	SW	30.78	225			VC	18.24829	1 in 55
4404		CO	0	750			VC	1.812009	
6204	32.35	CO	27.81	375			CO	23.22711	1 in 332
6202	33.39	CO	28.44	610			BR	30.01666	1 in 94
1916		CO	0	375			VC	41.16252	
3504	31.9	CO	30	300			VC	30.06659	1 in 15
4301	28.73	CO	25.33	750			VC	19.0283	
4102	33.8	CO	30.29	300			VC	35.98999	1 in 170
6401	33.84	CO	225				UN	1.098775	
5001	33.88	CO	28.62	375			VC	112.6197	
2901	31.09	CO	24.95	300			BR	68.01155	1 in 299
1101	34.1	CO	30.15	580			BR	38.23534	1 in 117
1303		CO	0	525			VC	19.25358	
3008	33.44	CO	31.13	225			VC	72.18033	1 in 62
2010	33.45	CO	20.15	2600			BR	304.1981	
1005	32.84	CO	24.08	850			VC	68.01155	1 in 158
2503	32.16	CO	24.69	300			VC	37.01351	
3601	33.08	CO	27.56	500			BR	12.20056	1 in 153
5205	34.42	CO	28.34	375			CO	78.26015	1 in 177
3403	28.38	OV	22.35	870			BR	33.54102	
4202		SW	0	580			BR	22.02271	
6516		CO	25.16	225			VC	2.670431	
5506	34.08	CO	375				VC	69.06033	1 in 83
2203		CO	0	375			VC	33.60059	
2104	32.11	SW	30.25	225			VC	31.38471	1 in 23
3107	29.25	SW	28.37	225			VC	52.17279	1 in 1043
6402	33.38		0	2800			BR	85.37564	
6502	36.02	CO	22.59	2400			BR	3.162278	
3105	33.7	CO	28.28	225			VC	45.54119	1 in 108
3501	32.11	CO	28.33	300			VC	37.33031	1 in 4
2103	33.15	SW	31.29	225			VC	55.4366	1 in 277
1100		CO	0	525			VC	12.31109	
6517		CO	28.74	225			VC	15.95625	
1303	33.74	CO	28.74	375			VC	41.82308	1 in 199
3505		CO	0	100			VC	3.076213	
1009	33.4	CO	30.67	300			VC	34.01666	1 in 8
1009	32.75	CO	30.45	300			VC	19.27938	1 in 12
3503	32.24	CO	20.49	300			VC	77.25283	
1906	32.58	CO	26.34	375			VC	8.902258	
5203	32.79	CO	20.36	2600			BR	164.7574	1 in 785
6301	32.03	CO	26.18	670			VC	10.04698	1 in 32
6302	32.33	CO	25.48	450			VC	7.615773	1 in 3
3201	32.89	CO	22.153	300			VC	52.57153	1 in 71
1301	30.88	CO	27.92	300			VC	21.47091	
6201	31.75	CO	27.54	630			BR	62.20767	1 in 82
3301	32.07	CO	22.29	375			VC	99.85258	1 in 434
6102	34.7	CO	28.53	375			CO	33.74201	1 in 178
5804	33.65	CO	30.72	300			VC	32.57259	1 in 142
5505	33.83	CO	26.55	375			VC	30.11522	
6901	34.13	CO	29.01	500			BR	604.1523	1 in 1510
4104	32.93	CO	21.88	375			VC	14.76482	
8902	34.12	CO	28.12	600			VC	14.80124	
1103	33.2	CO	26.4	500			BR	36.76955	1 in 164
4409		CO	0	525			VC	21.93171	
6001	34.15	CO	28.59	375			VC	78.86555	1 in 263
1006	33	CO	23.98	1250			BR	8.56923	
5501	34.91	CO	0	525			VC	15.81139	
5302	32.45	SW	25.64	450			VC	8.062258	
1108		CO	0	525			VC	26.49102	
4103	33.46	CO	20.15	2600			BR	162.0418	
2911	32.55	CO	30.15	225			VC	48.6921	1 in 135
3102	33.85	CO	30.03	300			VC	20.61553	
4501	33.52	CO	26.52	375			VC	36.01389	
2101	32.72	SW	26.82	300			VC	30.0125	
4201	33.28	CO	31.45	225			VC	86.14523	
2902	29.53	CO	24.7	300			VC	12.52996	
6002		CO	0	100			VC	4.258125	
8908		CO	0	100			VC	5.25967	
1002	32.94	CO	27.39	450			VC	2.469666	
5303		SW	0	450			VC	41.10981	
3203	32.14	CO	22.02	375			VC	69.83552	1 in 537
6903	34.03	CO	0	520			VC	11.3895	
4003	33.47	CO	30.73	300			VC	60.41145	1 in 212
5208		SW	0	150			BR	6.403124	
2006	33.17	CO	28.97	375			CO	23.25941	
3202	33.27	CO	26.94	375			VC	83.09633	
3106	33.95	CO	29.86	300			VC	17.88554	1 in 119
1001	32.84	CO	28.87	450			CO	38.64135	1 in 155
2102	33.24	SW	31.09	225			VC	41.31551	1 in 86
4005		CO	0	150			VC	45.81443	
4910		CO	0	100			VC	14.37713	
5401		CO	0	150			VC	78.03767	
5202	33.5	SW	30.06	300			VC	3.605551	
2910	32.47	CO	30.58	225			VC	36.63936	1 in 107
2202	33	SW	31.5	225			VC	71.17584	1 in 108
4002	33.57	CO	30.2	375			VC	85.47514	1 in 150
5301	32.32	CO	21.17	2800			BR	100.7224	1 in 124
1105		CO	0	525			VC	20.72691	
2204		CO	0	300			VC	44.15846	
5002	33.98	CO	31.6	225			VC	73.82411	1 in 97
2401	29.43	CO	28.45	600			BR	6.067763	1 in 4
4001	33.57	CO	31.51	225			VC	70.71718	1 in 93
3902	33.04	CO	27.44	500			BR	42.05948	1 in 100
5003	33.83	CO	30.81	300			VC	77.53223	1 in 149
1004	32.99	CO	23.75	2625			BR	110.8782	1 in 41
1300		CO	0	300			CO	31.37317	
3101	33.45	CO	28.79	375			VC	28.17891	
2105	29.61	SW	28.94	225			VC	36.46567	1 in 76
1911	32.71	CO	28.77	225			VC	17.20465	1 in 1
1107		CO	0	525			VC	28.89222	
5204		SW	0	150			VC	6.839522	
3402	28.41	CO	25.86	225			VC	33.14766	1 in 104
2404	30.4	CO	23.08	890			BR	28.26603	1 in 123
2403	29.24	CO	23.16	225			VC	7.142109	1 in 238

Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
6914	30.31	SW	23.99	100			VC	2.400157	
2201	32.8	SW	30.78	225			VC	18.24829	1 in 55
4404		CO	0	750			VC	1.812009	
6204	32.35	CO	27.81	375			CO	23.22711	1 in 332
6202	33.39	CO	28.44	610			BR	30.01666	1 in 94
1916		CO	0	375			VC	41.16252	
3504	31.9	CO	30	300			VC	30.06659	1 in 15
4301	28.73	CO	25.33	750			VC	19.0283	
4102	33.8	CO	30.29	300			VC	35.98999	1 in 170
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1005	32.84	CO	24.08	850			VC	68.01155	1 in 158
2503	32.16	CO	24.69	300			VC	37.01351	
3601	33.08	CO	27.56	500			BR	12.20056	1 in 153
5205	34.42	CO	28.34	375			CO	78.26015	1 in 177
3403	28.38	OV	22.35	870			BR	33.54102	
4202		SW	0	580			BR	22.02271	
6516		CO	25.16	225			VC	2.670431	
5506	34.08	CO	375				VC	69.06033	1 in 83
2203		CO	0	375			VC	33.60059	
2104	32.11	SW	30.25	225			VC	31.38471	1 in 23
3107	29.25	SW	28.37	225			VC	52.17279	1 in 1043
6402	33.38		0	2800			BR	85.37564	
6502	36.02	CO	22.59	2400			BR	3.162278	
3105	33.7	CO	28.28	225			VC	45.54119	1 in 108
3501	32.11	CO	28.33	300			VC	37.33031	1 in 4
2103	33.15	SW	31.29	225			VC	55.4366	1 in 277
1100		CO	0	525			VC	12.31109	
6517		CO	28.74	225			VC	15.95625	
1303	33.74	CO	28.74	375			VC	41.82308	1 in 199
3505		CO	0	100			VC	3.076213	
1009	33.4	CO	30.67	300			VC	34.01666	1 in 8
1009	32.75	CO	30.45	300			VC	19.27938	1 in 12
3503	32.24	CO	20.49	300			VC	77.25283	
1906	32.58	CO	26.34	375			VC	8.902258	
5203	32.79	CO	20.36	2600			BR	164.7574	1 in 785
6301	32.03	CO	26.18	670			VC	10.04698	1 in 32
6302	32.33	CO	25.48	450			VC	7.615773	1 in 3
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5804	33.65	CO	28.53	375			VC	11.00001	1 in 100
6101	33.65	CO	28.53	375			VC	11.00001	1 in 100
6103	33.65	CO	28.53	375			VC	11.00001	1 in 100
6104	33.65	CO	28.53	375			VC	11.00001	1 in 100
6105	33.65	CO	28.53	375			VC	11.00001	1 in 100
6106	33.65	CO	28.53	375			VC	11.00001	1 in 100
6107	33.65	CO	28.53	375			VC	11.00001	1 in 100
6108	33.65	CO	28.53	375			VC	11.00001	1 in 100
6109	33.65	CO	28.53	375			VC	11.00001	1 in 100
6110	33.65	CO	28.53	375			VC	11.00001	1 in 100
6111	33.65	CO	28.53	375			VC	11.00001	1 in 100
6112	33.65	CO	28.53	375			VC	11.00001	1 in 100
6113	33.65	CO	28.53	375			VC	11.00001	1 in 100
6114	33.65	CO	28.53	375			VC	11.00001	1 in 100
6115	33.65	CO	28.53	375			VC	11.00001	1 in 100
6116	33.65	CO	28.53	375			VC	11.00001	1 in 100
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6124	33.65	CO	28.53	375			VC	11.00001	1 in 100
6125	33.65	CO	28.53	375			VC	11.00001	1 in 100
6126	33.65	CO	28.53	375			VC	11.00001	1 in 100
6127	33.65	CO	28.53	375			VC	11.00001	1 in 100
6128	33.65	CO	28.53	375			VC	11.00001	1 in 100
6129	33.65	CO	28.53	375			VC	11.00001	1 in 100
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6140	33.65	CO	28.53	375			VC	11.00001	1 in 100
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6142	33.65	CO	28.53	375			VC	11.00001	1 in 100
6143	33.65	CO	28.53	375			VC	11.00001	1 in 100
6144	33.65	CO	28.53	375			VC	11.00001	1 in 100
6145	33.65	CO	28.53	375			VC	11.00001	1 in 100
6146	33.65	CO	28.53	375			VC	11.00001	1 in 100
6147	33.65	CO	28.53	375			VC	11.00001	1 in 100
6148	33.65	CO	28.53	375			VC	11.00001	1 in 100
6149	33.65	CO	28.53	375			VC	11.00001	1 in 100
6150	33.65	CO	28.53	375			VC	11.00001	1 in 100
6151	33.65	CO	28.53	375			VC	11.00001	1 in 100
6152	33.65	CO	28.53	375			VC	11.00001	1 in 100
6153	33.65	CO	28.53	375			VC	11.00001	1 in 100
6154	33.65	CO	28.53	375			VC	11.00001	1 in 100
6155	33.65	CO	28.53	375			VC	11.00001	1 in 100
6156	33.65	CO	28.53	375			VC	11.00001	1 in 100
6157	33.65	CO	28.53	375			VC	11.00001	1 in 100
6158	33.65	CO	28.53	375			VC	11.00001	1 in 100
6159	33.65	CO	28.53	375			VC	11.00001	1 in 100
6160	33.65	CO	28.53	375			VC	11.00001	1 in 100
6161	33.65	CO	28.53	375			VC	11.00001	1 in 100
6162	33.65	CO	28.53	375			VC	11.00001	1 in 100
6163	33.65	CO	28.53	375			VC	11.00001	1 in 100
6164	33.65	CO	28.53	375			VC	11.00001	1 in 100
6165	33.65	CO	28.53	375			VC	11.00001	1 in 100
6166	33.65	CO	28.53	375			VC	11.00001	1 in 100
6167	33.65	CO	28.53	375			VC	11.00001	1 in 100
6168	33.65	CO	28.53	375			VC	11.00001	1 in 100
6169	33.65	CO	28.53	375			VC	11.00001	1 in 100
6170	33.65	CO	28.53	375			VC	11.00001	1 in 100
6171	33.65	CO	28.53	375			VC	11.00001	1 in 100
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6190	33.65	CO	28.53	375			VC	11.00001	1 in 100
6191	33.65	CO	28.53	375			VC	11.00001	1 in 100
6192	33.65	CO	28.53	375			VC	11.00001	1 in 100
6193	33.65	CO	28.53	375			VC	11.00001	1 in 100
6194	33.65	CO	28.53	375			VC	11.00001	1 in 100
6195	33.65	CO	28.53	375			VC	11.00001	1 in 100
6196	33.65	CO	28.53	375			VC	11.00001	1 in 100
6197	33.65	CO	28.53	375			VC	11.00001	1 in 100
6198	33.65	CO	28.53	375			VC	11.00001	1 in 100
6199	33.65	CO	28.53	375			VC	11.00001	1 in 100
6200	33.65	CO	28.53	375			VC	11.00001	1 in 100

Appendix C – CCTV Drainage Survey

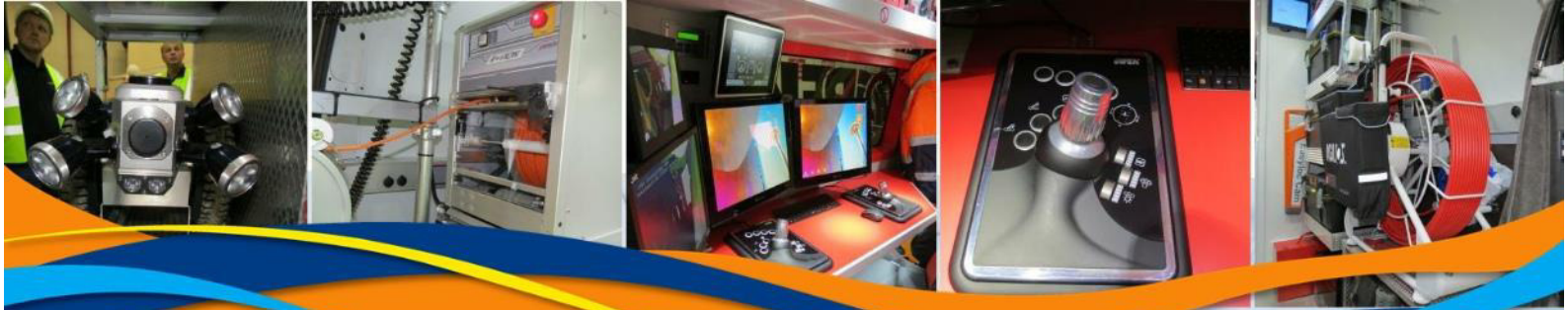


Drainage Notes:

- Existing details shown on this drawing including kerblines, existing drains, chambers, sewers, pipework, stub connections where new connections, diversions or abandonment are shown, invert levels and pipe sizes shall be checked and confirmed to the engineer prior to the commencement of any works. Any discrepancies shall be reported to the engineer for action prior to any new construction.
- All drainage works shall be carried out in accordance with the requirements of the local authority and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and addendums as appropriate.
- All drainage shall comply with the typical drainage construction details and the requirements of BS EN 752.
- Access covers and frames shall comply with the loadings specified and to BS EN 124 and kitemarked or if recessed covers are specified then in accordance with FACTA association equivalent.
- The proposed building outlines shown on this drawing are for information only. Refer to Architects plans for precise location setting out information and details.
- Cover levels shown on this drawing are approximate and shall be adjusted to suit finished pavement levels on site by Contractor. Covers shall be orientated to suit pavement finishes where appropriate. All drainage connecting to the public sewer network shall not commence until receipt of the approval from the drainage authority and shall comply with requirements using vitrified clay pipework to BS EN 295 with plain sleeved or socketed flexible joints subject to their approval.
- Where drainage works are carried out in the public highway the relevant necessary approvals and road opening notices shall be obtained from the highway authority and utility companies.
- Upon completion all new drainage installation together with any existing drainage retained shall be jetted and CCTV surveyed upon completion. Contractor to ensure that the drainage system is fully operational, free of excess debris/silt and all identified faults rectified.

HEALTH & SAFETY: The works shall be carried out by specialist competent and experienced contractors. All operatives shall have received full and appropriate training with appropriate qualifications for the operations they are required to undertake. All work shall be carried out in accordance with the relevant Health & Safety Regulations.

Standard Notes		Location Plan		Notes and Keys		Notes and Keys		Notes and Keys										Client																																																																																																																																																																																																																																																																																																																																																																																																																																																									
1. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and the specification. 2. This drawing should not be scaled. 3. All dimensions are to be verified by the contractor on site. 4. All discrepancies should be reported to the C.A. prior to the commencement of the works.				1. SITE LAYOUT BASED ON ARCHITECT'S (TPM) PLAN Z1-TPM-G710-PL-XX-2289-102 TO -104, REVISION P18. TOPOGRAPHICAL SURVEY CONDUCTED BY JLP SURVEYS LTD, DATED 20/05/2015. 4. EXISTING DRAINAGE FOR OWEN STREET AS PER UTILITY SURVEY CONDUCTED BY SURVEY OPERATIONS, DATED 29/06/2016. 5. EXISTING DRAINAGE FOR POND STREET AS PER CCTV SURVEY CONDUCTED BY LANES FOR DRAINS, DATED 05/2015.		EXISTING 300mmØ UU COMBINED SEWER EXISTING COMBINED SEWER MANHOLE EXISTING 300mmØ PRIVATE FOUL SEWER EXISTING COMBINED FOUL MANHOLE EXISTING STORMWATER 650 x 550mm BRICK SEWER EXISTING GULLY TAIL (CONNECTION TO BE RE-USED) EXISTING GULLY TO BE ABANDONED EXISTING GULLY TAIL TO BE ABANDONED		PROPOSED NEW STORMWATER SEWER PROPOSED NEW STORMWATER MANHOLE PROPOSED NEW 150mmØ GULLY TAIL PROPOSED ROAD GULLY EXISTING ROAD GULLY EXISTING PRIVATE SEWER IDENTIFIED BY RENAKER (NOT SURVEYED I.E. LOCATION, DEPTH AND CONDITION UNKNOWN)		11/10/19 P03 DOWN ST SEWER ADOPD AND GULLY CONNECTIONS UPDATED AS PER REQUEST FROM RENAKER (SEE EMAIL SENT ON 09/10/2019) FROM JAMES WALLBRIDGE 09/07/19 P02 AMENDMENTS TO EXISTING GULLY LOCATIONS ON OWEN ST AS PER RBL SURVEY (06/02/2019) 30/11/28 P01 DRAFT STAGE 4 ISSUE <table><tr><td>Date</td><td>Rev</td><td>Description</td><td>Drawn</td><td>Chk</td></tr></table>		Date	Rev	Description	Drawn	Chk	11/10/19 P03 DOWN ST SEWER ADOPD AND GULLY CONNECTIONS UPDATED AS PER REQUEST FROM RENAKER (SEE EMAIL SENT ON 09/10/2019) FROM JAMES WALLBRIDGE 09/07/19 P02 AMENDMENTS TO EXISTING GULLY LOCATIONS ON OWEN ST AS PER RBL SURVEY (06/02/2019) 30/11/28 P01 DRAFT STAGE 4 ISSUE <table><tr><td>Date</td><td>Rev</td><td>Description</td><td>Drawn</td><td>Chk</td></tr></table>		Date	Rev	Description	Drawn	Chk	11/10/19 P03 DOWN ST SEWER ADOPD AND GULLY CONNECTIONS UPDATED AS PER REQUEST FROM RENAKER (SEE EMAIL SENT ON 09/10/2019) FROM JAMES WALLBRIDGE 09/07/19 P02 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CCTV SURVEY INSPECTION REPORT

Client:	Renaker Build Limited
Location:	Crown Street, Manchester
Date:	09.01.2020



Industrial Water Jetting Systems Ltd

Dickens House, Old Stowmarket Road, Woolpit, Bury St. Edmunds IP22 9QS

Tel: 01359 242606 Fax: 01359 242 621
Web: www.iwjs.co.uk Email: surveys@iwjs.co.uk



Project

Project Name: 2019_12_18_Renaker_Crown Street_Manchester
Project Date: 18-Dec-19
Inspection Standard: MSCC5 Sewers & Drainage GB (SRM5 Scoring)

**IWJS**

Unit 3, Bridgeway
Tel. 01274 924 580
Sara.knight@iwjs.co.uk

Table of Contents

Project Name	Project Number	Project Date
2019_12_18_Renaker_Crown Street_Manchester		18-12-19

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Project Information

Project Name	Project Number	Project Date
2019_12_18_Renaker_Crown Street_Manchester		18-12-19

Client

Company: Renaker Build Limited
Contact: Dafydd Jones
Department: Project Quantity Surveyor
Street: 1st Floor, NQ Building, 47 Bengal Street
Town or City: Ancoats
County: Manchester
Post Code: M4 6BB

Manager

Company: Renaker Build Limited
Contact: Dafydd Jones
Department: Project Quantity Surveyor
Street: Crown Street
Town or City: Manchester
County: Lancashire
Post Code: M15 4AX
Phone: 0161 245 1150
Fax: 0161 601 0210
Mobile: 07584 055 825
Email: dafyddjones@renakerbuild.com

Contractor

Company: IWJS
Contact: Sara Knight
Department: Account Executive
Street: Unit 3
Town or City: Bridgeway
County: Bradford
Post Code: BD4 9SN
Phone: 01274 924 580
Mobile: 07464529600
Email: Sara.knight@iwjs.co.uk

Section Inspection - 18-Dec-19 - 1105X

Section 1	Inspection 1	Date 18/12/19	Time 21:22	Client's Job Ref N/A	Weather No Rain Or Snow	Pre Cleaned No	PLR 1105X
Operator MS		Vehicle EO16 FNY		Camera Pan And Tilt	Preset Length 0.60 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Manchester	Inspection Direction:	Downstream	Upstream Node:	1105
Road:	Mancunian Way	Inspected Length:	18.20 m	Upstream Pipe Depth:	3.330 m
Location:	Road	Total Length:	18.20 m	Downstream Node:	1100
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	3.720 m
Use:	Combined		Pipe Shape:	Circular	
Type of Pipe:	Gravity drain/sewer		Dia/Height:	600 mm	
Year Constructed:			Material:	Concrete	
Flow Control:	No flow control		Lining Type:	No Lining	
Inspection Purpose:	Sample condition survey		Lining Material:	No Lining	
Comments:	Wrong diameter on video				
Recommendations:	Cleaning				

Scale:	1:159	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: 3.33 m 1105 Depth: 3.72 m 1100							
0.00	MH	Start node type, manhole, reference number: 1105			00:00:00		
0.00	WL	Water level, 10% of the vertical dimension			00:00:10		
3.61	OBB	Other obstacles, brick or masonry in invert from 6 o'clock to 7 o'clock, 10% cross-sectional area loss			00:03:32	1105X_e5 8a2646-c9 11-4907-8	5
3.72	S01	DER	Settled deposits, coarse, 15% cross-sectional area loss, start		00:01:47	1105X_39 96a299-04 be-4035-b	
12.15	OBB	Other obstacles, brick or masonry in invert from 4 o'clock to 7 o'clock, 20% cross-sectional area loss			00:09:04	1105X_04 d7ba1b-8c 45-4777-8	5
18.20	F01	DER	Settled deposits, coarse, 15% cross-sectional area loss, finish		00:11:56	1105X_b4 718763-43 29-4ae5-8	3
18.20	MHF	Finish node type, manhole, reference number: 1100			00:11:57		

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	3	12.0	2.7	50.0	5.0

Section Pictures - 18-Dec-19 - 1105X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Downstream	1105X	N/A	N/A



1105X_e58a2646-c911-4907-860f-02568851a08a_20191218_213155_710.jpg, 00:03:32, 3.61 m
Other obstacles, brick or masonry in invert from 6 o'clock to 7 o'clock, 10% cross-sectional area loss



1105X_3996a299-04be-4035-bd44-1a8446a09a23_20191218_213009_115.jpg, 00:01:47, 3.72 m
Settled deposits, coarse, 15% cross-sectional area loss, start



1105X_04d7ba1b-8c45-4777-839c-1492a72d1db0_20191218_213804_994.jpg, 00:09:04, 12.15 m
Other obstacles, brick or masonry in invert from 4 o'clock to 7 o'clock, 20% cross-sectional area loss

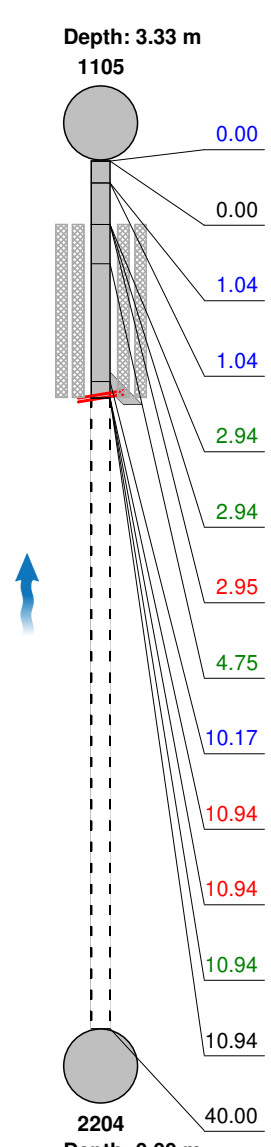


1105X_b4718763-4329-4ae5-8267-61e07a194c70_20200109_082429_832.jpg, 00:11:56, 18.20 m
Settled deposits, coarse, 15% cross-sectional area loss, finish

Section Inspection - 18-Dec-19 - 2204X

Section 2	Inspection 2	Date 18/12/19	Time 21:58	Client's Job Ref N/A	Weather No Rain Or Snow	Pre Cleaned No	PLR 2204X
Operator MS		Vehicle EO16 FNY		Camera Pan And Tilt	Preset Length 0.60 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Manchester	Inspection Direction:	Upstream	Upstream Node:	2204
Road:	Mancunian Way	Inspected Length:	10.94 m	Upstream Pipe Depth:	0.000 m
Location:	Road	Total Length:	40.00 m	Downstream Node:	1105
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	3.330 m
Use:	Combined	Pipe Shape: Circular Dia/Height: 600 mm Material: Concrete Lining Type: No Lining Lining Material: No Lining			
Type of Pipe:	Gravity drain/sewer				
Year Constructed:					
Flow Control:	No flow control				
Inspection Purpose:	Sample condition survey				
Comments:	wrong diameter on video				
Recommendations:	cannot clean brick work is very poor				

Scale:	1:348	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: 3.33 m 1105 							
	0.00	MH	Start node type, manhole, reference number: 1105		00:00:00		
	0.00	WL	Water level, 5% of the vertical dimension		00:00:09		
	1.04	MCBR	Pipe material changes to brick at this point		00:01:40		
	1.04	SCU	Shape changes to U-shaped with flat top, new size(s), 780mm high, 500mm wide		00:02:10		
	2.94	S01	RF	Roots, fine, start	00:05:09		
	2.94		RT	Roots, tap	00:05:51	2204X_dc ed5df7-38 18-4aeb-a	4
	2.95	S02	MMM	Mortar missing, medium (between 15mm and 50mm) from 1 o'clock to 11 o'clock, start	00:06:38		
	4.75		RT	Roots, tap	00:07:33	2204X_f01 2e500-f0fc -481b-b5e	4
	10.17		CN	Connection other than junction at 10 o'clock, diameter: 150mm	00:09:10		
	10.94		DI	Dropped invert, gap: 300mm from 5 o'clock to 7 o'clock	00:11:40	2204X_e5 699ea4-dd c3-40d9-9	
	10.94	F02	MMM	Mortar missing, medium (between 15mm and 50mm) from 1 o'clock to 11 o'clock, finish	00:11:40		
	10.94	F01	RF	Roots, fine, finish	00:11:40	2204X_2a 3c3330-cb 34-4f44-a6	2
	10.94		SA	Survey abandoned: Due to dropped or missing invert	00:11:40		
	40.00			End of pipe			
2204 Depth: 0.00 m							

Section Pictures - 18-Dec-19 - 2204X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Upstream	2204X	N/A	N/A



2204X_dced5df7-3818-4aeb-a04b-da4ec2573895_20191218_220723_457.jpg, 00:05:51, 2.94 m
Roots, tap



2204X_f012e500-f0fc-481b-b5e8-7461bc6394bf_20191218_220904_498.jpg, 00:07:33, 4.75 m
Roots, tap



2204X_e5c0bd09-637c-4e47-992c-48e38db5ee44_20191218_220928_242.jpg, 00:07:33, 4.75 m
Roots, tap



2204X_e5699ea4-ddc3-40d9-9bc6-c4ec7cdbcfff_20191218_221433_046.jpg, 00:11:40, 10.94 m
Dropped invert, gap: 300mm from 5 o'clock to 7 o'clock

Section Pictures - 18-Dec-19 - 2204X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Upstream	2204X	N/A	N/A



2204X_2a3c3330-cb34-4f44-a61b-ee1bfe9f7a4a_20200109_0
82526_030.jpg, 00:11:40, 10.94 m
Roots, fine, finish

Section Inspection - 18-Dec-19 - 2101X

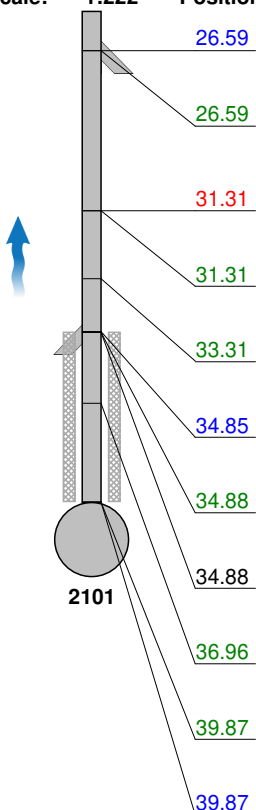
Section 3	Inspection 3	Date 18/12/19	Time 22:28	Client's Job Ref N/A	Weather No Rain Or Snow	Pre Cleaned No	PLR 2101X
Operator MS		Vehicle EO16 FNY		Camera Pan And Tilt	Preset Length 0.60 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Manchester	Inspection Direction:	Upstream	Upstream Node:	2101
Road:	Mancunian Way	Inspected Length:	39.87 m	Upstream Pipe Depth:	3.100 m
Location:	Road	Total Length:	39.87 m	Downstream Node:	1105
Surface Type:	Asphalt Highway	Joint Length:	1.50 m	Downstream Pipe Depth:	3.330 m
Use:	Surface water	Pipe Shape: Circular Dia/Height: 300 mm Material: Vitrified clay Lining Type: No Lining Lining Material: No Lining			
Type of Pipe:	Gravity drain/sewer				
Year Constructed:					
Flow Control:	No flow control				
Inspection Purpose:	Sample condition survey				
Comments:					
Recommendations:	cleaning required				

Scale: 1:222	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: 3.33 m 1105						
	0.00	MH	Start node type, manhole, reference number: 1105	00:00:00		
	0.00	WL	Water level, 5% of the vertical dimension	00:00:05		
	1.22	RFJ	Roots, fine at joint	00:00:55	2101X_30 833b35-49 60-4fdf-87	2
	1.59	MCCO	Pipe material changes to concrete at this point	00:02:06		
	6.91	RM	Roots, mass, 15% cross-sectional area loss	00:04:15	2101X_85f 62e90-ec1 9-4acf-bf4	3
	7.91	RT	Roots, tap	00:04:33	2101X_ba 195ac0-e5 d4-4fbc-bb	4
	8.35	CN	Connection other than junction at 10 o'clock, diameter: 150mm	00:05:01		
	10.49	RF	Roots, fine	00:06:20	2101X_98 2649c0-20 7f-4b63-8a	2
	10.49	FC	Fracture, circumferential from 2 o'clock to 10 o'clock	00:06:45	2101X_e4 3a32e1-e7 bb-4540-a	3 / 2
	11.19	RFJ	Roots, fine at joint	00:07:11	2101X_09 cd2e99-dd ea-4d5f-99	2
	16.17	S01 RM	Roots, mass, 20% cross-sectional area loss, start	00:07:54	2101X_46 2ddc81-c5 9d-43a3-8	
	18.19	CXB	Connection defective, connecting pipe is blocked at 10 o'clock, diameter: 150mm	00:08:34	2101X_9fe 4bb4f-b1f3 -436e-af08	
	18.57	F01 RM	Roots, mass, 20% cross-sectional area loss, finish	00:09:05	2101X_25 967ed6-0ff 3-4572-81	5
	18.57	WL	Water level, 15% of the vertical dimension	00:09:11		
	24.27	WL	Water level, 10% of the vertical dimension	00:10:01		

Section Inspection - 18-Dec-19 - 2101X

Section	Inspection	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
3	3	18/12/19	22:28	N/A	No Rain Or Snow	No	2101X
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID		
MS	EO16 FNY	Pan And Tilt	0.60 m	Public Sewer	Not Specified		

Scale:	1:222	Position [m]	Code	Observation	MPEG	Photo	Grade
		26.59	CXB	Connection defective, connecting pipe is blocked at 10 o'clock, diameter: 150mm	00:10:39	2101X_aff 6f31d-438 d-49fc-9cb	
		26.59	RF	Roots, fine	00:11:34	2101X_69 d52bde-46 2e-4bab-b	2
		31.31	FM	Fractures, multiple from 7 o'clock to 5 o'clock	00:14:04	2101X_02 ef41d3-54 02-44b2-b	4 / 2
		31.31	RF	Roots, fine	00:14:31	2101X_02 b31859-62 bb-4581-8	2
		33.31	RFJ	Roots, fine at joint	00:15:31	2101X_df3 3cf18-b4a b-4f51-898	2
		34.85	CN	Connection other than junction at 2 o'clock, diameter: 225mm	00:16:51		
		34.88	S02	DES	00:17:51	2101X_65f 33adf-bb8 d-4c29-96	
		34.88	WL	Water level, 20% of the vertical dimension	00:17:58		
		36.96	RFJ	Roots, fine at joint	00:21:47	2101X_f35 292fb-46e 6-4677-ab	2
		39.87	F02	DES	00:23:03	2101X_5e 7de495-03 ec-47ae-9	4
		39.87	MHF	Finish node type, manhole, reference number: 2101	00:23:10		
Depth: 3.10 m							

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
2	80.0	3.0	120.0	4.0	13	10.0	1.8	73.0	5.0

Section Pictures - 18-Dec-19 - 2101X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	2101X	N/A	N/A



2101X_30833b35-4960-4fdf-87b4-f3dfb2c9e443_20200109_082820_479.jpg, 00:00:55, 1.22 m
Roots, fine at joint



2101X_85f62e90-ec19-4acf-bf4b-1e2a8c9373ba_20191218_23414_189.jpg, 00:04:15, 6.91 m
Roots, mass, 15% cross-sectional area loss



2101X_ba195ac0-e5d4-4fbc-bb1f-bffe23014324_20191218_23431_754.jpg, 00:04:33, 7.91 m
Roots, tap



2101X_982649c0-207f-4b63-8a5e-4f3295769751_20200109_082829_179.jpg, 00:06:20, 10.49 m
Roots, fine

Section Pictures - 18-Dec-19 - 2101X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	2101X	N/A	N/A



2101X_e43a32e1-e7bb-4540-a1a8-16d7c8271d61_20191218_223652_030.jpg, 00:06:45, 10.49 m
Fracture, circumferential from 2 o'clock to 10 o'clock



2101X_09cd2e99-ddea-4d5f-996f-3bdd47d71097_20200109_082838_512.jpg, 00:07:11, 11.19 m
Roots, fine at joint



2101X_462ddc81-c59d-43a3-88b2-0b74bcc11d12_20191218_223753_042.jpg, 00:07:54, 16.17 m
Roots, mass, 20% cross-sectional area loss, start



2101X_9fe4bb4f-b1f3-436e-af08-a8c4b31ad9c4_20191218_223833_574.jpg, 00:08:34, 18.19 m
Connection defective, connecting pipe is blocked at 10 o'clock, diameter: 150mm

Section Pictures - 18-Dec-19 - 2101X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	2101X	N/A	N/A



2101X_25967ed6-0ff3-4572-8178-528241cc09ad_20200109_082843_723.jpg, 00:09:05, 18.57 m
Roots, mass, 20% cross-sectional area loss, finish



2101X_aff6f31d-438d-49fc-9cb5-d164974ebd40_20191218_24120_287.jpg, 00:10:39, 26.59 m
Connection defective, connecting pipe is blocked at 10 o'clock, diameter: 150mm



2101X_69d52bde-462e-4bab-beca-9a86779e0b75_20200109_082856_179.jpg, 00:11:34, 26.59 m
Roots, fine



2101X_02ef41d3-5402-44b2-b7ed-a30fa3ddc12a_20191218_224405_257.jpg, 00:14:04, 31.31 m
Fractures, multiple from 7 o'clock to 5 o'clock

Section Pictures - 18-Dec-19 - 2101X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	2101X	N/A	N/A



2101X_02b31859-62bb-4581-8431-ace2bb5bf4cd_20200109_082900_567.jpg, 00:14:31, 31.31 m
Roots, fine



2101X_df33cf18-b4ab-4f51-898c-c87bf54343cf_20200109_082904_272.jpg, 00:15:31, 33.31 m
Roots, fine at joint



2101X_65f33adf-bb8d-4c29-96e1-156203d14962_20191218_224821_145.jpg, 00:17:51, 34.88 m
Settled deposits, fine, 20% cross-sectional area loss, start



2101X_f35292fb-46e6-4677-ab75-0143026b05cf_20200109_082912_167.jpg, 00:21:47, 36.96 m
Roots, fine at joint

Section Pictures - 18-Dec-19 - 2101X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	2101X	N/A	N/A



2101X_5e7de495-03ec-47ae-972a-e7e7f12164f7_20200109_082915_999.jpg, 00:23:03, 39.87 m

Settled deposits, fine, 20% cross-sectional area loss, finish

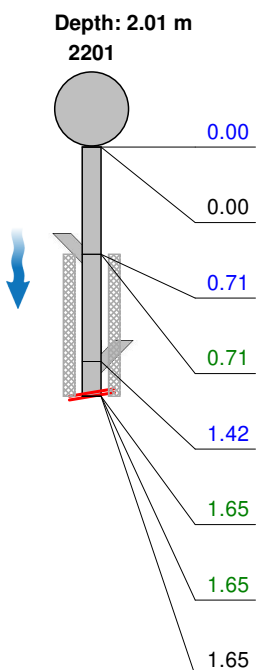
Section Inspection - 19-Dec-19 - 2201X

Section 4	Inspection 4	Date 19/12/19	Time 1:03	Client's Job Ref N/A	Weather No Rain Or Snow	Pre Cleaned No	PLR 2201X
Operator MS		Vehicle EO16 FNY		Camera Pan And Tilt	Preset Length 0.60 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Manchester	Inspection Direction:	Downstream	Upstream Node:	2201
Road:	Crown Street	Inspected Length:	1.65 m	Upstream Pipe Depth:	2.010 m
Location:	Road	Total Length:	1.65 m	Downstream Node:	2101
Surface Type:	Asphalt Highway	Joint Length:	1.50 m	Downstream Pipe Depth:	3.100 m
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	225 mm		
Year Constructed:		Material:	Vitrified clay		
Flow Control:	No flow control	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

Comments:

Recommendations: Cleaning

Scale:	1:50	Position [m]	Code	Observation	MPEG	Photo	Grade
							
		0.00	MH	Start node type, manhole, reference number: 2201	00:00:00		
		0.00	WL	Water level, 5% of the vertical dimension	00:00:03		
		0.71	JN	Junction at 1 o'clock, diameter: 150mm	00:01:13		
		0.71	S01	DES Settled deposits, fine, 20% cross-sectional area loss, start	00:01:27	2201X_c3 2e63fd-81 86-41f6-89	
		1.42	JN	Junction at 11 o'clock, diameter: 150mm	00:01:51		
		1.65	DES	Settled deposits, fine, 30% cross-sectional area loss	00:04:01	2201X_d7 eb6c7f-19 ab-49e2-8	4
		1.65	F01	DES Settled deposits, fine, 20% cross-sectional area loss, finish	00:04:09		4
		1.65	SA	Survey abandoned: Due to amount of silt	00:04:18		

Construction Features

Structural Defects

Miscellaneous Features

Service & Operational Observations

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	2	5.0	6.1	10.0	5.0

Section Pictures - 19-Dec-19 - 2201X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
4	Downstream	2201X	N/A	N/A



2201X_c32e63fd-8186-41f6-893a-d2db77e82397_20191219_010729_212.jpg, 00:01:27, 0.71 m
Settled deposits, fine, 20% cross-sectional area loss, start

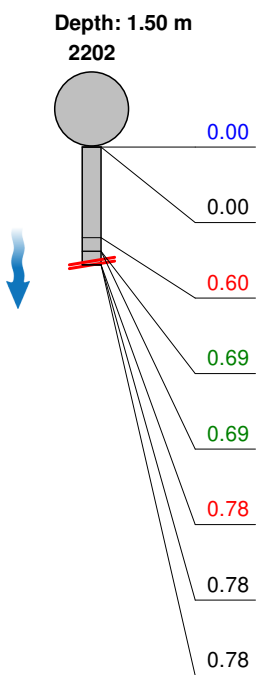


2201X_d7eb6c7f-19ab-49e2-82a2-fbdbc84d65fa_20191219_011003_390.jpg, 00:04:01, 1.65 m
Settled deposits, fine, 30% cross-sectional area loss

Section Inspection - 19-Dec-19 - 2202X

Section 5	Inspection 5	Date 19/12/19	Time 20:17	Client's Job Ref N/A	Weather No Rain Or Snow	Pre Cleaned No	PLR 2202X
Operator MS		Vehicle EO16 FNY		Camera Pan And Tilt	Preset Length 0.60 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Manchester	Inspection Direction:	Downstream	Upstream Node:	2202
Road:	Melbourne Street	Inspected Length:	0.78 m	Upstream Pipe Depth:	1.500 m
Location:	Road	Total Length:	0.78 m	Downstream Node:	2201
Surface Type:	Asphalt Highway	Joint Length:	1.50 m	Downstream Pipe Depth:	2.010 m
Use:	Surface water	Pipe Shape: Circular Dia/Height: 225 mm Material: Vitrified clay Lining Type: No Lining Lining Material: No Lining			
Type of Pipe:	Gravity drain/sewer				
Year Constructed:					
Flow Control:	No flow control				
Inspection Purpose:	Sample condition survey				
Comments:					
Recommendations:	Cleaning				

Scale:	1:50	Position [m]	Code	Observation	MPEG	Photo	Grade
							
		0.00	MH	Start node type, manhole, reference number: 2202	00:00:00		
		0.00	WL	Water level, 20% of the vertical dimension	00:00:04		
		0.60	FM	Fractures, multiple from 7 o'clock to 5 o'clock	00:00:37	2202X_faa 5824c-328 f-4b59-8d4	4 / 2
		0.69	DES	Settled deposits, fine, 20% cross-sectional area loss	00:01:18	2202X_9e 74917b-78 b7-4495-8	4
		0.69	RF	Roots, fine	00:01:21		2
		0.78	H	Hole in drain or sewer from 12 o'clock to 2 o'clock	00:02:05	2202X_b5 5a91f6-0b 21-421b-9	4
		0.78	REM	General remark: blockage visible in distance possible roots	00:02:29	2202X_fa7 60428-c13 d-4e09-a8	
		0.78	SA	Survey abandoned: Due to amount of silt	00:03:17	2202X_3c 85dc51-27 1d-4ecb-8	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
2	80.0	205.1	160.0	4.0	3	7.0	9.0	7.0	5.0

Section Pictures - 19-Dec-19 - 2202X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
5	Downstream	2202X	N/A	N/A



2202X_faa5824c-328f-4b59-8d4a-b95a0af8fc36_20191219_202346_967.jpg, 00:00:37, 0.60 m
Fractures, multiple from 7 o'clock to 5 o'clock



2202X_9e74917b-78b7-4495-8c04-d6319efe82de_20191219_202430_818.jpg, 00:01:18, 0.69 m
Settled deposits, fine, 20% cross-sectional area loss



2202X_b55a91f6-0b21-421b-91b1-69a9cd8ff5c3_20191219_202515_216.jpg, 00:02:05, 0.78 m
Hole in drain or sewer from 12 o'clock to 2 o'clock



2202X_fa760428-c13d-4e09-a836-50c0f9278e12_20191219_202556_946.jpg, 00:02:29, 0.78 m
General remark, blockage visible in distance possible roots

Section Pictures - 19-Dec-19 - 2202X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
5	Downstream	2202X	N/A	N/A



2202X_3c85dc51-271d-4ecb-8ab4-7ba6f2264d26_20191219_202629_924.jpg, 00:03:17, 0.78 m
Survey abandoned, Due to amount of silt



Renaker Build Limited_Crown Street_Grade Defect Report_Service							
Section	Town or Village	Upstream Node	Inspection Direction	Downstream Node	Observation	Code	Grade (Service)
1	Manchester	1105	Downstream	1100	Start node type, manhole, reference number: 1105	MH	5
1	Manchester	1105	Downstream	1100	Water level, 10% of the vertical dimension	WL	5
1	Manchester	1105	Downstream	1100	Other obstacles, brick or masonry in invert from 6 o'clock to 7 o'clock, 10% cross-sectional area loss	OBB	5
1	Manchester	1105	Downstream	1100	Settled deposits, coarse, 15% cross-sectional area loss, start	DER	5
1	Manchester	1105	Downstream	1100	Other obstacles, brick or masonry in invert from 4 o'clock to 7 o'clock, 20% cross-sectional area loss	OBB	5
1	Manchester	1105	Downstream	1100	Settled deposits, coarse, 15% cross-sectional area loss, finish	DER	5
1	Manchester	1105	Downstream	1100	Finish node type, manhole, reference number: 1100	MHF	5
3	Manchester	2101	Upstream	1105	Start node type, manhole, reference number: 1105	MH	5
3	Manchester	2101	Upstream	1105	Water level, 5% of the vertical dimension	WL	5
3	Manchester	2101	Upstream	1105	Roots, fine at joint	RFJ	5
3	Manchester	2101	Upstream	1105	Pipe material changes to concrete at this point	MCCO	5
3	Manchester	2101	Upstream	1105	Roots, mass, 15% cross-sectional area loss	RM	5
3	Manchester	2101	Upstream	1105	Roots, tap	RT	5
3	Manchester	2101	Upstream	1105	Connection other than junction at 10 o'clock, diameter: 150mm	CN	5
3	Manchester	2101	Upstream	1105	Roots, fine	RF	5
3	Manchester	2101	Upstream	1105	Fracture, circumferential from 2 o'clock to 10 o'clock	FC	5
3	Manchester	2101	Upstream	1105	Roots, fine at joint	RFJ	5
3	Manchester	2101	Upstream	1105	Roots, mass, 20% cross-sectional area loss, start	RM	5
3	Manchester	2101	Upstream	1105	Connection defective, connecting pipe is blocked at 10 o'clock, diameter: 150mm	CXB	5
3	Manchester	2101	Upstream	1105	Roots, mass, 20% cross-sectional area loss, finish	RM	5
3	Manchester	2101	Upstream	1105	Water level, 15% of the vertical dimension	WL	5
3	Manchester	2101	Upstream	1105	Water level, 10% of the vertical dimension	WL	5
3	Manchester	2101	Upstream	1105	Connection defective, connecting pipe is blocked at 10 o'clock, diameter: 150mm	CXB	5
3	Manchester	2101	Upstream	1105	Roots, fine	RF	5
3	Manchester	2101	Upstream	1105	Fractures, multiple from 7 o'clock to 5 o'clock	FM	5
3	Manchester	2101	Upstream	1105	Roots, fine	RF	5
3	Manchester	2101	Upstream	1105	Roots, fine at joint	RFJ	5
3	Manchester	2101	Upstream	1105	Connection other than junction at 2 o'clock, diameter: 225mm	CN	5
3	Manchester	2101	Upstream	1105	Settled deposits, fine, 20% cross-sectional area loss, start	DES	5
3	Manchester	2101	Upstream	1105	Water level, 20% of the vertical dimension	WL	5
3	Manchester	2101	Upstream	1105	Roots, fine at joint	RFJ	5
3	Manchester	2101	Upstream	1105	Settled deposits, fine, 20% cross-sectional area loss, finish	DES	5
3	Manchester	2101	Upstream	1105	Finish node type, manhole, reference number: 2101	MHF	5
4	Manchester	2201	Downstream	2101	Start node type, manhole, reference number: 2201	MH	5
4	Manchester	2201	Downstream	2101	Water level, 5% of the vertical dimension	WL	5
4	Manchester	2201	Downstream	2101	Junction at 1 o'clock, diameter: 150mm	JN	5
4	Manchester	2201	Downstream	2101	Settled deposits, fine, 20% cross-sectional area loss, start	DES	5
4	Manchester	2201	Downstream	2101	Junction at 11 o'clock, diameter: 150mm	JN	5
4	Manchester	2201	Downstream	2101	Settled deposits, fine, 30% cross-sectional area loss	DES	5
4	Manchester	2201	Downstream	2101	Settled deposits, fine, 20% cross-sectional area loss, finish	DES	5
4	Manchester	2201	Downstream	2101	Survey abandoned	SA	5
5	Manchester	2202	Downstream	2201	Start node type, manhole, reference number: 2202	MH	5
5	Manchester	2202	Downstream	2201	Water level, 20% of the vertical dimension	WL	5
5	Manchester	2202	Downstream	2201	Fractures, multiple from 7 o'clock to 5 o'clock	FM	5
5	Manchester	2202	Downstream	2201	Settled deposits, fine, 20% cross-sectional area loss	DES	5
5	Manchester	2202	Downstream	2201	Roots, fine	RF	5
5	Manchester	2202	Downstream	2201	Hole in drain or sewer from 12 o'clock to 2 o'clock	H	5
5	Manchester	2202	Downstream	2201	General remark	REM	5
5	Manchester	2202	Downstream	2201	Survey abandoned	SA	5
2	Manchester	2204	Upstream	1105	Start node type, manhole, reference number: 1105	MH	4
2	Manchester	2204	Upstream	1105	Water level, 5% of the vertical dimension	WL	4
2	Manchester	2204	Upstream	1105	Pipe material changes to brick at this point	MCCR	4
2	Manchester	2204	Upstream	1105	Shape changes to U-shaped with flat top, new size(s), 780mm high, 500mm wide	SCU	4
2	Manchester	2204	Upstream	1105	Roots, fine, start	RF	4

2	Manchester	2204	Upstream	1105	Roots, tap	RT	4
2	Manchester	2204	Upstream	1105	Mortar missing, medium (between 15mm and 50mm) from 1 o'clock to 11 o'clock, start	MMM	4
2	Manchester	2204	Upstream	1105	Roots, tap	RT	4
2	Manchester	2204	Upstream	1105	Connection other than junction at 10 o'clock, diameter: 150mm	CN	4
2	Manchester	2204	Upstream	1105	Dropped invert, gap: 300mm from 5 o'clock to 7 o'clock	DI	4
2	Manchester	2204	Upstream	1105	Mortar missing, medium (between 15mm and 50mm) from 1 o'clock to 11 o'clock, finish	MMM	4
2	Manchester	2204	Upstream	1105	Roots, fine, finish	RF	4
2	Manchester	2204	Upstream	1105	Survey abandoned	SA	4



Renaker Build Limited_Crown Street_Grade Defect Report_Structural							
Section	Town or Village	Upstream Node	Inspection Direction	Downstream Node	Observation	Code	Grade (Structural)
1	Manchester	1105	Downstream	1100	Start node type, manhole, reference number: 1105	MH	1
1	Manchester	1105	Downstream	1100	Water level, 10% of the vertical dimension	WL	1
1	Manchester	1105	Downstream	1100	Other obstacles, brick or masonry in invert from 6 o'clock to 7 o'clock, 10% cross-sectional area loss	OBB	1
1	Manchester	1105	Downstream	1100	Settled deposits, coarse, 15% cross-sectional area loss, start	DER	1
1	Manchester	1105	Downstream	1100	Other obstacles, brick or masonry in invert from 4 o'clock to 7 o'clock, 20% cross-sectional area loss	OBB	1
1	Manchester	1105	Downstream	1100	Settled deposits, coarse, 15% cross-sectional area loss, finish	DER	1
1	Manchester	1105	Downstream	1100	Finish node type, manhole, reference number: 1100	MHF	1
3	Manchester	2101	Upstream	1105	Start node type, manhole, reference number: 1105	MH	4
3	Manchester	2101	Upstream	1105	Water level, 5% of the vertical dimension	WL	4
3	Manchester	2101	Upstream	1105	Roots, fine at joint	RFJ	4
3	Manchester	2101	Upstream	1105	Pipe material changes to concrete at this point	MCCO	4
3	Manchester	2101	Upstream	1105	Roots, mass, 15% cross-sectional area loss	RM	4
3	Manchester	2101	Upstream	1105	Roots, tap	RT	4
3	Manchester	2101	Upstream	1105	Connection other than junction at 10 o'clock, diameter: 150mm	CN	4
3	Manchester	2101	Upstream	1105	Roots, fine	RF	4
3	Manchester	2101	Upstream	1105	Fracture, circumferential from 2 o'clock to 10 o'clock	FC	4
3	Manchester	2101	Upstream	1105	Roots, fine at joint	RFJ	4
3	Manchester	2101	Upstream	1105	Roots, mass, 20% cross-sectional area loss, start	RM	4
3	Manchester	2101	Upstream	1105	Connection defective, connecting pipe is blocked at 10 o'clock, diameter: 150mm	CXB	4
3	Manchester	2101	Upstream	1105	Roots, mass, 20% cross-sectional area loss, finish	RM	4
3	Manchester	2101	Upstream	1105	Water level, 15% of the vertical dimension	WL	4
3	Manchester	2101	Upstream	1105	Water level, 10% of the vertical dimension	WL	4
3	Manchester	2101	Upstream	1105	Connection defective, connecting pipe is blocked at 10 o'clock, diameter: 150mm	CXB	4
3	Manchester	2101	Upstream	1105	Roots, fine	RF	4
3	Manchester	2101	Upstream	1105	Fractures, multiple from 7 o'clock to 5 o'clock	FM	4
3	Manchester	2101	Upstream	1105	Roots, fine	RF	4
3	Manchester	2101	Upstream	1105	Roots, fine at joint	RFJ	4
3	Manchester	2101	Upstream	1105	Connection other than junction at 2 o'clock, diameter: 225mm	CN	4
3	Manchester	2101	Upstream	1105	Settled deposits, fine, 20% cross-sectional area loss, start	DES	4
3	Manchester	2101	Upstream	1105	Water level, 20% of the vertical dimension	WL	4
3	Manchester	2101	Upstream	1105	Roots, fine at joint	RFJ	4
3	Manchester	2101	Upstream	1105	Settled deposits, fine, 20% cross-sectional area loss, finish	DES	4
3	Manchester	2101	Upstream	1105	Finish node type, manhole, reference number: 2101	MHF	4
4	Manchester	2201	Downstream	2101	Start node type, manhole, reference number: 2201	MH	1
4	Manchester	2201	Downstream	2101	Water level, 5% of the vertical dimension	WL	1
4	Manchester	2201	Downstream	2101	Junction at 1 o'clock, diameter: 150mm	JN	1
4	Manchester	2201	Downstream	2101	Settled deposits, fine, 20% cross-sectional area loss, start	DES	1
4	Manchester	2201	Downstream	2101	Junction at 11 o'clock, diameter: 150mm	JN	1
4	Manchester	2201	Downstream	2101	Settled deposits, fine, 30% cross-sectional area loss	DES	1
4	Manchester	2201	Downstream	2101	Settled deposits, fine, 20% cross-sectional area loss, finish	DES	1
4	Manchester	2201	Downstream	2101	Survey abandoned	SA	1
5	Manchester	2202	Downstream	2201	Start node type, manhole, reference number: 2202	MH	4
5	Manchester	2202	Downstream	2201	Water level, 20% of the vertical dimension	WL	4
5	Manchester	2202	Downstream	2201	Fractures, multiple from 7 o'clock to 5 o'clock	FM	4
5	Manchester	2202	Downstream	2201	Settled deposits, fine, 20% cross-sectional area loss	DES	4
5	Manchester	2202	Downstream	2201	Roots, fine	RF	4
5	Manchester	2202	Downstream	2201	Hole in drain or sewer from 12 o'clock to 2 o'clock	H	4
5	Manchester	2202	Downstream	2201	General remark	REM	4
5	Manchester	2202	Downstream	2201	Survey abandoned	SA	4
2	Manchester	2204	Upstream	1105	Start node type, manhole, reference number: 1105	MH	1
2	Manchester	2204	Upstream	1105	Water level, 5% of the vertical dimension	WL	1
2	Manchester	2204	Upstream	1105	Pipe material changes to brick at this point	MCCR	1
2	Manchester	2204	Upstream	1105	Shape changes to U-shaped with flat top, new size(s), 780mm high, 500mm wide	SCU	1
2	Manchester	2204	Upstream	1105	Roots, fine, start	RF	1
2	Manchester	2204	Upstream	1105	Roots, tap	RT	1
2	Manchester	2204	Upstream	1105	Mortar missing, medium (between 15mm and 50mm) from 1 o'clock to 11 o'clock, start	MMM	1

2	Manchester	2204	Upstream	1105	Roots, tap	RT	1
2	Manchester	2204	Upstream	1105	Connection other than junction at 10 o'clock, diameter: 150mm	CN	1
2	Manchester	2204	Upstream	1105	Dropped invert, gap: 300mm from 5 o'clock to 7 o'clock	DI	1
2	Manchester	2204	Upstream	1105	Mortar missing, medium (between 15mm and 50mm) from 1 o'clock to 11 o'clock, finish	MMM	1
2	Manchester	2204	Upstream	1105	Roots, fine, finish	RF	1
2	Manchester	2204	Upstream	1105	Survey abandoned	SA	1



Project No.
Survey Date.
Surveyor.

Asset Survey Card

Asset ID: eg: MH, CP, GY
Status: Asset Type: Function: Cover Level:
Location:
Town:

COVER DETAILS

☒ Square ☐ Rectangle ☐ Triangle ☐ Dbl Triangle ☐ Circular ☐ Other
☒ Hinged ☐ Lockable ☐ Grating ☒ Cover Duty x Size (mm)

PIPE DETAILS

Incoming Pipes

Pipe	Depth from Cover (m)	Upstream / Downstream Ref	Shape	Size (mm)	Height	Width	Pipe Mat	Lining Mat	Back Drop Dia (mm)	Invert Level (m)
A	3.69	UNKNOWN	C	600	x		CO			
B	3.64	1105	C	600	x		CO			
C					x					
D					x					
E					x					
F					x					

Outgoing Pipes

X	3.72	1108	C	600	x		CO			
Y					x					

MANHOLE CONSTRUCTION DETAILS

Shaft

x Size (mm) Depth (m) No. of Reg Courses Soffit

Chamber

x Size (mm) Side Entry ☐ OX / H2S / METH Toxic atmosphere ☐ Evidence of Surcharge

☒ Pre Cast Concrete ☐ Insitu Concrete ☐ Bolted Segments ☐ GRP ☐ BR ☐ Reducing Slab
 Step Irons ☐ Ladder ☐ No. of Landings Depth of Flow (mm) Depth of Silt (mm)

ADDITIONAL CONSTRUCTION DETAILS

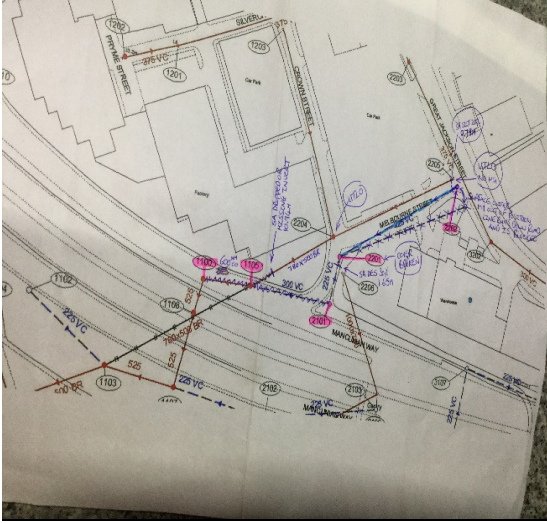
☐ Flap Valve ☐ Orifice ☐ Sluice Gate ☐ Weir ☐ Screens ☐ Penstock ☐ Flume ☐ H/Wall

CONDITION INFORMATION (Specify in Remark)

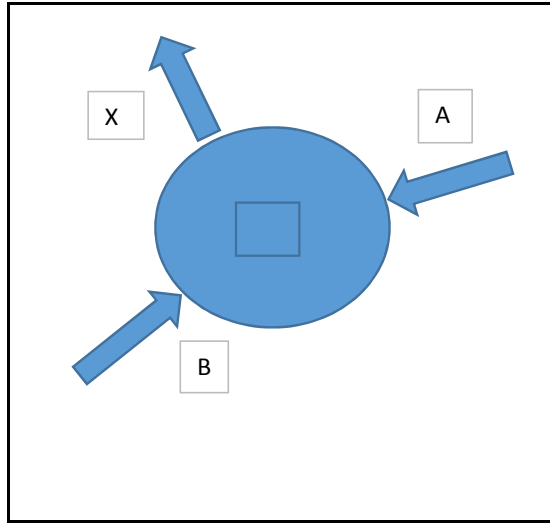
	Cover	Shaft	Irons/Ladder	Chamber	Benching	Channel
OK	☒	☒	☒	☒	☒	☒
Needs Attention	☐	☐	☐	☐	☐	☐
Urgent Attention	☐	☐	☐	☐	☐	☐

Remark

LOCATION SKETCH



PLAN OF MANHOLE



LOCATION PHOTO



INTERNAL PHOTO



STATUS	PU : Public	PR : Private	WC : Culverted Watercourse	} Applies to main outlet
	24 : Section 24	HD : Highway Drain		
FUNCTION	F : Foul	C : Combined	S : Surface Water	} Applies to main outlet
MANHOLE TYPE	IF : Infall	MH : Manhole	CP : Catchpit	
	LH : Lamphole	RE : Rodding Eye	SO : Storm Overflow	
	GU : Gully	OF : Outfall	SA : Soakaway	
COVER DUTY	L : Light Duty	M : Medium Duty	H : Heavy Duty	
SHAPE	C : Circular	E : Egg	R : Rectangular	
	S : Square	T : Trapezoidal	A : Arched	
	B : Barrel	H : Horseshoe (Inverted U)	U : U-shaped with flat top	
	X : Other (state in words)			
PIPE (OR LINING) MATERIAL	AK : Alkathene	AC : Asbestos Cement	BR : Brick	
	CI : Cast Iron	SI : Spun (Grey) Iron	CO : Concrete	
	CSB : Concrete Segments (Bolted)	CSU : Concrete Segments (Unbolted)	CC : Concrete Box Culvert	
	DI : Ductile Iron	GRC : Glass Reinforced Concrete	GRP : Glass Reinforced Plastic	
	PSC : Plastic/Steel Composite	PVC : Polyvinyl Chloride	PE : Polyethylene	
	RPM : Reinforced Plastic Matrix	ST : Steel	VC : Vitrified Clay	
	PP : Polypropylene	PF : Pitch Fibre	MAC : Masonry, Coursed	
	MAR : Masonry, Random Courses	XXX : Other (State in remarks)		
LINING	BL : Bitumen	RL : Resin	IS : Insituform	
	CL : Cement	PI : Plastic		



Project No.

Survey Date.

Surveyor.

Asset Survey Card

Asset ID: eg: MH, CP, GY

Status: Asset Type: Function: Cover Level:

Location:

Town:

COVER DETAILS

☒ Square ☐ Rectangle ☐ Triangle ☐ Dbl Triangle ☐ Circular ☐ Other Other

☒ Hinged ☐ Lockable ☐ Grating ☒ Cover Duty x Size (mm)

PIPE DETAILS

Incoming Pipes

Pipe	Depth from Cover (m)	Upstream / Downstream Ref	Shape	Size (mm)		Pipe Mat	Lining Mat	Back Drop Dia (mm)	Invert Level (m)
				Height	Width				
A	3.14	UNKNOWN	C	225	x	VC			
B	3.11	UNKNOWN	C	225	x	VC			
C	2.58	UNKNOWN	C	150	x	VC			
D	1.85	2204	C	600	x	CO			
E	3.24	UNKNOWN	C	150	x	VC			
F	3.15	2101	C	300	x	VC			

Outgoing Pipes

X	3.33	1100	C	600	x	CO			
Y					x				

MANHOLE CONSTRUCTION DETAILS

Shaft

x Size (mm) Depth (m) No. of Reg Courses Soffit

Chamber

x Size (mm) Side Entry ☐ OX / H2S / METH Toxic atmosphere ☐ Evidence of Surcharge

☒ Pre Cast Concrete ☐ Insitu Concrete ☐ Bolted Segments ☐ GRP Reducing Slab

Step Irons ☐ Ladder ☐ No. of Landings Depth of Flow (mm) Depth of Silt (mm)

ADDITIONAL CONSTRUCTION DETAILS

☐ Flap Valve ☐ Orifice ☐ Sluice Gate ☐ Weir ☐ Screens ☐ Penstock ☐ Flume ☐ H/Wall

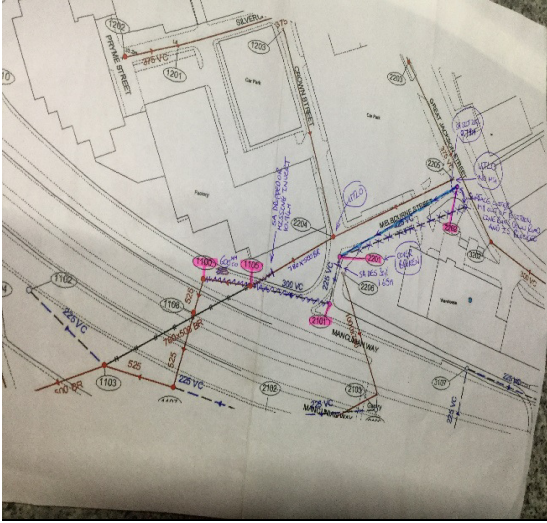
CONDITION INFORMATION (Specify in Remark)

	Cover	Shaft	Irons/Ladder	Chamber	Benching	Channel
OK	☒	☒	☒	☒	☒	☒
Needs Attention	☐	☐	☐	☐	☐	☐
Urgent Attention	☐	☐	☐	☐	☐	☐

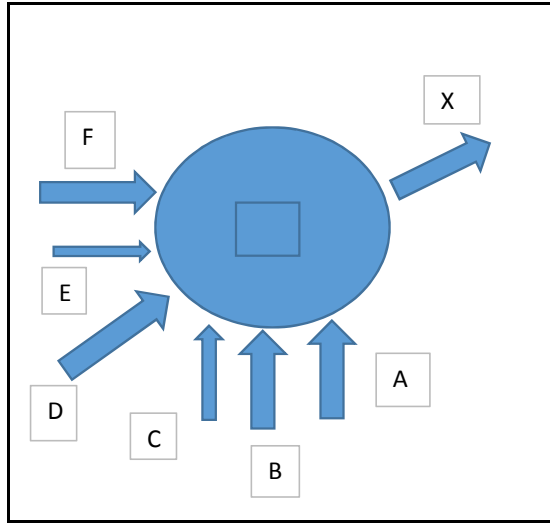
Remark

GPS - X=383187.43 Y=397197.852

LOCATION SKETCH



PLAN OF MANHOLE



LOCATION PHOTO



INTERNAL PHOTO



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	LH : Lamphole	RE : Rodding Eye	SO : Storm Overflow	
	GU : Gully	OF : Outfall	SA : Soakaway	
COVER DUTY	L : Light Duty	M : Medium Duty	H : Heavy Duty	
SHAPE	C : Circular	E : Egg	R : Rectangular	
	S : Square	T : Trapezoidal	A : Arched	
	B : Barrel	H : Horseshoe (Inverted U)	U : U-shaped with flat top	
	X : Other (state in words)			
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	CSB : Concrete Segments (Bolted)	CSU : Concrete Segments (Unbolted)	CC : Concrete Box Culvert	
	DI : Ductile Iron	GRC : Glass Reinforced Concrete	GRP : Glass Reinforced Plastic	
	PSC : Plastic/Steel Composite	PVC : Polyvinyl Chloride	PE : Polyethylene	
	RPM : Reinforced Plastic Matrix	ST : Steel	VC : Vitrified Clay	
	PP : Polypropylene	PF : Pitch Fibre	MAC : Masonry, Coursed	
	MAR : Masonry, Random Courses	XXX : Other (State in remarks)		
LINING	BL : Bitumen	RL : Resin	IS : Insituform	
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Project No.
Survey Date.
Surveyor.

Asset Survey Card

Asset ID: eg: MH, CP, GY
Status: Asset Type: Function: Cover Level:
Location:
Town:

COVER DETAILS

☒ Square ☐ Rectangle ☐ Triangle ☐ Dbl Triangle ☐ Circular ☐ Other Other
☒ Hinged ☐ Lockable ☐ Grating ☒ Cover Duty x Size (mm)

PIPE DETAILS

Incoming Pipes

Pipe	Depth from Cover (m)	Upstream / Downstream Ref	Shape	Size (mm)		Pipe Mat	Lining Mat	Back Drop Dia (mm)	Invert Level (m)
A	3	2201	C	225	x	VC			
B	2.99	UNKNOWN	C	225	x	VC			
C	1.18	UNKNOWN	C	150	x	VC			
D					x				
E					x				
F					x				

Outgoing Pipes

X	3.1	1105	C	300	x	CO			
Y					x				

MANHOLE CONSTRUCTION DETAILS

Shaft

x Size (mm) Depth (m) No. of Reg Courses Soffit

Chamber

x Size (mm) Side Entry ☐ OX / H2S / METH Toxic atmosphere ☐ Evidence of Surcharge

☒ Pre Cast Concrete ☐ Insitu Concrete ☐ Bolted Segments ☐ GRP Reducing Slab

Step Irons ☐ Ladder ☐ No. of Landings Depth of Flow (mm) Depth of Silt (mm)

ADDITIONAL CONSTRUCTION DETAILS

☐ Flap Valve ☐ Orifice ☐ Sluice Gate ☐ Weir ☐ Screens ☐ Penstock ☐ Flume ☐ H/Wall

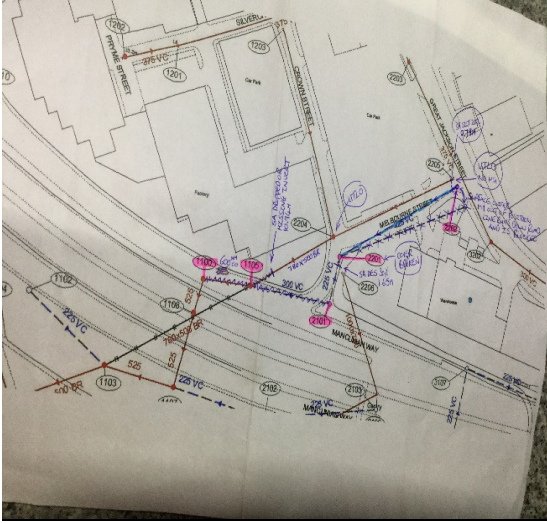
CONDITION INFORMATION (Specify in Remark)

	Cover	Shaft	Irons/Ladder	Chamber	Benching	Channel
OK	☒	☒	☒	☒	☒	☒
Needs Attention	☐	☐	☐	☐	☐	☐
Urgent Attention	☐	☐	☐	☐	☐	☐

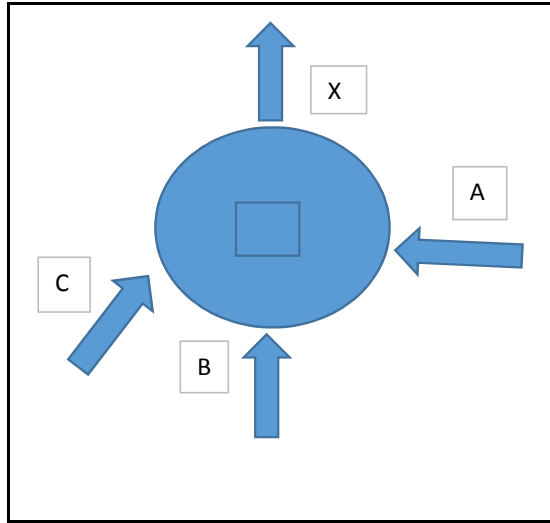
Remark

See Overleaf for Key

LOCATION SKETCH



PLAN OF MANHOLE



LOCATION PHOTO



INTERNAL PHOTO



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Project No.
Survey Date.
Surveyor.

Asset Survey Card

Asset ID: eg: MH, CP, GY
Status: Asset Type: Function: Cover Level:
Location:
Town:

COVER DETAILS

☒ Square ☐ Rectangle ☐ Triangle ☐ Dbl Triangle ☐ Circular ☐ Other Other
☒ Hinged ☐ Lockable ☐ Grating ☒ Cover Duty x Size (mm)

PIPE DETAILS

Incoming Pipes

Pipe	Depth from Cover (m)	Upstream / Downstream Ref	Shape	Size (mm) Height	Width	Pipe Mat	Lining Mat	Back Drop Dia (mm)	Invert Level (m)
A	1.98	2202	C	225	x	VC			
B	0.65	UNKNOWN	C	150	x	VC			
C					x				
D					x				
E					x				
F					x				

Outgoing Pipes

X	2.01	2101	C	225	x	VC			
Y					x				

MANHOLE CONSTRUCTION DETAILS

Shaft

x Size (mm) Depth (m) No. of Reg Courses Soffit

Chamber

x Size (mm) Side Entry ☐ OX / H2S / METH Toxic atmosphere ☐ Evidence of Surcharge

☒ Pre Cast Concrete ☐ Insitu Concrete ☐ Bolted Segments ☐ GRP Reducing Slab

Step Irons ☐ Ladder ☐ No. of Landings Depth of Flow (mm) Depth of Silt (mm)

ADDITIONAL CONSTRUCTION DETAILS

☐ Flap Valve ☐ Orifice ☐ Sluice Gate ☐ Weir ☐ Screens ☐ Penstock ☐ Flume ☐ H/Wall

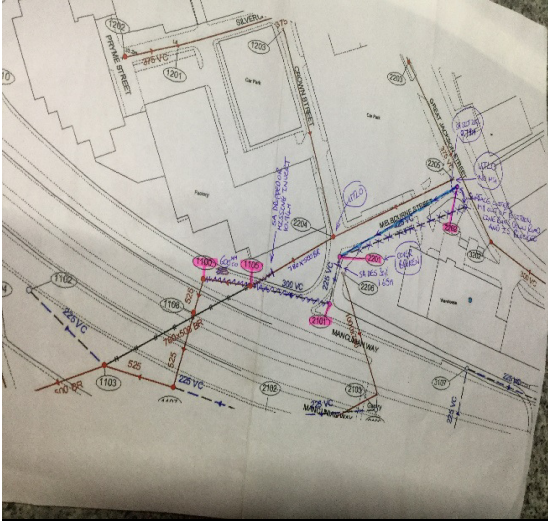
CONDITION INFORMATION (Specify in Remark)

	Cover	Shaft	Irons/Ladder	Chamber	Benching	Channel
OK	☒	☒	☒	☒	☒	☒
Needs Attention	☐	☐	☐	☐	☐	☐
Urgent Attention	☐	☐	☐	☐	☐	☐

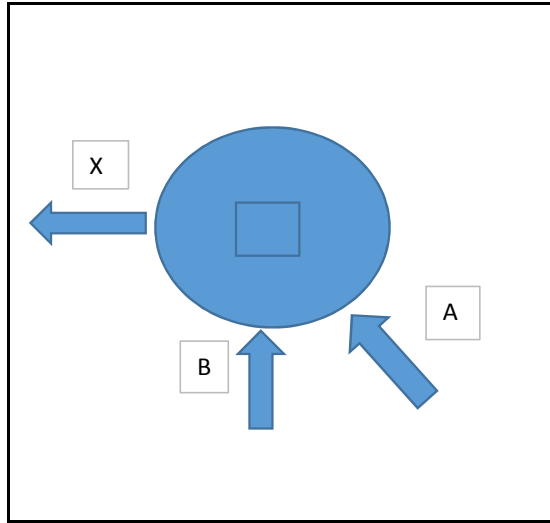
Remark

See Overleaf for Key

LOCATION SKETCH



PLAN OF MANHOLE



LOCATION PHOTO



INTERNAL PHOTO



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	X : Other (state in words)			
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	CSB : Concrete Segments (Bolted)	CSU : Concrete Segments (Unbolted)	CC : Concrete Box Culvert	
	DI : Ductile Iron	GRC : Glass Reinforced Concrete	GRP : Glass Reinforced Plastic	
	PSC : Plastic/Steel Composite	PVC : Polyvinyl Chloride	PE : Polyethylene	
	RPM : Reinforced Plastic Matrix	ST : Steel	VC : Vitrified Clay	
	PP : Polypropylene	PF : Pitch Fibre	MAC : Masonry, Coursed	
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Project No.

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Asset Survey Card

Asset ID: eg: MH, CP, GY

Status: Asset Type: Function: Cover Level:

Location:

Town:

COVER DETAILS

☒ Square ☐ Rectangle ☐ Triangle ☐ Dbl Triangle ☐ Circular ☐ Other Other

☒ Hinged ☐ Lockable ☐ Grating ☒ Cover Duty x Size (mm)

PIPE DETAILS

Incoming Pipes

Pipe	Depth from Cover (m)	Upstream / Downstream Ref	Shape	Size (mm)	Height	Width	Pipe Mat	Lining Mat	Back Drop Dia (mm)	Invert Level (m)
A	1.42	UNKNOWN	C	150	x		VC			
B					x					
C					x					
D					x					
E					x					
F					x					

Outgoing Pipes

X	1.5	2201	C	225	x		VC			
Y					x					

MANHOLE CONSTRUCTION DETAILS

Shaft

x Size (mm) Depth (m) No. of Reg Courses Soffit

Chamber

x Size (mm) Side Entry ☐ OX / H2S / METH Toxic atmosphere ☐ Evidence of Surcharge

☒ Pre Cast Concrete ☐ Insitu Concrete ☐ Bolted Segments ☐ GRP Reducing Slab

Step Irons ☐ Ladder ☐ No. of Landings Depth of Flow (mm) Depth of Silt (mm)

ADDITIONAL CONSTRUCTION DETAILS

☐ Flap Valve ☐ Orifice ☐ Sluice Gate ☐ Weir ☐ Screens ☐ Penstock ☐ Flume ☐ H/Wall

CONDITION INFORMATION (Specify in Remark)

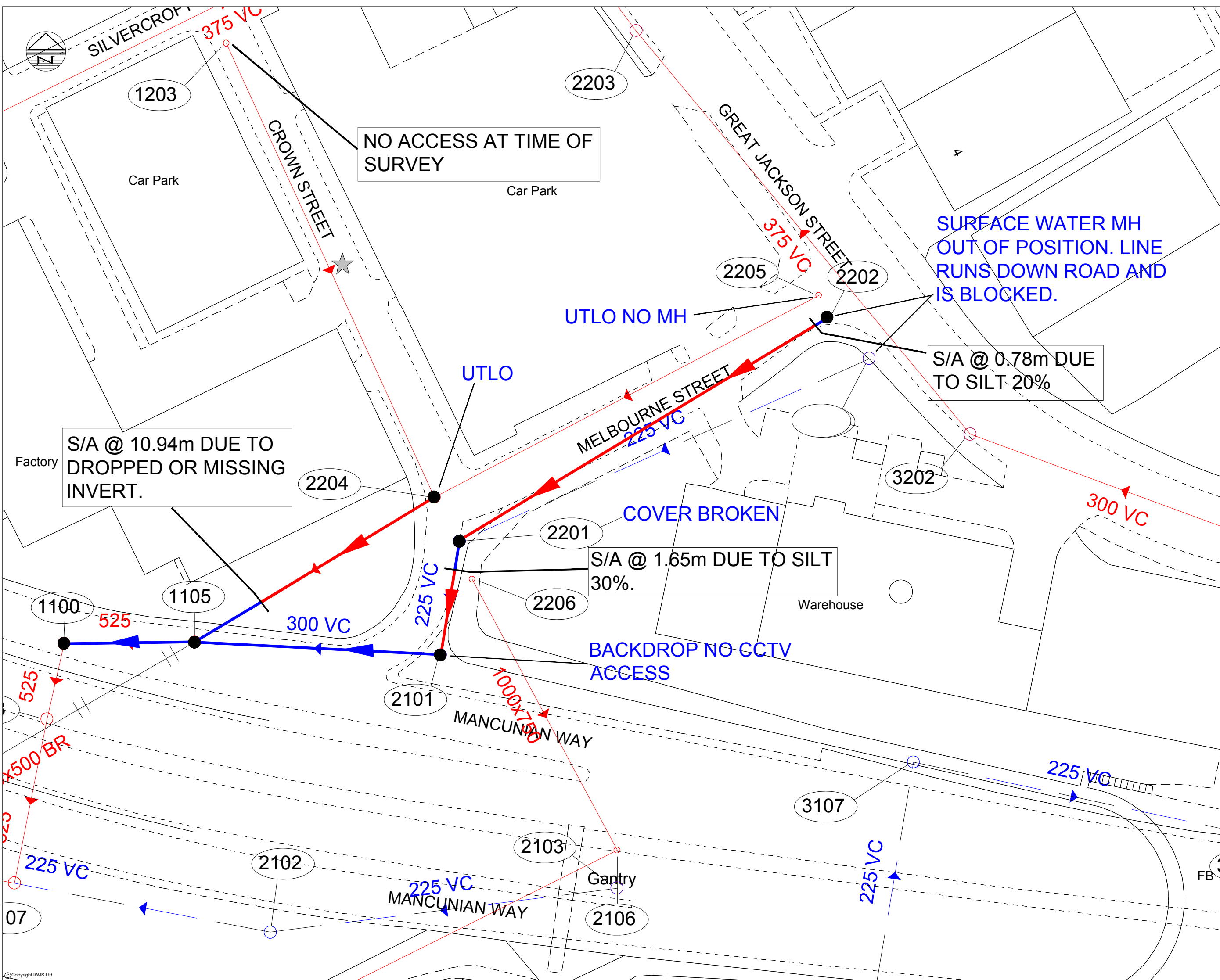
	Cover	Shaft	Irons/Ladder	Chamber	Benching	Channel
OK	☒	☒	☒	☒	☒	☒
Needs Attention	☐	☐	☐	☐	☐	☐
Urgent Attention	☐	☐	☐	☐	☐	☐

Remark

[illegible]

A diagram showing a large blue oval with a smaller blue rectangle centered inside it. Two blue arrows originate from the oval: one points towards the top-left towards a small white box labeled 'X', and the other points towards the bottom-left towards a small white box labeled 'A'. The entire diagram is enclosed in a black rectangular frame.

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	MAR : Masonry, Random Courses	XXX : Other (State in remarks)		
LINING	BL : Bitumen	RL : Resin	IS : Insituform	
	CL : Cement	PI : Plastic		



NOTES

1. DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED/VERIFIED ON SITE. IF IN DOUBT, ASK.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT CCTV DOCUMENTATION.

3. ALL DIMENSIONS AND LEVELS IN METRES UNLESS NOTED OTHERWISE.

4. PIPE RUNS ARE ASSUMED STRAIGHT BETWEEN CHAMBERS UNLESS OTHERWISE INDICATED.

5. ALL UTILITIES ARE UNDERGROUND EXCEPT WHERE INDICATED.

DRAINAGE/CCTV SURVEY LEGEND

●

MANHOLE

—

SURVEYED SEWER

—

UNSURVEYED SEWER

RENAKER

Constructing Solutions

Rev

Date

Details of issue / revision

Drw

Rev

ISSUES & REVISIONS

Head Office: Dickens House, Old Stowmarket Road, Woolpit, Bury St Edmunds, Suffolk IP30 9QS

Essex Office: 230 Old London Road, Marks Tey, Colchester, Essex CO6 1EN

Lincoln Office: Unit 4, Boundary Lane Enterprise Park, South Hykeham, Lincoln LN6 9NQ

Manchester Office: Unit 10 Hurlston Drive, North Bank Industrial Estate, Inham, Manchester M44 5EG

Norfolk Office: Green Road, Tisham Road Industrial Estate, Dereham, Norfolk NR20 3TG

Client

Renaker Build Limited
1st Floor, NQ Building, 47 Bengal Street
Ancoats
Manchester
M4 6BB

Project Title

Renaker Build Limited
Crown Street
Manchester
Lancashire
M15 4AX
0161 245 1150

Drawing Title

Drainage system
investigation.

Scale

NTS

Drawn

JS

Size

A1

Reviewed

BN

Drawing Status

EXISTING

Drawing No.

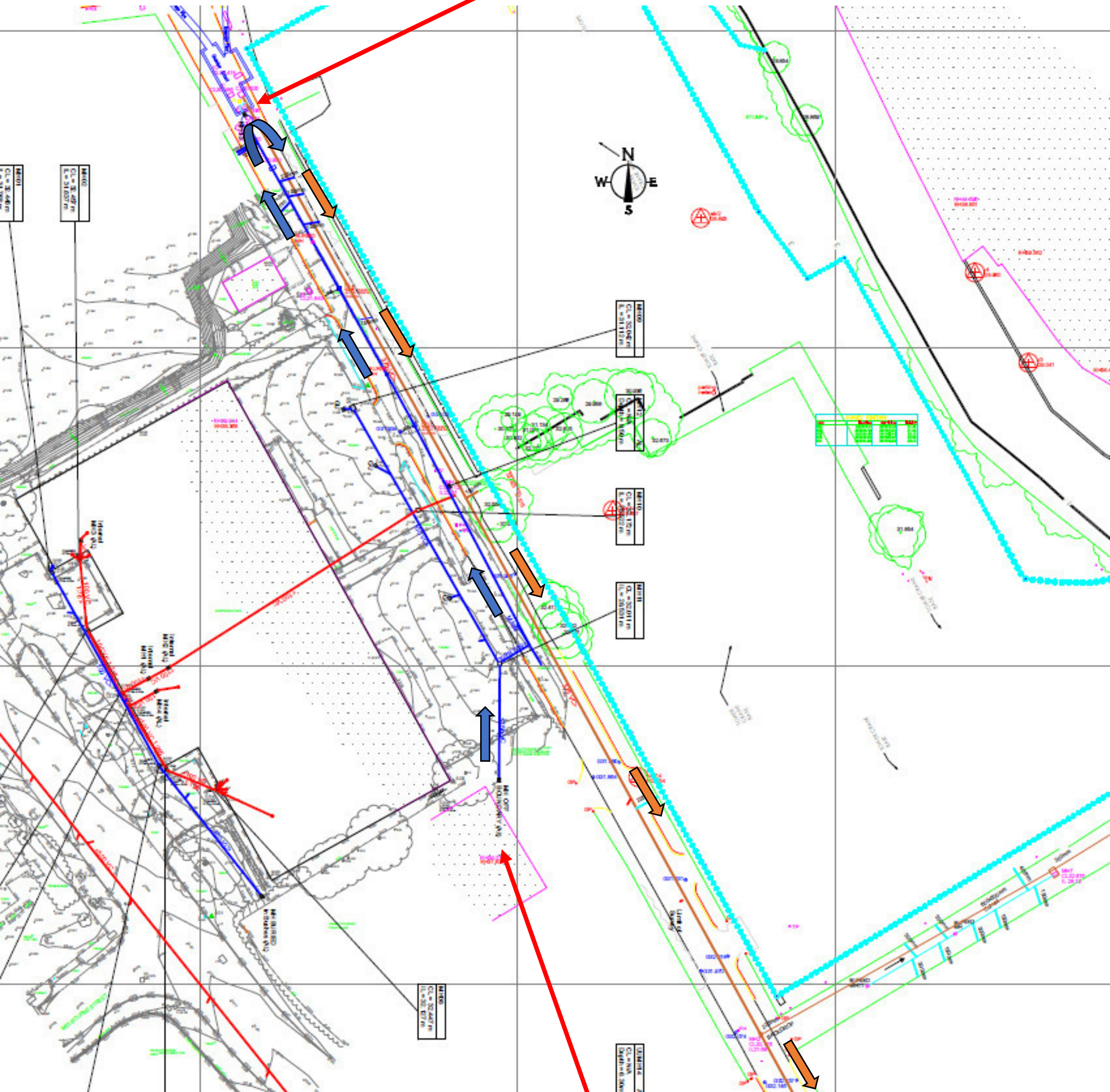
IWJS - 115982

Revision

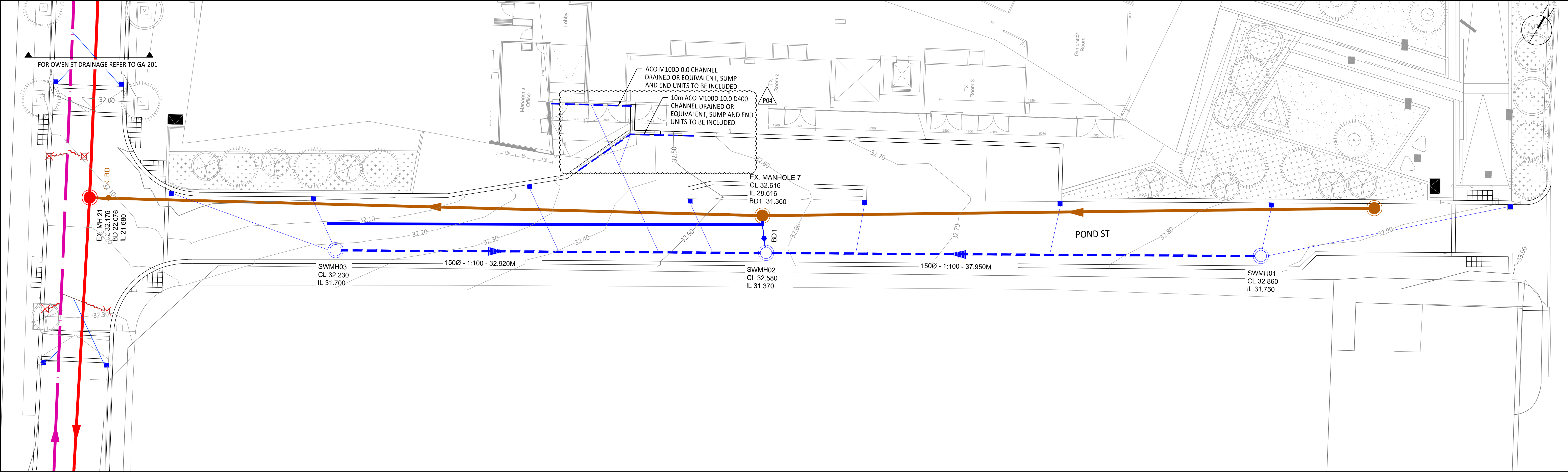
1

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4m deep drain runs north to CSO chamber at Owen Street bellmouth, backdrops in MH chamber then runs south through combined 375mm VC.

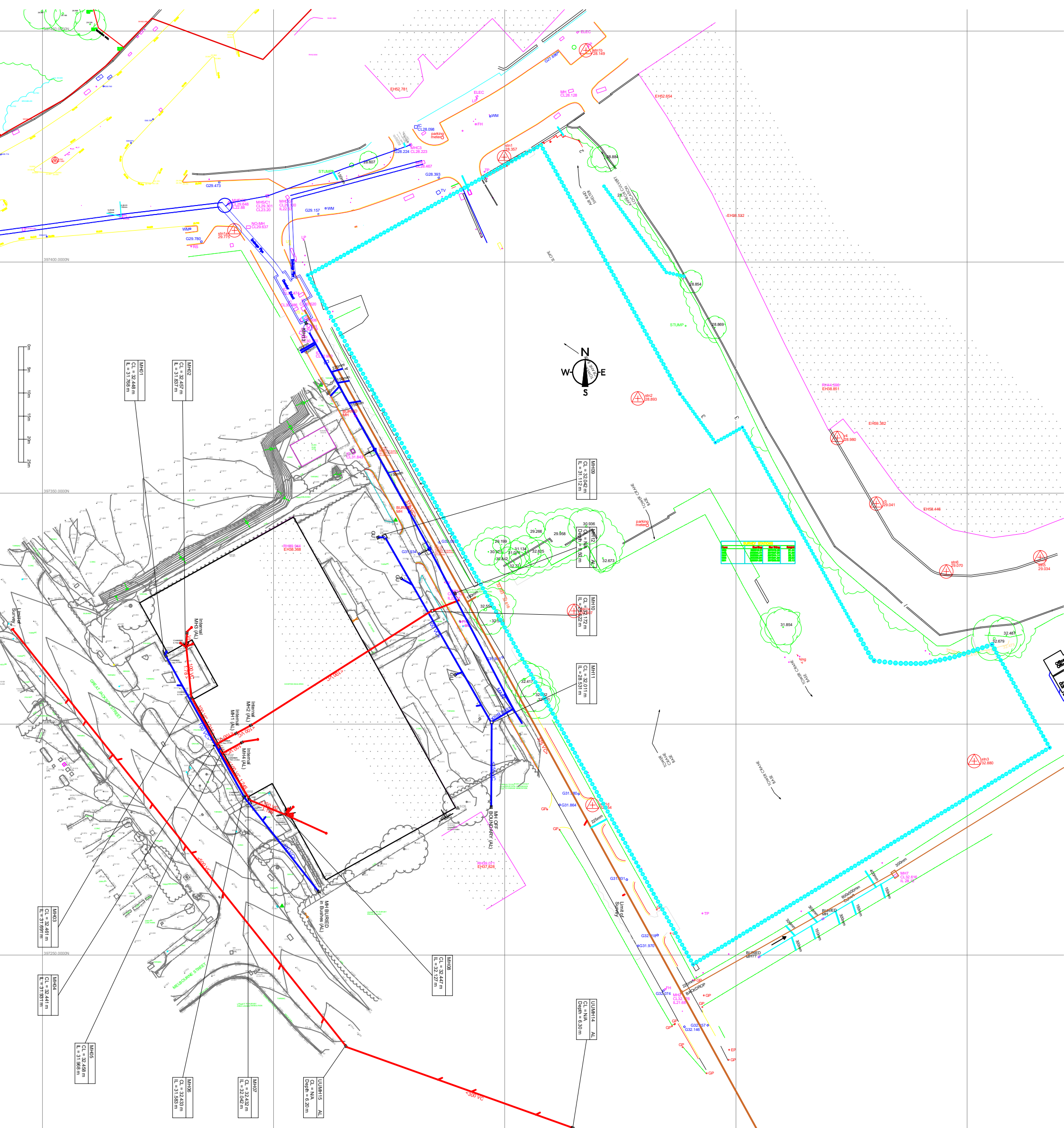


There is a 150mm line into 4m deep MH on DeTrafford plot which then runs north to CSO chamber on Owen Street



- Drainage Notes:
- Existing details shown on this drawing including kerblines, existing drains, chambers, sewers, pipework, stub connections where new connections, diversions or abandonment are shown, invert levels and pipe sizes shall be checked and confirmed to the engineer prior to the commencement of any works. Any discrepancies shall be reported to the engineer for action prior to any new construction.
 - All drainage works shall be carried out in accordance with the requirements of the local authority and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and addendums as appropriate.
 - All drainage shall comply with the typical drainage construction details and the requirements of BS EN 752.
 - Access covers and frames shall comply with the loadings specified and to BS EN 124 and kitemarked or if recessed covers are specified then in accordance with FACTA association equivalent.
 - The proposed building outlines shown on this drawing are for information only. Refer to Architects plans for precise location setting out information and details.
 - Cover levels shown on this drawing are approximate and shall be adjusted to suit finished pavement levels on site by Contractor. Covers shall be orientated to suit pavement finishes where appropriate. All drainage connecting to the public sewer network shall not commence until receipt of the approval from the drainage authority and shall comply with requirements using vitrified clay pipework to BS EN 295 with plain sleeved or socketed flexible joints subject to their approval.
 - Where drainage works are carried out in the public highway the relevant necessary approvals and road opening notices shall be obtained from the highway authority and utility companies.
 - Upon completion all new drainage installation together with any existing drainage retained shall be jetted and CCTV surveyed upon completion. Contractor to ensure that the drainage system is fully operational, free of excess debris/silt and all identified faults rectified.
- HEALTH & SAFETY: The works shall be carried out by specialist competent and experienced contractors. All operatives shall have received full and appropriate training with appropriate qualifications for the operations they are required to undertake. All work shall be carried out in accordance with the relevant Health & Safety Regulations.

Standard Notes	Location Plan	Notes and Keys	Notes and Keys	Notes and Keys							Client	
1. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and the specification. 2. This drawing should not be scaled. 3. All dimensions are to be verified by the contractor on site. 4. All discrepancies should be reported to the C.A. prior to the commencement of the works. © CIVIC ENGINEERS		1. SITE LAYOUT BASED ON ARCHITECT'S (TPM) PLAN Z1-TPM-G710-PL-XX-2289 102-103-104 P24, DATED 23/02/21. 2. TOPOGRAPHICAL SURVEY CONDUCTED BY JLP SURVEYS LTD, DATED 20/05/2015. 4. EXISTING DRAINAGE FOR OWEN STREET AS PER UTILITY SURVEY CONDUCTED BY SURVEY OPERATIONS, DATED 29/06/2016. 5. EXISTING DRAINAGE FOR POND STREET AS PER CCTV SURVEY CONDUCTED BY LANES FOR DRAINS, DATED 05/2015.	EXISTING 300mmØ UU COMBINED SEWER EXISTING COMBINED SEWER MANHOLE EXISTING 300mmØ PRIVATE FOUL SEWER EXISTING COMBINED FOUL MANHOLE EXISTING STORMWATER 650 x 550mm BRICK SEWER EXISTING GULLY TAIL (CONNECTION TO BE RE-USED) EXISTING GULLY TO BE ABANDONED EXISTING GULLY TAIL TO BE ABANDONED	PROPOSED NEW STORMWATER SEWER PROPOSED NEW STORMWATER MANHOLE PROPOSED NEW 150mmØ GULLY TAIL PROPOSED ROAD GULLY EXISTING ROAD GULLY EXISTING PRIVATE SEWER IDENTIFIED BY RENAKER (NOT SURVEYED I.E. LOCATION, DEPTH AND CONDITION UNKNOWN)	12/03/21 P04 GULLY CHANGED TO DRAINAGE CHANNEL LGS NH 05/03/21 P03 UPDATED BASED ON LATEST TPM LAYOUT LGS NH 09/07/19 P02 AMENDMENTS TO EXISTING GULLY LOCATIONS ON OWEN ST AS PER RBL SURVEY (06/02/2019) JLN NH 30/11/18 P01 DRAFT STAGE 4 ISSUE NH PM Date Rev Description Drawn Chk	Scale @ A1 1:150 Date Created 15/05/19 Drawn NH Checked PM Project Number 964-01 Drawing Number Z1-CIV-G580-PI-GF-200 Revision P04	CQ INVESTMENTS, Ltd	Project OWEN STREET, MANCHESTER	Title HIGHWAYS DRAINAGE LAYOUT POND STREET	Status	MANCHESTER LONDON LEEDS Currier's Warehouse, 77 Dale Street, Manchester, M1 2HG. Tel: 0161 228 6757 Lloyds Wharf, 3 Mill Street, London SE1 2BU. Tel: 020 7253 2977 Tower Works, Unit 02-01, Globe Road, Leeds, LS11 5QG. Tel: 0113 2025 130 www.civicengineers.com INFORMATION	



Appendix D – Topographic Survey Information



SURVEY STATIONS			
Name	Easting	Northing	Height
803	288950.87	287829.38	21.44
804	288950.87	287829.38	21.44
805	288950.87	287829.38	21.44
806	288950.87	287829.38	21.44
807	288950.87	287829.38	21.44
808	288950.87	287829.38	21.44
809	288950.87	287829.38	21.44
810	288950.87	287829.38	21.44
811	288950.87	287829.38	21.44
812	288950.87	287829.38	21.44
813	288950.87	287829.38	21.44
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873	288950.87	2878	

STANDARD REFERENCE & ABBREVIATIONS

Drawing title
Topographical Survey of land at:
Great Jackson Street
Manchester

Manchester

[illegible]

Scale(s)	Surveyor
4.200	

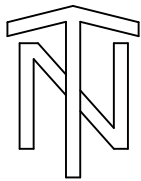
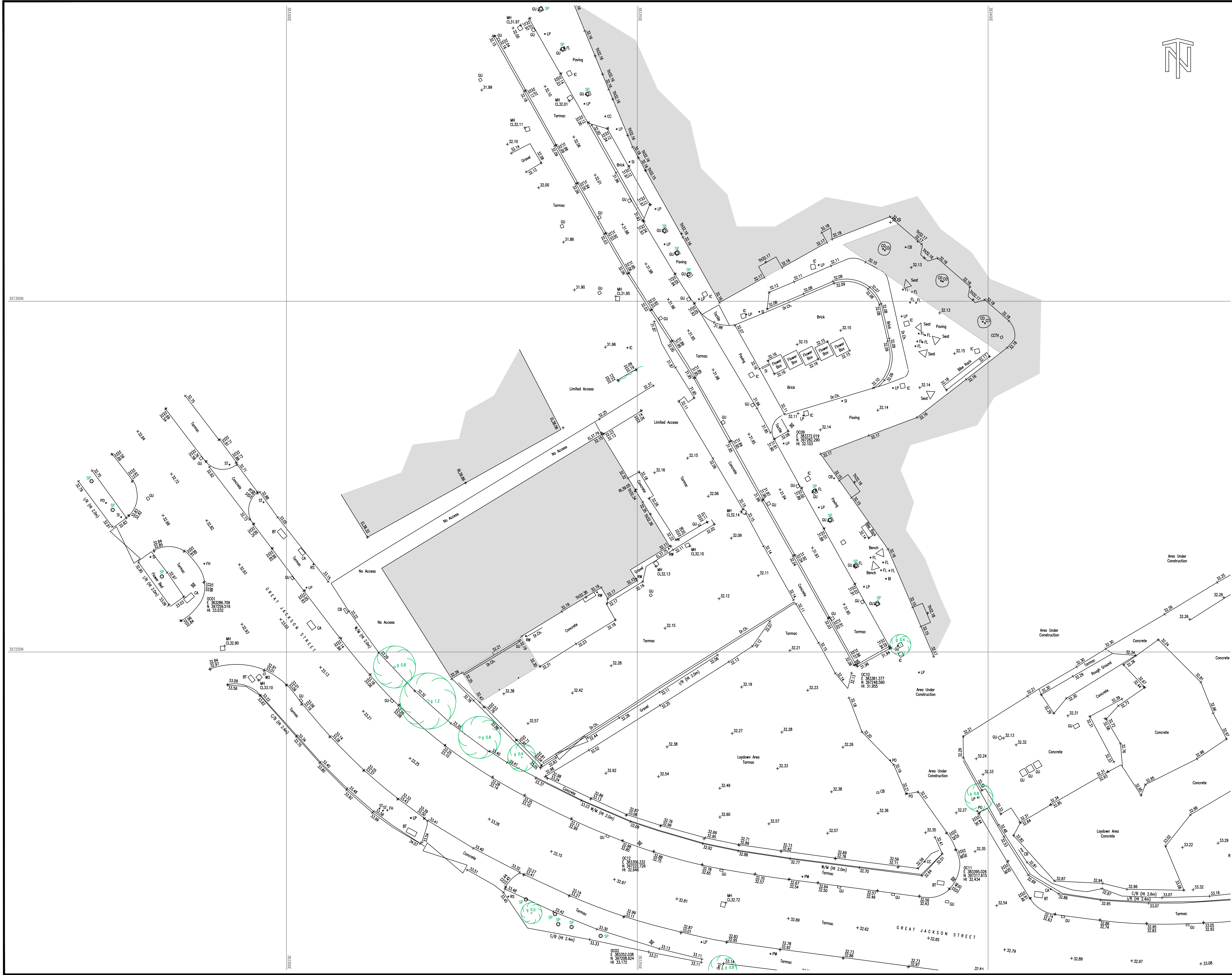
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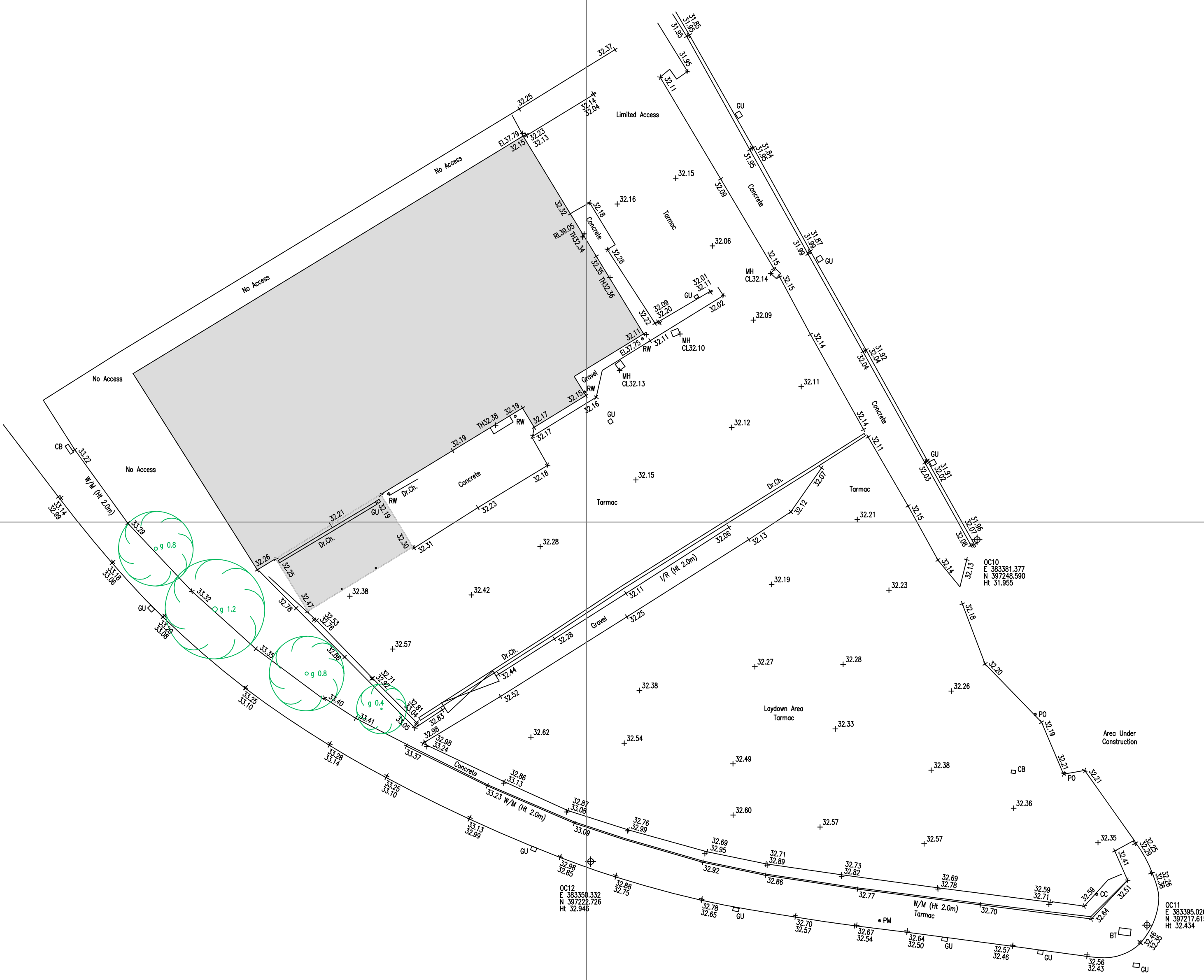
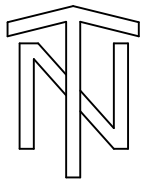
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701001

Sheet Size & Drg Number & Revision



NOTES		
KEY		
Grid & Datum - Local Plane Grid related to OS National Grid & Datum By GNSS RTK Observations		
STANDARD ABBREVIATIONS		
STREET FURNITURE		
AC - AIR CONDITIONING	LC - LIGHTING COLUMN	UTL - UNABLE TO LIFT
AD - AIR DUCT	LI - LIGHT	VDP - VEHICLE DETECTOR PAD
AL - ALARM	LP - LAMP POST	VP - VENT PIPE
AM - AIR VALVE	MO - MOORING ROLLARD	WM - WHISTLE BELOW
BA - BICYCLE AID	MA - MAST	WM - WATER METER
BB - BELLS REACH	MD - MONUMENT	WP - WASTE PIPE
BD - BUILDING DIVIDE	MR - MOORING RING	
BN - BORNHOLE	MM - MONITORING WELL	
BL - BASEMENT LIGHT	NP - NAME PLATE	
BO - BOLLARD	OH - OVERHEAD	
BP - BOUNDARY POST	OSBM - ORDNANCE SURVEY BENCH MARK	
BR - BRICK	PA - PLAY APPARATUS	
BS - BUS STOP	PS - PUBLIC HOUSE	
BU - BUSH	PL - PLANT	
CA - CABLE	PM - PARKING METER	
CB - CLOTHES BOX	PN - PLASTER	
CC - CLOTHES CIRCUT TV	PO - POST	
CD - CLOTHES CIRCUT BIN	PP - PETROL PUMP	
CE - CLOTHES CIRCUT TV	PR - RIDGE HEIGHT	
CF - CLOTHES CIRCUT TV	RS - ROAD SIGN	
CG - CLOTHES CIRCUT TV	RTW - RETAINING WALL	
CH - CLOTHES CIRCUT TV	RWP - RAINWATER PIPE	
CI - CLOTHES CIRCUT TV	SA - STANCHION	
CL - CLOTHES CIRCUT TV	SC - SPEED CAMERA	
CM - CLOTHES CIRCUT TV	SD - SATELLITE DISH	
CO - CLOTHES CIRCUT TV	SE - SAFETY FENCE	
CP - CLOTHES CIRCUT TV	SG - SIGNAL	
CQ - CLOTHES CIRCUT TV	SI - SIGN	
CR - CLOTHES CIRCUT TV	SM - SERVICE MANHOLE	
CS - CLOTHES CIRCUT TV	SS - SECURITY SENSOR	
CT - CLOTHES CIRCUT TV	ST - STOP TAP	
CU - CLOTHES CIRCUT TV	SU - STUMP	
CV - CLOTHES CIRCUT TV	SV - STOP VALVE	
CW - CLOTHES CIRCUT TV	SW - SWITCHGEAR	
CX - CLOTHES CIRCUT TV	SY - STAY	
CY - CLOTHES CIRCUT TV	TA - TAP	
CZ - CLOTHES CIRCUT TV	TM - TEMPORARY BENCH MARK	
DA - DRAIN	TCB - TELEPHONE CALL BOX	
DB - DRAIN	TE - TELEPHONE	
DC - DRAIN	TM - TICKET MACHINE	
DD - DRAIN	TS - TRAFFIC SIGNAL	
DE - DRAIN	TP - TELEGRAPH POLE	
DF - DRAIN		
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LY - LANDSCAPE		
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VR - VEHICLE		
VS - VEHICLE		
VT - VEHICLE		



NOTES

KEY

Grid & Datum

Local Plane Grid related to OS National Grid & Datum
By GNSS RTK Observations

STANDARD ABBREVIATIONS

STREET FURNITURE		LC	LIGHTING COLUMN	UTL	UNABLE TO LIFT
AC	AIR-CONDITIONING	LI	LAMP POST	VDP	VEHICLE DETECTOR PAD
AE	ADJUTANT GENERAL	LP	LAMP POST	VP	VENT PIPE
AL	ALUMINUM	MBO	MOORING BOLLARD	WM	WATER METER
AP	AIR PUMP	MA	MAST	WP	WASTE PIPE
AS	ASBESTOS	MW	WHISTLE BLOW	WD	WATER DRAIN
BB	BELLHOUSE	MD	MONUMENT	WM	WASTE PIPE
BC	BELL CURTAIN	MP	MONUMENT		
BD	BELL RING	MR	MOORING RING		
BO	BOLLARD	MW	MONITORING WELL		
BP	BELL POST	NP	NAME PLATE		
BR	BOLLARD	OH	OVERHEAD	CB	CLOSE BOARDED
BS	BELL SIGN	OSBM	ORDNANCE SURVEY BENCH MARK	C1	CORRUGATED IRON
BU	BUSH	PA	PLAY APPARATUS	CP	CONCRETE PANEL
CA	CABLE	PB	BENCH BOX	HR	HANDRAIL
CB	CONTROL BOX	PH	PUBLIC HOUSE	HR	IRON RAILING
CC	CENTRAL	PI	PIPE	PAL	PALISADE
CD	CABLE DRAIN	PL	PLANT	P2	POST & RAIL
CE	CABLE END	PM	PLANTER	P3	POST & RAIL
CG	CABLE GROUND	PO	POST	P4	POST & RAIL
CH	CHIMNEY	PP	PETROL PUMP	P5	POST & RAIL
CI	CABLE CIRCUIT TV	RD	ROAD SIGN	P6	POST & RAIL
CL	CABLE CIRCUIT TV	RTW	RETAINING WALL	P7	POST & RAIL
CM	CABLE MARKER	RWP	RAINWATER PIPE	P8	POST & RAIL
CO	CABLE OFF	SA	STANCHION	P9	POST & RAIL
CP	CABLE PUMP	SC	SPEED CAMERA	P10	POST & RAIL
CR	CABLE RING	SD	SATELLITE DISH	P11	POST & RAIL
CS	CABLE SIGN	SF	SAFETY FENCE	P12	POST & RAIL
CT	CABLE TAP	SG	SIGNAL	P13	POST & RAIL
CU	CABLE UNIT	SI	SIGN	P14	POST & RAIL
CV	CABLE VALVE	SMP	SERVICE MARKER POST	P15	POST & RAIL
DA	DRAINAGE	SS	SECURITY SENSOR	P16	POST & RAIL
DB	DRAIN BOX	ST	STOP TAP	P17	POST & RAIL
DC	DRAIN CURTAIN	SU	STUMP	P18	POST & RAIL
DE	DRAIN END	SV	STOP VALVE	P19	POST & RAIL
DF	DRAIN FLOW	SW	SWITCHGEAR	P20	POST & RAIL
DH	DRAIN HOLE	SY	STAY	P21	POST & RAIL
DI	DRAIN INLET	TA	TAP	P22	POST & RAIL
DJ	DRAIN JUNCTION	TCB	TELEPHONE CALL BOX	P23	POST & RAIL
DK	DRAIN KITCHEN	TE	TELEPHONE	P24	POST & RAIL
DL	DRAIN LATER	TM	TICKET MACHINE	P25	POST & RAIL
DM	DRAIN METER	TS	TRAFFIC SIGNAL	P26	POST & RAIL
DN	DRAIN NAIL	TP	TELEGRAPH POLE	P27	POST & RAIL
DO	DRAIN OUTLET			P28	POST & RAIL
DP	DRAIN PUMP			P29	POST & RAIL
DR	DRAIN RING			P30	POST & RAIL
DS	DRAIN SIGN			P31	POST & RAIL
DT	DRAIN TAP			P32	POST & RAIL
DU	DRAIN UNIT			P33	POST & RAIL
DV	DRAIN VALVE			P34	POST & RAIL
EA	ELECTRIC APPL			P35	POST & RAIL
EB	ELECTRIC BELL			P36	POST & RAIL
EC	ELECTRIC CABLE			P37	POST & RAIL
ED	ELECTRIC DRAIN			P38	POST & RAIL
EE	ELECTRIC END			P39	POST & RAIL
EF	ELECTRIC FLOW			P40	POST & RAIL
EG	ELECTRIC GROUND			P41	POST & RAIL
EH	ELECTRIC HOLE			P42	POST & RAIL
EI	ELECTRIC INLET			P43	POST & RAIL
EJ	ELECTRIC JUNCTION			P44	POST & RAIL
EK	ELECTRIC KITCHEN			P45	POST & RAIL
EL	ELECTRIC LATER			P46	POST & RAIL
EM	ELECTRIC METER			P47	POST & RAIL
EN	ELECTRIC NAIL			P48	POST & RAIL
EO	ELECTRIC OUTLET			P49	POST & RAIL
EP	ELECTRIC PUMP			P50	POST & RAIL
ER	ELECTRIC RING			P51	POST & RAIL
ES	ELECTRIC SIGN			P52	POST & RAIL
ET	ELECTRIC TAP			P53	POST & RAIL
EU	ELECTRIC UNIT			P54	POST & RAIL
EV	ELECTRIC VALVE			P55	POST & RAIL
FA	FENCE			P56	POST & RAIL
FB	FENCE BOARD			P57	POST & RAIL
FC	FENCE CABLE			P58	POST & RAIL
FD	FENCE DRAIN			P59	POST & RAIL
FE	FENCE END			P60	POST & RAIL
FF	FENCE FLOW			P61	POST & RAIL
FG	FENCE GROUND			P62	POST & RAIL
GH	FENCE HOLE			P63	POST & RAIL
GI	FENCE INLET			P64	POST & RAIL
GJ	FENCE JUNCTION			P65	POST & RAIL
GK	FENCE KITCHEN			P66	POST & RAIL
GL	FENCE LATER			P67	POST & RAIL
GM	FENCE METER			P68	POST & RAIL
GN	FENCE NAIL			P69	POST & RAIL
GO	FENCE OUTLET			P70	POST & RAIL
GP	FENCE PUMP			P71	POST & RAIL
GR	FENCE RING			P72	POST & RAIL
GS	FENCE SIGN			P73	POST & RAIL
GT	FENCE TAP			P74	POST & RAIL
GU	FENCE UNIT			P75	POST & RAIL
GV	FENCE VALVE			P76	POST & RAIL
HA	HANDRAIL			P77	POST & RAIL
HB	HANDRAIL BOARD			P78	POST & RAIL
HC	HANDRAIL CABLE			P79	POST & RAIL
HD	HANDRAIL DRAIN			P80	POST & RAIL
HE	HANDRAIL END			P81	POST & RAIL
HF	HANDRAIL FLOW			P82	POST & RAIL
HG	HANDRAIL GROUND			P83	POST & RAIL
HH	HANDRAIL HOLE			P84	POST & RAIL
HI	HANDRAIL INLET			P85	POST & RAIL
HJ	HANDRAIL JUNCTION			P86	POST & RAIL
HK	HANDRAIL KITCHEN			P87	POST & RAIL
HL	HANDRAIL LATER			P88	POST & RAIL
HM	HANDRAIL METER			P89	POST & RAIL
HN	HANDRAIL NAIL			P90	POST & RAIL
HO	HANDRAIL OUTLET			P91	POST & RAIL
HP	HANDRAIL PUMP			P92	POST & RAIL
HR	HANDRAIL RING			P93	POST & RAIL
HS	HANDRAIL SIGN			P94	POST & RAIL
HT	HANDRAIL TAP			P95	POST & RAIL
HU	HANDRAIL UNIT			P96	POST & RAIL
HV	HANDRAIL VALVE			P97	POST & RAIL
IA	IRON RAILING			P98	POST & RAIL
IB	IRON RAILING BOARD			P99	POST & RAIL
IC	IRON RAILING CABLE			P100	POST & RAIL
ID	IRON RAILING DRAIN				
IE	IRON RAILING END				
IF	IRON RAILING FLOW				
IG	IRON RAILING GROUND				
IH	IRON RAILING HOLE				
II	IRON RAILING INLET				
IJ	IRON RAILING JUNCTION				
IK	IRON RAILING KITCHEN				
IL	IRON RAILING LATER				
IM	IRON RAILING METER				
IN	IRON RAILING NAIL				
IO	IRON RAILING OUTLET				
IP	IRON RAILING PUMP				
IR	IRON RAILING RING				
IS	IRON RAILING SIGN				
IT	IRON RAILING TAP				
IU	IRON RAILING UNIT				
IV	IRON RAILING VALVE				
JA	JUNCTION BOX				
JB	JUNCTION BOARD				
JC	JUNCTION CABLE				
JD	JUNCTION DRAIN				
JE	JUNCTION END				
JF	JUNCTION FLOW				
JG	JUNCTION GROUND				
JH	JUNCTION HOLE				
JI	JUNCTION INLET				
JJ	JUNCTION JUNCTION				
JK	JUNCTION KITCHEN				
JL	JUNCTION LATER				
JM	JUNCTION METER				
JN	JUNCTION NAIL				
JO	JUNCTION OUTLET				
JP	JUNCTION PUMP				
JR	JUNCTION RING				
JS	JUNCTION SIGN				
JT	JUNCTION TAP				
JU	JUNCTION UNIT				
JV	JUNCTION VALVE				
KA	KITCHEN				
KB	KITCHEN BOARD				
KC	KITCHEN CABLE				
KD	KITCHEN DRAIN				
KE	KITCHEN END				
KF	KITCHEN FLOW				
KG	KITCHEN GROUND				
KH	KITCHEN HOLE				
KI	KITCHEN INLET				
KJ	KITCHEN JUNCTION				
KK	KITCHEN KITCHEN				
KL	KITCHEN LATER				
KM	KITCHEN METER				
KN	KITCHEN NAIL				
KO	KITCHEN OUTLET				
KP	KITCHEN PUMP				
KR	KITCHEN RING				
KS	KITCHEN SIGN				
KT	KITCHEN TAP				
KU	KITCHEN UNIT				
KV	KITCHEN VALVE				
LA	LATER				
LB	LATER BOARD				
LC	LATER CABLE				
LD	LATER DRAIN				
LE	LATER END				
LF	LATER FLOW				
LG	LATER GROUND				
LH	LATER HOLE				
LI	LATER INLET				
LJ	LATER JUNCTION				
LK	LATER KITCHEN				
LL	LATER LATER				
LM	LATER METER				
LN	LATER NAIL				
LO	LATER OUTLET				
LP	LATER PUMP				
LR	LATER RING				
LS	LATER SIGN				
LT	LATER TAP				
LU	LATER UNIT				
LV	LATER VALVE				
MA	MAST				
MB	MAST BOARD				
MC	MAST CABLE				
MD	MAST DRAIN				
ME	MAST END				
MF	MAST FLOW				
MG	MAST GROUND				
MH	MAST HOLE				
MI	MAST INLET				
MJ	MAST JUNCTION				
MK	MAST KITCHEN				
ML	MAST LATER				
MM	MAST METER				
MN	MAST NAIL				
MO	MAST OUTLET				
MP	MAST PUMP				
MR	MAST RING				
MS	MAST SIGN				
MT	MAST TAP				
MU	MAST UNIT				
MV	MAST VALVE				
NA	NAIL				
NB	NAIL BOARD				
NC	NAIL CABLE				
ND	NAIL DRAIN				
NE	NAIL END				
NF	NAIL FLOW				
NG	NAIL GROUND				
NH	NAIL HOLE				
NI	NAIL INLET				
NJ	NAIL JUNCTION				
NK	NAIL KITCHEN				
NL	NAIL LATER				
NM	NAIL METER				
NN	NAIL NAIL				
NO	NAIL OUTLET				
NP	NAIL PUMP				
NR	NAIL RING				
NS	NAIL SIGN				
NT	NAIL TAP				
NU	NAIL UNIT				
NV	NAIL VALVE				
OA	OVERHEAD				
OB	OVERHEAD BOARD				
OC	OVERHEAD CABLE				
OD	OVERHEAD DRAIN				
OE	OVERHEAD END				
OF	OVERHEAD FLOW				
OG	OVERHEAD GROUND				
OH	OVERHEAD HOLE				
OI	OVERHEAD INLET				
OJ	OVERHEAD JUNCTION				
OK	OVERHEAD KITCHEN				
OL	OVERHEAD LATER				
OM	OVERHEAD METER				
ON	OVERHEAD NAIL				
OO	OVERHEAD OUTLET				
OP	OVERHEAD PUMP				
OR	OVERHEAD RING				
OS	OVERHEAD SIGN				
OT	OVERHEAD TAP				
OU	OVERHEAD UNIT				
OV	OVERHEAD VALVE				
PA	PLAY APPARATUS				
PB	BENCH BOX				
PC	CONCRETE PANEL				
PD	DRAINAGE				
PE	ELECTRIC				
PF	FENCE				
PG	GROUND				
PH	PUBLIC HOUSE				
PI	PIPE				
PJ	POST & RAIL				
PK	POST & RAIL				
PL	PLANT				
PM	PLANTER				
PN	POST & RAIL				
PO	POST				
PP	PETROL PUMP				
PQ	POST & RAIL				
PR	POST & RAIL				
PS	POST & RAIL				
PT	POST & RAIL				
PU	POST & RAIL				
PV	POST & RAIL				
QA	QUANTITY				
QB	QUANTITY BOARD				
QC	QUANTITY CABLE				
QD	QUANTITY DRAIN				
QE	QUANTITY END				
QF	QUANTITY FLOW				
QG	QUANTITY GROUND				
QH	QUANTITY HOLE				
QI	QUANTITY INLET				
QJ	QUANTITY JUNCTION				
QK	QUANTITY KITCHEN				
QL	QUANTITY LATER				
QM	QUANTITY METER				
QN	QUANTITY NAIL				
QO	QUANTITY OUTLET				
QP	QUANTITY PUMP				
QR	QUANTITY RING				
QS	QUANTITY SIGN				
QT	QUANTITY TAP				
QU	QUANTITY UNIT				
QV	QUANTITY VALVE				
RA	RAINWATER PIPE				
RB	RAINWATER PIPE BOARD				
RC	RAINWATER PIPE CABLE				
RD	RAINWATER PIPE DRAIN				
RE	RAINWATER PIPE END				
RF	RAINWATER PIPE FLOW				
RG	RAINWATER PIPE GROUND				
RH	RAINWATER PIPE HOLE				
RI	RAINWATER PIPE INLET				
RJ	RAINWATER PIPE JUNCTION				

SYMBOLS					
	HEDGE		GATE		BUILDING
	TREE CANOPY		CONTROL STATION		TACTILE PAVING
	TREE				

Rev	Date	Drawn	Description	Ch'kd	App'd



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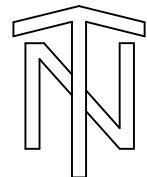
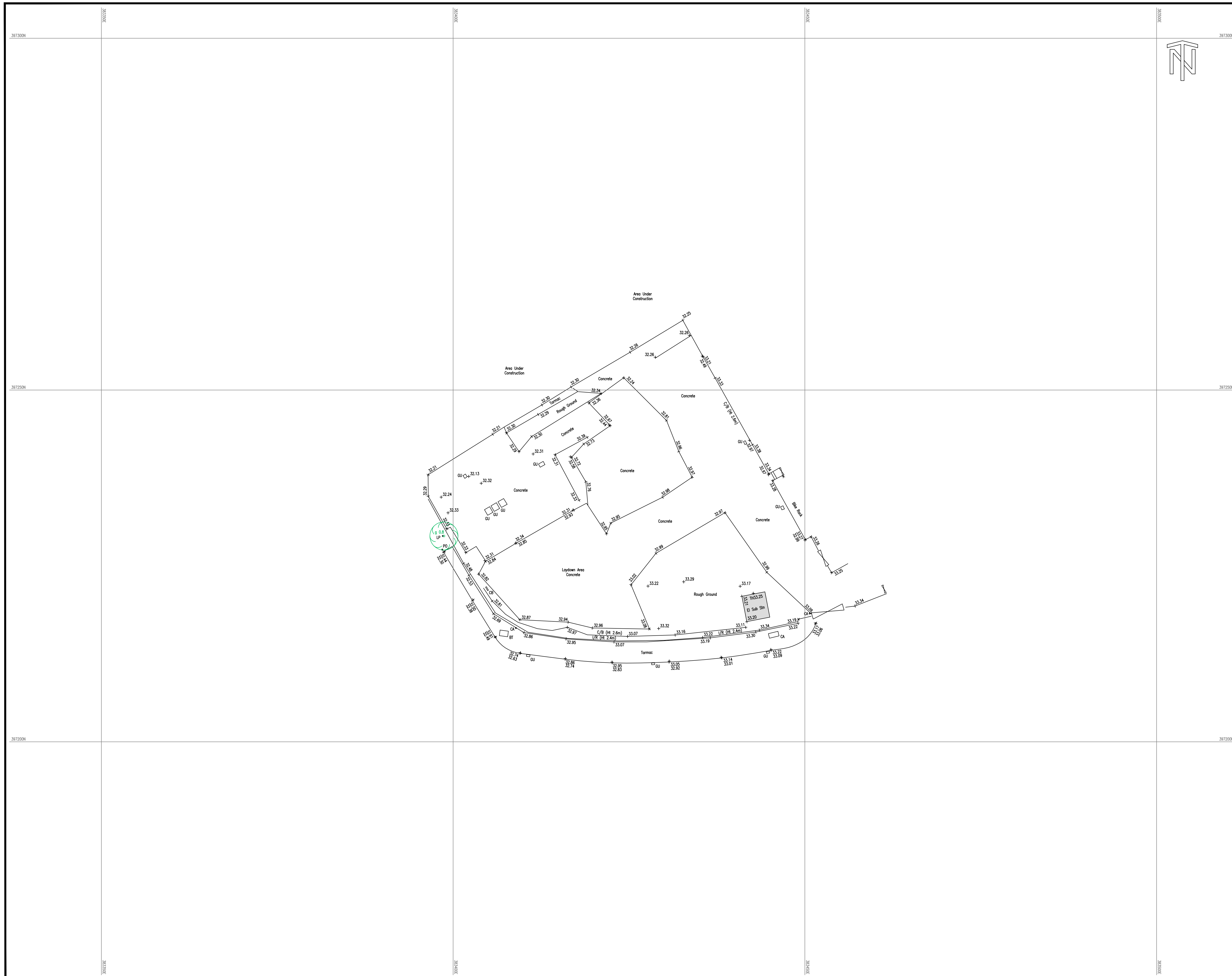
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Title

PLOT F1
GREAT JACKSON ST
MANCHESTER
TOPOGRAPHICAL SURVEY
SHEET 1 OF 1

Surveyed	JH	Drawn	BW	Drawn Date:	12/04/2021
Checked	AM	Approved	NDO		
Scale	1:250 @ A1	Project	11072	Status	ORIG
Drawing No	11072 / 001 / 3	Rev	0		



NOTES

KEY

Grid & Datum - Local Plane Grid related to OS National Grid & Datum
By GNSS RTK Observations

STANDARD ABBREVIATIONS

[illegible]

SYMBOLS

	HEDGE		GATE		BUILDING
	TREE CANOPY		CONTROL STATION		TACTILE PAVING
	TREE				

Rev	Date	Drawn	Description	Ch'kd	App'd



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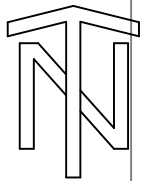
Client

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Title

PLOT F2
GREAT JACKSON ST
MANCHESTER
TOPOGRAPHICAL SURVEY
SHEET 1 OF 1

Surveyed	JH	Drawn	BW	Drawn Date: 12/04/2021
Checked	AM	Approved	NDO	
Scale 1:250 @ A1		Project 11072 CAD File INDO-SBS\Projects\1172\DRAWINGS\11072_001.dwg		Status ORIG
Drawing No 11072 / 001 / 4				Rev 0



KEY

Grid & Datum - Local Plane Grid related to OS National Grid & Datum
By GNSS RTK Observations

STANDARD ABBREVIATIONS

<u>STREET FURNITURE</u>					
A/C	AIR CONDITIONING	LC	LIGHTING COLUMN	UTL	UNABLE TO LIFT
AE	AERIAL	LI	LIGHT	VDP	VEHICLE DETECTOR PA
AL	ALARM	LP	LAMP POST	VP	VENT PIPE
AV	AIR VALVE	MBO	MOORING BOLLARD	WB	WHISTLE BLOW
BA	BATTERY AID	MA	MAST	WM	WATER METER
BO	BORDER OF ARCH	MH	MANHOLE	WO	WASH OUT
		MO	MONUMENT	WP	WASTE PIPE

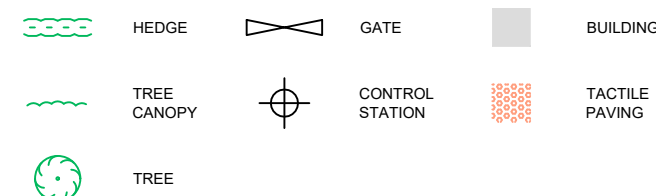
REFERENCE TYPES:

BO	BUILDING DIVIDE	MR	MORING RING	BFW	BENCH
BR	BROCKHOLE	MP	MONITORING PANEL	BE	BARRED WIRE
BS	BASEMENT LIGHT	NP	NAME PLATE	CB	CABLE BOARDED
BO	BOLLARD	OH	OVERHEAD	CC	CONCRETE RIGID
BR	BRAKE	OM	ORIGINATOR	CP	CONCRETE PANEL
BO	BOULDER	PM	PERMANENT SURFACE MARK	HR	HANDRAIL
BS	BUSH	PP	PLANT APPARATUS	HR	CRACKLING
CB	CABLE	PR	PUBLIC HOUSE	HS	HALF SIZE
CB	CABLE BOX	PI	PIPE	PC	POST & CHAIN
CC	CIRCUIT CIRCUIT TV	PL	PLANT	PP	POST & POST
CB	COGNATE FIRE	PM	PARKING METER	PR	POST & RAIL
CB	COLOR	PL	PULPER	PR	PEDESTRIAN SAFETY
CC	CIRCUIT CIRCUIT TV POLE	PO	POST	PR	POST & WIRE
CB	CORNER	PP	PIPE	PM	PIPE
DR	DRAIN	RH	RIDGE HEIGHT	WM	WIRE MESH

LEVELS

EL	DUCT	RTW - RETAINING WALL	<u>LEVELS</u>
DU	ELECTRIC	RWP - RAINNAPPE PIPE	R4,4.5 - BED LEVEL
EL	ELECTRICITY POLE	STANCHION	
ER	EARTH ROD	SC - SPEED CAMERA	E4,4.5 - EAVE LEVEL
ES	ENDOR ARMOR	SC - SPEED CAMERA	
FB	FLOWER BED	SC - SAFETY ENGINE	R4,4.5 - INVERT LEVEL
FI	FIRE HYDRANT	SC - SIGNAL	
FL	FLAG	SM - SIGN	43.45 - SPOOT LEVEL
FS	FLAG STAKE	SMP - SERVICE MARKER POST	R4,4.5 - LEVEL
GA	GAS	SS - SECURITY SENSOR	R4,4.5 - RIDGE LEVEL
GM	GAS METER	ST - STOP TAP	
G	GIRTH	SV - STUMP	
GP	GATE POST	SV - STOP VALVE	S8,4.5 - SOFT BED LEVEL
GV	GATE VALVE	SW - SWITCHGEAR	R4,4.5 - SOFT BED LEVEL
GV	GAS VALVE	SY - STAY	
HYD	HYDRANT	TA - TAP	T4,4.5 - THRESHOLD LEVEL
IND	INSPECTION COVER	TB - TELEPHONE BENCH MARK	
IT	TRAFFIC COVER	TCB - TELEPHONE CALL BOX	W4,4.5 - WATER LEVEL

SYMBOLS



Rev	Date	Drawn	Description	Ch'kd	App'd



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Title

PLOT F3
GREAT JACKSON ST
MANCHESTER

TOPOGRAPHICAL SURVEY
SHEET 1 OF 1

Surveyed	JH	Drawn	BW	Drawn Date: 12/04/2021
Checked	AM	Approved	NDO	

Scale 1:250 @ A1	Project 11072	Status ORIGINAL
	CAD File	

Drawing No	11072 / 001 / 5	Rev	0
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Appendix E – Surface Water Drainage Strategy

[illegible]

- DESIGN PHILOSOPHY**
- SURFACE WATER DESIGN**
THE DESIGN PROVIDES CAPACITY UP TO THE 100 YEAR + 45% CLIMATE CHANGE EVENT.
- SW FLOW RATE: BASED ON 1/4 IN FROM EACH TOWER (20% TOTAL) THIS CONSISTS OF 1/4 IN FROM EACH BUILDING AND 1/4 IN FROM EACH EXTERNAL AREA.**
- APPROXIMATE STORAGE REQUIREMENT:**
E = 32 * 70 = 2240
C8 = 32 * 90 = 1296
E1 = 32 * 100 = 1280
E2 = 38 * 90 = 1283
- OUTFALL TO COMBINED PUBLIC SEWER**
- LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED FROM B1 OR ABOVE. B2C FOLLOWING FURTHER DESIGN AND SURVEY WORK, INTERNAL DRAINAGE BY M&E ENGINEER MAY REQUIRE PUMPING (TBC)
- POLLUTION TREATMENT: PERMEABLE SUB-BASE**
- SUSTAINABLE DRAINAGE: PERMEABLE SUB-BASE**
- INFILTRATION IS NOT CONSIDERED APPROPRIATE FOR THIS SCHEME.**
- FOUL WATER DESIGN**
FW PEAK FLOW RATE: TO BE CONFIRMED BY M&E ENGINEER
- OUTFALL TO COMBINED PUBLIC SEWER**
- LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED FROM B1 AND ABOVE. B2C FOLLOWING FURTHER DESIGN AND SURVEY WORK, INTERNAL DRAINAGE BY M&E ENGINEER MAY REQUIRE PUMPING (TBC)

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Civil & Structural • Transport Planning • Environmental • Infrastructure • Geotechnical • Construction & Heritage • Principal Designer Engineering • Project Collaboration • Carbon Design • Quality Management • Health & Safety • Contract Leadership • Innovation • Programme			
Status: SUITE FOR INFORMATION			S2
Project: CROWN STREET 3			
Dip Title: PHASE 3 GROUND LEVEL DRAINAGE STRATEGY			
Drawn By: KS		Designed By: SR	
Checked By: AR		Date: 10/02/2023	
Scales @ A0: 1:20		Revision:	
Project No. Originator Function Spatial Form Discipline Number			
082430 - CUR - XX - XX - D - C - 92001			
P03			

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