



**FLOOD RISK ASSESSMENT
FOR
PROPOSED RESIDENTIAL DEVELOPMENT, FORMER TETROSYL SITE
WALMERSLEY OLD ROAD, BURY, GREATER MANCHESTER
ON BEHALF OF
BARRATT HOMES MANCHESTER**

DECEMBER 2018

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1.0 INTRODUCTION

- 1.1 This *Flood Risk Assessment* has been prepared by Cole Easdon Consultants on behalf of Barratt Homes (Manchester) in support of a planning application for a residential development of land at the Former Tetrosyl Site, Walmersley Old Road, Bury. Refer to CEC Figure 6155/500 Figure 1 [*Site Location Plan*] in Appendix 1.

Development Proposals

- 1.2 Development proposals are the redevelopment of the Tetrosyl site including the removal of Mill Reservoir and existing buildings and hardstanding and the erection of 268 dwellings with associated access, parking and landscaping.

Need for Study

- 1.3 The purpose of this assessment is to demonstrate that the development proposal outlined above can be satisfactorily accommodated without worsening flood risk for the area and without placing the development itself at risk of flooding, as per National guidance provided within the National Planning Policy Framework document (NPPF).
- 1.4 Accordingly, this study has been prepared to:
- i) assess flood risk to the development from fluvial sources;
 - ii) assess flood risk to the development from other potential sources, including ditches, sewers, groundwater and overland flows; and
 - iii) ensure that the proposed development will fully comply with the requirements of the Environment Agency's policy on the safeguarding of floodplains.

Scope of Study

- 1.5 In Section 2.0, we describe the characteristics of the proposed development site and surrounding area. In Section 3.0, we assess flood risk issues and outline the proposed surface water drainage strategy. In Section 4.0, we assess the foul water disposal. Finally, conclusions are presented in Section 5.0.

Local Policy

- 1.6 This assessment also demonstrates that the proposals meet the requirements of Bury Borough Council Draft Local Plan Policy OP3 (Climate change) which seeks to take a proactive approach towards mitigating against and adapting to the cause and effects of climate change. Policy OP5 (Flood Risk) seeks to manage flood risk from all sources by

ensuring that new development complies with the flood risk management hierarchy and is not subject to unacceptable levels of risk, does not result in increased flood risk elsewhere and where possible, achieves reductions in flood risk overall. In addition, it should seek to ensure that all new development proposals minimise the impact of development on surface water run-off, and where possible, seek to reduce it.

1.7 The following resources have been used for this study:

- *Flood Map for Surface Water – Environment Agency (EA, accessed November 2018);*
- *Flood Zone Map – Environment Agency (EA, accessed November 2018);*
- *Geological Map - British Geological Survey (BGS);*
- *Groundwater Source Protection Zones Map - Environment Agency (EA);*
- *Revised Climate Change Allowances (EA, March 2016);*
- *Topographical Survey Drawing (Drawing Ref SDL 2140/1 by Survey & Design Limited, March 2015); and*
- *United Utilities Sewer Records (February 2014).*

1.8 The following publicly available documents have also been reviewed as part of this assessment:

- *Building Regulations 2010 – Approved Document H (Drainage and Waste Disposal);*
- *Bury Metropolitan Borough Council Local Plan (under consultation) (2018);*
- *Bury, Rochdale and Oldham Strategic Flood Risk Assessment Level 1 (November 2009);*
- *C753 The SuDS Manual (CIRIA, November 2015);*
- *Greater Manchester Surface Water Management Plan (January 2013);*
- *National Planning Policy Framework (NPPF) (2018);*
- *Non-Statutory Technical Standards for Sustainable Drainage Systems (Defra, March 2015);*
- *Planning Practice Guidance (PPG) (March 2014);*
- *Rainfall Runoff Management for Developments (R&D Technical Report W5-074/A/TR/1 Revision E, Defra, June 2012); and*
- *Sewers for Adoption, 6th Edition – A Design and Construction Guide for Developers (SFA 6) (March 2006).*

1.9 The following abbreviations are used in this report:

- AOD – Above Ordnance Datum;
- BGS – British Geological Society;
- BRO – Bury, Rochdale and Oldham;

- EA – Environment Agency;
- FZM – Flood Zone Map prepared by the EA;
- NPPF – National Planning Policy Framework;
- SFRA – Strategic Flood Risk Assessment;
- SUDS – Sustainable Urban Drainage Systems;
- SWMP – Surface Water Management Plan; and
- UU – United Utilities.

2.0 THE EXISTING SITE

Refer to CEC Plan 6155/501 [*Existing Site Layout (3 No. Sheets)*] in Appendix 4.

- 2.1 The proposed development site comprises 10.88ha area of brownfield land located in Walmersley, to the north of Bury town centre. Walmersley Old Road forms the site's western boundary. The site's southern boundary is formed by Mill Road. The north western boundary is formed by Bentley Lane with the M66 motorway bounding the site to the north east. The site's eastern boundary is formed by an un-named road which connects Mill Road to the south and White Carr Lane to the north.
- 2.2 Land use to the south and east of the site is predominantly residential with greenfield land to the north and east.
- 2.3 Large industrial buildings and associated hardstanding from the site's former use cover the southern and north-western parts of the site. The topographical survey indicates the site falls in a southerly direction. Levels vary between 159.6m -162.0m AOD along the northern boundary and 136.5m - 142.0m AOD to the south of the site.

Nearby Watercourses/Drainage Features

- 2.4 The River Irwell drains the wider local catchment. It rises from Irwell Springs on Derpwell Moor and drains in a generally southerly direction. South of Lower Broughton the Irwell joins the River Irk and River Medlock and continues as part of the Manchester Ship Canal which discharges into the River Mersey east of Irlam. The overall length of the River Irwell is some 63km.
- 2.5 One of the tributaries of the River Irwell as it passes between Ramsbottom and Bury is Pigs Lee Brook which discharges to the Irwell to the west of Limefield. Pigs Lee Brook rises upstream of Cob House Farm, to the west of Deeply Vale, and flows in a south-easterly direction beneath the M66 motorway. Downstream of the M66 culvert, Pigs Lee Brook flows in a south-westerly direction through two reservoirs before re-entering a culvert beneath the A56 Walmersley Road highway at Bevis Green. Downstream of the A56, the Brook continues as open channel to its confluence at the River Irwell.
- 2.6 The Study Area is drained by an un-named tributary of Pigs Lee Brook (referred to hereafter as PLB Tributary), which rises on the southern edge of Harden Moor, near Nangreaves. It flows in a generally southerly direction through open farmland and 3 smaller reservoirs at

Whitewall Wood before passing beneath the M66 motorway. Downstream of the motorway culvert the PLB Tributary continues for approximately 100m before entering Mill Reservoir which is located on the site. Outflow from the reservoir is controlled by a weir, with flow being culverted for over 475m through the development site, discharging to open channel some 175m to the south east of the site boundary. The watercourse continues through the Bevis Green area of Bury to its confluence with Pigs Lee Brook. Both watercourses are culverted at the confluence located upstream of the crossing beneath the A56 Walmersley Road highway.

- 2.7 Mill Reservoir, dates back to at least the late 1800s, and is understood to have been originally constructed to supply water to the Lumn Cotton Mill, the site's original occupier. Tetrosyl, the current occupier, are a chemical manufacturer who have been based on the site for approximately 45 years.

Existing Drainage

- 2.8 Asset records provided by United Utilities (UU) indicate the presence of a public 300mm diameter combined water sewer located to the west of the site within Walmersley Old Road. It flows in a southerly direction away from the site. Connections from the residential areas to the west of the site occur frequently along the length of sewer. Two existing public 225mm diameter surface water sewers are located to the south of the site. One flows in a southerly direction down Humber Drive with the second flowing in a south easterly direction and discharging to the Pigs Lee Brook. Refer to Appendix 2.
- 2.9 The site is brownfield. The existing site surface water drainage is directed to the public combined sewer via a public surface water sewer connection at the site access onto Walmersley Old Road, MH ref 8851. In addition, the existing onsite culvert downstream of Mill Reservoir has been surveyed on behalf of the EA, refer to Appendix 2. The survey indicates a number of incoming pipe connections, of varying diameters, along the culvert length which are assumed to be incoming surface water connections also discharging runoff generated by the site.
- 2.10 Brownfield runoff rates for the existing hard area (44,977m²) on the site have been calculated using the modified rational method and are summarised in Table 2.1 below.
- 2.11 Greenfield runoff rates for the site have been calculated as 9.0l/s/ha for the 1:1 year event, 17.6l/s/ha for the 1:30 year event and 21.6l/s/ha for the 1:100 year event.

Table 2.1: Assessment of Brownfield Runoff Rates

Hard Area (ha)	Calculated Brownfield Runoff Rate (l/s)		
	1:1yr	1:30 yr	1:100 yr
4.49	368.2	905.3	1164.8

Existing Ground Conditions

Refer to SI Extract in Appendix 2.

- 2.12 Records acquired from the British Geological Society (BGS) indicate the site is situated on Rough Rock - Sandstone overlain by superficial till deposits of Diamicton. An intrusive site investigation was carried out in May 2014 by e3p which showed there were extensive depths of made ground present across the majority of the site extending to depths of 4.0m in the western areas, with depths of 2.0 – 3.0m in the central and southern areas. The nature of the backfilled materials encountered was highly variable, with inter-bedded granular and cohesive matrices present throughout the site. Beneath the made ground, stiff clay soils were encountered towards the northern part of the site overlying very dense sand and gravel stratum.
- 2.13 No discernible groundwater aquifer was identified as part of the intrusive investigation; however, perched groundwater was identified within the monitoring wells with seepages occurring within 7 of the 14 boreholes conducted. Seepages occurred between 0.75 – 3.5m bgl.
- 2.14 The EA mapping also shows the bedrock aquifer underlying the site is classified as a Secondary 'A' Aquifer with the superficial deposits classified as Secondary 'undifferentiated'.

3.0 FLOOD RISK ISSUES

Refer to CEC Plans 6155/501 [*Existing Site Layout (3 No. Sheets)*] and 6155/502(A) [*Proposed Site Layout*], both located in Appendix 4.

3.1 This section presents an assessment of flood risk to the development from:

- a) external sources; and
- b) surface water discharge from the proposed development.

3.2 Recommended flood risk mitigation measures appropriate to the level of perceived risk are included in the assessment. The mitigation measures are summarised in Table 3.1 on page 13.

A) Assessment of Flood Risk to the Development Site from External Sources

Ai) Assessment of Flood Risk from Fluvial and Tidal Sources

3.3 The Flood Zone Map (FZM) for the locality as produced by the EA is shown on CEC Figure 6155/500/Figure 2 [*EA Flood Zone Map*] within Appendix 1. According to the FZM it can be seen that the site lies within Flood Zone 1 (Low Risk). The PLB tributary is classified as 'Main River' through the site

3.4 The *NPPF* identifies Flood Zone 1 as low flood risk with an annual probability exceeding a 1 in 1,000 from river flooding. In accordance with *NPPF PPG Table 2: Flood Risk Vulnerability Classification*, residential development is classified as 'More vulnerable'. *PPG Table 3: Flood Risk Vulnerability and Flood Zone Compatibility* relates that more vulnerable land use is acceptable in Flood Zone 1. As such, the flood vulnerability of the proposed site use is compatible with the fluvial flood risks (as defined by the EA Flood Map for Planning) associated with the site.

Flood History

3.5 Tetrosyl, the former site occupiers, hold no records of historical flooding from Mill Reservoir. The Strategic Flood Risk Assessment (SFRA) for Bury, Rochdale and Oldham (BRO) also does not record any instances of fluvial flooding at the site.

Climate Change Allowances

3.6 In February 2016, the EA produced peak river flow allowances by river basin district for climate change. The development site falls within the north west river basin district. The

site is in Flood Zone 1, and the proposed use is classified as 'more vulnerable'. Therefore, the EA advise that the appropriate peak river flow climate change allowance to be considered for this locality is 30%.

Hydraulic Modelling

- 3.7 PLB tributary has not been modelled hydraulically by the EA. Therefore, a 1D-2D linked hydraulic model of PLB tributary through the site, including Mill Reservoir, has been produced by CEC to determine the potential impact of the revised climate change allowances on water levels and potential floodplain. Refer to separate *Hydraulic Modelling Study Report* which has determined and assessed the mechanisms of flooding within the existing site arising from the PLB tributary. The report has identified that the primary flood mechanism would be rainfall events causing peak flows to exceed the in-bank capacity of Mill Reservoir resulting in overtopping.
- 3.8 It is intended to remove the existing Mill Reservoir as part of the development proposal. Hydraulic modelling has been undertaken to assess the impact on flood risk arising from reservoir removal. Mitigation proposals have also been modelled.

Hydraulic Modelling – Existing Site

- 3.9 Hydraulic modelling found that for the existing site:
- during the 1:20 year event all flows remain in-bank through the site, with no flooding occurring from Mill Reservoir.
 - during the 1:100 year and 1:100 year+ 30% climate change event, flooding occurred within the existing site occurring from the southern bank of Mill Reservoir. 2D flood mapping undertaken as part of the *Hydraulic Modelling Study* indicates that floodwaters issuing from Mill Reservoir travel southwards through the site and along Walmersley Old Road before re-entering the open channel section of PLB tributary some 120m downstream of the development site. Refer to Figure 3.1 below.
 - Mill Reservoir provides some attenuation to flood flows downstream of the development site.

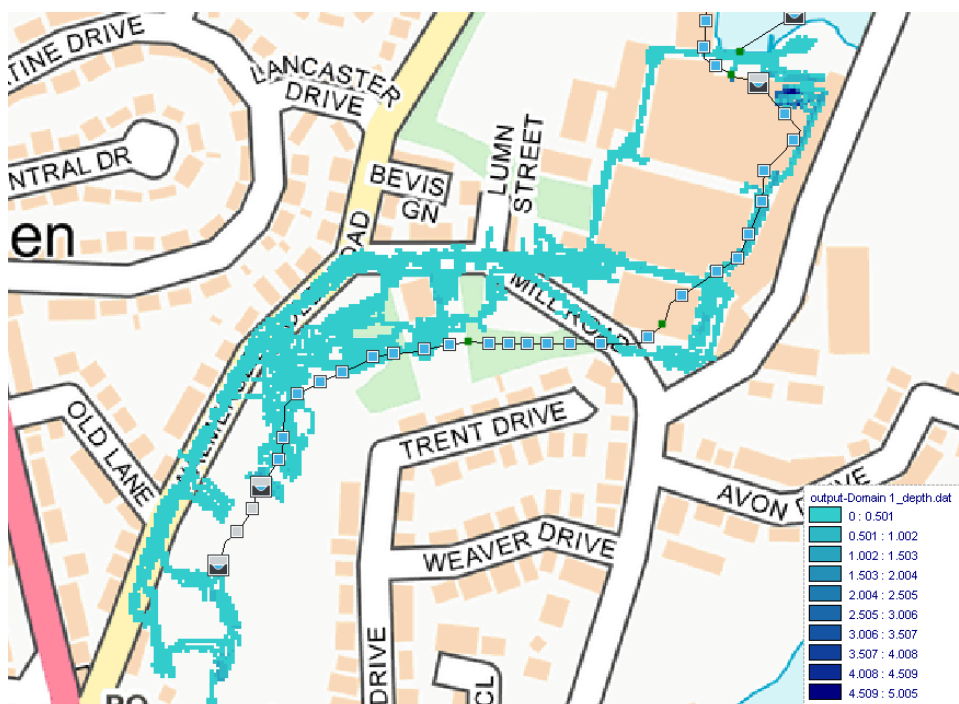


Figure 3.1: Maximum fluvial flood extent for the 1:100 year + 30% climate change event

Hydraulic Modelling – Post Development Site

- 3.10 As part of proposed development, the existing culverted section of PLB tributary downstream of Mill Reservoir through the site will be deculverted and PLB tributary will be routed as open channel along the eastern boundary of the development site. The proposed channel has been sized to ensure that no flooding occurs arising from the 1:100 year + 30% climate change event.
- 3.11 Furthermore, under development proposals the Mill Reservoir will be removed thus removing the existing fluvial flood risk to the site. However, due to the attenuating effect Mill Reservoir has upon flood flows it has been necessary to retain part of the reservoir as a Compensatory Flood Storage Area (FSA). The FSA has been modelled hydraulically in conjunction with the proposed open channel as part of the *Hydraulic Modelling Study* to ensure that flows within the PLB tributary downstream of the site during the 1:100 year+ 30% climate change event do not increase as a result of the development. Outflow from the FSA to the proposed open channel will be controlled via a v-notch weir.
- 3.12 As the FSA is designed to function during high flow events, it is proposed to include an open pond with a permanent water level within the FSA in order to provide ecological benefits.

The permanent water depth in the pond will be some 0.8m over an area of 500m². Storage of floodwater will be above the permanent water level.

- 3.13 The EA advise that detailed design of the proposed channel should have a preference for soft bio-engineering solutions where feasible and be guided by existing good practice design guides such as 'Rivers by Design' and the current draft Greater Manchester Spatial Framework policies in relation to green infrastructure and river valleys. Refer to Appendix 2.

Aii) Assessment of Flood Risk from Existing Ditches

- 3.14 A review of the topographic survey and OS mapping indicate no drainage ditches are present in the vicinity of the site.

Ditch Flood Risk Mitigation Measures

- 3.15 No mitigation required.

Aiii) Assessment of Flood Risk from Existing Sewers/ Drains

- 3.16 UU asset records indicate a public 300mm diameter combined water sewer to the west of the site within Walmersley Old Road, which flows in a southerly direction away from the site. Part of the existing surface water drainage generated within the site is conveyed to the public combined sewer via a public surface water sewer connection at the site access onto Walmersley Old Road, MH ref 8851. The remainder of surface water generated within the site discharges to the culverted section of PLB tributary.
- 3.17 The site is largely elevated above the Walmersley Old Road highway and therefore, should flooding of the combined sewer occur, flood waters would likely be conveyed in a southerly direction and contained within the highway corridor and away from the site.
- 3.18 The culverted section of PLB tributary has been included within the CEC *Hydraulic Modelling Study* and as such, flood risk from this has been assessed as part of the 'Fluvial Flood Risk' as outlined above. Should flooding of the onsite private surface water drainage system discharging to the culverted section of PLB tributary occur, runoff would follow local topography heading in a southerly direction.
- 3.19 The Strategic Flood Risk Assessment (SFRA) for Bury, Rochdale and Oldham (BRO) does not specify individual instances of sewer related flooding. The SFRA does state that Bury had

the least recorded number of sewer flood instances in the Greater Manchester area with 51 flooded properties. Flood risk from the site can be therefore be considered low.

Sewer/ Drain Flood Risk Mitigation Measures

- 3.20 As a precautionary measure, finished floor levels will be raised some 150mm above finished ground levels.

Aiv) Assessment of Flood Risk from Overland Flow (Pluvial)

- 3.21 The Surface Water Flood Zone Map for the locality as produced by the EA is shown on CEC Figure 6155/500/Figure 3 [*EA Surface Water Flood Zone Map*] within Appendix 1. The surface water flood map indicates areas of low – high risk across the development site, with water typically routed around existing buildings with two potential areas for high risk pluvial flooding to occur. The first area is within the existing car park within the south western part of the site where EA maps indicate depths could reach over 900mm during events with a 0.1% - 1% probability with a velocity of less than 0.25m/s. The combination of depth and velocity indicates that this area is at risk from ponding of pluvial flows.
- 3.22 The second area of elevated risk is to the south eastern corner of the site within an area of low lying topography on the south eastern side of one of the existing buildings, having a flood depth of some 300mm during events with a 0.1% - 1% probability and a velocity greater than 0.25m/s. Pluvial flood mapping in the south eastern corner indicates a pluvial flow route originating from the south eastern corner of the site, travelling across Mill Road in a south westerly direction towards either Walmersley Old Road or land to the north of Trent Drive where flow discharges back into the open channel section of PLB tributary downstream of the site.
- 3.23 Pluvial flows generated within the north western part of the site flow around existing buildings and either discharge onto Walmersley Old Road via the site access or contribute to the pluvial floodwaters ponding within the existing south western car park.
- 3.24 The EA pluvial flood map indicates that 'Mill Reservoir' is considered to be at high risk of pluvial flooding and indicates a pluvial flood route from the south eastern corner of the reservoir onto the unnamed access road to the east of the site. However, this is not an accurate representation of pluvial risk in this area, with inaccuracies likely due to the LiDAR data used within the pluvial flood mapping. The eastern banks of Mill Reservoir rise steeply from the top of the reservoir towards the unnamed access road to the east. The

reservoir banks are lowest along the southern edge, as corroborated by the fluvial flood modelling results. In addition, the pluvial mapping does not account for the outflow weir from Mill Reservoir or the sub-surface continuation of PLB Tributary through the site. This false flood route originating from the reservoir re-enters the site at the south-eastern corner and as such may have an impact on the flood depths at the south eastern site boundary as described in Paragraph 3.21 above.

3.25 The SWMP for Greater Manchester which covers the Bury area does not state that the site is located within a Critical Drainage Area or that any specific flood instances have occurred within the vicinity of the site.

3.26 Pluvial flood risk is considered moderate for the site.

Overland Flow Flood Risk Mitigation Measures

3.27 Existing levels vary significantly across the site due to the site's former use. Existing levels are to be regraded as part of development proposals which will eliminate existing areas of ponding. As a precautionary measure, finished floor levels of proposed dwellings will be raised 150mm above surrounding finished ground levels.

Av) Assessment of Flood Risk from Groundwater

3.28 BGS records indicate the site is situated on geology of Rough Rock - Sandstone overlain by superficial till deposits of Diamicton. An intrusive site investigation has been undertaken which encountered made ground up to 4.0m in depth. No discernible groundwater aquifer was identified as part of the intrusive investigation. However, perched groundwater was identified within the monitoring wells with seepages occurring within 7 of 14 boreholes. Seepages occurred between 0.75 – 3.5m bgl. The BRO SFRA indicates that there have been relatively few recorded instances of groundwater flooding within Bury. Therefore, flood risk from groundwater is considered low.

Groundwater Flood Risk Mitigation Measures

3.29 Proposed attenuation SuDS features can be lined with an impermeable geomembrane as required in the areas where shallow groundwater seepages were found by the intrusive site investigation. In addition, finished floor levels will be raised some 150mm above finished ground levels.

Avi) Assessment of Flood Risk from Artificial Sources

- 3.30 The flood risk posed by Mill Reservoir has been outlined within the fluvial flood risk section of this report. The EA Flood Risk from Reservoirs mapping indicates the site is at risk of flooding from Ashworth Moor Reservoir, an upland water supply reservoir belonging to UU serving the Rochdale area, some 2.2km to the north of the site. Refer to CEC Figure 6155/500 Figure 4 [EA Flood Risk from Reservoirs Map] in Appendix 1. Regular maintenance and inspection of Ashworth Moor Reservoir is undertaken by UU and is enforceable by the Environment Agency under the Reservoir Act 1975. Therefore, flood risk is considered to be low.

Reservoir Flood Risk Mitigation Measures

- 3.31 No mitigation required.

Table 3.1: Assessment of Flood Risk to the Development Site Arising from External Sources

Source of Potential Flooding to the Development Site	Flood Risk	Mitigation/Comments
Fluvial	Moderate	- Site is within EA Flood Zone 1 but may be at risk from overtopping of Mill Reservoir during the 1:100 year and 1:100 year + 30% climate change event - Mill Reservoir to be removed as part of development proposals reducing existing risk - Existing culverted section of PLB tributary to be skylighted and replaced with open watercourse designed to contain the 1:100 year + 30% climate change event without flooding - Compensatory flood storage area proposed to ensure flows do not increase downstream of the site for events up to the 1:100 year + 30% climate change event - Finished floor levels to be 150mm above surrounding finished ground levels
Overland Flow	Moderate	- Site to be reprofiled as part of proposed development reducing potential areas for ponding - Finished floor levels to be raised 150mm above surrounding finished ground levels
Groundwater	Low	- Proposed SuDS features to be lined with an impermeable geomembrane in areas of site with potential for elevated perched groundwater - Finished floor levels to be raised 150mm above surrounding finished ground levels
Public Sewers	Low	Finished floor levels to be 150mm above surrounding finished ground levels
Ditches	Low	No mitigation required
Reservoirs	Low	

B) Assessment of Flood Risk Arising from Surface Water Discharge from the Proposed Development

Refer to CEC Plan 6155/502(A) [*Proposed Site Layout*] in Appendix 4.

- 3.32 In order to mitigate flood risk posed by post development runoff, adequate control measures will need to be considered within the site.

Bi) Surface Water Runoff Control

Refer to Appendix 3 for Calculations and Table 3.2 below.

- 3.33 The proposed development will introduce some 3.4ha of impermeable surfaces in the form of access roads and roof areas. For calculation purposes an impermeable area of 50% of the total developable area (6.8ha) has been assumed. The additional runoff arising from development will need to be managed in accordance with sustainable drainage principles.

Bii) Infiltration Potential

- 3.34 Intrusive investigation indicated extensive made ground across the site, with depths of up to 4.0m. Refer to SI extract in Appendix 2. In addition, due to the site's former use contamination may be present across the site with the intrusive investigation indicating a presence of hydrocarbon impacted soils. Therefore, an infiltration-based strategy is unlikely to be appropriate and an attenuation-based strategy is proposed, with discharge to be made to PLB tributary.

Biii) Proposed Discharge Rate

- 3.35 Equivalent greenfield runoff rates and existing brownfield rates from the proposed and existing hard areas respectively have been calculated. Please refer to calculated runoff rates in Section 2.0.
- 3.36 Post development runoff will be restricted to the equivalent QBAR runoff rate for a site area of 9.0ha (i.e the site area of 10.9ha – 1.9ha of retained public open space) which is equivalent to 93l/s. This will provide some 75% betterment over the 1:1 year brownfield runoff rate of 368.2l/s and 92% betterment over the 1:100 year brownfield rate of 1164.8l/s.
- 3.37 All attenuation facilities will be designed to accommodate and dispose of runoff from storms up to the 1:100 year + 40% climate change event, without flooding.

Biv) Proposed Discharge Location

- 3.38 It is proposed to discharge post development surface water to the existing culverted section of PLB tributary to remain at the south of the site where it passes beneath Mill Road.

Bv) Proposed Surface Water Drainage

- 3.39 Surface water runoff generated from impermeable areas within the development will be managed utilising attenuation SuDS. This will comprise online storage within oversize pipes for storms up to the 1:30 year runoff event and offline storage provided in below ground crates, subject to detailed design, for storms greater than the 1:30 year event up to the 1:100 year + 40% climate change event.
- 3.40 Calculations indicate that some 672m³ of storage is required to restrict runoff for the 1:30 year event and that some 1638m³ of runoff is required to restrict runoff from the 1:100 year + 40% climate change event to the equivalent QBAR runoff rate of 93l/s. A preliminary surface water drainage strategy has been prepared by Barratt Homes Manchester and indicates sufficient space exists within the development layout to accommodate both the online and offline storage. Post development discharge is to be controlled using a HydroBrake flow device, or similar. See calculations within Appendix 3. Preliminary modelling has been undertaken using MicroDrainage software.
- 3.41 The 672m³ of storage for the 1:30 year can be provided in 300m of 1500mm diameter pipe and 12no. 3m diameter manholes. The additional 966m³ of storage required to attenuate post development flows from the 1:100 year + 40% event will be provided within below ground cellular storage.

Table 3.2: Summary of Existing & Proposed Surface Water Discharge Rates

Area (ha)		Discharge Point	Calculation Method	Discharge Rate (l/s)				Attenuation Volume Required (m ³)
				1:1 yr	1:30 yr	1:100 yr	1:100 yr +40%	
Green-field	10.88 (soft)	To ground	ICP SUDS	97.9	191.5	235.0	-	-
Brown-field	4.49 (hard)	Unattenuated to public combined sewer and PLB tributary	Micro Drainage	368.2	905.3	1164.8	-	-
Proposed hard area	3.4	Attenuated to PLB tributary	Micro Drainage	<93.0	<93.0	93.0	93.0	672 (1:30yr) 1638 (100 yr)

Design Exceedance

- 3.42 Should the onsite drainage system fail under extreme rainfall events or blockage, flooding may occur within the site. Any resultant floodwater will be routed along the highways in a southerly and easterly direction, towards the open channel of the PLB tributary where flows will be conveyed away from the site.

Water Quality

- 3.43 Water quality has been assessed in line with the Simple Index approach from Chapter 26 of CIRIA C753 *The SuDS Manual*:
1. Step 1 – Allocate suitable pollution hazard indices for the proposed land use.
 2. Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index.
- 3.44 The highest pollution hazard level for the proposed land use is Low (residential car parks and low trafficked roads). The pollution hazard indices for this land use are shown in Table 3.3 below.

Table 3.3: Pollution Hazard Indices for the Proposed Site (from Table 26.2 of CIRIA C753 The SuDS Manual)

Total suspended solids (TSS)	Metals	Hydrocarbons
0.5	0.4	0.4

- 3.45 SuDS components to be used in the development should be assessed for their effectiveness in pollutant removal prior to discharge to surface waters in accordance with Table 26.3 in CIRIA C753 *The SuDS Manual*. Runoff from residential roofs is considered to be of a low pollution hazard. Petrol/ oil interceptors will be used to treat runoff from proposed parking areas and highways. No pollution mitigation indices are available for this proprietary treatment system but their use will ensure sufficient water quality treatment prior to discharge to PLB tributary.

Adoption & Maintenance

- 3.46 All on-site sewers, including oversized pipe attenuation storage and offline storage will be offered for adoption by United Utilities. The proposed open channel of the PLB tributary with associated structures, compensatory FSA and offline storage (if not adopted by UU) will be maintained by a private management company. A suggested Maintenance Schedule is outlined in Table 3.4 below.

Cellular Storage

- 3.47 It is not envisaged that silt build up within the cellular crate systems will require a rigorous maintenance regime so long as silt is removed from upstream catch pits and inspection chambers on a regular basis. Notwithstanding this, a suitable maintenance regime for the systems will comprise of routine inspection and silt removal (as necessary). Inspection should be undertaken using CCTV equipment offered up the inspection tunnels located within the crate system. Camera access can be gained via inspection chambers and inlet pipework located at each end of the tunnels.
- 3.48 Silt removal can be achieved by jetting the inspection tunnels. Jetting should be undertaken in accordance with current jetting guidelines, in particular the Code of Practice for Sewer Jetting published by The Water Research Centre. Jetting at 150bar at 300l/min should be more than adequate in removing any build-up of material within the tunnel. The crate system will take higher pressures. However, unlike regular jetting which relies heavily on high pressure to remove hardened deposits on the inner bore of pipes, effective cleansing of a crate system relies more on the delivery flow rate to flush solids back through the system.
- 3.49 A standard jet head with rear facing nozzles should be used. The head should be fed to the far end of the crate tunnel via the nearest inspection chamber, activated and retracted. As the nozzle is removed, debris will be swept back into the inspection chamber where it can then be removed with the use of a standard gully sucker. This method will ensure the effective removal of gross solids (carrier bags, cans, leaf litter etc.) from the system. Whilst 100% removal cannot be guaranteed, it has been shown that this jetting method will also remove an element of finer material which would otherwise be 'lost' within the system.

Pipework and Catchpits

- 3.50 It is not envisaged that silt build up within the pipework systems (including oversize pipes) will require a rigorous maintenance regime so long as silt is removed from upstream catch pits on a regular basis. Notwithstanding this, a suitable maintenance regime for the systems will comprise of routine inspection (every six months) and silt removal (as necessary).

Flow Controls

- 3.51 Flow controls should be inspected regularly for blockages and silt/ debris removed as necessary.

Table 3.4: Suggested Maintenance Regime for Elements of the Drainage Infrastructure

Drainage Element	Maintenance Requirement	Frequency
Catchpits	Inspect and remove silt	To be inspected every 6 months and silt removed as necessary
Inspection chambers & flow controls	Inspect and remove silt/ debris	To be inspected every 6 months and silt/ debris removed as necessary. Flow control to be checked for blockages.
Cellular Storage	Inspect and remove debris	CCTCV inspection following first storm event. Monthly CCTV inspections for first 3 months. 6 monthly CCTV inspections thereafter. Jetting to remove silt as necessary.

Note: In addition to the above maintenance requirements, it is recommended that all drainage elements are inspected:

- Following the first storm event
- Monthly for the first 3 months following commissioning



4.0 FOUL WATER DRAINAGE

- 4.1 UU asset records indicate the presence of a public 300mm diameter combined water sewer located to the west of the site within Walmersley Old Road. Refer to Appendix 2.
- 4.2 It is proposed to discharge foul water by gravity from the site to the existing public combined sewer at the junction of Mill Road and Walmersley Old Road. A new manhole will be installed on the line of the existing public combined sewer to which post development foul flows will discharge.
- 4.3 The anticipated peak foul flows generated by the 268 dwellings will be 12.4l/s.
- 4.4 All proposed foul water infrastructure will be offered for adoption by United Utilities.

5.0 DISCUSSION AND CONCLUSIONS

Assessment of Flood Risk from External Sources

- 5.1 Flood risk to the proposed development from various sources, sewers, groundwater, drains, ditches and overland flow has been considered in this study. Flood risk from fluvial and pluvial sources are considered moderate, all other sources are considered to be low.
- 5.2 As part of the proposed development Mill Reservoir is to be removed, reducing existing risk. Furthermore, the existing culverted section of PLB tributary through the site will be deculverted and replaced with open watercourse designed to contain the 1:100 year + 30% climate change event without flood. A compensatory flood storage area is proposed to ensure that flood flows do not increase downstream of the site for events up to the 1:100 year + 30% climate change event.
- 5.3 Other mitigation measures include reprofiling as part of the proposed development to reduce potential areas for ponding and raising finished floor levels to be raised 150mm above surrounding finished ground levels. Proposed SuDS features will also be lined with an impermeable geomembrane in areas of site with the potential for elevated perched groundwater.

Assessment of Flood Risk Arising from Surface Water Discharge from the Proposed Development

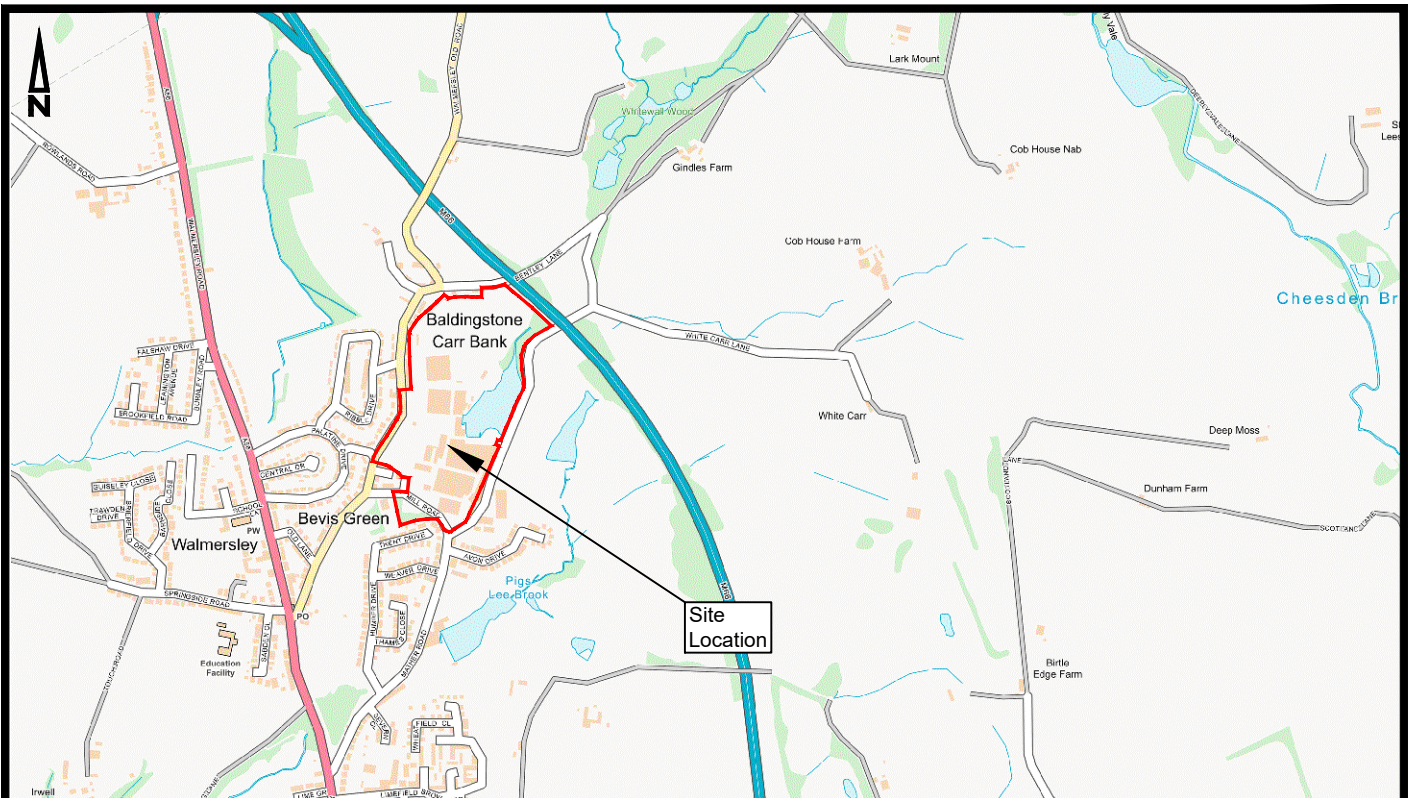
- 5.4 The development site is on brownfield land. The proposed development will introduce impermeable surfaces in the form of access roads and roof areas. Surface water runoff from the development site will be managed on site for storms up to the 1:100 year + 40% climate change event, without flooding.
- 5.5 Post development runoff will be discharged via the use of attenuation SuDS. All attenuation facilities will be designed to accommodate and dispose of runoff from storms up to the 1:100 year + 40% climate change event, without flooding.
- 5.6 Post development runoff will be restricted to the equivalent QBAR runoff rate of 93l/s.
- 5.7 Preliminary calculations indicate that some 1638m³ of storage is required within the proposed attenuation system to restrict flows from the 1:100 year + 40% event to 93l/s. Attenuation SuDS will comprise 672m³ of online storage within oversize pipes for storms up

to the 1:30 year runoff event and 966m³ of offline storage provided in below ground crates, subject to detailed design, for storms greater than the 1:30 year event up to the 1:100 year + 40% climate change event. Outflow from the surface water drainage system will be controlled using a HydroBrake or similar flow control device.

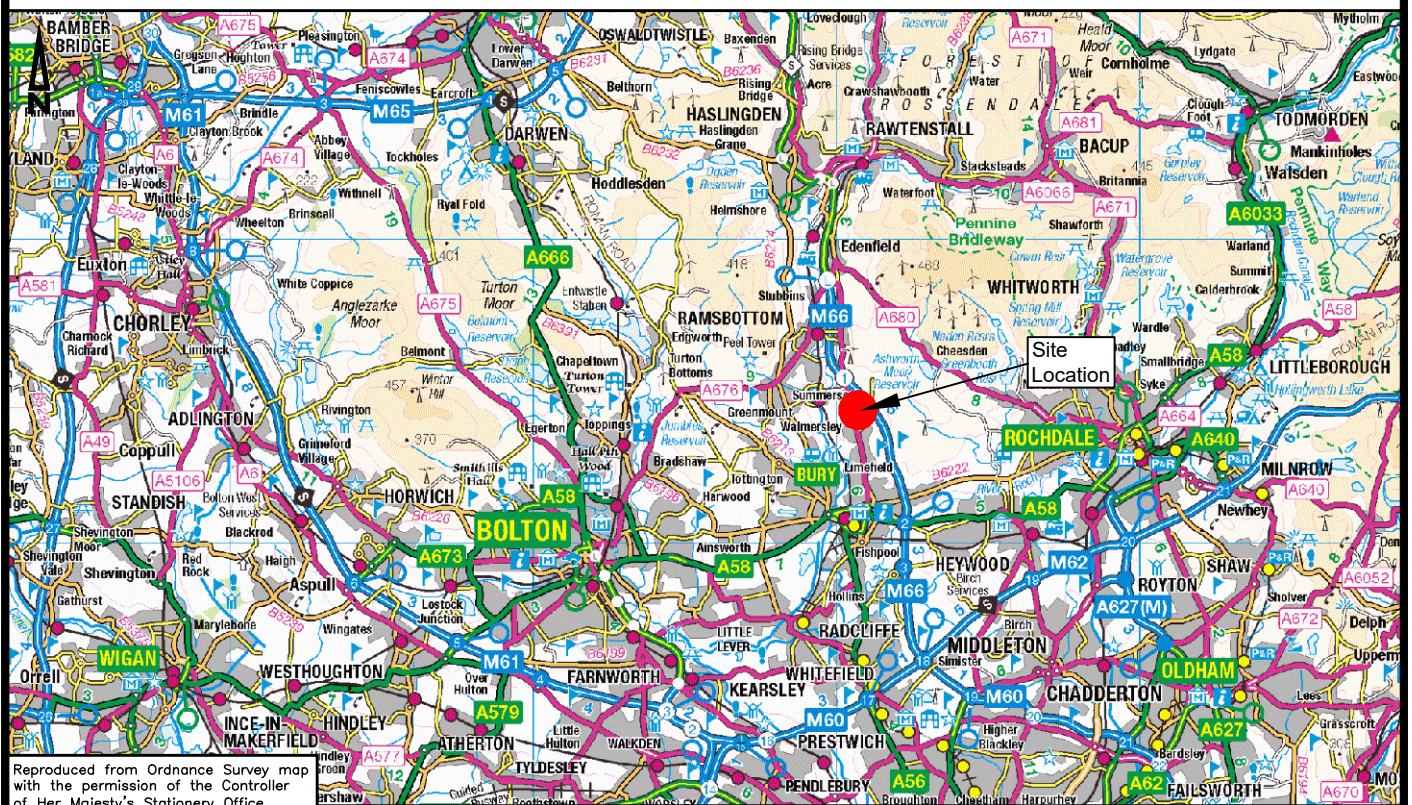
- 5.8 Should the onsite drainage system fail under extreme rainfall events or blockage, flooding may occur within the site. Any resultant floodwater will be routed along the highways in a southerly and easterly direction, towards the open channel of the PLB tributary where flows will be conveyed away from the site.
- 5.9 Runoff from roofs is considered relatively clean. However, an oil interceptor will be implemented to treat runoff from parking areas.
- 5.10 All on-site sewers, including oversized pipe attenuation storage and offline storage will be offered for adoption by United Utilities. The proposed open channel of the PLB tributary with associated structures, compensatory FSA and offline storage (if not adopted by UU) will be maintained by a private management company.
- 5.11 Foul water from the proposed development will be discharged via gravity to the public combined sewer. Proposed foul water pipework will be offered for adoption by United Utilities.
- 5.12 This study has been undertaken in accordance with the principles set out in NPPF. We can conclude that providing the development adheres to the conditions advised in paragraphs 5.1 to 5.11 above, the said development proposals can be accommodated without increasing flood risk within the locality in accordance with objectives set by Central Government and the EA.

Cole Easdon Consultants Limited
December 2018

Appendix 1



Scale 1:16,000



Scale 1:250,000

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Job Title:

Proposed Residential Development
Former Tetrosyl Site
Walmersley Old Road
Bury

Drawing Title:

Site Location Plan

Client:

Barratt Homes (Manchester)

Drawn By

NJ

Date Drawn

April 2018

Checked By

DF

Drawing No.

6155/500 Figure 1

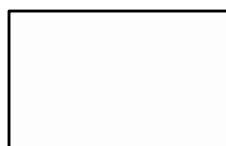
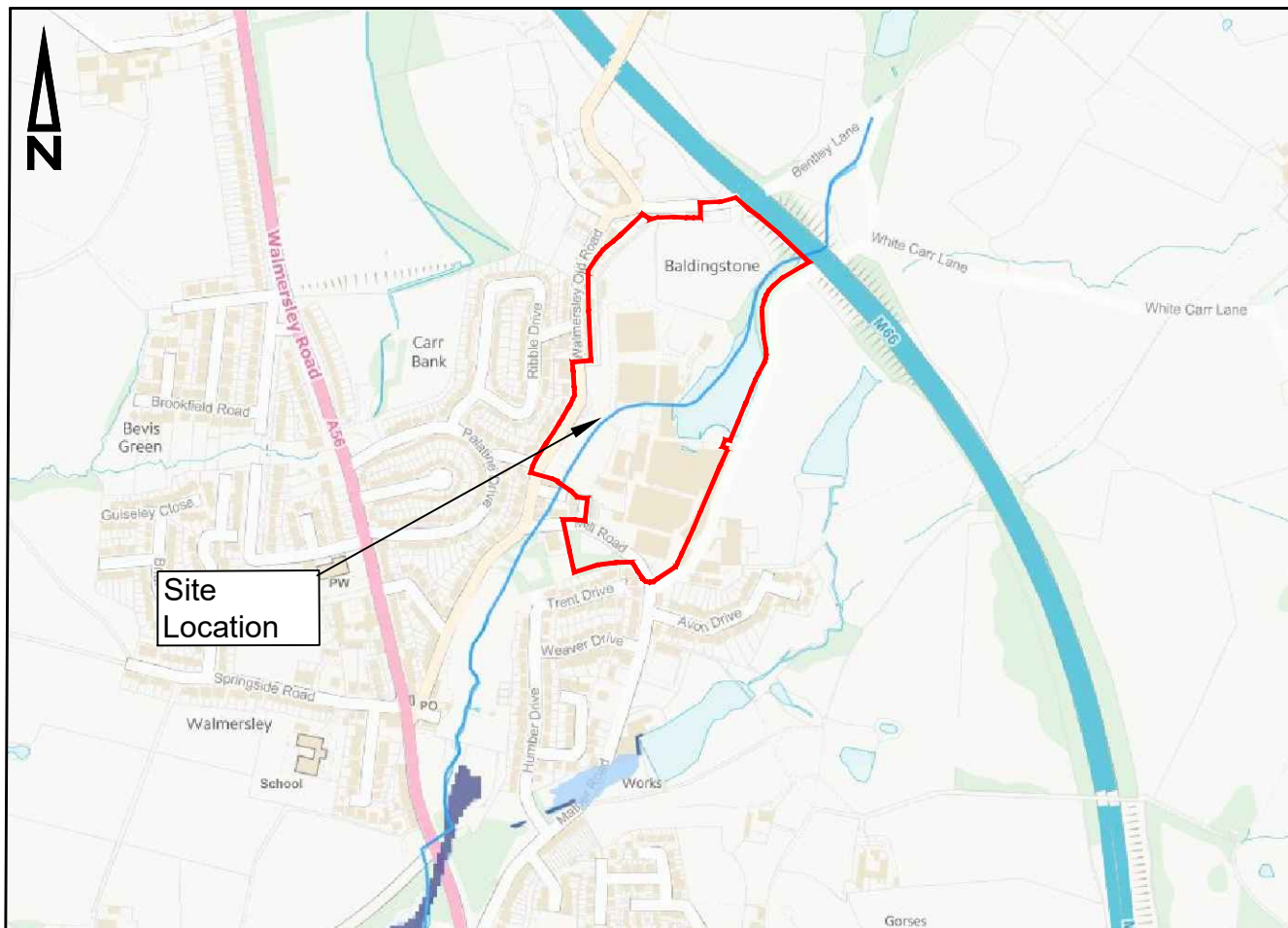
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FOR PLANNING	
FOR TENDER	
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Scale

As shown (A4)

Revision



Flood Zone 1
- Low Risk



Flood Zone 2
- Medium Risk



Flood Zone 3
- High Risk



Main Rivers

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Job Title:

Proposed Residential Development
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Drawing Title:

EA Flood Zone Map

Client:

Barratt Homes (Manchester)

Drawn By

NJ

Checked By

DF

Date Drawn

April 2018

Drawing No.

6155/500 Figure 2

Drawing Status:

CONSTRUCTION AT CLIENT AND/OR CONTRACTOR RISK	FOR COMMENT	
	FOR PLANNING	☒
	FOR TENDER	
	FOR APPROVAL	
	FOR CONSTRUCTION AS BUILT	

Scale

1:10,000 @ A4

Revision



Surface Water
Flooding - Low
Risk



Surface Water
Flooding -
Medium Risk



Surface Water
Flooding - High
Risk

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Job Title:

Proposed Residential Development
Former Tetrosyl Site
Walmersley Old Road
Bury

Drawing Title:

EA Surface Water Flood Zone Map

Client:

Barratt Homes (Manchester)

Drawn By

NJ

Checked By

DF

Date Drawn

April 2018

Drawing No.

6155/500 Figure 3

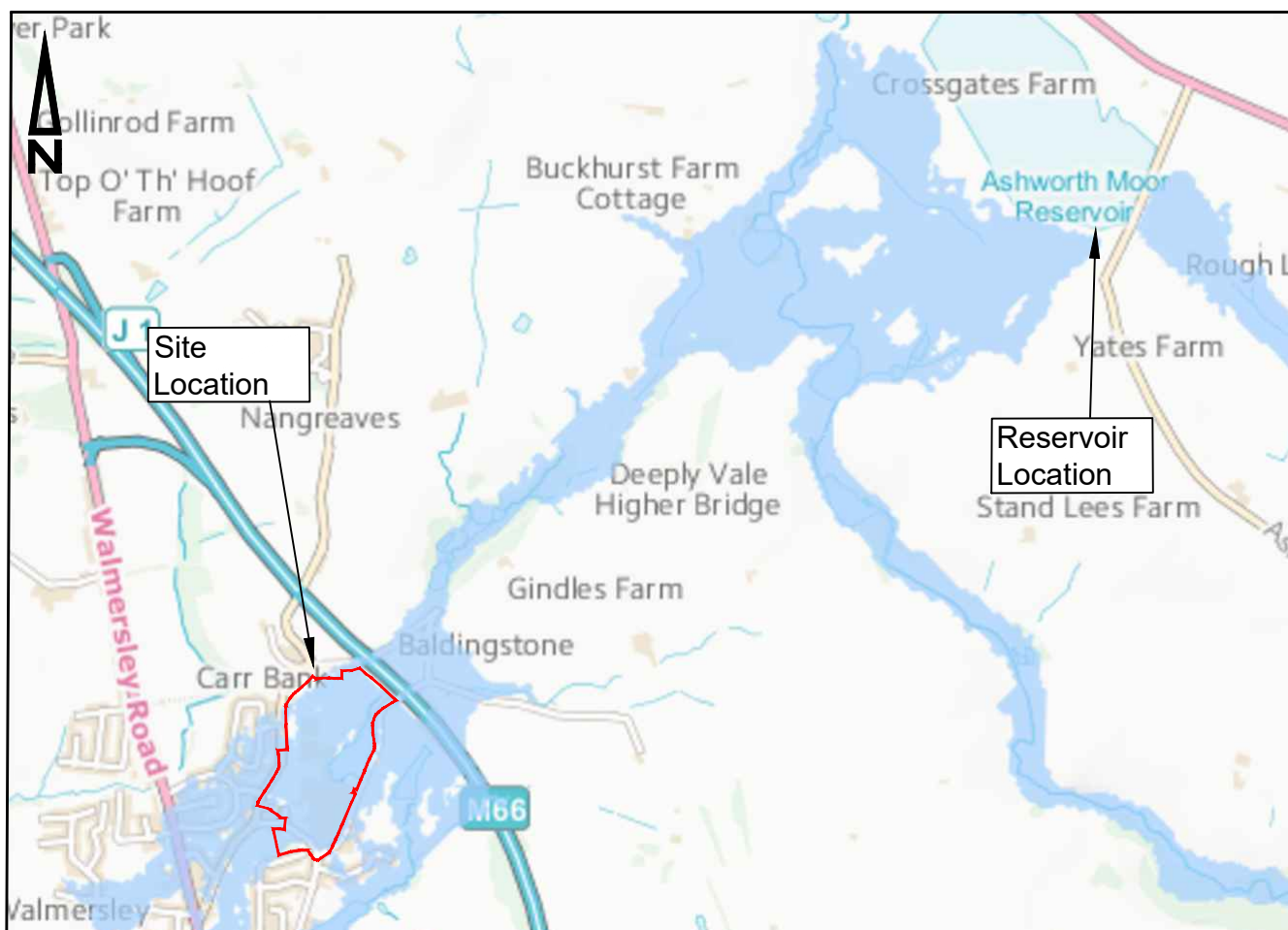
Drawing Status:

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	FOR PLANNING	☒
	FOR TENDER	
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Revision



Maximum extent of flooding

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Job Title:

Proposed Residential Development
Former Tetrosyl Site
Walmersley Old Road
Bury

Drawing Title:

EA Flood risk from reservoirs Map

Client:

Barratt Homes (Manchester)

Drawn By

ZB

Checked By

DF

Date Drawn

November 2018

Drawing No.

6155/500 Figure 4

Drawing Status:

CONSTRUCTION AT CLIENT AND/OR CONTRACTOR RISK	FOR COMMENT	
	FOR PLANNING	☒
	FOR TENDER	
	FOR APPROVAL	
	FOR CONSTRUCTION	
	AS BUILT	

Scale

1:20,000 @ A4

Revision

Appendix 2



PHASE I AND PHASE II GEO-ENVIRONMENTAL SITE INVESTIGATION

**Bevis Green Works (Tetrosyl)
Mill Road
Walmersley
Bury
Lancashire
UK
BL9 6RE**

**E3P Report: 10-110-r1
Issued: May 2014**

Prepared for



QUALITY ASSURANCE

Remarks	Final
Date	May 2014
Prepared by	M. Dyer
Qualifications	BSc, FGS, AIEMA, MIEEnvSc, CEnv
Signature	
Checked by	A. Edgar
Qualifications	BSc, AIEMA, MIEEnvSc, CEnv
Signature	
Authorised by	M. Dyer
Qualifications	BSc, FGS, AIEMA, MIEEnvSc, CEnv
Signature	
Project number	10-110

Environment – Energy – Engineering

***E3P
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EXECUTIVE SUMMARY

Site Address	Tetrosyl Ltd, Bevis Green Works, Mill Road, Walmersley, Bury
Grid Reference	380950, 413950
Site Area	10.46 hectares or 25.85 acres
Current Site Use	The site is an operational formulation plant for Tetrosyl's car care products, with mixing, blending, packaging, storage and distribution activities being undertaken within various buildings across the site. A large reservoir is located within the central eastern sector of the landholding with the dam / high wall at the southerly end. The majority of the proposed development footprint is occupied by large industrial buildings that comprise 19th century mills and more modern portal frame warehousing.
Topography	The site can be split between the upper and lower sectors with large 19th century mill buildings and reservoir dams forming retaining features. The developable area falls from circa 154m AOD at the northern tank farm to circa 139m AOD at the entrance from Mill Lane at the south west boundary. The eastern boundary is formed by Cross Hall Lane, which is at a similar elevation to the north eastern boundary, however the current site levels drop significantly at the southern end of the reservoir which results in a level change from the top of the embankment at 149.38 to 138.90 at the lower level building floor slab. This 11.0m level difference appears to have been a result of the forming of the reservoir dam in the 19th century. Two further in-filled reservoirs are present within the central and southwest sectors which have also resulted in notable level changes as the site appears to have been redeveloped from a level plateau formed by the in-filling works.
Environmental Setting	The site is underlain by a Secondary Aquifer. Five groundwater abstractions have been identified within a 1km radius of the site. The site is not within an area that is at risk from flooding.
Site History	Historical maps indicate that the site has been used to house Cotton Mills, a Dye Works and later a Print Works. A second reservoir was formerly situated in the south western sector of the site and a quarry was present in the northern sector.
Utility Locations	A review of online data held by United Utilities shows no sewer or drainage services on site, however facilities are available in the immediate surrounding area.
Landfill Sites & Ground Gases	Made Ground associated with the in-filled reservoirs and quarries has been identified as a potential source of ground gas and chemical vapours.
Radon	Unaffected – no special precautions required.
Coal Mining / Land Stability	Three recorded Coal Authority assets are present within the curtilage of the proposed development site, these are:  Adit – South eastern boundary;  Shaft – Far Southeast boundary; and,

	 Air Shaft Central northern sector. A review of the detailed Coal Authority Mine Abandonment Plans in consultation with Coal Authority surveyors suggests that the south eastern sector of the subject site may be underlain by shallow mine workings which could pose a theoretical risk of subsidence at the surface due to successive caving of any workings. Further detailed intrusive Ground Investigation and risk assessments are required in accordance with the Coal Authority Permissions Process to confirm the following:  Location of the historic Adit & its current condition;  Presence / absence of shallow mine workings;  Location of historic mine shaft at southeast boundary;  Location, size and depth of historic air shaft in the central north;  Confirm the absence of shallow coal workings within the area of the historic air shaft; and,  Preparation of a suitable programme of stabilisation works in accordance with the Coal Authority Permissions Process.
Intrusive Ground Investigation	
Ground Conditions	Made Ground Extensive depths of Made Ground are present across the majority of the proposed development site, extending to depths of circa 4.0m in the western sectors within the area of in-filled reservoirs, generally 2.0 to 3.0m in the central and southern sectors. No Made Ground was identified within the sampling location toward the northern margins of the wider landholding, albeit this is outside the area of proposed development. The backfilled materials are highly variable, and the extent of exploratory investigations is limited by the operational nature of the subject site. Inter-bedded granular and cohesive matrices are present throughout the site. Drift Stiff / high strength glacial clay soils have been identified underlying the Made Ground towards the northern sector of the site, overlying very dense sand and gravel stratum (possible weathered Millstone Grit bedrock). Ground Water No discernable aquifer has been identified (partially due to the limitation of the exploratory investigative technique). Perched groundwater has been identified within the monitoring wells. The underlying weathered bedrock may provide some degree of effective porosity. In general the current buildings have been 'cut' into the natural landform, with former reservoirs and lower elevations in-filled to create level plateaus across the site.

Tier 1 Contaminated Land Risk Assessment

Human Health	Elevated concentrations of non-volatile inorganic heavy metals, PAH and trace asbestos fibres have been identified within the underlying Made Ground across the subject site. Further post decommissioning investigation will be required to quantify the exact level of risk, however this pollutant linkage can be mitigated through the adoption of the following mitigation processes;  Careful management of soils during the remediation & enabling works and placement of problematic materials within area of low / non sensitivity; and,  Construction of a suitable cover system (nominally 600mm) within all areas of private garden, soft landscaping and Public Open Space. Elevated volatile (aliphatic and aromatic) petroleum range (BTEX) compounds have been identified within the shallow soil and groundwater adjacent to the AST's used for the storage / recovery of bulk solvents and UST's used to store petrol, diesel and white spirit. The elevated contaminants of concern would pose an unacceptable level of risk to chronic human health. Therefore; upon safe decommissioning of all AST's and UST's, further detailed intrusive investigations will be required to inform the production of a Tier 2 Detailed Quantitative Risk Assessment, (DQRA) that will derive the Site Specific Remediation Targets (SSRT's) and ultimately define the extent of remediation works. It is considered that the potential pollutant linkage associated with volatile hydrocarbon compounds can be mitigated through the bioremediation of impacted soil and on-site treatment of groundwater to ensure the most cost effective, legislatively compliant and sustainable development solutions. On completion of site decommissioning and demolition works, further intrusive Ground Investigation works will be required.
Controlled Waters	Elevated concentrations of volatile, soluble phase C5-C12 (aliphatic & Aromatic) hydrocarbon impact has been identified within the immediate vicinity of the Above-ground Storage Tanks (AST's) in the northern sector of the site. The reported concentrations would pose an unacceptable level of risk to the critical on-site controlled waters receptors (reservoir & culvert) and underlying aquifer. Further intrusive sampling will be required as and when the site has been fully decommissioned, to inform the production of a robust Tier 2 DQRA that will define the Site Specific Remediation Targets, to ensure the site is developed in a manner that will pose no unacceptable level of risk to controlled waters and the wider environ.
Eco-toxic	No significantly elevated concentrations of eco-toxic contaminants have been identified within the intrusive ground investigation works completed to date.
Ground Gas	The initial assessment has identified significantly elevated concentrations of methane and carbon dioxide, attributed to the decomposition of organic materials within the deep Made Ground (reservoirs) and possibly the anaerobic degradation of hydrocarbon (solvent) impact to the near surface soil and groundwater. Extensive land remediation and enabling works will be required to facilitate the construction of a suitable development platform, which will accommodate the proposed low rise residential structures. As part of the enabling works process, a significant amount of material will be excavated and treated, to

	either remove the hydrocarbon contamination or degradable organic matter, and thus treat the identified sources of hazardous ground gasses. Ground Gas Monitoring including (VOC analysis) is currently on-going, the results of which will be reported as an addendum to this document in July 2014.
Potable Water Infrastructure	It is likely that hydrocarbon resistant potable water supply infrastructure will be required for this development site. On completion of the land remediation and enabling works, a UKWIR assessment should be completed, to inform the detailed design of potable water supply infrastructure.
Geotechnical Assessment	
Underground Obstructions	The site is underlain by notable historic features in the form of backfilled reservoirs, quarries that contain notable quantities of large buried obstructions and high walls. Historical mapping confirms the presence of features such a large chimneys, culverts, machine beds and reservoir high walls. In light of the site history, it is considered that the entire site will be underlain by large relict obstructions, which will need to be removed to facilitate the proposed development.
Allowable Bearing Capacity	The site is underlain by stiff high strength clay soils, with a calculated Allowable Bearing Pressure in excess of 125kN/m², overlying very dense sand and gravels at circa 3.0-5.0m bgl with an ABP in excess of 300kN/m².
Foundation Options	It is considered that a well-designed remediation and enabling works programme is to be completed in conjunction with a site wide cut / fill works, to ensure the placement of granular materials beneath the proposed plot footprints to facilitate re-engineering through the construction of vibro replacement stone columns. Plots within the in-filled reservoir, adjacent to sensitive retaining structures and deep cohesive fills will require a piled foundation.
Soak-away Drainage	The underlying weathered bedrock will provide some degree of infiltration potential, therefore soak-away drainage may be viable within the central, northwest and southwest sectors of the site. The presence of soluble hydrocarbon impacted soil and groundwater may result in limitations in the use of Soak-away drainage.
Sulphate Assessment	Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE Special Digest 1 (2005).
CBR Design %	It is considered that site remediation and enabling works will re-engineer the Made Ground to ensure a CBR of 5% and thus ensure standard highway construction.
Cut / Fill	The site has significant topographical variances, which are formed by retaining features, incorporated into the existing 19th century mill buildings. It is considered that a large scale cut / fill exercise will be required to achieve a development platform, suitable to accommodate the proposed low rise residential units and critically the adopted infrastructure.
Waste Classification	Stable Non-Reactive (Non Hazardous & Inert)
Surface Water	The existing culvert will need to be addressed as part of the detailed surface water management plan and external works design.

Earthworks

An initial appraisal of the subject site in relation to the proposed development, would suggest that a large scale earthworks exercise is required to construct a suitable development platform, which will accommodate the appropriate highway and pavement grade.

The current reservoir and adjacent highway levels will constrain the proposed development at the central and eastern boundary, with existing properties in the south-western also a factor.

It is likely that large scale up-filling, combined with some retaining structure will provide the optimum development platform.

Development Considerations

To facilitate the cost effective, legislatively compliant and sustainable regeneration of the Bevis Green Works for a low rise residential end use, the following key development constraints must be addressed within the site Remediation & Enabling Works:

-  Safe decommissioning of all above ground and below ground solvent, petroleum and diesel storage tanks and all associated infrastructure;
-  Further detailed contamination investigation within the immediate vicinity of each and every identified tank / piece of infrastructure to accurately define the extent of vertical and lateral migration of soluble / volatile hydrocarbon impact within the underlying soils;
-  Further investigation within the areas of identified deep Made Ground to characterise the nature across the site;
-  Confirmation with respect to the absence of any soluble phase hydrocarbon impact to the underlying aquifer within the superficial drift deposits and solid rock formations;
-  Development of Site Specific Remediation Targets to inform the pragmatic remediation of impacted soil and groundwater;
-  Development of a suitable on-site (in-situ / ex-situ) remediation solution to treat impacted soils to ensure they comply with the SSRT's;
-  Completion of further detailed intrusive investigations within the areas of the known mine workings at the central northern sector (air shaft) and south east (Adit, shaft & possible shallow workings) to inform an appropriate risk assessment in accordance with the standards and guidance set out within CIRIA32;
-  Identify the precise location of all mine entries and if present shallow coal workings, undertake stabilisation works in accordance with the Coal Authority Permissions Process and in general accordance with CIRIA 665;
-  Define the extent of the in-filled quarry within the central northern sector, demarcation of all high walls and assess the need for ground work in this sector to facilitate development of residential dwellings, highways and infrastructure;
-  Removal of all Asbestos Containing Material from within the building fabric, in strict accordance with the UK Control of Asbestos Regulations (CAR 1212);
-  Identify the location of the large surface water culvert emanating from the reservoir in the central eastern sector and exiting at the southwest boundary;
-  Demolition of all buildings, slabs, foundations, drainage infrastructure and anthropogenic obstructions across the entirety of the site in a controlled manner;
-  Treatment of all invasive plant species;
-  Treatment of all in-filled reservoirs to remove any deleterious content and render the ground suitable for re-engineering to facilitate the development of residential housing and ancillary

7.0 GROUND INVESTIGATION

7.1 General

A ground investigation has been designed based on the findings in consideration of the historic reports and findings of the desk study review completed with exploratory holes advanced to target specific potential contaminant sources summarised in Table 7.1.

It must be noted that the current operational nature of the site restricted the extent of the ground investigation works and as such exploratory holes were limited in to specific locations adjacent to point sources of contamination as identified within the E3P site walkover survey.

Table 7.1 Summary of Fieldwork

Potential Source/Rationale	Location Hole	Type	Maximum Depth (m bgl)	Monitoring Wells Response Zone
In-filled reservoir	WS101	Window Sample	3.00	N/A
Undeveloped land to north	WS102	Window Sample	1.60	N/A
Northern extremity of Solvent Tank Farm	WS103	Window Sample	2.00	N/A
Eastern edge of solvent recovery plant	WS104	Window Sample	4.45	N/A
Southern UST's	WS105	Window Sample	3.37	N/A
Down gradient of Solvent AST	WS106	Window Sample	3.00	N/A
Southern UST's	WS107	Window Sample	2.70	N/A
Infilled reservoir	WS108	Window Sample	4.00	N/A
Reservoir dam / tank	WS109	Window Sample	4.00	N/A
Solvent storage	WS110	Window Sample	1.00	N/A
Central Solvent Tanks	WS111	Window Sample	1.00	N/A
Central solvent tanks	WS112	Window Sample	1.55	N/A
In-filled reservoir	WS113	Window Sample	4.45	N/A
Diesel AST	WS114	Window Sample	5.45	N/A

Notes

m bgl – metres below ground level.

The window sample probeholes were designed to provide geotechnical information and confirm the findings of the Initial Conceptual Site Model (ICSM).

Return visits were made to monitor installations for groundwater level and gas concentrations. In addition, selected wells were purged and samples of groundwater recovered for chemical analysis. Ground gas monitoring is ongoing with the results to be provided within an addendum to this report.

Selected soil samples were submitted for a range of chemical analysis comprising, metals, pH, total sulphate, water soluble sulphate (2:1 extract), sulphide, cyanide, phenols, total and speciated polycyclic aromatic hydrocarbons (PAHs), asbestos, organic carbon and total and speciated petroleum hydrocarbon (TPH).

The analytical work was completed at an appropriately certified analytical laboratory with testing to UKAS accreditation standards where applicable.

7.2 In-Situ Standard Penetration Testing (SPT)

In-situ geotechnical testing was conducted using the Standard Penetration Test (SPT) and where the ground is granular, a 60° cone (SPT(C)) was used instead of the sampling tube. The testing was conducted using the Cone Penetration Test (CPT). The results are shown in the probehole logs in Appendix VI.

7.3 In-Situ California Bearing Ration (CBR)

No in-situ CBR testing has been completed as part of this phase of intrusive investigation works due to the operational nature of the site.

7.4 Laboratory Analysis

Selected soil samples were submitted for a range of chemical analysis comprising, metals, pH, total sulphate, water soluble sulphate (2:1 extract), sulphide, cyanide, phenols, total and speciated poly-aromatic hydrocarbons (PAHs), asbestos, organic carbon and total and speciated petroleum hydrocarbon (TPH).

Exova Laboratories undertook the analytical work and the testing results are included in Appendix VIII.

8.0 GROUND AND GROUNDWATER CONDITIONS

8.1 Ground Conditions

8.1.1 Summary of Ground Conditions

The ground investigation generally confirms the published geology, historic ground investigations and identifies the strata set out in Table 8.1 below:

Table 8.1 Summary of Strata

Strata:	General Description:	Typical Depth (mbgl):			
		Top:		Base:	
		Min:	Max:	Min:	Max:
Made Ground ¹	Dark brown, black clayey gravelly fine to coarse sand. Gravel is fine to medium sub-angular brick sandstone.	0.00	3.00	0.10	4.50
Made Ground ²	Firm to stiff brown gravelly sandy clay. Gravel is occasional brick gritstone sandstone shale.	0.10	3.30	0.40	4.00
Made Ground ³	Soft grey brown slightly medium coarse sandy gravelly clay. Gravel is medium to coarse sub-angular to sub-rounded brick gritstone.	0.00	2.70	0.10	3.37
Made Ground ⁴	Yellow medium coarse sandy gravel. Gravel is fine to medium sub-angular gritstone.	0.00	0.36	0.18	1.25
Made Ground-Boulders	Grey yellow clayey boulders. Boulders are sub-angular gritstone.	1.00	1.00	1.70	1.70
CLAY	Brown very stiff slightly sandy gravelly CLAY. Gravel is sub-angular to sub-rounded gritstone sandstone shale.	0.00	0.45	1.50	3.80
GRAVEL	Light brown medium coarse sandy GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded gritstone.	0.35	3.80	1.00	4.45
SAND	Yellow brown gravelly SAND. Gravel is fine to medium sub-angular gritstone.	4.50	4.50	5.45	5.45

8.1.2 Made Ground

Made Ground

Extensive depths of Made Ground are present across the majority of the proposed development site, extending to depths of circa 4.0m in the western sectors within the area of in-filled reservoirs, generally 2.0 to 3.0m in the central and southern sectors.

No Made Ground was identified within the sampling location toward the northern margins of the wider landholding, albeit this is outside the area of proposed development.

The backfilled materials are highly variable, and the extent of exploratory investigations is limited by the operational nature of the subject site. Inter-bedded granular and cohesive matrices are present throughout the site.

Drift

Stiff / high strength glacial clay soils have been identified underlying the Made Ground towards the northern sector of the site, overlying very dense sand and gravel stratum (possible weathered Millstone Grit bedrock).

Ground Water

No discernable aquifer has been identified (partially due to the limitation of the exploratory investigative technique). Perched groundwater has been identified within the monitoring wells.

The underlying weathered bedrock may provide some degree of effective porosity.

In general the current buildings have been 'cut' into the natural landform, with former reservoirs and lower elevations in-filled to create level plateaus across the site.

Table 8.2 Standard/Cone Penetration Test Results

Boreholes	Depth (m bgl) (i)	Material Field Description	CPT/SPT "N" Value	Corrected "N" Value (N ₁) ₆₀	Terzaghi & Peck Relative Density (Sands)	Eurocode Soil strength	Consistency (BS5930)	Terzaghi & Peck Approximate Undrained Shear Strength (kN/m ²)
WS101	1	MG Gravelly Clay	11	11.09	N/A	Medium strength	Stiff	55.45
WS101	2	MG Gravelly Clay	23	21.01	N/A	High strength	Very Stiff	105.06
WS101	2.5	MG Gravelly Clay	16	14.21	N/A	Medium strength	Stiff	71.05
WS101	3	MG Gravelly Clay	32	27.83	N/A	High strength	Very Stiff	139.14
WS102	1	Sandy Gravelly Clay	43	43.35	N/A	Very high strength	Very Stiff	216.75
WS102	1.5	Sandy Gravelly Clay	50	47.51	N/A	Very high strength	Very Stiff	237.54
WS103	1	Gravelly Clay	15	15.12	N/A	High strength	Very Stiff	75.61
WS103	2	Gravelly Clay	50	45.68	N/A	Very high strength	Very Stiff	228.38
WS104	1	MG Gravelly Sand	1	1.01	Very Loose	N/A	N/A	N/A
WS104	2	Sandy gravelly clay	9	8.22	N/A	Medium strength	Stiff	41.11
WS104	3	Sandy Gravelly Clay	9	7.83	N/A	Low strength	Firm	39.13
WS104	4	Very Sandy GRAVEL	50	42.24	Dense	N/A	N/A	N/A
WS105	1	MG Clayey Boulders	8	8.07	Loose	N/A	N/A	N/A
WS105	2	MG Sandy Gravelly Clay	0	0.00	N/A	FALSE	FALSE	0.00
WS105	3	MG Sandy Gravelly Clay	40	34.79	N/A	Very high strength	Very Stiff	173.93
WS106	1	MG Sandy Gravelly Clay	6	6.05	N/A	Low strength	Firm	30.24
WS106	2	MG Gravelly Clay	8	7.31	N/A	Low strength	Firm	36.54
WS106	3	MG Gravelly Clay	33	28.70	N/A	High strength	Very Stiff	143.49
WS107	1	MG Gravelly Sandy Clay	0	0.00	N/A	FALSE	FALSE	0.00
WS107	2	MG Sandy Clay	0	0.00	N/A	FALSE	FALSE	0.00

Boreholes	Depth (m bgl) (i)	Material Field Description	CPT/SPT "N" Value	Corrected "N" Value (N ₁) ₆₀	Terzaghi & Peck Relative Density (Sands)	Eurocode Soil strength	Consistency (BS5930)	Terzaghi & Peck Approximate Undrained Shear Strength (kN/m ²)
WS107	2.7	Sandy GRAVEL	35	30.80	Dense	N/A	N/A	N/A
WS108	1	MG Gravelly Sand	15	15.12	Medium Dense	N/A	N/A	N/A
WS108	2	MG Gravelly Clay	4	3.65	N/A	Very low strength	Soft	18.27
WS108	3	MG Sand	5	4.35	Loose	N/A	N/A	N/A
WS108	4	MG Gravelly Clay	5	4.22	N/A	Low strength	Firm	21.12
WS109	1	MG Sandy Gravel	13	13.11	Medium Dense	N/A	N/A	N/A
WS109	2	MG Gravelly Clay	6	5.48	N/A	Low strength	Firm	27.41
WS109	3	MG Gravelly Clay	9	7.83	N/A	Low strength	Firm	39.13
WS109	4	MG Gravelly Clay	15	12.67	N/A	Medium strength	Stiff	63.36
WS109	5	MG Gravelly Clay	50	41.48	N/A	Very high strength	Very Stiff	207.41
WS110	1	MG Gravelly Clay	50	50.41	N/A	Very high strength	Very Stiff	252.04
WS111	1	Sandy Gravel	50	50.41	Very Dense	N/A	N/A	N/A
WS112	1	MG Sandy Gravel	8	8.07	Loose	N/A	N/A	N/A
WS112	2	MG Gravelly clay	50	45.68	N/A	Very high strength	Very Stiff	228.38
WS113	1	MG Sandy Gravel	5	5.04	Loose	N/A	N/A	N/A
WS113	2	MG Sandy Gravel	1	0.91	Very Loose	N/A	N/A	N/A
WS113	3	MG Sandy Gravel	2	1.74	Very Loose	N/A	N/A	N/A
WS113	4	MG Sandy Gravel	10	8.45	Loose	N/A	N/A	N/A
WS114	1	MG Gravelly Sand	4	4.03	Loose	N/A	N/A	N/A
WS114	2	MG Clay	2	1.83	N/A	Low strength	Very Soft	9.14
WS114	3	MG Gravelly Sand	1	0.87	Very Loose	N/A	N/A	N/A
WS114	4	MG Gravelly Sand	2	1.69	Very Loose	N/A	N/A	N/A
WS114	5	Gravelly Sand	10	8.30	Loose	N/A	N/A	N/A

Notes

Undrained shear strength values have been taken from correlations with SPT values based on Stroud and Butler and take account of the soil plasticity summarised in Table 2.5.

Stroud and Butler use un-corrected SPT values for the correlations which are based on empirical data.

Certificate of Calibration for the Er Value should be available.

Corrections for overburden and length of rods.

Design SPT values should be corrected below groundwater.

8.1.3 pH and Sulphate

Chemical analyses for pH and soluble sulphate content contained in Appendix VIII (summarised below in Table 8.3), shows that the soils at the site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE Special Digest 1 (2005).

Table 8.3 Summary of pH and Sulphate Data

Location	Depth (m)	SO ₄ in 2:1 water / soil (g/l)	pH Value
WS101	0.5	0.02	7.54
WS102	0.6	0.02	7.26
WS104	0.3	0.01	7.20
WS104	2.5	N/A	N/A
WS105	2.3	N/A	N/A
WS106	0.5	<0.01	7.46
WS107	0.7	0.02	7.69
WS108	1.8	0.02	7.27

8.2 Groundwater Conditions

Groundwater strikes were encountered as seepages at WS104, WS105, WS106, WS107, WS108, WS110 and WS113. The depth of the seepages and the depth to which groundwater rose are shown on the exploratory hole records and summarised in Table 8.2 below:

Table 8.4 Summary Groundwater Strikes

Location	Depth to strike (m)	Depth to standing water (m)	Notes
WS104	3.5	N/A	Seepage
WS105	1.0	N/A	Seepage
WS106	1.5	N/A	Seepage
WS107	1.10	N/A	Seepage
WS108	2.20	N/A	Seepage
WS110	0.75	N/A	Seepage
WS113	1.0	N/A	Seepage

8.3 Ground Gas

Concentrations of methane (CH₄), carbon dioxide (CO₂) and Oxygen (O₂) were measured using an infra-red gas analyser (GA2000) calibrated to a reference standard (before and after each survey) and gas flow rates were measured using an attached flow pod.

Gas measurements were recorded for a minimum of sixty seconds at each location, at which point the maximum concentration of CH₄ and CO₂ together with the lowest concentration of O₂ were recorded. The results of the ground gas monitoring are presented in Appendix VII

APPENDIX VI

E3P EXPLORATORY LOGS



Borehole Log

Borehole No.

WS101

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

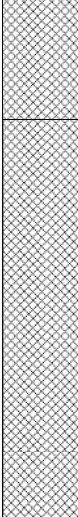
Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES	N=11 (1,2/2,3,3,3)	0.80			MADE GROUND: Dark brown clayey gravelly fine to coarse sand. Gravel is fine to medium sub-angular brick sandstone.	1
		1.00 1.00 - 1.45	D					MADE GROUND: Stiff brown gravelly clay. Gravel is occasional brick gritstone sandstone shale.	
		2.00 2.00 - 2.45	D	N=23 (3,4/5,5,6,7)	3.00			MADE GROUND: Stiff brown gravelly clay. Gravel is occasional brick gritstone sandstone shale.	2
		2.50		N=16 (21 for 0mm/16 for 0mm)					3
		3.00 3.00 - 3.45	D	N=32 (5,6/7,7,8,10)	3.45			End of borehole at 3.45 m	4
									5
									6
									7
									8
									9
									10

Remarks

Refusal - No water strikes.





Borehole Log

Borehole No.

WS102

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

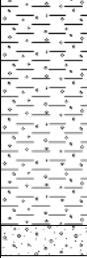
Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.60	ES					Brown very stiff slightly sandy gravelly CLAY. Gravel is sub-angular to sub-rounded gritstone sandstone shale.	1
		1.00							
		1.00 - 1.45	D	N=43 (3,3/8,12,15,8)					
		1.50			1.50				
		1.50 - 1.60	D	N=50 (6,12/50 for 236mm)	1.70			Light brown medium coarse sandy GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded gritstone. End of borehole at 1.70 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Refusal



Borehole Log

Borehole No.

WS103

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.10 0.18 0.45			MADE GROUND: Soft to firm brown clay with rootlets. MADE GROUND: Yellow medium coarse sandy gravel. Gravel is fine to medium sub-angular gritstone.	
		1.00		N=15 (2,3/3,4,4,4)				MADE GROUND: Firm black brown slightly gravelly clay. Gravel is fine to medium sub-angular shale.	1
		2.00		N=50 (4,4/8,13,15,14)				Stiff to very stiff gravelly CLAY. Gravel is fine to medium sub-angular to sub-rounded sandstone gritstone shale.	2
					2.45			End of borehole at 2.45 m	
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Refusal



Borehole Log

Borehole No.

WS104

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES					MADE GROUND: Firm to stiff brown slightly sandy gravelly clay. Sand is fine to medium. Gravel is fine to medium angular to sub-angular brick ash and clinker.	
		1.00		N=1 (1,0/0,0,0,1)	1.00			MADE GROUND: Dark brown slightly clayey gravelly fine to coarse sand. Gravel is fine to medium angular to sub-angular ash sandstone shale.	1
		1.50	ES						
		2.00		N=9 (2,2/2,3,2,2)	1.90			Firm to stiff brown slightly sandy gravelly clay. Gravel is fine to medium shale sandstone and gritstone.	2
		2.50	ES						
		3.00		N=9 (3,3/3,2,2,2)					3
		4.00		N=50 (4,6/50 for 285mm)	3.80			Yellow grey very sandy GRAVEL. Sand is coarse. Gravel is fine to coarse sub-angular to sub-rounded gritstone.	4
					4.45			End of borehole at 4.45 m	5
									6
									7
									8
									9
									10

Remarks
Refusal



Borehole Log

Borehole No.

WS105

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES	N=8 (2,2/2,2,2,2)	0.30			MADE GROUND: Black medium coarse sandy gravel. Gravel is fine to coarse sub-angular occassional ash gritstone brick.	1 <

Remarks
Refusal



Borehole Log

Borehole No.

WS106

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

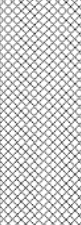
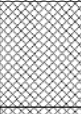
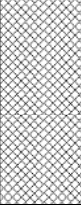
Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES					MADE GROUND: Stiff brown sandy gravelly clay. Gravel is fine to coarse brick shale gritstone.	1
		1.00 1.00 - 1.45	D	N=6 (1,1/1,2,1,2)					
					1.50			MADE GROUND: Soft grey brown gravelly clay. Gravel is fine to medium sub-angular brick gritstone. Moderate odour.	2
		1.90 2.00 2.00 - 2.45	ES D	N=8 (2,2/2,2,2,2)	2.20				
								MADE GROUND: Firm to stiff slightly gravelly gravelly clay. Gravel is fine sub-angular brick grit stone.	3
		3.00 3.20 3.50	ES	N=33 (6,6/8,9,8,8) 0 (50 for 95mm/0 for 0mm)	3.00 3.59				
								End of borehole at 3.59 m	4
									5
									6
									7
									8
									9
									10

Remarks
Refusal



Borehole Log

Borehole No.

WS107

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.70	ES		0.20			MADE GROUND: Grey white medium coarse sandy gravel. Gravel is fine to coarse sub-angular to sub-rounded gritstone.	
		1.00		N=0 (1,0/0,0,0,0)				MADE GROUND: Black fine to medium sandy gravel. Gravel is fine to medium sub-angular to sub-rounded ash coal brick gritstone.	1
		1.50	ES		1.20			MADE GROUND: Very soft grey gravelly sandy clay. Gravel is fine to medium sub-angular to sub-rounded ash brick gritstone.	
		2.00		N=0 (1,0/0,0,0,0)					2
		2.70		35 (25,15/35 for 180mm)	2.50 2.70			Yellow grey very sandy GRAVEL. Sand is coarse. Gravel is fine to coarse sub-angular to sub-rounded gritstone.	
								End of borehole at 2.88 m	3
									4
									5
									6
									7
									8
									9
									10

Remarks
Refusal



Borehole Log

Borehole No.

WS108

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

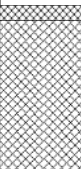
Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Asphalt. MADE GROUND: Firm to stiff grey gravelly clay. Gravel is medium sub-angular to sub-rounded gritstone brick.	
		1.00		N=15 (2,7/6,5,2,2)	1.15			MADE GROUND: Grey gravelly medium coarse sand. Gravel is fine to medium sub-angular to sub-rounded gritstone.	1
		1.80	ES		1.55			MADE GROUND: Firm grey gravelly clay. Gravel is fine to medium sub-angular to sub-rounded brick gritstone sandstone shale.	2
		2.00		N=4 (2,1/1,1,1,1)					
		3.00		N=5 (1,1/2,1,1,1)	3.00			MADE GROUND: Orange brown sand.	3
					3.30			MADE GROUND: Firm grey gravelly clay. Gravel is fine to medium sub-angular to sub-rounded brick gritstone sandstone shale.	
		4.00		N=5 (1,1/1,2,1,1)	4.00			MADE GROUND: Firm grey gravelly clay. Gravel is fine to medium sub-angular to sub-rounded brick gritstone sandstone shale.	4
		5.00		N=23 (3,4/4,6,6,7)					5
					5.45			End of borehole at 5.45 m	6
									7
									8
									9
									10

Remarks
Refusal



Borehole Log

Borehole No.

WS109

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Black gravelly medium coarse sand. Gravel is fine to medium brick sandstone. MADE GROUND: Grey white medium coarse sandy gravel. Gravel is fine to coarse sub-angular to sub-rounded occasional brick gritstone sandstone.	1
		1.00		N=13 (11,8/3,4,4,2)	1.20			MADE GROUND: Very stiff grey brown gravelly clay. Gravel is sub-angular fine to medium sandstone brick gritstone.	2
		2.00		N=6 (2,2/2,1,2,1)	2.70			MADE GROUND: Soft to firm brown mottled grey CLAY. Unusual odour.	3
		2.00 - 2.45	D		3.10			MADE GROUND: Very stiff grey brown gravelly clay. Gravel is sub-angular fine to medium sandstone brick gritstone.	4
		2.90	ES	N=9 (2,2/2,3,2,2)	4.00			MADE GROUND: Very stiff grey brown gravelly clay. Gravel is sub-angular fine to medium sandstone brick gritstone.	5
		3.00	D		5.00				6
		3.00 - 3.45							7
		3.90	ES	N=15 (2,3/3,4,4,4)					8
		4.00	D						9
		4.00 - 4.45							10
		5.00		N=50 (8,9/13,13,14,10)	5.45			End of borehole at 5.45 m	

Remarks
Refusal



Borehole Log

Borehole No.

WS110

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	50 (3,3/50 for 160mm)	0.20			MADE GROUND: Concrete.	
		0.50	ES		0.24			MADE GROUND: Soft to firm blue grey clay.	
					0.30			MADE GROUND: Grey clayey fine to medium sandy gravel. Gravel is coarse sub-angular siltstone.	
		1.00			0.75			MADE GROUND: Stiff gravelly clay. Gravel is fine to medium sub-angular to sub-rounded siltstone brick.	
		1.00	ES		0.85			MADE GROUND: Black very clayey gravel. Gravel is fine to medium sub-angular ashphalt.	
		1.00 - 1.45	D		1.00			MADE GROUND: Black brown gravelly clay. Gravel is fine to medium sub-angular ashphalt.	
					1.21			MADE GROUND: Black brown gravelly clay. Gravel is fine to medium sub-angular ashphalt.	
								End of borehole at 1.21 m	

Remarks
Refusal



Borehole Log

Borehole No.

WS111

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES	50 (3,4/50 for 145mm)	0.20			MADE GROUND: Concrete.	
		0.50	ES		0.35			MADE GROUND: Black clayey gravelly fine to medium sand. Gravel is fine sub-angular to sub-rounded brick sandstone ash.	
		1.00						Yellow medium coarse sandy GRAVEL. Gravel is fine to coarse sub-angular fine to coarse sub-angular to sub-rounded gritstone.	1
		1.00 - 1.45	D		1.19			End of borehole at 1.19 m	
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Refusal





Borehole Log

Borehole No.

WS113

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.04 0.36			MADE GROUND: Asphalt.	
		1.00 1.00 - 1.45	D	N=5 (2,2/2,2,1,0)	0.90			MADE GROUND: Red grey fine to coarse sandy gravel. Gravel is fine to medium sub-angular brick concrete.	1
		2.00 2.20	ES	N=1 (1,0/0,0,0,1)				MADE GROUND: Very stiff brown gravelly clay. Gravel is fine to medium sub-angular to sub-rounded ash brick sandstone.	2
		3.00		N=2 (1,0/1,0,1,0)				MADE GROUND: Black clayey medium coarse sandy gravel. Gravel is fine to medium sub-angular occasional brick ash clinker siltstone.	3
		4.00		N=10 (1,1/2,2,3,3)	4.45				4
								End of borehole at 4.45 m	5
									6
									7
									8
									9
									10

Remarks

Hole collapsing





Borehole Log

Borehole No.

WS114

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.05			0.05			MADE GROUND: Ashphalt.	
		0.35			0.35			MADE GROUND: Yellow brown gravelly fine to medium sand. Gravel is fine to coarse sub-angular to sub-rounded sandstone.	
		0.60	ES					MADE GROUND: Firm to stiff black and brown clayey gravelly sand. Gravel is fine to medium sub-angular to sub-rounded brick clinker ash.	1
		1.00		N=4 (3,2/1,1,1,1)					
		1.00 - 1.45	D		1.20			MADE GROUND: Black and grey gravelly fine to medium sand. Gravel is fine to medium sub-angular sandstone ash.	
		1.50	ES						
		2.00		N=2 (1,0/0,0,1,1)	1.90			MADE GROUND: Firm to stiff light brown CLAY.	2
		3.00		N=1 (3,2/1,0,0,0)	3.00			MADE GROUND: Black clayey gravelly fine to medium sand. Gravel is fine sub-angular to sub-rounded ash clinker fissile micaceous material and carbonaceous material.	3
		4.00		N=2 (2,2/0,0,1,1)					4
					4.50			Yellow brown gravelly SAND. Gravel is fine to medium sub-angular gritstone.	5
		5.00		N=10 (2,2/2,2,3,3)					
		5.00 - 5.45	D		5.45			End of borehole at 5.45 m	6
									7
									8
									9
									10

Remarks
Complete



Borehole Log

Borehole No.

WS114

Sheet 1 of 1

Project Name: Tetrosyl

Project No.
10110

Co-ords: -

Hole Type
WS

Location: Bury

Level:

Scale
1:50

Client: WHR Property Consultants LLP

Dates: 10/03/2014 -

Logged By
J.O'K

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		1.00		N=4 (3,2/1,1,1,1)					
		1.00 - 1.45	D		1.20				
		1.50	ES					MADE GROUND: Black and grey gravelly fine to medium sand. Gravel is fine to medium sub-angular sandstone ash.	
		2.00		N=2 (1,0/0,0,1,1)	1.90			MADE GROUND: Firm to stiff light brown CLAY.	2
		3.00		N=1 (3,2/1,0,0,0)	3.00				3
		4.00		N=2 (2,2/0,0,1,1)				MADE GROUND: Black clayey gravelly fine to medium sand. Gravel is fine sub-angular to sub-rounded ash clinker fissile micaceous material and carbonaceous material.	4
		5.00		N=10 (2,2/2,2,3,3)	4.50			Yellow brown gravelly SAND. Gravel is fine to medium sub-angular gritstone.	5
		5.00 - 5.45	D		5.45			End of borehole at 5.45 m	6
									7
									8
									9
									10

Remarks
Complete

Barratt Manchester

**4 Brindley Road, City Park
Manchester**

M16 9HO

FAO: Steve Garth

United Utilities Water PLC

Property Searches
Ground Floor Grasmere House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

DX 715568 Warrington
Telephone 0870 751 0101

Fax Number 0870 7510102

Property.searches@uuplc.co.uk

Your Ref: SGARTH/WALMERSLEYRD
Our Ref: 13/ 999160
Date: 19/02/2014

Dear Sirs

Location: Walmersley Od Road Bury

I acknowledge with thanks your request dated 18/02/14 for information on the location of our services.

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

I attach General Condition Information sheets, which details contact numbers for additional services (i.e. new supplies, connections, diversions) which we are unable to deal with at this office. In addition you should ensure they are made available to anyone carrying out any works which may affect our apparatus.

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

If you have any queries regarding this matter please telephone us on 0870 7510101.

Yours Faithfully,



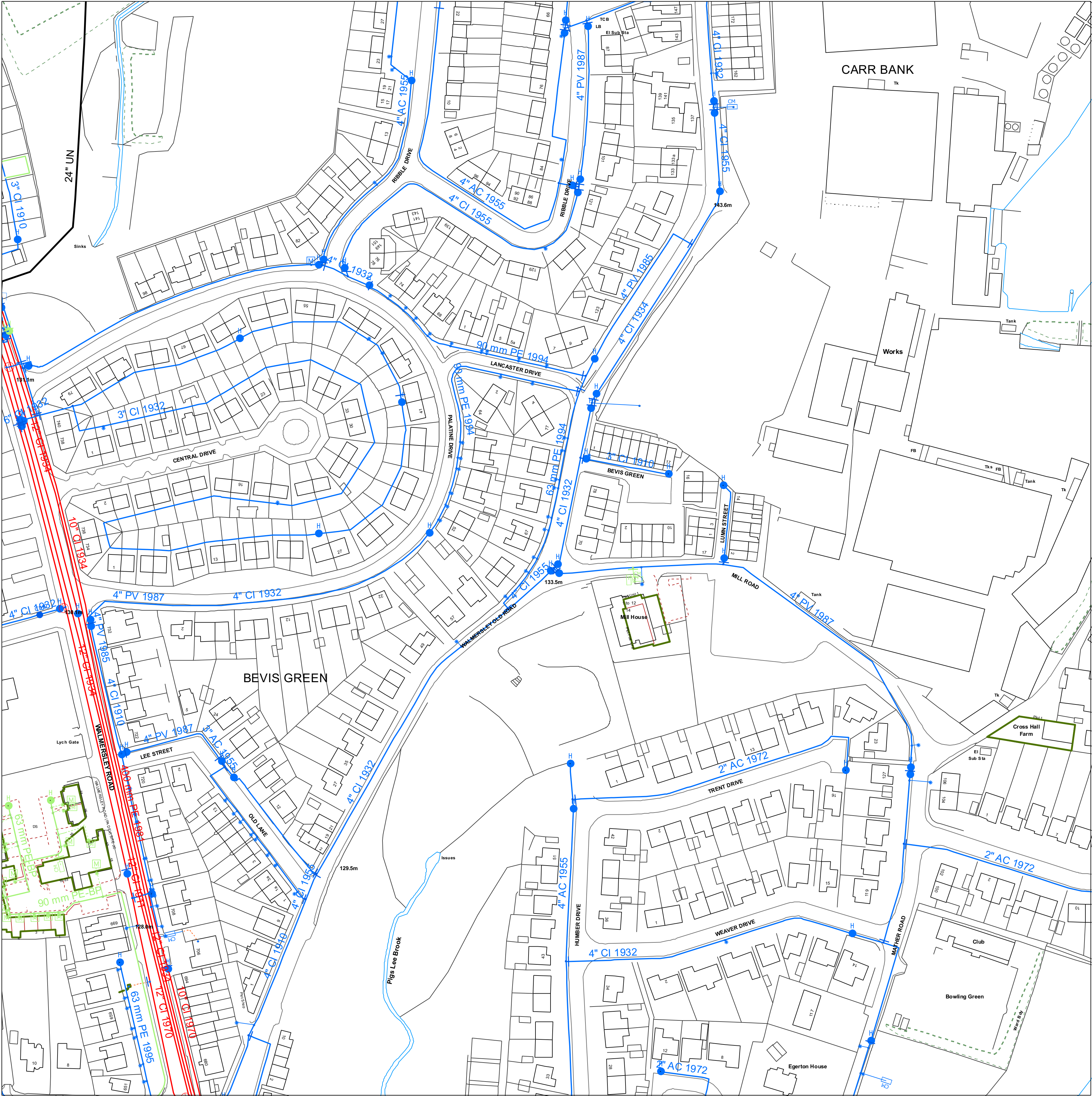
Sue McManus
Operations Manager
Property Searches

TERMS AND CONDITIONS - WASTERWATER & WATER DISTRIBUTION PLANS

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

TERMS AND CONDITIONS:

1. This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
2. This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
3. In particular, the position and depth of any UW apparatus shown on the Map are approximate only. UW strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UW apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
4. The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
5. The position and depth of UW apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
6. This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UW apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
7. No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UW apparatus by reason of the actual position and/or depths of UW apparatus being different from those shown on the Map and any information supplied with it.



LEGEND
PIPE WORK

Live	Proposed	
		Trunk Main - PressurisedMain
		Raw Water Aqueduct - PressurisedMain
		Raw Water Aqueduct - GravityMain
		LDTM Raw Water Distribution - PressurisedMain
		LDTM Raw Water Distribution - GravityMain
		LDTM Treated Water Distribution - PressurisedMain
		LDTM Treated Water Distribution - GravityMain
		Private Pipe - LateralLine
		Distribution Main - PressurisedMain
		Comms Pipe - LateralLine
		Concessionary Service - LateralLine

ABANDONED PIPE

	Trunk Main
	Raw Water Aqueduct
	LDTM Raw Water Distribution
	LDTM Treated Water Distribution
	Private Pipe
	Distribution Main
	Comms Pipe
	Concessionary Service

NODES/ FURNITURE

Live	Proposed	
		End Cap
		CC Valve
		AC Valve
		Air Valve
		Sluice Valve
		Non Return Valve
		Pressure Management Valve
		Change of Characteristic
		Anode
		Chlorination Point
		De Chlorination Point
		Bore Hole
		Inlet Point
		Bulk Supply Point
		Fire Hydrant
		Hydrant
		Private Fire Hydrant
		Pump
		Site Termination
		Service Start
		Service End
		Process Meter
		Stop Tap
		Monitor Location
		Strainer Point
		Access Point
		Hatch Box
		IP Point
		Route Marker
		SPT Sampling Station
		LB Logger Box

PROPERTY TYPES

Live	Proposed	
		Condition Report
		Pipe Bridges
		Tunnels (non carrier)
		Pumping Station
		Water Treatment Works
		Private Treatment Works
		Valve House
		Water Tower
		Service Reservoir
		Supply Reservoir
		Abstraction Point
		Domestic meter
		Commercial meter
		Telemetry Outstation

MATERIAL TYPES

AC ASBESTOS CEMENT	OT OTHERS
CI CAST IRON	PB LEAD
CU COPPER	PV uPVC
CO CONCRETE	SI SPUN IRON
DI DUCTILE IRON	ST STEEL
GI GALVANISED IRON	UN UNKNOWN
GR GREY IRON	PE POLYETHYLENE

LINING TYPES

CL CEMENT LINING	ERL EPOXY RESIN
TB TAR OR BITUMEN	

INSERTION TYPES

DD DIE DRAWN	MO MOLING
DR DIRECTIONAL DRILLING	PI PIPELINE
	SL SLIP LINED

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OS Sheet No: SD8013NE
Scale: 1: 1250
Date: 19/02/2014



WATER MAIN RECORDS



LEGEND
PIPE WORK

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		Raw Water Aqueduct - GravityMain
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		CC Valve
		AC Valve
		Air Valve
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		Non Return Valve
		Pressure Management Valve
		Change of Characteristic
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		Pump
		Site Termination
		Service Start
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		Process Meter
		Stop Tap
		Monitor Location
		Strainer Point
		Access Point
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		Condition Report
		Pipe Bridges
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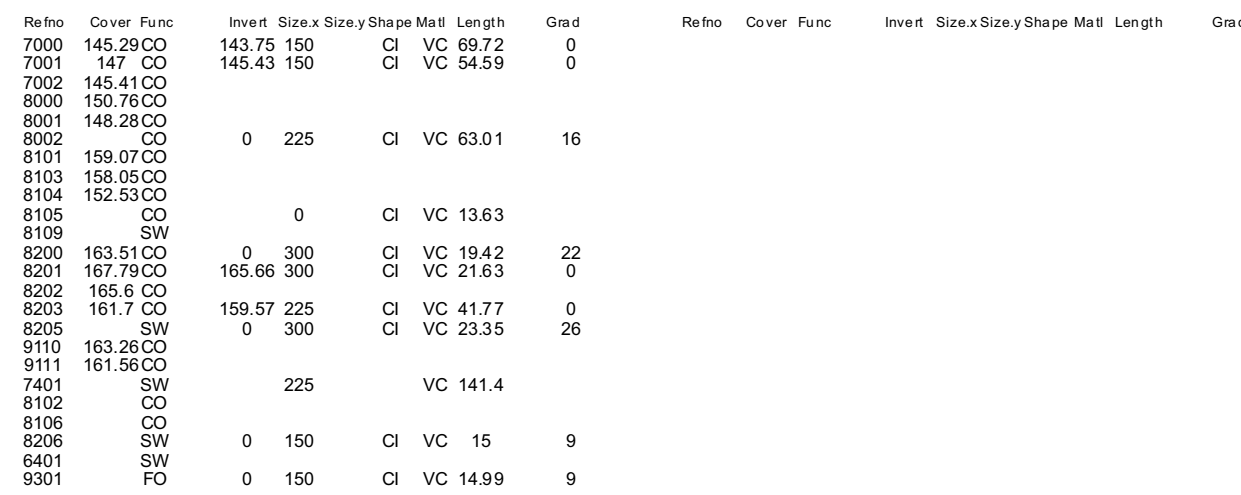
Printed By: Nicola Morris

OS Sheet No: SD8014SE

Scale: 1: 1250 Date: 19/02/2014

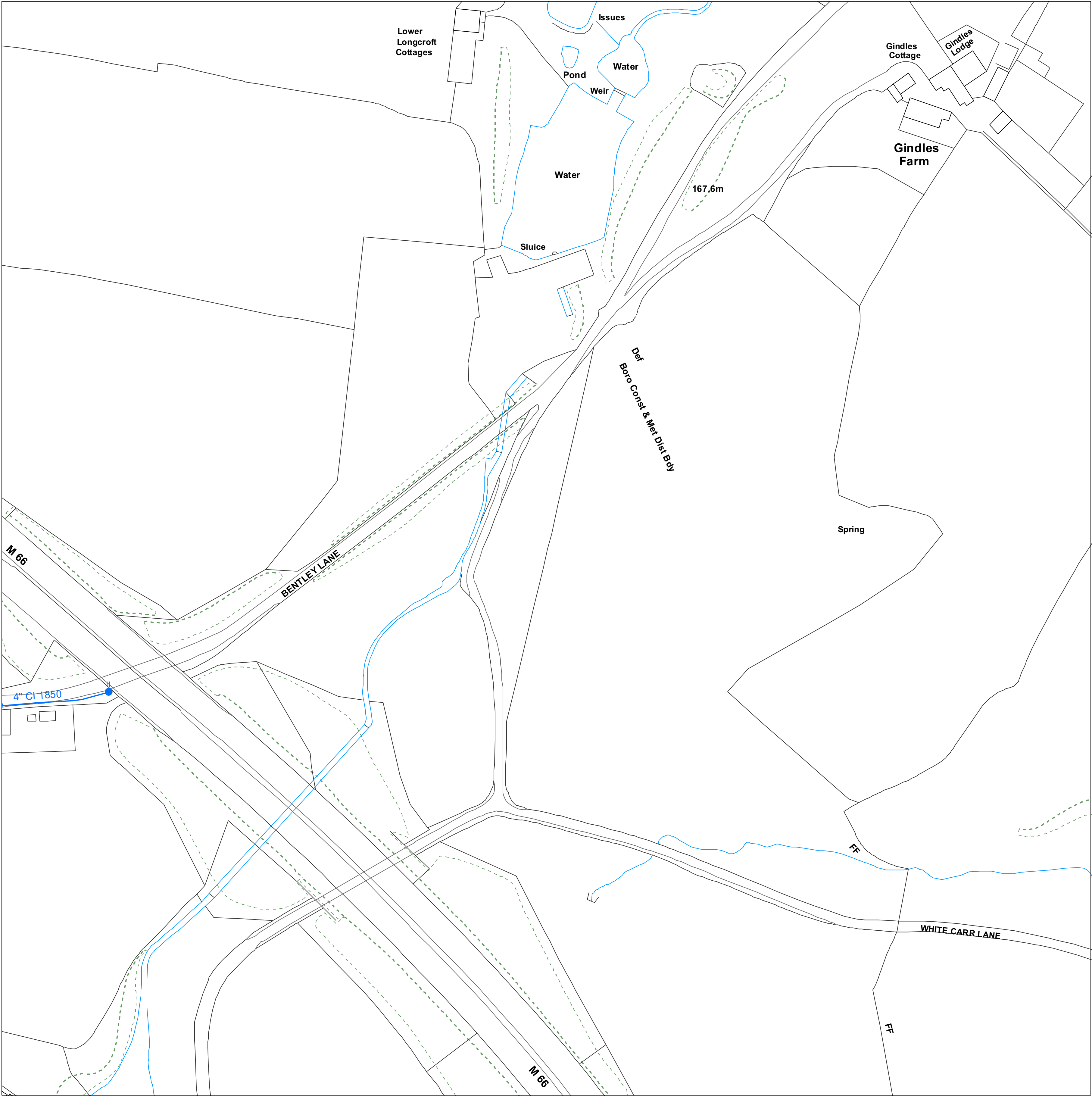


WATER MAIN RECORDS



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





LEGEND

PIPE WORK

Live

Proposed

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Raw Water Aqueduct - GravityMain

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End Cap

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Change of Characteristic

Anode

Chlorination Point

De Chlorination Point

Bore Hole

Inlet Point

Bulk Supply Point

Fire Hydrant

Hydrant

Private Fire Hydrant

Pump

Site Termination

Service Start

Service End

Process Meter

Stop Tap

Monitor Location

Strainer Point

Access Point

Hatch Box

IP Point

Route Marker

SPT

Logger Box

PROPERTY TYPES

Live

Proposed

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Domestic meter

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Scale: 1: 1250

Date: 19/02/2014



WATER MAIN RECORDS

OS Sheet No: SD8114SW

Printed By: Nicola Morris

Scale: 1: 1250 Date: 19/02/2014

These general conditions and precautions apply to the water distribution system of United Utilities.

Please ensure that a copy of these conditions is passed to your representative and contractor on site.

1. United Utilities provides approximate locations of its water mains or apparatus according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of private service pipes from the mains to properties. Where service pipes are shown, a blue broken line indicates their approximate position. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated.

2. Special requirements relative to our apparatus may be indicated. United Utilities employees will visit any site at reasonable notice to assist in the location of its underground water apparatus and advise any precautions that may be required to obviate any damage. To arrange a visit or for further information regarding new supplies, connections, diversions, costing, future proposals for construction of company apparatus or any notification required under these General Conditions, please telephone us on **0845 746 2200** or write to United Utilities, PO Box 453, Warrington, WA5 3QN.

3. In order to achieve safe working conditions adjacent to any water apparatus the following should be observed;

(a) All water apparatus should be located by hand digging prior to the use of mechanical excavation.

(b) During construction work where heavy plant may have to cross the line of a water main, and the main is not under a carriageway of adequate standard of construction, crossing points should be suitably reinforced with sleepers, steel plates or a specially constructed reinforced concrete raft as necessary. These crossing points should be clearly indicated and crossing the line of the water main at other places should be prevented. United Utilities employees will advise on the type of reinforcement necessary. This is particularly important on agricultural or open land, where tilling or erosion may have significantly reduced the original cover.

(c) No explosive should be used within 32 metres of any United Utilities apparatus without prior consultation with United Utilities.

(d) Where it is proposed to carry out piling within 15 metres of any water main United Utilities should be consulted so that the affected main may be surveyed.

4. During any excavation, it is important that measures should be taken to ensure continued support for any water main:

(a) Where excavation of trenches adjacent to any water main is likely to affect its support, the main must be supported to the satisfaction of United Utilities.

(b) Where a trench is excavated crossing or parallel to the line of a water main, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the main. In special cases it may be necessary to provide permanent support to a main which has been exposed over the length of the excavation before back-filling and reinstatement is carried out. No back-filled concrete should contact the main.

5. No other apparatus should be laid over and along the line of a water main irrespective of clearance. A minimum clearance of 450 millimetres should be allowed between any plant being installed and an existing main, to facilitate maintenance and repair, whether the adjacent plant is parallel to or crossing the main. No manhole, chamber, or other obstruction should be built over or around a water main.

6. Where a water main is coated with special wrapping and the wrapping is damaged, even to a minor extent, United Utilities must be notified, and the excavation must be left open for ready access so that repairs can be made. In case of any material damage to the main itself causing leakage, or weakening of the mechanical strength of the pipe, the person or body responsible should immediately notify United Utilities in order that the necessary remedial work can be carried out. The full cost of the necessary remedial work will be charged to the person or body responsible for the damage.

7. If you propose to change existing levels over water mains you will need to inform us. We will need specific locations to be identified together with precise details as to the scale of the proposed changes to existing ground levels. Changes to existing levels may require the diversion of our apparatus at your cost. However, in certain circumstances we may wish to leave our apparatus where it is. On these occasions you will usually be required to protect our apparatus by means of a concrete raft and either raise or lower any surface boxes affected.

8. Under no circumstances should our surface boxes be either buried or left in a situation where they are raised above finished ground levels. You should re-use and re-set any surface boxes affected by your works into the new surface so that they align over the water apparatus below. You will be responsible for the cost of repairing any damage to our apparatus as a result of your works.

9. Where proposals involve resurfacing, you must notify United Utilities if your excavation will be greater than 750mm in the highway and 300mm in a footpath, verge or other location.

10. For information regarding easements, deeds, grants, licences or wayleaves, please write to United Utilities Property Solutions, Coniston Buildings, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3UU (Tel 01925 731 365).

Tree planting restrictions over water mains

a) Poplar and willow trees have extensive root systems and should not be planted within 10 metres of any water main.

b) The following trees and those of a similar size, whether they are deciduous or evergreen, should not be planted within six metres of any water main:

- Ash, beech, birch, elm, horse chestnut, lime, oak, sycamore;
- Apple trees and pear trees;
- Most conifers.

c) United Utilities requires access to the route of its mains at all times to inspect for leaks and carry out surveys.

We recommend that no shrubs or bushes which might obstruct or interfere with our access should be planted within one metre of the centre line of any water main.

d) There may be instances when both United Utilities and the landowner will wish to plant shrubs or bushes close to the water main for screening or other purposes. The following shallow rooting shrubs would be suitable for this purpose:

- Blackthorn, broom, cotoneaster, elder;
- Hazel, laurel, privet, quickthorn, snowberry;
- Most ornamental flowering shrubs.

e) In areas where soft fruit is grown, blackcurrant, raspberries and gooseberries may be planted close to the main, provided that a path is left clear for inspection access and surveys. United Utilities can give additional advice where required in particular circumstances.

These general conditions and precautions apply to the wastewater network of United Utilities.

Please ensure that a copy of these conditions is passed to your representative and contractor on site.

1. United Utilities provides the approximate locations of its sewers according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of every sewer culvert or drain, private connections from properties to the public sewers or the particulars of any private system. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated. The records do indicate the position of the nearest known public sewer from which the likely length of private connections can be estimated together with the need for any off site drainage rights or easements.

2. Special requirements relative to our sewers may be indicated. United Utilities employees or its contractors will visit any site at reasonable notice to assist in the location of its underground sewers and advise any precautions that may be required to obviate any damage. To arrange a visit or for further information regarding new supplies, connections, diversions, costing, or any notification required under these General Conditions, please call us on **0845 746 2200**.

3. Where public sewers are within a site which is to be developed and do not take any drainage from outside the area, they are from an operational viewpoint redundant. The developer must identify all redundant sewers affected by the development and apply to United Utilities in writing for these sewers to be formally closed. The developer shall bear all related costs of the physical abandonment work.

4. Public sewers within the site that are still live outside the area will be subject to a "Restricted Building zone". This would normally be a surface area equivalent to the depth of the sewer measured from the centre line of the sewer on either side. No construction will be permitted within that zone. The developer should also note that deep and wide rooted trees must not be planted in close proximity to live sewers. Access to public sewers must be maintained at all times and no interference to manholes will be permitted during construction work.

5. Where there is a public sewer along the line of a proposed development/building, arrangements shall be made by the developer at his cost to divert the sewer around the development. Where this is not possible and as a last resort, a "Building Over Agreement" will need to be completed under section 18 of the Building Act 1984. The developer shall design building foundations to ensure that no additional loading is transferred to the sewer and submit such details both to the Local Authority's Building Control Officer and to United Utilities for approval/acceptance. United Utilities on a rechargeable basis would normally undertake all aspects of design work associated with the diversion of any part of the operational wastewater network. For further advice please call asset protection on **01925 678 306**

6. Where there is a non-main river watercourse/culvert passing through the site, the landowner has the responsibility of a riparian owner for the watercourse/culvert and is responsible for the maintenance of the fabric of the culvert and for all works involved in maintaining the unrestricted flow through it. Building over the watercourse/culvert is not recommended. The developer must contact the local authority before any works are carried out on the watercourse/culvert. Where it is necessary to discharge surface water from the site into the watercourse/culvert the developer shall make an assessment of the available capacity of the watercourse/culvert (based on a 1 in 50 year event) and ensure that the additional flow to be discharged into the watercourse/culvert will not cause any flooding. In appropriate cases, flooding may be prevented by on-site storage. The developer shall submit the relevant details required to substantiate his development proposals. Details of any outfall proposed shall also be submitted to the Environment Agency, PO Box 12, Richard Fairclough House, Knutsford Road, Warrington, Cheshire, WA4 1HT for their approval.

7. Where there is a main river watercourse/culvert passing through the site, the developer shall submit all proposals affecting the river to the Environment Agency at the address stated in paragraph 6 for approval/acceptance.

8. Your attention is drawn also to the following:

• **Private drains or sewers which may be within the site.**

On 1 October 2011 all privately owned sewers and lateral drains which communicate with (that is drain to) an existing public sewer as at 1 July 2011 will become the responsibility of the sewerage undertaker. This includes private sewers upstream of pumping stations that have yet to transfer, but excludes lengths of sewer or drain that are the subject of an on-going appeal or which have been excluded from transfer as a result of an appeal or which are on or under land opted-out by a Crown body. The transfer specifically excludes sewers and lateral drains owned by a railway undertaker. Sewers upstream of such assets, however, are transferred. Such assets may not be recorded on the public sewer record currently as it was not a requirement to keep records of previously private sewers and drains.

• **Applications to make connections to the public sewer.**

The developer must write to United Utilities requesting an application form that must be duly completed and returned. No works on the public sewer shall be carried out until a letter of consent is received from United Utilities.

• **Sewers for adoption.**

If an agreement for the adoption of sewers under Section 104 of the Water Industry Act 1991 is being contemplated, a submission in accordance with "Sewers for Adoption", Seventh Edition, published by the Water Research Centre (2001) Plc, Henley Road, Medmenham, PO Box 16, Marlow, Buckinghamshire, SL7 2HD will be required, taking into consideration any departures from the general guide stipulated by United Utilities.

• **Further consultation with United Utilities.**

Developers wishing to seek advice or clarification regarding sewer record information provided should contact United Utilities to arrange an appointment. A consultation fee may be charged, details of which will be made available at the time of making an appointment.

9. Combined sewers, foul sewers, surface water sewers, and pumped mains. These are shown separately in a range of colours or markings to distinguish them on our drawings, which are extracts from the statutory regional sewer map. A legend and key is provided on each extract for general use, although not all types of sewer will be shown on every extract.

Combined sewers shown coloured red carries both surface water and foul sewage, especially in areas where there is no separate surface water sewerage system.

Foul sewers coloured brown may also carry surface water and there may be no separate surface water system indicated in the immediate area. Both combined and foul sewers carry wastewater to our treatment works before it can safely be returned to the environment.

Surface water sewers coloured blue on our drawings are intended only to carry uncontaminated surface water (e.g. rainfall from roofs, etc) and they usually discharge into local watercourses. It is important for the protection of the environment and water quality that only uncontaminated surface water is connected to the surface water sewers. Improper connections to surface water sewers from sink wastes, washing machines and other domestic use of water can cause significant pollution of watercourses.

Pumped mains, rising mains and sludge mains will all be subject to pumping pressures and are neither suitable nor available for making new connections.

Highway drains, when included, show as blue and black dashed lines. Highway drains are not assets belonging to United Utilities and are the responsibility of local authorities.

10. For information regarding future proposals for construction of company apparatus please write to United Utilities, PO Box 453, Warrington, WA5 3QN.

11. For information regarding easements, deeds, grants or wayleaves please write to United Utilities Property Solutions, Coniston Buildings, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3UU (Tel: 01925 731 365).

Cole Easdon Consultants
160 Aztec West
Almondsbury
Bristol
BS32 4TU

Our ref: SO/2018/118439/01-L01
Your ref: 180717/JW05
Date: 06 August 2018

Dear Sir/Madam

**PRELIMINARY OPINION - PROPOSED RESIDENTIAL DEVELOPMENT. INVOLVES
INFILLING OF RESERVOIR.
FORMER TETROSYL SITE, WALMERSLEY OLD ROAD, BURY**

Thank you for submitting the above enquiry which we received on 18th July 2018.

We would like to make the following comments.

Flood Risk

The site is shown as Flood Zone 1 on the Environment Agency flood maps but previous applications relating to this site have shown that some areas of the site are actually within flood zone 2 and 3 therefore being of a higher flood risk. A Flood Risk Assessment (FRA) should be prepared to support any future planning application.

Any modelling undertaken to evidence this risk should consider a range of return periods and take the impacts of climate change into account in setting finished floor levels, new climate change allowances have been published on 19th February 2016, see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> for full details.

The Environment Agency does not have updated flood levels with the revised climate change allowances and as such the flood risk consultant should consider the appropriate mitigation measures to mitigate against fluvial and pluvial flooding. Our general recommendation is that floor levels are at least 600mm above the 1% plus 35% climate change flood level.

Culverted Watercourse

There is a culverted watercourse that runs through the site. The culvert position will have an impact on the area available for development and ultimately the number of units that the site will accommodate. Construction above culverts is not good practice as it restricts future access for maintenance/repair. The culvert will also be a liability for the individual landowners. We would suggest that these high risk areas of the site

Environment Agency
Richard Fairclough House Knutsford Road, Warrington, WA4 1HT.
Customer services line: 03708 506 506
www.gov.uk/environment-agency

Cont/d..

accommodate the public open space and the dwellings avoid the high risk area and therefore, follow the sequential approach to development within the site.

Infilling the reservoir

Infilling the reservoir will result in loss of surface water and flood water storage. The FRA will need to demonstrate no increase in flood risk elsewhere and the provision of compensatory flood storage for the infilling of the reservoir proposals may be required.

The effect of this on flood flows downstream will need to be considered in the FRA as the reservoir will provide some balancing effect on flood flows.

This development may require a permit under the Environmental Permitting (England and Wales) Regulations 2016 from the Environment Agency for any proposed works or structures, in, under, over or within eight metres of the top of the bank of Pigs Lee Brook, designated a 'main river'. This was formerly called a Flood Defence Consent. Some activities are also now [excluded](#) or [exempt](#). A permit is separate to and in addition to any planning permission granted. Further details and guidance are available on the GOV.UK website: <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>.

The Environment Agency has discretionary powers to carry out maintenance works on the channels of "main river" watercourses to remove blockages and ensure the free flow of water. The responsibility for the repair and condition of Pigs Lee Brook, its channel, banks and adjacent structures, lies ultimately with the riparian owner.

Ecology

We would seek that an appropriate environmental and ecological assessment is undertaken for this large mixed greenspace and brownfield site, and be guided by identified environmental constraints and opportunities, and ensuing in particular the protection of Pigs Lee Brook watercourse, WFD waterbody (Ref: GB112069064620) which is a key ecological receptor of the site. Any decommissioning and decontamination of former industrial site will need to be carefully managed to protect the aquatic environment.

Any ecological assessment should be conducted prior to development of any detailed plans to enable an assessment of level of risk posed by future development. The detailed design, construction, mitigation and compensation measures should be based on the results of a survey carried out at an appropriate time of year by a suitably experienced surveyor using recognised survey methodology.

The survey and risk assessment should:

- identify any rare, declining, protected or otherwise important terrestrial and aquatic flora, fauna or habitats within the site;
- assess the importance of the above features at a local, regional and national level;
- identify the impacts of the scheme on those features;
- demonstrate how the development will avoid adverse impacts
- propose mitigation for any adverse ecological impacts or compensation for loss;
- propose wildlife/ habitat enhancement measures;
- Propose post-project appraisal, management plans and management responsibilities with details of how biodiversity enhancement will be incorporated

into the development and maintained over the long term.

We would recommend any ecological impact assessment follow IEEM ecological assessment guidelines

(https://www.cieem.net/data/files/Website_Downloads/Guidelines_for_Ecological_Impact_Assessment_2015.pdf) particularly in regards ecological impact associated with proposed loss of relatively large and well established reservoir and wetland.

Whilst we welcome the retention of an open channel watercourse and the preferable 'skylighting' of some of the 400m of existing culverted sections of Pigs Lee Brook tributary as part of future development proposals. The design of the new open channel watercourse should be shaped by not just flood modelling and high flows, but also look to provide a high quality riparian corridor that is resilient and ecological valuable in dominant dry weather flows, one that has a wide undeveloped green space corridor that is accessible for both people and wildlife, a riparian design that ensures new development positively integrates with restored river corridor i.e. front facing development, use of above ground Sustainable Urban Drainage as part of site surface water drainage; a riparian channel design that has a preference soft bio-engineering solutions where feasible (<http://www.hrwallingford.com/news/supporting-green-river-engineering>), and provides commensurate mitigation for loss of reservoir wetland and high quality green infrastructure asset.

We would also recommend any new open channel watercourse be guided by existing good practice design guides such as 'Rivers by design' (<http://www.ecrr.org/Portals/27/Publications/131223%20Rivers%20by%20Design.pdf>) and current draft Greater Manchester Spatial Framework policies in regards to rivers valleys and green infrastructure (https://www.greatermanchester-ca.gov.uk/downloads/file/371/draft_greater_manchester_spatial_framework_october_2016_-_full_version).

It is understood from previous development plans for redeveloping Tetrosyl site, that a number of protected species have been confirmed present within the site. This will mean Natural England licensing (<https://www.gov.uk/guidance/wildlife-licences>) would be required, and we would recommend Natural England are consulted in regards to redeveloping the Tetrosyl site.

Our Fisheries Team understand that the existing reservoir was an active fishery. The Agency regulates the removal of fish from inland waters in order to protect fisheries and the environment from the impacts of inappropriate fish transfers, disease transmission and poaching. The applicant will require written permission (consent) from us in regards to the draining of the existing reservoir and:

- i. removal of fish from any inland water.
- ii. Use any fishing instruments, such as nets, traps or electric equipment.

Contaminated Land

The site is a former industrial area where elevated concentrations of contamination may be present and could adversely impact the water environment now and in the future.

Should the site be brought forward for development then land conditions should be considered. We would expect ground investigation to be undertaken prior to the commencement of any in-filling and onwards development.

Model Procedures and good practice:

Due to the former land use(s), soil and /or groundwater contamination may exist at the site and the associated risks to controlled waters should be addressed by:

1. Following the risk management framework provide in CLR11, Model procedures for the management of land contamination
 - o <https://www.gov.uk/government/publications/managing-land-contamination>
2. Referring to the Environment Agency guiding principles for land contamination and the land contamination sections in the Environment Agency's Groundwater Protection: Principles and Practice
 - o <https://www.gov.uk/government/publications/managing-and-reducing-land-contamination>
 - o <https://www.gov.uk/government/collections/groundwater-protection>
3. Further information may be found on the land contamination technical guidance pages on the direct.gov website
 - o <https://www.gov.uk/government/collections/land-contamination-technical-guidance>

All investigations of land potentially affected by contamination should be carried out by or under the direction of a suitably qualified competent person and in accordance with BS 10175 (2001) Code of practice for the investigation of potentially contaminated sites. The competent person would normally be expected to be chartered member of an appropriate body (such as the Institution of Civil Engineers, Geological Society of London, Royal Institution of Chartered Surveyors, Institution of Environmental Management) and also have relevant experience of investigating contaminated sites. The Specialist in Land Condition (SiLC) qualification administered by the Institution of Environmental Management provides an accredited status for those responsible for signing off LCR's. For further information see - www.silc.org.uk we are keen to work with the developer in resolving any problems or issues that may occur so that any further possible delays are minimise or avoided.

Waste Management

Depending on the material proposed to be used to fill the reservoir, the proposed development may require a Waste Management Licence in accordance with the requirements of the Environmental Protection Act 1990. Further information can be obtained from www.gov.uk

Should you wish to discuss the above comments in further detail or would like a meeting we can do this as part of our cost recovery service which is £100+VAT per hour, per person.

Yours faithfully

Ms Sylvia Whittingham
Planning Advisor

Direct dial 02030250159

Direct e-mail Sylvia.whittingham@environment-agency.gov.uk

CCTV Culvert Survey

**Pig Lee Tributary,
Off Walmersley Old Road,
Bury**

Job No: SALE1308031

25th October 2012

Pig Lee Trib, Off Walmersley Old Road, Bury
SALE1308031

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Executive Summary

CCTV SURVEY – EXECUTIVE SUMMARY

Client:	Environment Agency	NFCDD Ref:	01313PIGT0101B02
Site Address :	Pig Lee Trib, Off Walmersley Old Road, Bury	Contact:	Mark Whittaker
Date of Report:	25 th October 2012	Job No:	SALE 1308031

Objective

A CCTV survey was undertaken by Aquajet (GB) Ltd using Man assisted CCTV techniques. This was conducted on behalf of the Environment Agency.

The purpose of the survey was to determine the route of the culvert and to visually ascertain the condition of the culvert/headwalls.

Location and Description

Pedestrian and vehicle access to the culvert is gained via Tetrosyl for the Inlet (ladders are required), and opposite 27 Walmersley Old Road for the Outlet.

The culvert flows in a North Easterly direction from the Inlet, the direction then changes to Southerly and continues to MH01. The direction then changes to Westerly and continues to MH01 where just after it changes again to South Westerly and continues to flow to the Outlet which is situated opposite 27 Walmersley Old Road.

The Inlet headwall is of concrete and brick construction and appears to be in good condition. The Outlet headwall is of masonry construction but is covered in moss so we are therefore unable to comment on the condition.

The following information should be viewed in conjunction with the CCTV report.

The culvert is made up of the following:

1. Outlet upstream to MH01 – Date of Survey: 17-09-12 - Weather: Dry - Flow Level: Low

- The culvert is 1200mm circular brick construction.
- There is infiltration gushing at 15.9m.
- There is infiltration dripping at 15.9m and 26.9m.
- There is medium encrustation at various points in the length.
- There is medium scale from a connection at 120.2m.
- The survey was completed at 158.8m.

Observations & Anomalies

Service defects have been recorded on this length. We were unable to obtain GPS for the Outlet due to trees. The complete frame of MH01 had to be removed to survey as the cover had seized.

2. MH01 upstream to MH02 – Date of Survey: 17-09-12 - Weather: Dry - Flow Level: Low

- The culvert is 2500mm x 1300mm rectangular masonry in regular courses construction.
- The culvert changes to a 2220mm x 1300mm arched masonry randomly coursed construction at 2.0m.
- There are missing bricks approximately every 1.0m starting at 2.0m through to 95.3m.
- The invert steps up twice at 82.7m.
- The dimensions of the culvert change to 2600mm x 1600mm at 83.7m.
- The invert steps up at 95.3m.
- The survey was abandoned as communication was lost due to step up of invert at 95.3m.

CCTV SURVEY – EXECUTIVE SUMMARY

Client:	Environment Agency	NFCDD Ref:	01313PIGT0101B02
Site Address :	Pig Lee Trib, Off Walmersley Old Road, Bury	Contact:	Mark Whittaker
Date of Report:	25 th October 2012	Job No:	SALE 1308031

Observations & Anomalies

Service and structural defects have been recorded on this length. The complete frame of MH01 had to be removed to survey as the cover had seized. We were unable to obtain GPS for MH02.

3. MH02 downstream to MH01 – Date of Survey: 18-09-12 - Weather: Showers - Flow Level: Low

- The culvert is 1700mm x 2800mm rectangular masonry randomly coursed construction.
- There is a metal corrugated soffit at 0.0m.
- There are missing bricks at 2.0m.
- There is a connection with an intrusion of 30mm at 2.0m.
- The culvert changes to an arched 1800mm x 280mm construction at 2.0m.
- The invert steps down twice at 2.0m.
- The invert steps down at 6.9m.
- The dimensions of the culvert change to 2600mm x 1600mm at 10.8m.
- The invert steps down at 27.3m.
- The survey was abandoned as due to the overlap being completed at 27.3m.

Observations & Anomalies

Structural and constructional defects have been recorded on this length. The complete frame of MH01 had to be removed to survey as the cover had seized. We were unable to gain GPS for MH02.

4. MH02 upstream to Inlet – Date of Survey: 18-09-12 - Weather: Showers - Flow Level: Low

- The culvert is 1100mm x 900mm rectangular masonry in regular courses construction.
- There is a flagged soffit at 2.0m.
- There is a small chamber with metal bars visible at 8.3m.
- The culvert changes to a 1000mm x 1100mm masonry randomly coursed construction at 9.1m.
- The dimensions of the culvert change to 1070mm x 900mm at 22.1m.
- The width at 10 o'clock – 2 o'clock is 600mm at 22.1m.
- There is a blind chamber at 34.7m.
- There is an exiting blind chamber at 37.8m.
- There are intruding connections at various points in the length.
- There is a blind chamber at 54.7m.
- The dimensions of the culvert change to 100mm x 900mm at 54.7m.
- The dimensions of the culvert change to 1300mm x 1000mm at 56.7m.
- The material of the culvert changes to brick on the right hand side of the wall at 56.7.
- Benching starts on the right hand side at 56.7m and finishes at 100.8m.
- The culvert changes to a 100mm x 1100mm masonry randomly coursed construction at 60.5m.
- The dimensions of the culvert change to 1750mm x 1100mm at 62.5m.
- There are services across the culvert at 63.2m, 65.5m and 93.4m.
- There is brick 9 o'clock – 3 o'clock at 66.3m.
- There is infiltration gushing at 88.5m and 94.2m.
- The dimensions of the culvert change to 1250mm x 1500mm at 100.8m.
- The brick at 10 o'clock – 2 o'clock stops at 100.8m.
- There are metal brackets attached to the soffit at 104.9m, 107.6m and 136.3m.
- There is a beam across the soffit at 114.4m.

CCTV SURVEY – EXECUTIVE SUMMARY

Client:	Environment Agency	NFCDD Ref:	01313PIGT0101B02
Site Address :	Pig Lee Trib, Off Walmersley Old Road, Bury	Contact:	Mark Whittaker
Date of Report:	25 th October 2012	Job No:	SALE 1308031

- The culvert changes to a 1500mm x 1500mm square culvert at 117.8m.
- There is medium encrustation at 153.2m.
- There is infiltration running at 153.2m.
- The survey was completed at 163.7m.

Observations & Anomalies

Service and constructional defects have been recorded on this length. We were unable to gain access to the Inlet as ladders are required. We were unable to obtain GPS at MH02 or the Inlet.

Recommendations

Our survey has highlighted debris, encrustation and scale which need removed using high pressure water removal. Our survey has also highlighted gushing and running infiltrations and also missing bricks which will all require remedial works. There were a number of dripping infiltrations which will require monitoring over the next twelve months. Our survey has also highlighted a number of intruding connections, however as they do not impede the flow no works will be required.

Health & Safety

We were unable to gain access to the Inlet and the Outlet is covered in moss so we are unable to comment on the condition of the headwalls.

Remaining Life

Culvert – Visually assessed in excess as between 3 and 5 years, subject to our recommendations.

Note:

This report is compiled from information provided by our trained and certified CCTV operators.

Thank you for using Aquajet (GB) Ltd

Executive Summary produced by J. Warren

Pig Lee Trib, Off Walmersley Old Road, Bury
SALE1308031

Area Plan

Pig Lee Trib, Off Walmersley Old Road, Bury
SALE1308031

Grade Defect Report

Grade Defect Report

AquaJet (GB) Ltd, Retford, Nottinghamshire, DN22 6HG, Tel: 01777 701335, Fax: 01777 701344 // E.A, SALE1308031,Pig Lee Trib.mdb

	Place	Road	start MH	Flow	end MH	Position	Observation	grade
1	BURY	OFF MILL ROAD	MH01	u/s	MH02	0	Start of Survey	0
2	BURY	OFF MILL ROAD	MH02	u/s	INLET	0	Start of Survey	0
3	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	0	Start of Survey	0
4	BURY	OFF MILL ROAD	MH02	d/s	MH01	0	Start of Survey	0
5	BURY	OFF MILL ROAD	MH02	u/s	INLET	0	Manhole Remark: MH02	0
6	BURY	OFF MILL ROAD	MH01	u/s	MH02	0	Manhole Remark: MH01	0
7	BURY	OFF MILL ROAD	MH02	d/s	MH01	0	Manhole Remark: MH02	0
8	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	0	Manhole Remark: OUTLET	0
9	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	0	Water level, 10 % height/diameter	0
10	BURY	OFF MILL ROAD	MH02	u/s	INLET	0	Water level, 15 % height/diameter	0
11	BURY	OFF MILL ROAD	MH02	d/s	MH01	0	Water level, 10 % height/diameter	0
12	BURY	OFF MILL ROAD	MH01	u/s	MH02	0	Water level, 05 % height/diameter	0
13	BURY	OFF MILL ROAD	MH02	d/s	MH01	0	General Observation, Remark: METAL CORRAGATED SOFFIT	0
14	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	2	General Condition photograph	0
15	BURY	OFF MILL ROAD	MH02	u/s	INLET	2	General Condition photograph	0
16	BURY	OFF MILL ROAD	MH01	u/s	MH02	0	General Condition photograph	0
17	BURY	OFF MILL ROAD	MH02	d/s	MH01	0	General Condition photograph	0
18	BURY	OFF MILL ROAD	MH02	u/s	INLET	2	General Observation, Remark: FLAGGED SOFFIT	0
19	BURY	OFF MILL ROAD	MH02	u/s	INLET	7.3	General Condition photograph	0
20	BURY	OFF MILL ROAD	MH01	u/s	MH02	2	Dimension of sewer changes, new dimension dia 2220 mm, Remark: X 1300MM	0
21	BURY	OFF MILL ROAD	MH01	u/s	MH02	2	Sewer shape changes at this point, Remark: ARCHED	0
22	BURY	OFF MILL ROAD	MH02	u/s	INLET	8.3	General Observation, Remark: SMALL CHAMBER ON LEFT METAL BARS VISIBLE	0
23	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	14.1	General Condition photograph	0
24	BURY	OFF MILL ROAD	MH02	d/s	MH01	2	Sewer shape changes at this point, Remark: ARCHED	0
25	BURY	OFF MILL ROAD	MH01	u/s	MH02	2	Sewer Material changes at this point, Masonry - rand. coursed	0
26	BURY	OFF MILL ROAD	MH02	u/s	INLET	9.1	Line of Sewer deviates right, Remark: SHARP	0
27	BURY	OFF MILL ROAD	MH02	u/s	INLET	9.1	Dimension of sewer changes, new dimension dia 1000 mm, Remark: X 1100MM	0
28	BURY	OFF MILL ROAD	MH02	d/s	MH01	2	Dimension of sewer changes, new dimension dia 1800 mm, Remark: X 2800MM	0
29	BURY	OFF MILL ROAD	MH02	u/s	INLET	9.1	Sewer Material changes at this point, Masonry - rand. coursed	0
30	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	22.5	Line of Sewer deviates left, Remark: SHARP	0
31	BURY	OFF MILL ROAD	MH02	d/s	MH01	2	General Observation, Remark: INVERT STEPS DOWN X 2	0
32	BURY	OFF MILL ROAD	MH02	u/s	INLET	9.1	General Condition photograph	0
33	BURY	OFF MILL ROAD	MH02	d/s	MH01	6.9	General Observation, Remark: INVERT STEPS DOWN 1.0M APPROX	0
34	BURY	OFF MILL ROAD	MH01	u/s	MH02	16.2	General Condition photograph	0
35	BURY	OFF MILL ROAD	MH02	d/s	MH01	9.9	Connection, at 03 o'clock, dia 450 mm, Remark: X 300MM	0
36	BURY	OFF MILL ROAD	MH01	u/s	MH02	16.2	General Observation, Remark: TIMBER ACROSS CULVERT 10 - 02 O'CLOCK	0
37	BURY	OFF MILL ROAD	MH02	u/s	INLET	20	General Condition photograph	0
38	BURY	OFF MILL ROAD	MH01	u/s	MH02	22.7	Connection, at 02 o'clock, dia 225 mm	0
39	BURY	OFF MILL ROAD	MH02	d/s	MH01	10.8	Line of Sewer deviates right, Remark: GRADUAL	0
40	BURY	OFF MILL ROAD	MH02	u/s	INLET	22.1	Connection, at 11 o'clock, dia 100 mm	0

Grade Defect Report

Aquajet (GB) Ltd, Retford, Nottinghamshire, DN22 6HG, Tel: 01777 701335, Fax: 01777 701344 // E.A, SALE1308031,Pig Lee Trib.mdb

	Place	Road	start MH	Flow	end MH	Position	Observation	grade
41	BURY	OFF MILL ROAD	MH02	u/s	INLET	22.1	Dimension of sewer changes, new dimension dia 1070 mm, Remark: X 900MM	0
42	BURY	OFF MILL ROAD	MH02	d/s	MH01	10.8	Dimension of sewer changes, new dimension dia 2600 mm, Remark: X 1600MM	0
43	BURY	OFF MILL ROAD	MH01	u/s	MH02	26.7	Connection, at 08 o'clock, dia 225 mm, Remark: X 225MM LIVE	0
44	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	32.3	Line of Sewer deviates left, Remark: QUITE SHARP	0
45	BURY	OFF MILL ROAD	MH02	d/s	MH01	10.8	General Condition photograph	0
46	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	32.3	General Condition photograph	0
47	BURY	OFF MILL ROAD	MH01	u/s	MH02	26.7	General Condition photograph	0
48	BURY	OFF MILL ROAD	MH02	u/s	INLET	22.1	General Observation, Remark: 10 - 02 O'CLOCK WIDTH 600MM	0
49	BURY	OFF MILL ROAD	MH02	u/s	INLET	22.1	General Condition photograph	0
50	BURY	OFF MILL ROAD	MH02	d/s	MH01	15	Connection, at 09 o'clock, dia 225 mm	0
51	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	39.5	Line of Sewer deviates right, Remark: QUITE SHARP	0
52	BURY	OFF MILL ROAD	MH01	u/s	MH02	31.8	General Condition photograph	0
53	BURY	OFF MILL ROAD	MH02	u/s	INLET	26.8	Connection, at 11 o'clock, dia 100 mm	0
54	BURY	OFF MILL ROAD	MH02	d/s	MH01	17.5	Connection, at 03 o'clock, dia 225 mm, Remark: X 225MM	0
55	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	39.5	General Condition photograph	0
56	BURY	OFF MILL ROAD	MH01	u/s	MH02	44.7	General Condition photograph	0
57	BURY	OFF MILL ROAD	MH02	u/s	INLET	26.8	General Condition photograph	0
58	BURY	OFF MILL ROAD	MH01	u/s	MH02	52.1	Connection, at 10 o'clock, dia 150 mm	0
59	BURY	OFF MILL ROAD	MH02	d/s	MH01	20	General Condition photograph	0
60	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	44.3	Line of Sewer deviates right, Remark: SHARP	0
61	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	44.3	General Condition photograph	0
62	BURY	OFF MILL ROAD	MH02	u/s	INLET	34.7	General Observation, Remark: BLIND CHAMBER	0
63	BURY	OFF MILL ROAD	MH02	d/s	MH01	20	Line of Sewer deviates right, Remark: GRADUAL	0
64	BURY	OFF MILL ROAD	MH01	u/s	MH02	61.7	General Condition photograph	0
65	BURY	OFF MILL ROAD	MH01	u/s	MH02	69.9	Connection, at 12 o'clock, dia 225 mm, Remark: LIVE	0
66	BURY	OFF MILL ROAD	MH02	d/s	MH01	26.9	Connection, at 02 o'clock, dia 500 mm, Remark: X 300MM	0
67	BURY	OFF MILL ROAD	MH01	u/s	MH02	69.9	Line of Sewer deviates right, Remark: SLIGHT	0
68	BURY	OFF MILL ROAD	MH02	d/s	MH01	27.3	General Observation, Remark: INVERT STEPS DOWN	0
69	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	52.3	General Condition photograph	0
70	BURY	OFF MILL ROAD	MH02	u/s	INLET	37.8	General Observation, Remark: EXITING BLIND CHAMBER	0
71	BURY	OFF MILL ROAD	MH02	u/s	INLET	37.8	General Condition photograph	0
72	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	70.1	General Condition photograph	0
73	BURY	OFF MILL ROAD	MH02	d/s	MH01	27.3	Survey abandoned, Remark: OVERLAP COMPLETED	0
74	BURY	OFF MILL ROAD	MH01	u/s	MH02	73.8	Connection, at 09 o'clock, dia 100 mm	0
75	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	83	General Condition photograph	0
76	BURY	OFF MILL ROAD	MH01	u/s	MH02	80.5	General Condition photograph	0
77	BURY	OFF MILL ROAD	MH01	u/s	MH02	82.7	Connection, at 04 o'clock, dia 600 mm, Remark: X 450MM	0
78	BURY	OFF MILL ROAD	MH02	u/s	INLET	48.6	General Condition photograph	0
79	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	95.4	General Condition photograph	0
80	BURY	OFF MILL ROAD	MH01	u/s	MH02	82.7	General Observation, Remark: INVERT STEPS UP TWICE	0

Grade Defect Report

Aquajet (GB) Ltd, Retford, Nottinghamshire, DN22 6HG, Tel: 01777 701335, Fax: 01777 701344 // E.A, SALE1308031,Pig Lee Trib.mdb

	Place	Road	start MH	Flow	end MH	Position	Observation	grade
81	BURY	OFF MILL ROAD	MH02	u/s	INLET	54.7	General Observation, Remark: BLIND CHAMBER	0
82	BURY	OFF MILL ROAD	MH01	u/s	MH02	83.7	Dimension of sewer changes, new dimension dia 2600 mm, Remark: X 1600MM	0
83	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	103	Line of Sewer deviates right, Remark: SHARP	0
84	BURY	OFF MILL ROAD	MH01	u/s	MH02	87.8	Line of Sewer deviates right, Remark: QUITE SHARP	0
85	BURY	OFF MILL ROAD	MH02	u/s	INLET	54.7	Dimension of sewer changes, new dimension dia 100 mm, Remark: X 900MM	0
86	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	103	General Condition photograph	0
87	BURY	OFF MILL ROAD	MH02	u/s	INLET	56.7	Dimension of sewer changes, new dimension dia 1300 mm, Remark: X 1000MM	0
88	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	116	General Condition photograph	0
89	BURY	OFF MILL ROAD	MH01	u/s	MH02	91.3	General Condition photograph	0
90	BURY	OFF MILL ROAD	MH01	u/s	MH02	95.3	General Observation, Remark: INVERT STEPS UP	0
91	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	120.2	Connection, at 10 o'clock, dia 225 mm	0
92	BURY	OFF MILL ROAD	MH02	u/s	INLET	56.7	General Condition photograph	0
93	BURY	OFF MILL ROAD	MH02	u/s	INLET	56.7	Sewer Material changes at this point, Brick, Remark: RIGHTSIDE WALL	0
94	BURY	OFF MILL ROAD	MH02	u/s	INLET	56.7	General Observation, Remark: BENCHING STARTS ON RIGHTSIDE	0
95	BURY	OFF MILL ROAD	MH02	u/s	INLET	60.5	Sewer Material changes at this point, Masonry - rand. coursed, Remark: RIGHTSIDE WALL	0
96	BURY	OFF MILL ROAD	MH02	u/s	INLET	60.5	Dimension of sewer changes, new dimension dia 100 mm, Remark: X 1100MM	0
97	BURY	OFF MILL ROAD	MH01	u/s	MH02	95.3	Survey abandoned, Remark: LOSS OF COMMUNICATION DUE TO STEP UP OF INVERT	0
98	BURY	OFF MILL ROAD	MH02	u/s	INLET	61.8	Line of Sewer deviates left, Remark: SHARP	0
99	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	124.3	General Condition photograph	0
100	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	138	General Condition photograph	0
101	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	150.9	General Condition photograph	0
102	BURY	OFF MILL ROAD	MH02	u/s	INLET	62.5	Dimension of sewer changes, new dimension dia 1750 mm, Remark: X 1100MM	0
103	BURY	OFF MILL ROAD	MH02	u/s	INLET	63.2	General Observation, Remark: SERVICE ACROSS CULVERT 11 - 01O'CLOCK	0
104	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	158.8	Manhole Remark: MH01	0
105	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	158.8	Finish Survey	0
106	BURY	OFF MILL ROAD	MH02	u/s	INLET	65.5	General Observation, Remark: SERVICE ACROSS CULVERT 10 - 02 O'CLOCK	0
107	BURY	OFF MILL ROAD	MH02	u/s	INLET	66.3	General Observation, Remark: BRICK 09 - 03 O'CLOCK	0
108	BURY	OFF MILL ROAD	MH02	u/s	INLET	70.3	Connection, at 01 o'clock, dia 100 mm	0
109	BURY	OFF MILL ROAD	MH02	u/s	INLET	70.3	General Condition photograph	0
110	BURY	OFF MILL ROAD	MH02	u/s	INLET	82.1	General Condition photograph	0
111	BURY	OFF MILL ROAD	MH02	u/s	INLET	91.1	Connection, at 10 o'clock, dia 150 mm	0
112	BURY	OFF MILL ROAD	MH02	u/s	INLET	91.1	General Condition photograph	0
113	BURY	OFF MILL ROAD	MH02	u/s	INLET	93.4	Connection, at 10 o'clock, dia 100 mm	0
114	BURY	OFF MILL ROAD	MH02	u/s	INLET	93.4	General Observation, Remark: SERVICE ACROSS CULVERT 10 - 02 O'CLOCK	0
115	BURY	OFF MILL ROAD	MH02	u/s	INLET	94.2	General Condition photograph	0
116	BURY	OFF MILL ROAD	MH02	u/s	INLET	96.5	Connection, at 08 o'clock, dia 150 mm, Remark: LIVE	0
117	BURY	OFF MILL ROAD	MH02	u/s	INLET	100.7	Line of Sewer deviates left, Remark: QUITE SHARP	0
118	BURY	OFF MILL ROAD	MH02	u/s	INLET	100.8	General Observation, Remark: BENCHING ON RIGHT STOPS	0
119	BURY	OFF MILL ROAD	MH02	u/s	INLET	100.8	Dimension of sewer changes, new dimension dia 1250 mm, Remark: X 1500MM	0
120	BURY	OFF MILL ROAD	MH02	u/s	INLET	100.8	General Condition photograph	0

Grade Defect Report

Aquajet (GB) Ltd, Retford, Nottinghamshire, DN22 6HG, Tel: 01777 701335, Fax: 01777 701344 // E.A, SALE1308031,Pig Lee Trib.mdb

	Place	Road	start MH	Flow	end MH	Position	Observation	grade
121	BURY	OFF MILL ROAD	MH02	u/s	INLET	100.8	General Observation, Remark: BRICK STOPS 10 - 02 O'CLOCK	0
122	BURY	OFF MILL ROAD	MH02	u/s	INLET	104.1	Connection, at 11 o'clock, dia 150 mm	0
123	BURY	OFF MILL ROAD	MH02	u/s	INLET	104.9	General Observation, Remark: 2 X METAL BRACKETS ATTACHED TO SOFFIT	0
124	BURY	OFF MILL ROAD	MH02	u/s	INLET	107.6	General Observation, Remark: METAL BRACKET ATTACHED TO SOFFIT	0
125	BURY	OFF MILL ROAD	MH02	u/s	INLET	112.2	Line of Sewer deviates left, Remark: SHARP	0
126	BURY	OFF MILL ROAD	MH02	u/s	INLET	112.2	General Condition photograph	0
127	BURY	OFF MILL ROAD	MH02	u/s	INLET	114.4	General Observation, Remark: BEAM ACROSS SOFFIT	0
128	BURY	OFF MILL ROAD	MH02	u/s	INLET	117.8	Line of Sewer deviates right, Remark: SHARP	0
129	BURY	OFF MILL ROAD	MH02	u/s	INLET	117.8	General Condition photograph	0
130	BURY	OFF MILL ROAD	MH02	u/s	INLET	117.8	Dimension of sewer changes, new dimension dia 1500 mm, Remark: X 1500MM	0
131	BURY	OFF MILL ROAD	MH02	u/s	INLET	117.8	Sewer shape changes at this point, Remark: SQUARE	0
132	BURY	OFF MILL ROAD	MH02	u/s	INLET	130	General Condition photograph	0
133	BURY	OFF MILL ROAD	MH02	u/s	INLET	136.3	General Observation, Remark:3 X METAL BEAMS ACROSS SOFFIT	0
134	BURY	OFF MILL ROAD	MH02	u/s	INLET	141.1	Connection, at 12 o'clock, dia 150 mm	0
135	BURY	OFF MILL ROAD	MH02	u/s	INLET	141.5	Water level, 20 % height/diameter	0
136	BURY	OFF MILL ROAD	MH02	u/s	INLET	141.5	General Condition photograph	0
137	BURY	OFF MILL ROAD	MH02	u/s	INLET	150.4	Line of Sewer deviates left, Remark: SHARP	0
138	BURY	OFF MILL ROAD	MH02	u/s	INLET	150.4	General Condition photograph	0
139	BURY	OFF MILL ROAD	MH02	u/s	INLET	163.3	General Condition photograph	0
140	BURY	OFF MILL ROAD	MH02	u/s	INLET	163.7	Manhole Remark: INLET	0
141	BURY	OFF MILL ROAD	MH02	u/s	INLET	163.7	Finish Survey	0
142	BURY	OFF MILL ROAD	MH01	u/s	MH02	0	Light Scale from 07 to 05 o'clock, Start, Remark: CLOCKS VARY	1
143	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	2	Light Scale from 03 to 05 o'clock, Start, Remark: CLOCKS VARY	1
144	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	2	Light Scale from 07 to 09 o'clock, Start, Remark: CLOCKS VARY	1
145	BURY	OFF MILL ROAD	MH01	u/s	MH02	95.3	Light Scale from 07 to 05 o'clock, Finish, Remark: CLOCKS VARY	1
146	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	124.3	Light Scale from 03 to 05 o'clock, Finish, Remark: CLOCKS VARY	1
147	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	124.3	Light Scale from 07 to 09 o'clock, Finish, Remark: CLOCKS VARY	1
148	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	124.3	Light Scale from 07 to 05 o'clock, Start, Remark: CLOCKS VARY	1
149	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	158.8	Light Scale from 07 to 05 o'clock, Finish, Remark: CLOCKS VARY	1
150	BURY	OFF MILL ROAD	MH02	u/s	INLET	120.4	Debris, 10 % cross-sectional area loss, Start, Remark: RUBBLE	1
151	BURY	OFF MILL ROAD	MH02	u/s	INLET	141.5	Debris, 20 % cross-sectional area loss, Changed, Remark: RUBBLE	1
152	BURY	OFF MILL ROAD	MH02	u/s	INLET	146.6	Debris, 25 % cross-sectional area loss, Remark: ROCKS ON LEFT	1
153	BURY	OFF MILL ROAD	MH02	u/s	INLET	146.6	Debris, 15 % cross-sectional area loss, Changed, Remark: RUBBLE	1
154	BURY	OFF MILL ROAD	MH02	u/s	INLET	156.6	Debris, 25 % cross-sectional area loss, Remark: ROCK	1
155	BURY	OFF MILL ROAD	MH02	u/s	INLET	163.7	Debris, 15 % cross-sectional area loss, Finish, Remark: RUBBLE	1
156	BURY	OFF MILL ROAD	MH02	u/s	INLET	34.7	Obstruction, 50 % height/diameter loss, Remark: SERVICE ACROSS CULVERT	2
157	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	15.9	Infiltration Dripping at 12 o'clock	3
158	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	26.9	Infiltration Dripping at 12 o'clock	3
159	BURY	OFF MILL ROAD	MH02	d/s	MH01	2	Connection, at 11 o'clock, dia 150 mm, intrusion 30 mm	4
160	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	22.5	Encrustation medium, from 03 to 05 o'clock, 15% cross-sectional area loss	4

Grade Defect Report

Aquajet (GB) Ltd, Retford, Nottinghamshire, DN22 6HG, Tel: 01777 701335, Fax: 01777 701344 // E.A, SALE1308031,Pig Lee Trib.mdb

	Place	Road	start MH	Flow	end MH	Position	Observation	grade
161	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	26.9	Encrustation medium, from 10 to 12 o'clock, 10% cross-sectional area loss	4
162	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	52.3	Encrustation medium, from 11 to 12 o'clock, 10% cross-sectional area loss	4
163	BURY	OFF MILL ROAD	MH02	u/s	INLET	40.8	Connection, at 11 o'clock, dia 150 mm, intrusion 80 mm	4
164	BURY	OFF MILL ROAD	MH02	u/s	INLET	41.3	Connection, at 11 o'clock, dia 100 mm, intrusion 50 mm	4
165	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	86.7	Encrustation medium, from 07 to 09 o'clock, 10% cross-sectional area loss	4
166	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	120.2	Medium Scale from 07 to 10 o'clock, 10% cross-sectional area loss, Remark: FROM CONN	4
167	BURY	OFF MILL ROAD	MH02	u/s	INLET	62	Connection, at 01 o'clock, dia 225 mm, intrusion 50 mm	4
168	BURY	OFF MILL ROAD	MH02	u/s	INLET	62.5	Connection, at 10 o'clock, dia 225 mm, intrusion 40 mm	4
169	BURY	OFF MILL ROAD	MH02	u/s	INLET	66.3	Connection, at 02 o'clock, dia 100 mm, intrusion 500 mm	4
170	BURY	OFF MILL ROAD	MH02	u/s	INLET	74	Connection, at 10 o'clock, dia 225 mm, intrusion 60 mm	4
171	BURY	OFF MILL ROAD	MH02	u/s	INLET	77.2	Connection, at 01 o'clock, dia 150 mm, intrusion 60 mm	4
172	BURY	OFF MILL ROAD	MH02	u/s	INLET	78.1	Connection, at 10 o'clock, dia 150 mm, intrusion 40 mm	4
173	BURY	OFF MILL ROAD	MH02	u/s	INLET	82.1	Connection, at 11 o'clock, dia 100 mm, intrusion 60 mm	4
174	BURY	OFF MILL ROAD	MH02	u/s	INLET	85	Connection, at 10 o'clock, dia 150 mm, intrusion 50 mm, Remark: LIVE	4
175	BURY	OFF MILL ROAD	MH02	u/s	INLET	92.4	Connection, at 03 o'clock, dia 150 mm, intrusion 80 mm, Remark: LIVE	4
176	BURY	OFF MILL ROAD	MH02	u/s	INLET	93.4	Infiltration Running from 07 to 10 o'clock	4
177	BURY	OFF MILL ROAD	MH02	u/s	INLET	99.5	Connection, at 09 o'clock, dia 150 mm, intrusion 30 mm	4
178	BURY	OFF MILL ROAD	MH02	u/s	INLET	101.8	Connection, at 01 o'clock, dia 100 mm, intrusion 30 mm, Remark: LIVE	4
179	BURY	OFF MILL ROAD	MH02	u/s	INLET	110.9	Connection, at 03 o'clock, dia 150 mm, intrusion 30 mm	4
180	BURY	OFF MILL ROAD	MH02	u/s	INLET	146.1	Connection, at 11 o'clock, dia 100 mm, intrusion 350 mm	4
181	BURY	OFF MILL ROAD	MH02	u/s	INLET	151.4	Connection, at 02 o'clock, dia 100 mm, intrusion 300 mm	4
182	BURY	OFF MILL ROAD	MH02	u/s	INLET	151.4	Connection, at 03 o'clock, dia 400 mm, intrusion 200 mm	4
183	BURY	OFF MILL ROAD	MH02	u/s	INLET	153.2	Encrustation medium, from 04 to 05 o'clock, 10% cross-sectional area loss	4
184	BURY	OFF MILL ROAD	MH02	u/s	INLET	153.2	Infiltration Running from 04 to 05 o'clock	4
185	BURY	OFF MILL ROAD	MH02	d/s	MH01	2	Missing bricks at 09 o'clock	5
186	BURY	OFF WALMERSLEY OLD ROAD	OUTLET	u/s	MH01	15.9	Infiltration Gushing at 12 o'clock	5
187	BURY	OFF MILL ROAD	MH01	u/s	MH02	2	Missing bricks at 02 o'clock, Start, Remark: EVERY 1.0M APPROX	5
188	BURY	OFF MILL ROAD	MH01	u/s	MH02	2	Missing bricks at 10 o'clock, Start, Remark: EVERY 1.0M APPROX	5
189	BURY	OFF MILL ROAD	MH01	u/s	MH02	95.3	Missing bricks at 02 o'clock, Finish, Remark: EVERY 1.0M APPROX	5
190	BURY	OFF MILL ROAD	MH01	u/s	MH02	95.3	Missing bricks at 10 o'clock, Finish, Remark: EVERY 1.0M APPROX	5
191	BURY	OFF MILL ROAD	MH02	u/s	INLET	88.5	Infiltration Gushing at 07 o'clock	5
192	BURY	OFF MILL ROAD	MH02	u/s	INLET	94.2	Infiltration Gushing at 10 o'clock	5
193	BURY	OFF MILL ROAD	MH02	u/s	INLET	98.6	Infiltration Gushing at 08 o'clock	5

Pig Lee Trib, Off Walmersley Old Road, Bury
SALE1308031

WinCan Report (3rd Edition)



Project-information

Project name:
Environment Agency

Contract number:
1308031

Contact:
Mark Whittaker

Date:
31/12/2005

Client **Environment Agency**
 Contact: **Mark Whittaker**
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 Town **Sale**
 County **Cheshire**
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AquaJet (GB) Ltd

Retford

Nottinghamshire, DN22 6HG

Tel:01777 701335, Fax:01777 701344

Inspection report

Date: 17.09.2012	Job N°: 1308031	Weather: Dry	Operator: G.Smith	section number: 1	PLR: MH01 X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

Road: OFF WALMERSLEY OLD ROAD	Division: NW	start MH: OUTLET
Place: BURY	District: AQSER	end MH: MH01
Location: Difficult access	Tape No.:	Total length: 158.8 m

Purpose: Asset condition	Shape/Size: Circular 1200
Use: Watercourse	Material: Brick
Catchment:	Pipe length:
	Category:

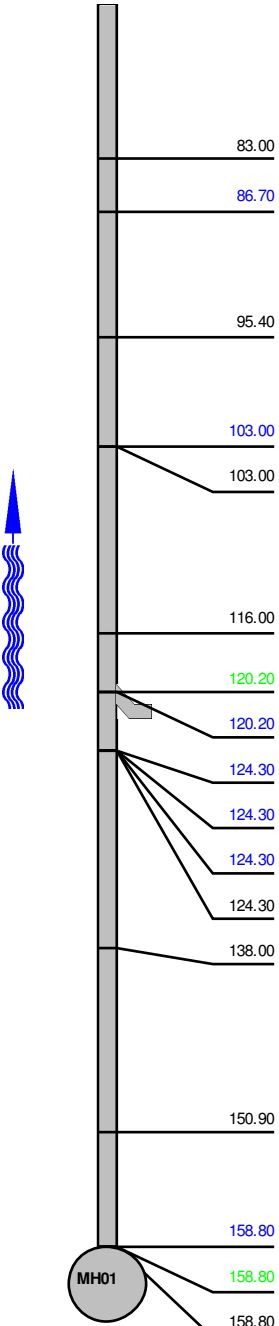
Comment: 01313PIGT0101B02

Location details: Pig Lee Trib

1:527	position	code	observation	MPEG	photo	grade
Depth: 1.60						
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	MH	Manhole Remark: OUTLET	00:00:00		(Constr) 0
	0.00	WL	Water level, 10 % height/diameter	00:00:00		(Serv) 0
	2.00	GP	General Condition photograph	00:00:28	4_4a	(Misc) 0
	2.00	S1	ESL Light Scale from 03 to 05 o'clock, Start, Remark: CLOCKS VARY	00:00:34	5_5a	(Serv) 1
	2.00	S2	ESL Light Scale from 07 to 09 o'clock, Start, Remark: CLOCKS VARY	00:00:34	6_6a	(Serv) 1
	14.10	GP	General Condition photograph	00:01:48	7_7a	(Misc) 0
	15.90	IG	Infiltration Gushing at 12 o'clock	00:02:11	8_8a	(Serv) 5
	15.90	ID	Infiltration Dripping at 12 o'clock	00:02:15	9_9a	(Serv) 3
	22.50	LL	Line of Sewer deviates left, Remark: SHARP	00:02:56		(Serv) 0
	22.50	EM	Encrustation medium, from 03 to 05 o'clock, 15% cross-sectional area loss	00:02:57	11_11a	(Serv) 4
	26.90	EM	Encrustation medium, from 10 to 12 o'clock, 10% cross-sectional area loss	00:03:36	12_12a	(Serv) 4
	26.90	ID	Infiltration Dripping at 12 o'clock	00:03:39	13_13a	(Serv) 3
	32.30	LL	Line of Sewer deviates left, Remark: QUITE SHARP	00:04:18		(Serv) 0
	32.30	GP	General Condition photograph	00:04:21	15_15a	(Misc) 0
	39.50	LR	Line of Sewer deviates right, Remark: QUITE SHARP	00:05:05		(Serv) 0
	39.50	GP	General Condition photograph	00:05:05	17_17a	(Misc) 0
	44.30	LR	Line of Sewer deviates right, Remark: SHARP	00:05:45		(Serv) 0
	44.30	GP	General Condition photograph	00:05:45	19_19a, b	(Misc) 0
	52.30	EM	Encrustation medium, from 11 to 12 o'clock, 10% cross-sectional area loss	00:06:42	20_20a	(Serv) 4
	52.30	GP	General Condition photograph	00:06:52	21_21a	(Misc) 0
	70.10	GP	General Condition photograph	00:08:44	22_22a	(Misc) 0

Inspection report

Date: 17.09.2012	Job nr.: 1308031	Weather: Dry	Operator: G.Smith	section number: 1	PLR: MH01 X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

1:527	position	code	observation	MPEG	photo	grade
	83.00	GP	General Condition photograph	00:10:13	23_23a	(Misc) 0
	86.70	EM	Encrustation medium, from 07 to 09 o'clock, 10% cross-sectional area loss	00:11:08	24_24a	(Serv) 4
	95.40	GP	General Condition photograph	00:12:14	25_25a	(Misc) 0
	103.00	LR	Line of Sewer deviates right, Remark: SHARP	00:13:18		(Serv) 0
	103.00	GP	General Condition photograph	00:13:18	27_27a	(Misc) 0
	116.00	GP	General Condition photograph	00:14:39	28_28a	(Misc) 0
	120.20	CN	Connection, at 10 o'clock, dia 225 mm	00:15:22		(Constr) 0
	120.20	ESM	Medium Scale from 07 to 10 o'clock, 10% cross-sectional area loss, Remark: FROM CONNECTION	00:15:22	30_30a	(Serv) 4
	124.30	F1	ESL Light Scale from 03 to 05 o'clock, Finish, Remark: CLOCKS VARY	00:16:09		(Serv) 1
	124.30	F2	ESL Light Scale from 07 to 09 o'clock, Finish, Remark: CLOCKS VARY	00:16:09		(Serv) 1
	124.30	S3	ESL Light Scale from 07 to 05 o'clock, Start, Remark: CLOCKS VARY	00:16:09		(Serv) 1
	124.30	GP	General Condition photograph	00:16:10	34_34a	(Misc) 0
	138.00	GP	General Condition photograph	00:17:50	35_35a	(Misc) 0
	150.90	GP	General Condition photograph	00:19:29	36_36a	(Misc) 0
	158.80	F3	ESL Light Scale from 07 to 05 o'clock, Finish, Remark: CLOCKS VARY	00:21:00		(Serv) 1
	158.80	MH	Manhole Remark: MH01	00:21:00	38_38a, b	(Constr) 0
	158.80	FH	Finish Survey	00:21:27		(Misc) 0
						
Structural Defects			Constructional Features			
Service Defects			Miscellaneous Features			



AquaJet (GB) Ltd

Retford

Nottinghamshire, DN22 6HG

Tel:01777 701335, Fax:01777 701344

Inspection report

Date: 17/09/2012	Job N°: 1308031	Weather: Dry	Operator: G.Smith	section number: 2	PLR: MH02 X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

Road: OFF MILL ROAD	Division: NW	start MH: MH01
Place: BURY	District: AQSER	end MH: MH02
Location: Difficult access	Tape No.:	Total length: 122.6 m

Purpose: Asset condition	Shape/Size: Rectangular 2500/1300
Use: Watercourse	Material: Masonry - in reg. courses
Catchment:	Lining: Category:

Comment: 01313PIGT0101B02

Location details: Pig Lee Trib

1:465	position	code	observation	MPEG	photo	grade
Depth: 13.36						
		MH01				
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	MH	Manhole Remark: MH01	00:00:00		(Constr) 0
	0.00	WL	Water level, 05 % height/diameter	00:00:00		(Serv) 0
	0.00	S1	ESL Light Scale from 07 to 05 o'clock, Start, Remark: CLOCKS VARY	00:00:00		(Serv) 1
	0.00	GP	General Condition photograph	00:00:24	76_5a	(Misc) 0
	2.00	DC	Dimension of sewer changes, new dimension dia 2220 mm, Remark: X 1300MM	00:00:55		(Misc) 0
	2.00	SC	Sewer shape changes at this point, Remark: ARCHED	00:01:03		(Misc) 0
	2.00	MC	Sewer Material changes at this point, Masonry - rand. coursed	00:01:04		(Misc) 0
	2.00	S2	MB Missing bricks at 02 o'clock, Start, Remark: EVERY 1.0M APPROX	00:01:05	80_9a	(Struct) 5
	2.00	S3	MB Missing bricks at 10 o'clock, Start, Remark: EVERY 1.0M APPROX	00:01:05	81_10a	(Struct) 5
	16.20	GP	General Condition photograph	00:02:07	82_11a	(Misc) 0
	16.20	GO	General Observation, Remark: TIMBER ACROSS CULVERT 10 - 02 O'CLOCK	00:02:20	83_12a	(Misc) 0
	22.70	CN	Connection, at 02 o'clock, dia 225 mm	00:02:52		(Constr) 0
	26.70	CN	Connection, at 08 o'clock, dia 225 mm, Remark: X 225MM LIVE	00:03:13		(Constr) 0
	26.70	GP	General Condition photograph	00:03:19	86_15a	(Misc) 0
	31.80	GP	General Condition photograph	00:03:49	87_16a	(Misc) 0
	44.70	GP	General Condition photograph	00:04:41	88_17a	(Misc) 0
	52.10	CN	Connection, at 10 o'clock, dia 150 mm	00:05:38		(Constr) 0
	61.70	GP	General Condition photograph	00:06:20	90_19a	(Misc) 0

Date: 17/09/2012	Job nr.: 1308031	Weather: Dry	Operator: G.Smith	section number: 2	PLR: MH02 X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features



Aquajet (GB) Ltd

Retford

Nottinghamshire, DN22 6HG

Tel:01777 701335, Fax:01777 701344

Inspection report

Date: 18/09/2012	Job N°: 1308031	Weather: Showers	Operator: G.Smith	section number: 3	PLR: MH02 X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

Road: OFF MILL ROAD	Division: NW	start MH: MH02
Place: BURY	District: AQSER	end MH: MH01
Location: Warehouse	Tape No.:	Total length: 122.6 m

Purpose: Asset condition	Shape/Size: Rectangular 1700/2800
Use: Watercourse	Material: Masonry - rand. coursed
Catchment:	Pipe length:
	Lining:
	Category:

Comment: 01313PIGT0101B02

Location details: Pig Lee Trib

1:200	position	code	observation	MPEG	photo	grade
Depth: 2.22						
		MH02				
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	MH	Manhole Remark: MH02	00:00:00		(Constr) 0
	0.00	WL	Water level, 10 % height/diameter	00:00:00		(Serv) 0
	0.00	GO	General Observation, Remark: METAL CORRAGATED SOFFIT	00:00:24	108_4a	(Misc) 0
	0.00	GP	General Condition photograph	00:00:35	109_5a	(Misc) 0
	2.00	MB	Missing bricks at 09 o'clock	00:01:08	110_6a	(Struct) 5
	2.00	CNI	Connection, at 11 o'clock, dia 150 mm, intrusion 30 mm	00:01:20	111_7a	(Constr) 4
	2.00	SC	Sewer shape changes at this point, Remark: ARCHED	00:01:44		(Misc) 0
	2.00	DC	Dimension of sewer changes, new dimension dia 1800 mm, Remark: X 2800MM	00:01:45	113_9a	(Misc) 0
	2.00	GO	General Observation, Remark: INVERT STEPS DOWN X 2	00:01:57	114_10a	(Misc) 0
	6.90	GO	General Observation, Remark: INVERT STEPS DOWN 1.0M APPROX	00:03:39	115_11a	(Misc) 0
	9.90	CN	Connection, at 03 o'clock, dia 450 mm, Remark: X 300MM	00:04:11		(Constr) 0
	10.80	S1	LR Line of Sewer deviates right, Remark: GRADUAL	00:04:46		(Serv) 0
	10.80	DC	Dimension of sewer changes, new dimension dia 2600 mm, Remark: X 1600MM	00:04:46		(Misc) 0
	10.80	GP	General Condition photograph	00:04:54	119_15a	(Misc) 0
	15.00	CN	Connection, at 09 o'clock, dia 225 mm	00:05:32		(Constr) 0
	17.50	CN	Connection, at 03 o'clock, dia 225 mm, Remark: X 225MM	00:05:51		(Constr) 0
	20.00	GP	General Condition photograph	00:06:19	122_18a	(Misc) 0
	20.00	F1	LR Line of Sewer deviates right, Remark: GRADUAL	00:06:22		(Serv) 0
	26.90	CN	Connection, at 02 o'clock, dia 500 mm, Remark: X 300MM	00:07:04		(Constr) 0
	27.30	GO	General Observation, Remark: INVERT STEPS DOWN	00:07:25		(Misc) 0
	27.30	SA	Survey abandoned, Remark: OVERLAP COMPLETED	00:07:31	126_22a	(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features



AquaJet (GB) Ltd

Retford

Nottinghamshire, DN22 6HG

Tel:01777 701335, Fax:01777 701344

Inspection report

Date: 18/09/2012	Job N°: 1308031	Weather: Showers	Operator: G.Smith	section number: 4	PLR: INLET X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

Road: OFF MILL ROAD	Division:	start MH: MH02
Place: BURY	District: NW	end MH: INLET
Location: Warehouse	Tape No.: AQSER	Total length: 163.7 m

Purpose: Asset condition	Shape/Size: Rectangular 1100/900
Use: Watercourse	Material: Masonry - in reg. courses
Catchment:	Pipe length:
	Lining:
	Category:

Comment: 01313PIGT0101B02

Location details: Pig Lee Trib

1:310	position	code	observation	MPEG	photo	grade
Depth: 2.22						
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	MH	Manhole Remark: MH02	00:00:00		(Constr) 0
	0.00	WL	Water level, 15 % height/diameter	00:00:00		(Serv) 0
	2.00	GP	General Condition photograph	00:00:21	130_4a	(Misc) 0
	2.00	GO	General Observation, Remark: FLAGGED SOFFIT	00:00:30	131_5a	(Misc) 0
	7.30	GP	General Condition photograph	00:01:16	132_6a	(Misc) 0
	8.30	GO	General Observation, Remark: SMALL CHAMBER ON LEFT METAL BARS VISIBLE	00:02:09	133_7a	(Misc) 0
	9.10	LR	Line of Sewer deviates right, Remark: SHARP	00:02:47		(Serv) 0
	9.10	DC	Dimension of sewer changes, new dimension dia 1000 mm, Remark: X 1100MM	00:02:48		(Misc) 0
	9.10	MC	Sewer Material changes at this point, Masonry - rand. coursed	00:02:49		(Misc) 0
	9.10	GP	General Condition photograph	00:02:50	137_11a	(Misc) 0
	20.00	GP	General Condition photograph	00:03:43	138_12a	(Misc) 0
	22.10	CN	Connection, at 11 o'clock, dia 100 mm	00:04:08		(Constr) 0
	22.10	DC	Dimension of sewer changes, new dimension dia 1070 mm, Remark: X 900MM	00:04:16		(Misc) 0
	22.10	GO	General Observation, Remark: 10 - 02 O'CLOCK WIDTH 600MM	00:04:25		(Misc) 0
	22.10	GP	General Condition photograph	00:04:27	142_16a	(Misc) 0
	26.80	CN	Connection, at 11 o'clock, dia 100 mm	00:04:58		(Constr) 0
	26.80	GP	General Condition photograph	00:05:13	144_18a	(Misc) 0
	34.70	GO	General Observation, Remark: BLIND CHAMBER	00:05:55	145_19a	(Misc) 0
	34.70	OB	Obstruction, 50 % height/diameter loss, Remark: SERVICE ACROSS CULVERT	00:06:04	146_20a	(Serv) 2
	37.80	GO	General Observation, Remark: EXITING BLIND CHAMBER	00:06:40		(Misc) 0
	37.80	GP	General Condition photograph	00:06:41	148_22a	(Misc) 0
	40.80	CNI	Connection, at 11 o'clock, dia 150 mm, intrusion 80 mm	00:07:09	149_23a	(Constr) 4
	41.30	CNI	Connection, at 11 o'clock, dia 100 mm, intrusion 50 mm	00:07:19	150_24a	(Constr) 4

Inspection report

Date: 18/09/2012	Job nr.: 1308031	Weather: Showers	Operator: G.Smith	section number: 4	PLR: INLET X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

1:310	position	code	observation	MPEG	photo	grade
	48.60	GP	General Condition photograph	00:08:10	151_25a	(Misc) 0
	54.70	GO	General Observation, Remark: BLIND CHAMBER	00:09:12	152_26a	(Misc) 0
	54.70	DC	Dimension of sewer changes, new dimension dia 100 mm, Remark: X 900MM	00:09:35		(Misc) 0
	56.70	DC	Dimension of sewer changes, new dimension dia 1300 mm, Remark: X 1000MM	00:11:10		(Misc) 0
	56.70	GP	General Condition photograph	00:11:12	4_29a	(Misc) 0
	56.70	MC	Sewer Material changes at this point, Brick, Remark: RIGHTSIDE WALL	00:11:21	4_30a	(Misc) 0
	56.70	GO	General Observation, Remark: BENCHING STARTS ON RIGHTSIDE	00:11:21		(Misc) 0
	60.50	MC	Sewer Material changes at this point, Masonry - rand. coursed, Remark: RIGHTSIDE WALL	00:11:59	4_32a	(Misc) 0
	60.50	DC	Dimension of sewer changes, new dimension dia 100 mm, Remark: X 1100MM	00:11:59		(Misc) 0
	61.80	LL	Line of Sewer deviates left, Remark: SHARP	00:12:26	4_34a	(Serv) 0
	62.00	CNI	Connection, at 01 o'clock, dia 225 mm, intrusion 50 mm	00:12:47	4_35a	(Constr) 4
	62.50	CNI	Connection, at 10 o'clock, dia 225 mm, intrusion 40 mm	00:13:12	4_36a	(Constr) 4
	62.50	DC	Dimension of sewer changes, new dimension dia 1750 mm, Remark: X 1100MM	00:13:12		(Misc) 0
	63.20	GO	General Observation, Remark: SERVICE ACROSS CULVERT 11 - 01O'CLOCK	00:13:26	4_38a	(Misc) 0
	65.50	GO	General Observation, Remark: SERVICE ACROSS CULVERT 10 - 02 O'CLOCK	00:13:50	4_39a	(Misc) 0
	66.30	CNI	Connection, at 02 o'clock, dia 100 mm, intrusion 500 mm	00:14:05	4_40a	(Constr) 4
	66.30	GO	General Observation, Remark: BRICK 09 - 03 O'CLOCK	00:14:18	4_41a	(Misc) 0
	70.30	CN	Connection, at 01 o'clock, dia 100 mm	00:14:44		(Constr) 0
	70.30	GP	General Condition photograph	00:14:56	4_43a	(Misc) 0
	74.00	CNI	Connection, at 10 o'clock, dia 225 mm, intrusion 60 mm	00:15:16	4_44a	(Constr) 4
	77.20	CNI	Connection, at 01 o'clock, dia 150 mm, intrusion 60 mm	00:16:02	4_45a	(Constr) 4
	78.10	CNI	Connection, at 10 o'clock, dia 150 mm, intrusion 40 mm	00:16:31	4_46a	(Constr) 4
	82.10	CNI	Connection, at 11 o'clock, dia 100 mm, intrusion 60 mm	00:16:55	4_47a	(Constr) 4
	82.10	GP	General Condition photograph	00:17:02	4_48a	(Misc) 0
	85.00	CNI	Connection, at 10 o'clock, dia 150 mm, intrusion 50 mm, Remark: LIVE	00:17:21	4_49a	(Constr) 4
	88.50	IG	Infiltration Gushing at 07 o'clock	00:17:45	4_50a	(Serv) 5
	91.10	CN	Connection, at 10 o'clock, dia 150 mm	00:18:12		(Constr) 0
	91.10	GP	General Condition photograph	00:18:16	4_52a	(Misc) 0
	92.40	CNI	Connection, at 03 o'clock, dia 150 mm, intrusion 80 mm, Remark: LIVE	00:18:31	4_53a	(Constr) 4

Inspection report

Date: 18/09/2012	Job nr.: 1308031	Weather: Showers	Operator: G.Smith	section number: 4	PLR: INLET X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

1:310	position	code	observation	MPEG	photo	grade
	93.40	CN	Connection, at 10 o'clock, dia 100 mm	00:18:54		(Constr) 0
	93.40	IR	Infiltration Running from 07 to 10 o'clock	00:18:55	4_55a	(Serv) 4
	93.40	GO	General Observation, Remark: SERVICE ACROSS CULVERT 10 - 02 O'CLOCK	00:19:11	4_56a	(Misc) 0
	94.20	IG	Infiltration Gushing at 10 o'clock	00:19:35	4_57a	(Serv) 5
	94.20	GP	General Condition photograph	00:19:47	4_58a	(Misc) 0
	96.50	CN	Connection, at 08 o'clock, dia 150 mm, Remark: LIVE	00:20:04		(Constr) 0
	98.60	IG	Infiltration Gushing at 08 o'clock	00:20:36	4_60a	(Serv) 5
	99.50	CNI	Connection, at 09 o'clock, dia 150 mm, intrusion 30 mm	00:20:56	4_61a	(Constr) 4
	100.70	LL	Line of Sewer deviates left, Remark: QUITE SHARP	00:21:14		(Serv) 0
	100.80	GO	General Observation, Remark: BENCHING ON RIGHT STOPS	00:21:16		(Misc) 0
	100.80	DC	Dimension of sewer changes, new dimension dia 1250 mm, Remark: X 1500MM	00:21:17		(Misc) 0
	100.80	GP	General Condition photograph	00:21:17	4_65a	(Misc) 0
	100.80	GO	General Observation, Remark: BRICK STOPS 10 - 02 O'CLOCK	00:21:24		(Misc) 0
	101.80	CNI	Connection, at 01 o'clock, dia 100 mm, intrusion 30 mm, Remark: LIVE	00:21:57	4_67a	(Constr) 4
	104.10	CN	Connection, at 11 o'clock, dia 150 mm	00:22:26		(Constr) 0
	104.90	GO	General Observation, Remark: 2 X METAL BRACKETS ATTACHED TO SOFFIT	00:22:53	4_69a, b	(Misc) 0
	107.60	GO	General Observation, Remark: METAL BRACKET ATTACHED TO SOFFIT	00:23:33	4_70a	(Misc) 0
	110.90	CNI	Connection, at 03 o'clock, dia 150 mm, intrusion 30 mm	00:23:58	4_71a	(Constr) 4
	112.20	LL	Line of Sewer deviates left, Remark: SHARP	00:24:17		(Serv) 0
	112.20	GP	General Condition photograph	00:24:20	4_73a	(Misc) 0
	114.40	GO	General Observation, Remark: BEAM ACROSS SOFFIT	00:24:43	4_74a	(Misc) 0
	117.80	LR	Line of Sewer deviates right, Remark: SHARP	00:25:30		(Serv) 0
	117.80	GP	General Condition photograph	00:25:30	4_76a	(Misc) 0
	117.80	DC	Dimension of sewer changes, new dimension dia 1500 mm, Remark: X 1500MM	00:25:36		(Misc) 0
	117.80	SC	Sewer shape changes at this point, Remark: SQUARE	00:25:36		(Misc) 0
	120.40	S1 DE	Debris, 10 % cross-sectional area loss, Start, Remark: RUBBLE	00:26:06	4_79a	(Serv) 1
	130.00	GP	General Condition photograph	00:27:18	4_80a	(Misc) 0
	136.30	GO	General Observation, Remark: 3 X METAL BEAMS ACROSS SOFFIT	00:27:53	4_81a	(Misc) 0
	141.10	CN	Connection, at 12 o'clock, dia 150 mm	00:28:47		(Constr) 0
	141.50	C1 DE	Debris, 20 % cross-sectional area loss, Changed, Remark: RUBBLE	00:29:04	4_83a	(Serv) 1
	141.50	WL	Water level, 20 % height/diameter	00:29:04		(Serv) 0
	141.50	GP	General Condition photograph	00:29:10	4_85a	(Misc) 0

Inspection report

Date: 18/09/2012	Job nr.: 1308031	Weather: Showers	Operator: G.Smith	section number: 4	PLR: INLET X
Present:	Vehicle: FX08ERY	Camera: Camera assist	Preset:	Cleaned: No	Grade:

1:310	position	code	observation	MPEG	photo	grade
	146.10	CNI	Connection, at 11 o'clock, dia 100 mm, intrusion 350 mm	00:30:25	4_86a	(Constr) 4
	146.60	DE	Debris, 25 % cross-sectional area loss, Remark: ROCKS ON LEFT	00:30:41	4_87a	(Serv) 1
	146.60	C1 DE	Debris, 15 % cross-sectional area loss, Changed, Remark: RUBBLE	00:30:44		(Serv) 1
	150.40	LL	Line of Sewer deviates left, Remark: SHARP	00:31:07		(Serv) 0
	150.40	GP	General Condition photograph	00:31:09	4_90a	(Misc) 0
	151.40	CNI	Connection, at 02 o'clock, dia 100 mm, intrusion 300 mm	00:31:54	4_91a	(Constr) 4
	151.40	CNI	Connection, at 03 o'clock, dia 400 mm, intrusion 200 mm	00:31:54	4_92a	(Constr) 4
	153.20	EM	Encrustation medium, from 04 to 05 o'clock, 10% cross-sectional area loss	00:32:21	4_93a	(Serv) 4
	153.20	IR	Infiltration Running from 04 to 05 o'clock	00:32:24	4_94a	(Serv) 4
	156.60	DE	Debris, 25 % cross-sectional area loss, Remark: ROCK	00:32:58	4_95a	(Serv) 1
	163.30	GP	General Condition photograph	00:34:48	4_96a	(Misc) 0
	163.70	F1 DE	Debris, 15 % cross-sectional area loss, Finish, Remark: RUBBLE	00:35:54		(Serv) 1
	163.70	MH	Manhole Remark: INLET	00:35:56	4_98a	(Constr) 0
	163.70	FH	Finish Survey	00:36:02		(Misc) 0

U.T.G.A TO INLET LADDERS REQUIRED

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Pig Lee Trib, Off Walmersley Old Road, Bury
SALE1308031

Metre Report



Aquajet (GB) Ltd
 Retford
 Nottinghamshire, DN22 6HG
 Tel: 01777 701335, Fax: 01777 701344

 $\Sigma \emptyset$

Project name:
Environment Agency

Contract number:
1308031

Contact:
Mark Whittaker

Date:
31/12/2005

No.	start MH	end MH	Date	Road	Tape No.	Material	m	(m)
1	OUTLET	MH01	17.09.2012	OFF WALMERSLEY OLD ROAD	AQSER	Brick	158.8	158.8

Profile: CIRCULAR 1200 = 158.8 m (158.8 m)

No.	start MH	end MH	Date	Road	Tape No.	Material	m	(m)
4	MH02	INLET	18/09/2012	OFF MILL ROAD	AQSER	Masonry - in reg. courses	163.7	163.7

Profile: RECTANGULAR 1100/900 = 163.7 m (163.7 m)

No.	start MH	end MH	Date	Road	Tape No.	Material	m	(m)
3	MH02	MH01	18/09/2012	OFF MILL ROAD	AQSER	Masonry - rand. coursed	122.6	27.3

Profile: RECTANGULAR 1700/2800 = 122.6 m (27.3 m)

No.	start MH	end MH	Date	Road	Tape No.	Material	m	(m)
2	MH01	MH02	17/09/2012	OFF MILL ROAD	AQSER	Masonry - in reg. courses	122.6	95.3

Profile: RECTANGULAR 2500/1300 = 122.6 m (95.3 m)

all sections = 567.7 m (445.1 m)

Pig Lee Trib, Off Walmersley Old Road, Bury
SALE1308031

SRM Scoring Report



AquaJet (GB) Ltd

Retford

Nottinghamshire, DN22 6HG

Tel:01777 701335, Fax:01777 701344

Service / Operational Defects (SRM 4)

 Project name:
Environment Agency

 Contract number:
1308031

 Contact:
Mark Whittaker

 Date:
31/12/2005

No.	PLR	Dir.	Use	Shape / Size	Date	Mat.	Total Length	Insp. Length	Peak HWG	Cat.	Peak Score	Grade	Mean Score	Total Score
1	MH01 X	U	W	C 1200	17.09.2012	BR	158.8	158.8	5	-	3	3	1.8	288
2	MH02 X	U	W	R 2500/1300	17.09.2012	MAC	122.6	95.3	1	-	1	2	1.0	95
3	MH02 X	D	W	R 1700/2800	18.09.2012	MAR	122.6	27.3	-	-	5	4	0.2	5
4	INLET X	U	W	R 1100/900	18.09.2012	MAC	163.7	163.7	5	-	20	5	1.4	236



AquaJet (GB) Ltd

Retford

Nottinghamshire, DN22 6HG

Tel:01777 701335, Fax:01777 701344

Structural Defects (SRM 4)

Project name:
Environment Agency

Contract number:
1308031

Contact:
Mark Whittaker

Date:
31/12/2005

No.	PLR	Dir.	Use	Shape / Size	Date	Mat.	Total Length	Insp. Length	Peak HWG	Cat.	Peak Score	Grade	Mean Score	Total Score
1	MH01 X	U	W	C 1200	17/09/2012	BR	158.8	158.8	-	-	0	1	0	0
2	MH02 X	U	W	R 2500/1300	17/09/2012	MAC	122.6	95.3	5	-	0	1	0	0
3	MH02 X	D	W	R 1700/2800	18/09/2012	MAR	122.6	27.3	5	-	0	1	0	0
4	INLET X	U	W	R 1100/900	18/09/2012	MAC	163.7	163.7	-	-	0	1	0	0

Site Coding Report

Pages 83 - 89

Surveyed by (Operator) **G.Smith** Contract no. **1308031** Job no. **1308031** Catchment (Drainage area) Div. District **NW** Pipe length reference **MH01 X**
 Date **170912** Time Location - Road name **OFF WALMERSLEY OLD ROAD** Location - Place name **BURY**
 Start manhole no. **OUTLET** Depth **1.60** Cover level Invert level Finish manhole no. **MH01** Depth Cover level Invert level
 Use **W** Direction **U** Size (dia) **1200** x Size Shape **C** Material **BR** Lining Pipe length Total length **158.8** Year laid
 Video recording Index no. **AQSER** Cleaned Flow Control Comments - general **01313PIGT0101B02**
 Purpose **F** Cat. Pre-cleaning **N** Weather **1** Loc. code **X** Further location details **Pig Lee Trib**

Video no.	Photo no.	Distance (m)	Cont. def.	Letters	Diameter / Dimension	Numbers		Intrusion % mm	Remarks
				Code		Clock at / to			
0000		0.0		ST					
0000		0.0		MH					OUTLET
0000		0.0		WL				10	
0002	4_4a	2.0		GP					
0003	5_5a	2.0	S1	ESL		03 - 05			CLOCKS VARY
0003	6_6a	2.0	S2	ESL		07 - 09			CLOCKS VARY
0014	7_7a	14.1		GP					
0021	8_8a	15.9		IG		12			
0021	9_9a	15.9		ID		12			
0025		22.5		LL					SHARP
0025	11_11a	22.5		EM		03 - 05		15	
0033	12_12a	26.9		EM		10 - 12		10	
0033	13_13a	26.9		ID		12			
0041		32.3		LL					QUITE SHARP
0042	15_15a	32.3		GP					
0050		39.5		LR					QUITE SHARP
0050	17_17a	39.5		GP					
0054		44.3		LR					SHARP
0054	19_19a	44.3		GP					
0064	20_20a	52.3		EM		11 - 12		10	
0065	21_21a	52.3		GP					
0084	22_22a	70.1		GP					
0101	23_23a	83.0		GP					
0110	24_24a	86.7		EM		07 - 09		10	
0121	25_25a	95.4		GP					
0131		103.0		LR					SHARP
0131	27_27a	103.0		GP					
0143	28_28a	116.0		GP					
0152		120.2		CN	225	10			
0152	30_30a	120.2		ESM		07 - 10		10	FROM CONNECTION
0160		124.3	F1	ESL		03 - 05			CLOCKS VARY
0160		124.3	F2	ESL		07 - 09			CLOCKS VARY
0160		124.3	S3	ESL		07 - 05			CLOCKS VARY

[illegible]

Surveyed by (Operator) **G.Smith** Contract no. **1308031** Job no. **1308031** Catchment (Drainage area) Div. District **NW** Pipe length reference **MH02 X**
 Date **170912** Time Location - Road name **OFF MILL ROAD** Location - Place name **BURY**
 Start manhole no. **MH01** Depth **13.36** Cover level Invert level Finish manhole no. **MH02** Depth **02.22** Cover level Invert level
 Use **W** Direction **U** Size (dia) **2500** x Size **1300** Shape **R** Material **MAC** Lining Pipe length Total length **122.6** Year laid
 Video recording Index no. **AQSER** Cleaned Flow Control Comments - general **01313PIGT0101B02**
 Purpose **F** Cat. Pre-cleaning **N** Weather **1** Loc. code **X** Further location details **Pig Lee Trib**

Video no.	Photo no.	Distance (m)	Cont. def.	Letters	Diameter / Dimension	Numbers		Intrusion % mm	Remarks
				Code		Clock at / to			
0000		0.0		ST					
0000		0.0		MH					MH01
0000		0.0		WL				10	
0000		0.0	S1	ESL		07 - 05			CLOCKS VARY
0002	76_5a	0.0		GP					
0005		2.0		DC				200	X 1300MM
0010		2.0		SC					ARCHED
0010		2.0		MC					Masonry - rand. coursed
0010	80_9a	2.0	S2	MB		02			EVERY 1.0M APPROX
0010	81_10a	2.0	S3	MB		10			EVERY 1.0M APPROX
0020	82_11a	16.2		GP					
0022	83_12a	16.2		GO					TIMBER ACROSS CULVERT 10 - 02 O'CLOCK
0025		22.7		CN	225	02			
0031		26.7		CN	225	08			X 225MM LIVE
0031	86_15a	26.7		GP					
0034	87_16a	31.8		GP					
0044	88_17a	44.7		GP					
0053		52.1		CN	150	10			
0062	90_19a	61.7		GP					
0065		69.9		CN	225	12			LIVE
0065		69.9		LR					SLIGHT
0071		73.8		CN	100	09			
0075	94_23a	80.5		GP					
0083		82.7		CN	600	04			X 450MM
0084	96_25a	82.7		GO					INVERT STEPS UP TWICE
0080		83.7		DC				600	X 1600MM
0102	2_27a	87.8		LR					QUITE SHARP
0110	2_28a	91.3		GP					
0114		95.3		GO					INVERT STEPS UP
0114		95.3	F1	ESL		07 - 05			CLOCKS VARY
0114		95.3	F2	MB		02			EVERY 1.0M APPROX
0114		95.3	F3	MB		10			EVERY 1.0M APPROX
0115	2_33a	95.3		SA					LOSS OF COMMUNICATION DUE TO STEP UP OF INVERT

[illegible]

Surveyed by (Operator) **G.Smith** Contract no. **1308031** Job no. **1308031** Catchment (Drainage area) Div. District **NW** Pipe length reference **INLET X**
 Date **180912** Time Location - Road name **OFF MILL ROAD** Location - Place name **BURY**
 Start manhole no. **MH02** Depth **2.22** Cover level Invert level Finish manhole no. **INLET** Depth Cover level Invert level
 Use **W** Direction **U** Size (dia) **1100** x Size **900** Shape **R** Material **MAC** Lining Pipe length Total length **163.7** Year laid
 Video recording Index no. **AQSER** Cleaned Flow Control Comments - general **01313PIGT0101B02**
 Purpose **F** Cat. Pre-cleaning **N** Weather **4** Loc. code Further location details **Pig Lee Trib**

Video no.	Photo no.	Distance (m)	Cont. def.	Letters	Diameter / Dimension	Numbers		Intrusion % mm	Remarks
				Code		Clock at /to			
0000		0.0		ST					
0000		0.0		MH					MH02
0000		0.0		WL				10	
0002	130_4a	2.0		GP					
0003	131_5a	2.0		GO					FLAGGED SOFFIT
0011	132_6a	7.3		GP					
0020	133_7a	8.3		GO					SMALL CHAMBER ON LEFT METAL BARS VISIBLE
0024		9.1		LR					SHARP
0024		9.1		DC				1000	X 1100MM
0024		9.1		MC					Masonry - rand. coursed
0025	137_11	9.1		GP					
0034	138_12	20.0		GP					
0040	a	22.1		CN	100	11			
0041		22.1		DC				1000	X 900MM
0042		22.1		GO					10 - 02 O'CLOCK WIDTH 600MM
0042	142_16	22.1		GP					
0045	a	26.8		CN	100	11			
0051	144_18	26.8		GP					
0055	145_19	34.7		GO					BLIND CHAMBER
0060	146_20	34.7		OB				50	SERVICE ACROSS CULVERT
0064	a	37.8		GO					EXITING BLIND CHAMBER
0064	148_22	37.8		GP					
0070	149_23	40.8		CNI	150	11		0080	
0071	150_24	41.3		CNI	100	11		0050	
0081	151_25	48.6		GP					
0091	152_26	54.7		GO					BLIND CHAMBER
0093	a	54.7		DC				100	X 900MM
0111		56.7		DC				1300	X 1000MM
0111	4_29a	56.7		GP					
0112	4_30a	56.7		MC					Brick, RIGHTSIDE WALL
0112		56.7		GO					BENCHING STARTS ON RIGHTSIDE
0115	4_32a	60.5		MC					Masonry - rand. coursed, RIGHTSIDE WALL
0115		60.5		DC				100	X 1100MM

Surveyed by (Operator) **G.Smith** Contract no. **1308031** Job no. **1308031** Catchment (Drainage area) Div. District **NW** Pipe length reference **INLET X**
 Date **180912** Time Location - Road name **OFF MILL ROAD** Location - Place name **BURY**
 Start manhole no. **MH02** Depth **2.22** Cover level Invert level Finish manhole no. **INLET** Depth Cover level Invert level
 Use **W** Direction **U** Size (dia) **1100** x Size **900** Shape **R** Material **MAC** Lining Pipe length Total length **163.7** Year laid
 Video recording Index no. **AQSER** Cleaned Flow Control Comments - general **01313PIGT0101B02**
 Purpose **F** Cat. Pre-cleaning **N** Weather **4** Loc. code Further location details **Pig Lee Trib**

Video no.	Photo no.	Distance (m)	Cont. def.	Letters	Numbers			Remarks
				Code	Diameter / Dimension	Clock at /to	Intrusion % mm	
0122	4_34a	61.8		LL				SHARP
0124	4_35a	62.0		CNI	225	01	0050	
0131	4_36a	62.5		CNI	225	10	0040	
0131		62.5		DC			700	X 1100MM
0132	4_38a	63.2		GO				SERVICE ACROSS CULVERT 11 - 010'CLOCK
0135	4_39a	65.5		GO				SERVICE ACROSS CULVERT 10 - 02 O'CLOCK
0140	4_40a	66.3		CNI	100	02	0500	
0141	4_41a	66.3		GO				BRICK 09 - 03 O'CLOCK
0144		70.3		CN	100	01		
0145	4_43a	70.3		GP				
0151	4_44a	74.0		CNI	225	10	0060	
0160	4_45a	77.2		CNI	150	01	0060	
0163	4_46a	78.1		CNI	150	10	0040	
0165	4_47a	82.1		CNI	100	11	0060	
0170	4_48a	82.1		GP				
0172	4_49a	85.0		CNI	150	10	0050	LIVE
0174	4_50a	88.5		IG		07		
0181		91.1		CN	150	10		
0181	4_52a	91.1		GP				
0183	4_53a	92.4		CNI	150	03	0080	LIVE
0185		93.4		CN	100	10		
0185	4_55a	93.4		IR		07 - 10		
0191	4_56a	93.4		GO				SERVICE ACROSS CULVERT 10 - 02 O'CLOCK
0193	4_57a	94.2		IG		10		
0194	4_58a	94.2		GP				
0200		96.5		CN	150	08		LIVE
0203	4_60a	98.6		IG		08		
0205	4_61a	99.5		CNI	150	09	0030	
0211		100.7		LL				QUITE SHARP
0211		100.8		GO				BENCHING ON RIGHT STOPS
0211		100.8		DC			1100	X 1500MM
0211	4_65a	100.8		GP				
0212		100.8		GO				BRICK STOPS 10 - 02 O'CLOCK

Surveyed by (Operator) **G.Smith** Contract no. **1308031** Job no. **1308031** Catchment (Drainage area) Div. District **NW** Pipe length reference **INLET X**
 Date **180912** Time Location - Road name **OFF MILL ROAD** Location - Place name **BURY**
 Start manhole no. **MH02** Depth **2.22** Cover level Invert level Finish manhole no. **INLET** Depth Cover level Invert level
 Use **W** Direction **U** Size (dia) **1100** x Size **900** Shape **R** Material **MAC** Lining Pipe length Total length **163.7** Year laid
 Video recording Index no. **AQSER** Cleaned Flow Control Comments - general **01313PIGT0101B02**
 Purpose **F** Cat. Pre-cleaning **N** Weather **4** Loc. code Further location details **Pig Lee Trib**

Video no.	Photo no.	Distance (m)	Cont. def.	Letters	Numbers			Remarks
				Code	Diameter / Dimension	Clock at / to	Intrusion % mm	
0215	4_67a	101.8		CNI	100	01	0030	LIVE
0222		104.1		CN	150	11		
0225	4_69a	104.9		GO				2 X METAL BRACKETS ATTACHED TO SOFFIT
0233	4_70a	107.6		GO				METAL BRACKET ATTACHED TO SOFFIT
0235	4_71a	110.9		CNI	150	03	0030	
0241		112.2		LL				SHARP
0242	4_73a	112.2		GP				
0244	4_74a	114.4		GO				BEAM ACROSS SOFFIT
0253		117.8		LR				SHARP
0253	4_76a	117.8		GP				
0253		117.8		DC			1300	X 1500MM
0253		117.8		SC				SQUARE
0260	4_79a	120.4	S1	DE			10	RUBBLE
0271	4_80a	130.0		GP				
0275	4_81a	136.3		GO				3 X METAL BEAMS ACROSS SOFFIT
0284		141.1		CN	150	12		
0290	4_83a	141.5	C1	DE			20	RUBBLE
0290		141.5		WL			20	
0291	4_85a	141.5		GP				
0302	4_86a	146.1		CNI	100	11	0350	
0304	4_87a	146.6		DE			25	ROCKS ON LEFT
0304		146.6	C1	DE			15	RUBBLE
0310		150.4		LL				SHARP
0310	4_90a	150.4		GP				
0315	4_91a	151.4		CNI	100	02	0300	
0315	4_92a	151.4		CNI	400	03	0200	
0322	4_93a	153.2		EM		04 - 05	10	
0322	4_94a	153.2		IR		04 - 05		
0325	4_95a	156.6		DE			25	ROCK
0344	4_96a	163.3		GP				
0355		163.7	F1	DE			15	RUBBLE
0355	4_98a	163.7		MH				INLET
0360		163.7		FH				

Pig Lee Trib, Off Walmersley Old Road, Bury
SALE1308031

Manhole Surveys

NFCDD REFERENCE	01313PIGT0101B02
NATIONAL GRID REFERENCE	No GPS
MAINTAINER (DELETE AS APPROPRIATE)	E.A.



ENVIRONMENT
AGENCY

**SURVEY RECORD FOR MANHOLE OR INLET/
OUTLET STRUCTURE**

STC25 GRID REFERENCE

Inlet

Pig Lee Trib B02, In Tetrosyl

LOCATION

YEAR	Z	STATUS	PU	FUNCTION	W	NODE TYPE	IN	SURVEY DATE	18-09-12			
COVER	SHAPE		HINGED		LOCK		DUTY		SIZE (MM)		TOXIC ATMOSPHERE	N
SHAFT	SIDE ENTRY		REGULAT COURCES		DEPTH		SIZE (MM)		EVIDENCE OF VERMIN	N		
CHAMBER	SOFFIT		STEPS		LAD-DERS		LNDG S		SIZE (MM)		CONSTRUCT CODE	MAC
DEPTH OF FLOW (MM)		DEPTH OF SILT (MM)		HEIGHT OF SURCH (MM)		COVER LEVEL (M)						

	UPSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE DIAM (MM)	BECKDROP DIAM (MM)	PIPE MATE- RIAL	LINING MATERIAL	DEPTH FROM COVER (M)	INVERT LEVEL (M)
Incoming Pipes	A	BROOK						
	B							
	C							
	D							
	E							
	F							

COND CRITY

Outgoing Pipes	X	MH01												
	Y													
CONDITION (Y/N) (Y IF ATTENTION REQUIRED)			COVER		IRON/ LADDERS		SHAFT		CHAMBER		BENCHING		OTHER	

NOTES:

Unable to gain access to Inlet, ladders required. Unable to gain access for GPS.

WEATHER: Dry.

SKETCH



ELEMENT (MIN OF 2)			
ID	TYPE	SUBTYPE	MATERIAL



**ENVIRONMENT
AGENCY**

NFCDD REFERENCE	01313PIGT0101B02
NATIONAL GRID REFERENCE	No GPS
MAINTAINER (DELETE AS APPROPRIATE)	E.A.

**SURVEY RECORD FOR MANHOLE OR INLET/
OUTLET STRUCTURE**

STC25 GRID REFERENCE

MH02

Pig Lee Trib B02, Warehouse in Tetrosyl

LOCATION

YEAR	Z	STATUS	PU	FUNCTION	W	NODE TYPE	MH	SURVEY DATE	18-09-12		
COVER	SHAPE S	HINGED	N	LOCK	N	DUTY	H	SIZE (MM)	660 x 660	TOXIC ATMOSPHERE	N
SHAFT	SIDE ENTRY	REGULAT COURCES	0	DEPTH	0.52	SIZE (MM)	610 x 610	EVIDENCE OF VERMIN	N		
CHAMBER	SOFFIT	STEPS	0	LADDERS		LNDG S		SIZE (MM)	3500 x 2800	CONSTRUCT CODE	MAC
DEPTH OF FLOW (MM)	0	DEPTH OF SILT (MM)	150	HEIGHT OF SURCH (MM)		COVER LEVEL (M)					

	UPSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE DIAM (MM)	BECKDROP DIAM (MM)	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (M)	INVERT LEVEL (M)
Incoming Pipes	A	INLET	R	1100 x 900		MAC	2.19	
	B							
	C							
	D							
	E							
	F							

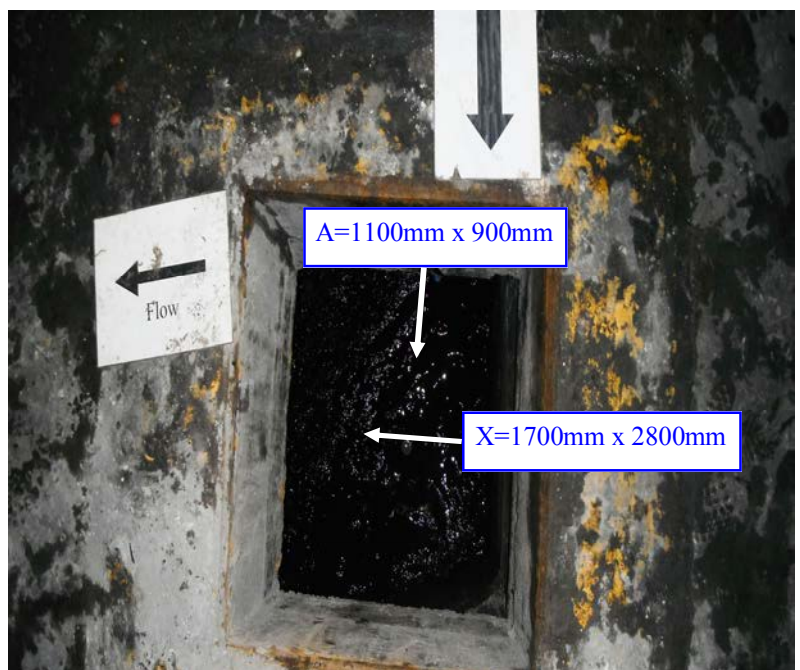
COND CRITY

Outgoing Pipes	X	MH01	R	1700 x 2800			MAC			2.22				
	Y													
CONDITION (Y/N) (Y IF ATTENTION REQUIRED)			COVER		IRON/ LADDERS		SHAFT		CHAMBER		BENCHING		OTHER	

NOTES:

WEATHER: Dry.

SKETCH



ELEMENT (MIN OF 2)			
ID	TYPE	SUBTYPE	MATERIAL

NFCDD REFERENCE	01313PIGT0101B02
NATIONAL GRID REFERENCE	SD8081913693
MAINTAINER (DELETE AS APPROPRIATE)	E.A.



ENVIRONMENT
AGENCY

**SURVEY RECORD FOR MANHOLE OR INLET/
OUTLET STRUCTURE**

STC25 GRID REFERENCE

MH01, (E:380819.08, N:413693.51)

Pig Lee Trib B02, Field R/O 11 Trent Drive

LOCATION

YEAR	Z	STATUS	PU	FUNCTION	W	NODE TYPE	MH	SURVEY DATE	18-09-12			
COVER	SHAPE	S	HINGED	N	LOCK	N	DUTY	H	SIZE (MM)	650 x 650	TOXIC ATMOSPHERE	N
SHAFT	SIDE ENTRY		REGULAT COURSES	0	DEPTH	11.31	SIZE (MM)	700 x 500	EVIDENCE OF VERMIN	N		
CHAMBER	SOFFIT		STEPS	40	LADDERS		LNDG S		SIZE (MM)	1930 x 1400	CONSTRUCT CODE	BR
DEPTH OF FLOW (MM)	100	DEPTH OF SILT (MM)	0	HEIGHT OF SURCH (MM)		COVER LEVEL (M)	135.76					

	UPSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE DIAM (MM)	BECKDROP DIAM (MM)	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (M)	INVERT LEVEL (M)
Incoming Pipes	A	MH02	R	2500 x 1300		MAC	13.06	122.70
	B	UNKNOWN	C	300		VC	3.81	131.95
	C							
	D							
	E							
	F							

COND CRITY

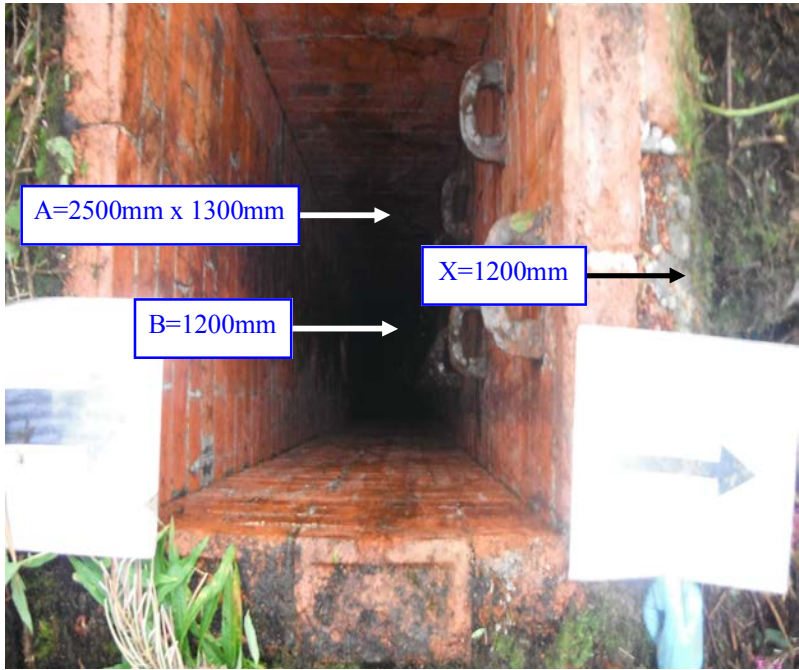
Outgoing Pipes	X	OUTLET	C	1200						BR				13.36	122.40		
	Y																
CONDITION (Y/N) (Y IF ATTENTION REQUIRED)			COVER		IRON/ LADDERS		SHAFT		CHAMBER		BENCHING		OTHER				

NOTES:

Cover seized on MH01 the complete frame was removed to enable access into culvert.

WEATHER: Dry.

SKETCH



ELEMENT (MIN OF 2)			
ID	TYPE	SUBTYPE	MATERIAL



**ENVIRONMENT
AGENCY**

NFCDD REFERENCE	01313PIGT0101B02
NATIONAL GRID REFERENCE	No GPS
MAINTAINER (DELETE AS APPROPRIATE)	E.A.

**SURVEY RECORD FOR MANHOLE OR INLET/
OUTLET STRUCTURE**

STC25 GRID REFERENCE

Outlet

Pig Lee Trib B02, Banking opp 27 Walmersley Old Road

LOCATION

YEAR	Z	STATUS	PU	FUNCTION	W	NODE TYPE	OUT	SURVEY DATE	17-09-12			
COVER	SHAPE		HINGED		LOCK		DUTY		SIZE (MM)		TOXIC ATMOSPHERE	N
SHAFT	SIDE ENTRY		REGULAT COURCES		DEPTH		SIZE (MM)		EVIDENCE OF VERMIN	N		
CHAMBER	SOFFIT		STEPS		LAD-DERS		LNDG S		SIZE (MM)		CONSTRUCT CODE	BR
DEPTH OF FLOW (MM)	100	DEPTH OF SILT (MM)	0	HEIGHT OF SURCH (MM)		COVER LEVEL (M)						

	UPSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE DIAM (MM)	BECKDROP DIAM (MM)	PIPE MATE- RIAL	LINING MATERIAL	DEPTH FROM COVER (M)	INVERT LEVEL (M)
Incoming Pipes	A	MH01	C	1200			1.60	
	B							
	C							
	D							
	E							
	F							

COND CRITY

Outgoing Pipes	X	BROOK												
	Y													
CONDITION (Y/N) (Y IF ATTENTION REQUIRED)			COVER		IRON/ LADDERS		SHAFT		CHAMBER		BENCHING		OTHER	

NOTES:

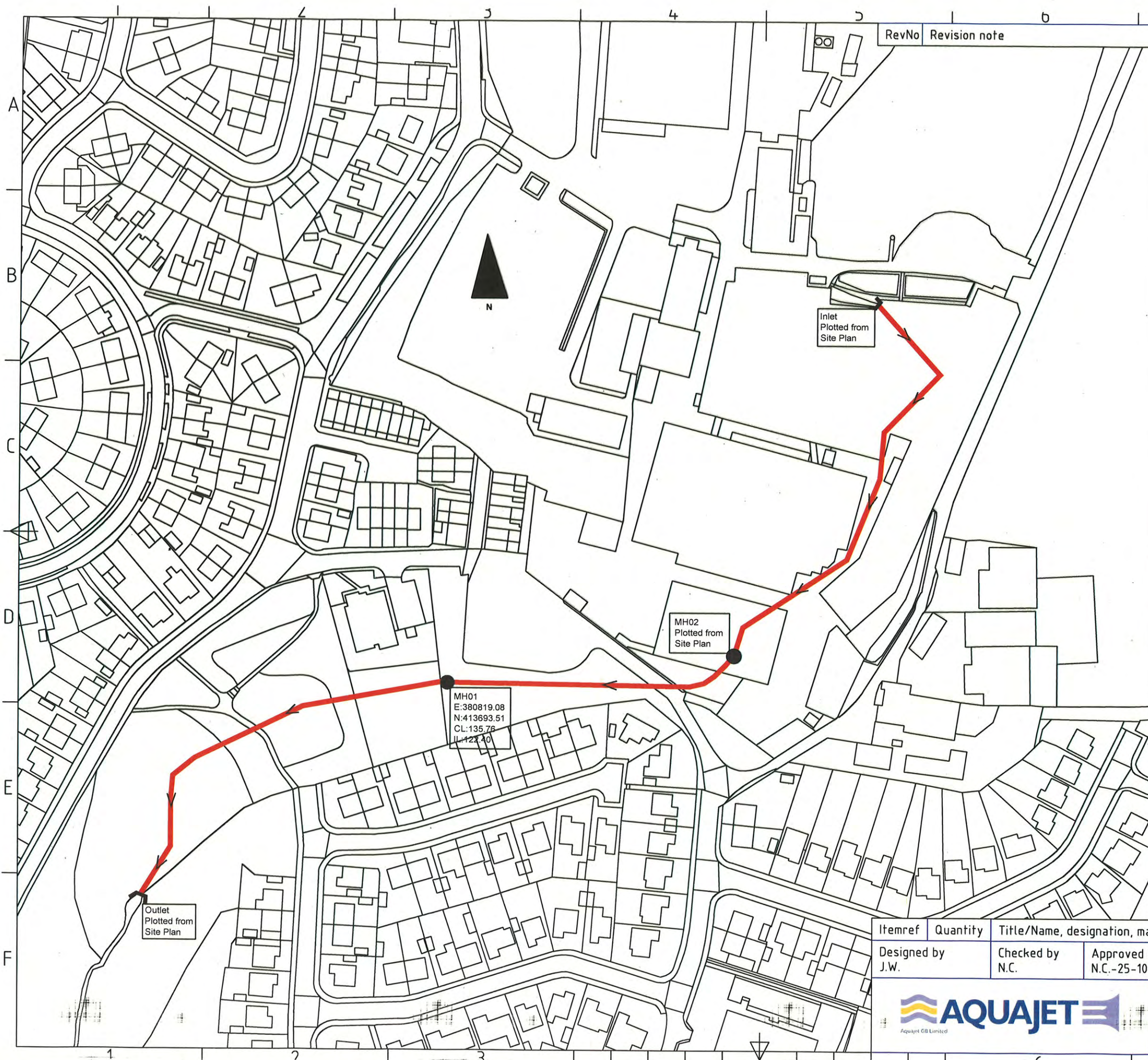
Unable to gain GPS signal due to deep valley and trees.

WEATHER: Dry.

SKETCH



ELEMENT (MIN OF 2)			
ID	TYPE	SUBTYPE	MATERIAL



RevNo	Revision note	Date	Signature	Checked
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Aquajet (GB) Ltd

Surveyed —

Inlet: Plotted from Site Plan
MH01: SD8081913696
MH02: Plotted from Site Plan
Outlet: Plotted from Site Plan

Itemref	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference
Designed by J.W.	Checked by N.C.	Approved by - date N.C.-25-10-12	File name SALE1308031	Date 25-12-12	Scale 1:1250



01313PIGT0101B02

Pig Lee Trib, Bury

Edition
0

Sheet
1/1

CCTV SURVEY – EXECUTIVE SUMMARY

Client:	Environment Agency	NFCDD Ref:	0131PIGT0101 B02
Site Address:	Pig Lee Brook, Walmersley, Bury	Contact:	Gareth Hamlett
Date of Report:	5 th March	Job No:	EA052014065

Objective

A CCTV survey was undertaken by IWJS Ltd using CCTV remote techniques. This was conducted on behalf of the Environment Agency.

The purpose of the survey was to determine the route of the culvert and to visually ascertain the condition of the culvert/headwalls.

Location and Description

Pedestrian and vehicle access is gained off Walmersley Old Rd to the inlet.

The culvert flows in a southerly direction from Inlet to outlet.

The following information should be viewed in conjunction with the Grade Defect & CCTV reports.

The Culvert is made up of the following:

1. Outlet upstream to Inlet

- The Culvert is a 1200 x 2400mm randomly coursed rectangular masonry pipe.
- Culvert starts to gradually deviate right from 4.4m to 11.9m
- Culvert deviates right sharply at 20.3m
- Survey was abandoned at 21.2m due to 85% obstruction.

Observations and anomalies

Structural & service defects have been recorded on this length.

On completion of the survey a total of 21.2m of drainage runs were CCTV surveyed including 2 asset structures.

As a result of the structural survey there were 3 grade 4-5 defects identified.

Health & Safety

There are no issues to report

Note:

This report is compiled from information provided by our trained and certified CCTV operators.

Thank you for using IWJS Ltd

Executive Summary produced by S.Allsey



IWJS
Huntsman Drive
Irlam
Tel.: 0161 776 0499
Fax:
Email: paul.crane@iwjsgroup.co.uk

Table of contents

Project Name: EA 052014065, Pig Lee Bro	Project number: 0131PIGT0101 B02	Date: 27/02/2015	Contact: Gareth Hamlett	
--	-------------------------------------	---------------------	----------------------------	--

Profile Report	1
SRMReport :	2
Inspection: 1	
Project Information	4
Section: 1, INLET --- OUTLET	5

Place :



IWJS
 Huntsman Drive
 Irlam
 Tel: 0161 776 0499
 Fax:
 Email: paul.crane@iwjsgroup.co.uk

/ Main sections

Project name : EA 052014065, Pig Lee Brook B02	Project number : 0131PIGT0101 B02	Contact : Gareth Hamlett	Date : 27/02/2015
--	---	------------------------------------	-----------------------------

Nr.	US MH	DS MH	Date	Road	Tape No.	Material	m	(m)
1	INLET	OUTLET	27/02/2015	off Walmersley Old Road		Masonry - in regular courses	45.00	21.20

Pipe size: RECTANGULAR 1200/2400 = 45 m (21.2 m)

All sections = 45 m (21.2 m)



IWJS
Huntsman Drive
Irlam
Tel: 0161 776 0499
Fax:
Email: paul.crane@iwjsgroup.co.uk

Service / Operational Defects (SRM 4)

Project name : EA 052014065, Pig Lee Brook B02	Project Number : 0131PIGT0101 B02	Contact : Gareth Hamlett	Date : 27/02/2015
---	--------------------------------------	-----------------------------	----------------------

No.	PLR	Dir.	Use	Shape / Size	Date	Mat.	Total Length	Insp. Length	Peak HWG	Peak Score	Grade	Mean Score	Total Score
1	INLETX	U	W	R 1200/2400	27/02/2015	MAC	45.00	21.20	-	10	5	1.08	23



IWJS
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Irlam
Tel: 0161 776 0499
Fax:
Email: paul.crane@iwjsgroup.co.uk

Structural Defects (SRM 4)

Project name :
EA 052014065, Pig Lee Brook B02

Project Number :
0131PIGT0101 B02

Contact :
Gareth Hamlett

Date :
27/02/2015

No.	PLR	Dir.	Use	Shape / Size	Date	Mat.	Total Length	Insp. Length	Peak HWG	Peak Score	Grade	Mean Score	Total Score
1	INLETX	U	W	R 1200/2400	27/02/2015	MAC	45.00	21.20	-	0	1	0	0



IWJS
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Fax:
Email: paul.crane@iwjsgroup.co.uk

Project-information

Project name :
EA 052014065, Pig Lee Brook B02

Project Number :
0131PIGT0101 B02

Contact :
Gareth Hamlett

Date :
27/02/2015

Client: **Environment Agency**
Contact Name: **Gareth Hamlett**
Department:
Road: **Dodd Way**
Town: **Bamber Bridge, PR5 8BX**
County: **Lancashire**
Telephone: **01772 714105**
Fax:
Mobile:
E-mail:

Site: **Pig Lee Brook**
Contact Name: **Gareth Hamlett**
Department:
Road: **Walmersley Old Rd**
Town: **Walmersley, Bury**
County: **Lancashire**
Telephone:
Fax:
Mobile:
E-mail:

Contractor **IWJS**
Contact Name: **Paul Crane**
Department: **Contracts Manager**
Road: **Huntsman Drive**
Town: **Irlam**
County: **Manchester**
Telephone: **0161 776 0499**
Fax:
Mobile:
E-mail: **paul.crane@iwjsgroup.co.uk**

Inspection report

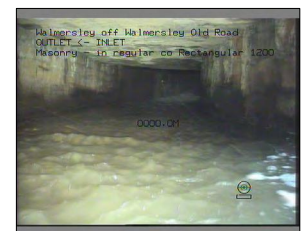
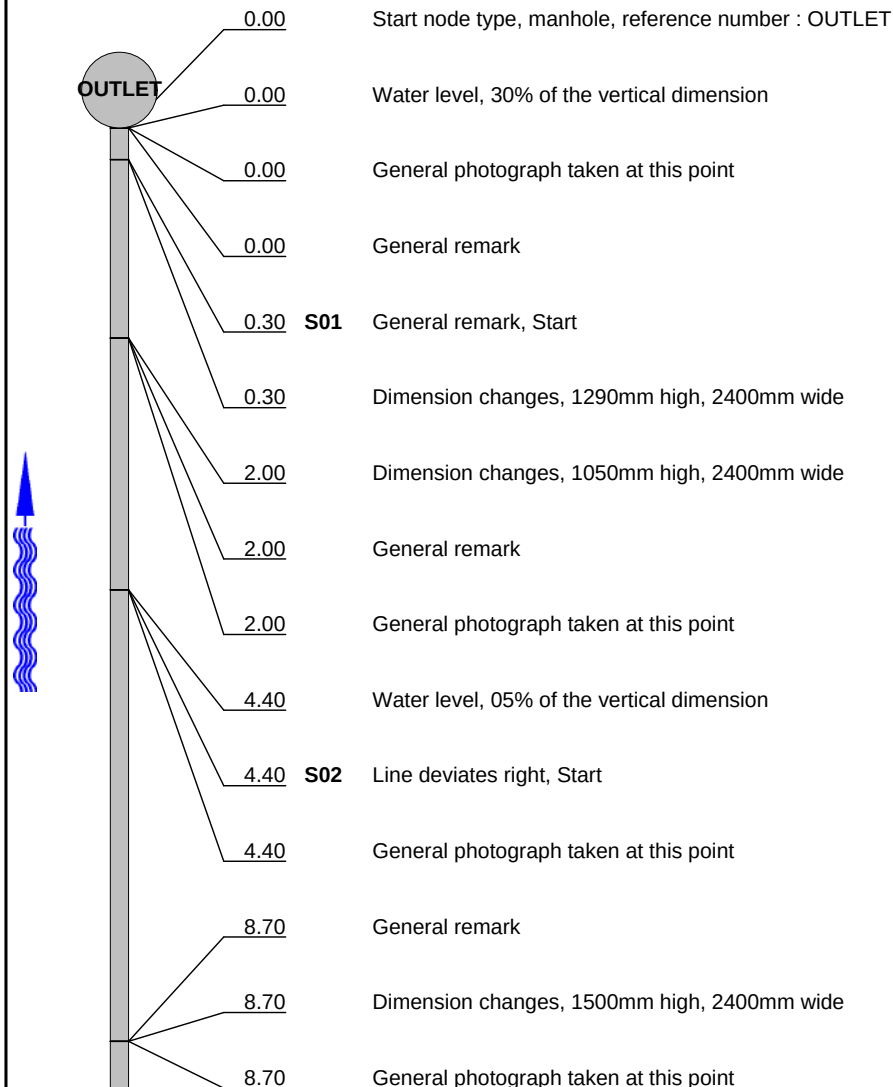
Date : 27/02/2015	Job number :	Weather : no rain or snow	Operator : G.Smith	Section number : 1	PLR SUFFIX: X
Weather no rain or snow	Vehicle : GU62DLF	Camera : Camera assist	Preset :	Cleaned : no	Operator : G.Smith

Place : Road : Location Inspection	Walmersley off Walmersley Old Road Difficult access OUTLET (U/S) INLET	Location details: Catchment: Tape number : Pipe Length	U/S MH : U/S Depth : D/S MH : D/S Depth :	INLET 1.61 OUTLET
Direction Use:	Culverted watercourse	Pipe shape :	Rectangular	
Year laid :	Z	Pipe size :	1200 mm	
Purpose :	Routine inspection of condition	Pipe material :	Masonry - in regular courses	
Total length :	45.00 m	Lining :		

Comment : **INLET and the Outlet are in Tetrosyl**

1:72 Position Observation

Building on top of the Outlet

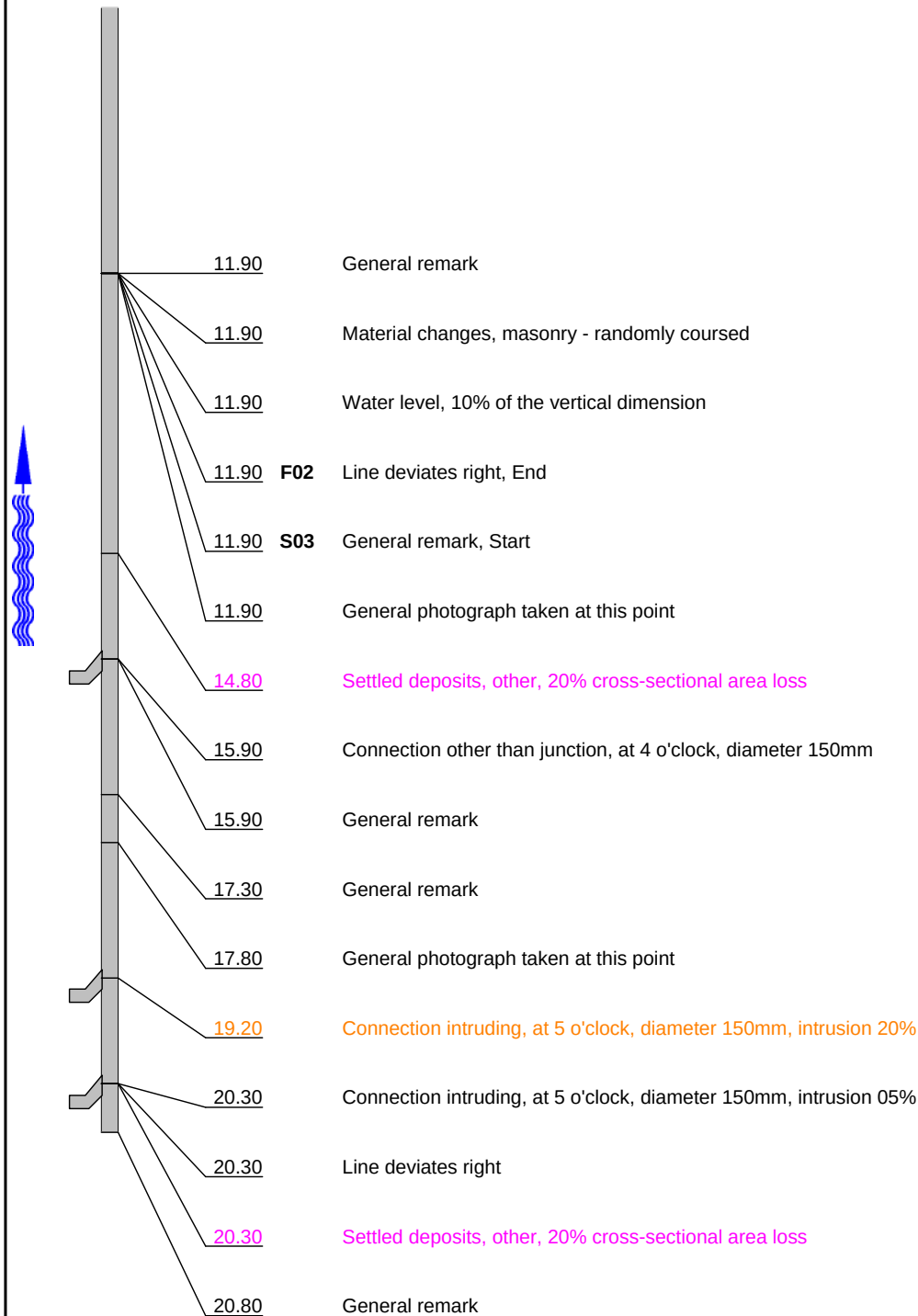




Inspection Report

Date : 27/02/2015	Job number :	Weather : no rain or snow	Operator : G.Smith	Section number : 1	PLR : X
Weather no rain or snow	Vehicle : GU62DLF	Camera : Camera assist	Preset :	Cleaned : no	Grade:

1:72 Position Observation



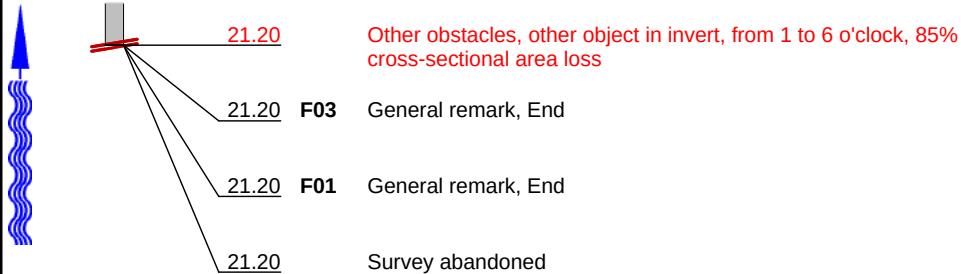


IWJS
 Huntsman Drive
 Irlam
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Inspection Report

Date : 27/02/2015	Job number :	Weather : no rain or snow	Operator : G.Smith	Section number : 1	PLR : X
Weather no rain or snow	Vehicle : GU62DLF	Camera : Camera assist	Preset :	Cleaned : no	Grade:

1:72 Position Observation



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	1	5	10	1.08	23	5

Inspection pictures

Place : Walmersley	Road : off Walmersley Old Road	Date : 27/02/2015	Section number : 1	PLR Suffix : X
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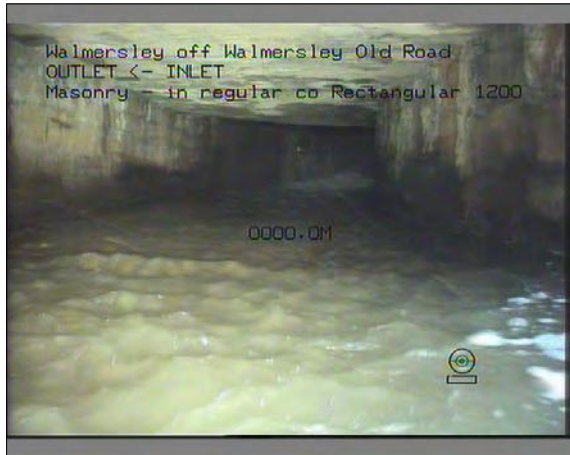


Photo: 001.JPG
0m, General photograph taken at this point



Photo: 002.JPG
0m, General remark



Photo: 003.JPG
0.3m, General remark, Start



Photo: 004.JPG
2m, General photograph taken at this point

Inspection pictures

Place : Walmersley	Road : off Walmersley Old Road	Date : 27/02/2015	Section number : 1	PLR Suffix : X
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Photo: 005.JPG
4.4m, General photograph taken at this point



Photo: 006.JPG
8.7m, General remark

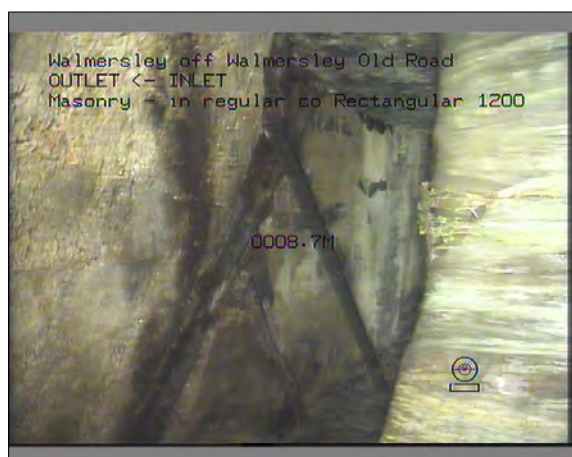


Photo: 007.JPG
8.7m, General photograph taken at this point



Photo: 008.JPG
11.9m, General remark

Inspection pictures

Place : Walmersley	Road : off Walmersley Old Road	Date : 27/02/2015	Section number : 1	PLR Suffix : X
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Photo: 009.JPG
11.9m, General remark, Start

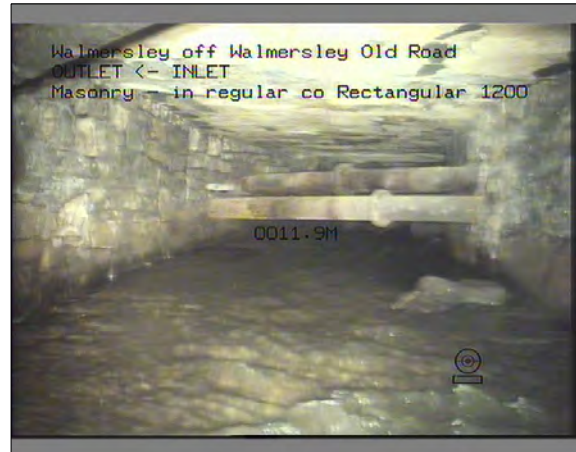


Photo: 010.JPG
11.9m, General photograph taken at this point



Photo: 011.JPG
14.8m, Settled deposits, other, 20% cross-sectional area loss

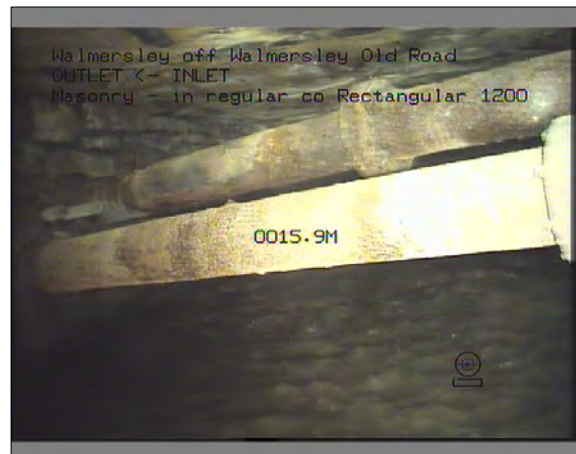


Photo: 012.JPG
15.9m, General remark

Inspection pictures

Place : Walmersley	Road : off Walmersley Old Road	Date : 27/02/2015	Section number : 1	PLR Suffix : X
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Photo: 013.JPG
17.3m, General remark

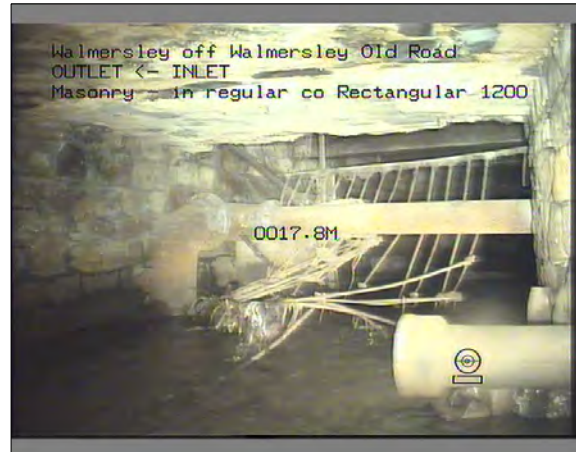


Photo: 014.JPG
17.8m, General photograph taken at this point



Photo: 015.JPG
19.2m, Connection intruding, at 5 o'clock, diameter 150mm, intrusion 20%



Photo: 016.JPG
20.3m, Connection intruding, at 5 o'clock, diameter 150mm, intrusion 05%

Inspection pictures

Place :
Walmersley

Road :
off Walmersley Old Road

Date :
27/02/2015

Section number :
1

PLR Suffix :
X



Photo: 017.JPG
20.3m, Settled deposits, other, 20% cross-sectional area loss



Photo: 018.JPG
21.2m, Other obstacles, other object in invert, from 1 to 6 o'clock, 85% cross-sectional area loss

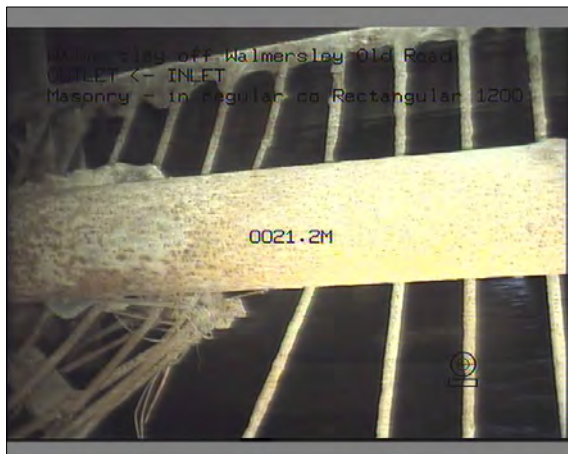
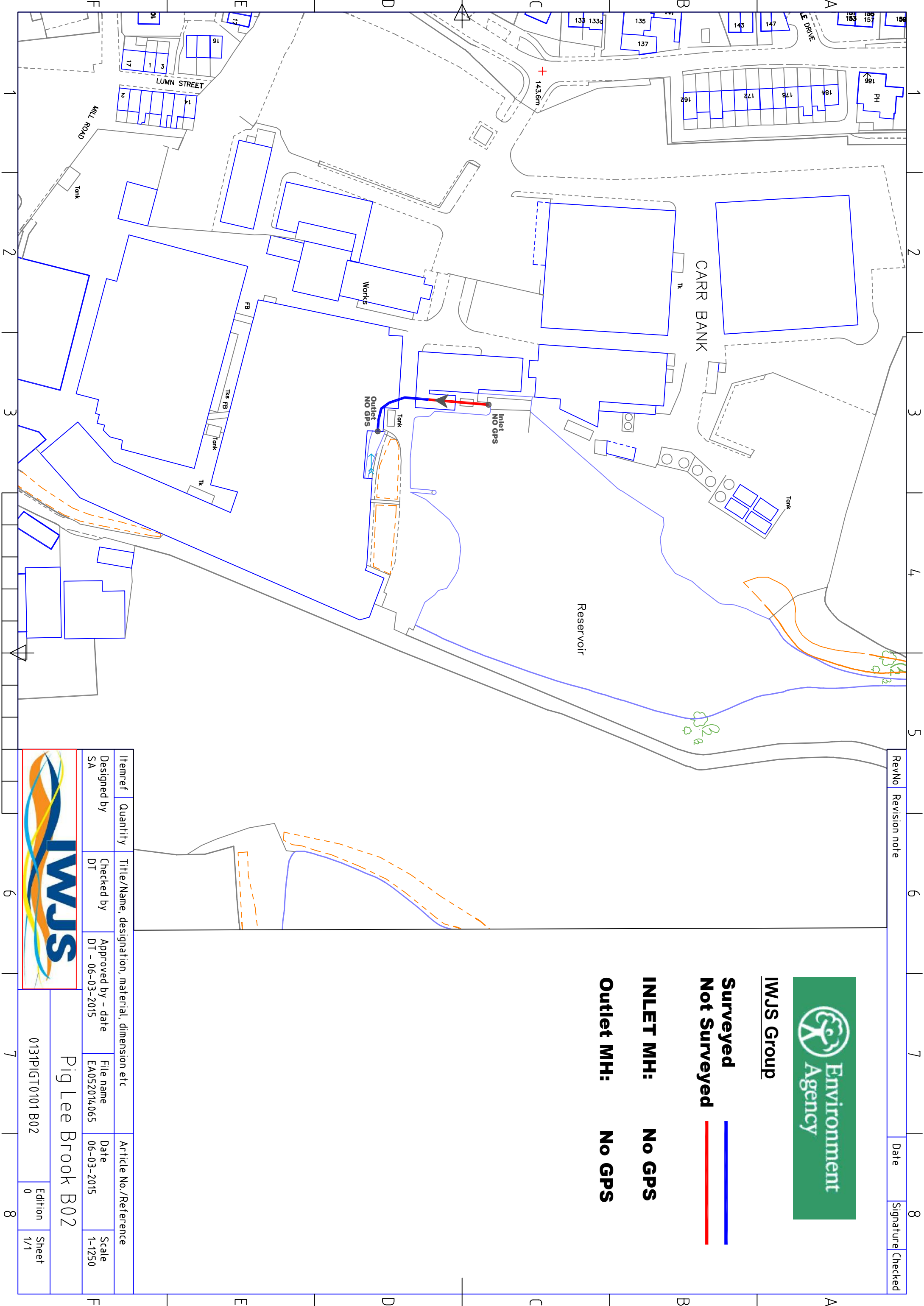


Photo: 019.JPG
21.2m, Survey abandoned

Pig Lee Brook					
	No.	Upstream MH	Downstream MH	Observation	Grade
1	1	INLET	OUTLET	Other obstacles, other object in invert, from 1 to 6 o'	5
2	1	INLET	OUTLET	Settled deposits, other, 20% cross-sectional area lo	4
3	1	INLET	OUTLET	Settled deposits, other, 20% cross-sectional area lo	4
4	1	INLET	OUTLET	Connection intruding, at 5 o'clock, diameter 150mm	3
5	1	INLET	OUTLET	Dimension changes, 1500mm high, 2400mm wide	0
6	1	INLET	OUTLET	General remark	0
7	1	INLET	OUTLET	General photograph taken at this point	0
8	1	INLET	OUTLET	Line deviates right, Start	0
9	1	INLET	OUTLET	Water level, 05% of the vertical dimension	0
10	1	INLET	OUTLET	General photograph taken at this point	0
11	1	INLET	OUTLET	General photograph taken at this point	0
12	1	INLET	OUTLET	Dimension changes, 1050mm high, 2400mm wide	0
13	1	INLET	OUTLET	Line deviates right, End	0
14	1	INLET	OUTLET	Dimension changes, 1290mm high, 2400mm wide	0
15	1	INLET	OUTLET	General remark, Start	0
16	1	INLET	OUTLET	General remark	0
17	1	INLET	OUTLET	General photograph taken at this point	0
18	1	INLET	OUTLET	Water level, 30% of the vertical dimension	0
19	1	INLET	OUTLET	General remark	0
20	1	INLET	OUTLET	General remark	0
21	1	INLET	OUTLET	General remark, End	0
22	1	INLET	OUTLET	General remark, End	0
23	1	INLET	OUTLET	General remark	0
24	1	INLET	OUTLET	Line deviates right	0
25	1	INLET	OUTLET	Material changes, masonry - randomly coursed	0
26	1	INLET	OUTLET	General remark	0
27	1	INLET	OUTLET	General remark	0
28	1	INLET	OUTLET	Connection other than junction, at 4 o'clock, diamet	0
29	1	INLET	OUTLET	General photograph taken at this point	0
30	1	INLET	OUTLET	General remark, Start	0
31	1	INLET	OUTLET	Survey abandoned	0
32	1	INLET	OUTLET	Water level, 10% of the vertical dimension	0
33	1	INLET	OUTLET	Start node type, manhole, reference number : OUT	0
34	1	INLET	OUTLET	General photograph taken at this point	0
35	1	INLET	OUTLET	Connection intruding, at 5 o'clock, diameter 150mm	



RevNo	Revision note	Date	Signature	Checked
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IWJS Group

Surveyed —
Not Surveyed —

INLET MH: No GPS
Outlet MH: No GPS

Itemref	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference		
Designed by SA		Checked by DT	Approved by - date DT - 06-03-2015	File name EA052014.065	Date 06-03-2015	Scale 1-1250	
				Pig Lee Brook B02			
013PIGT0101 B02				Edition 0	Sheet 1/1		

Appendix 3

Cole Easdon Consultants		Page 1
160 Aztec Aztec West Bristol BS32 4TU		
Date 15/11/2018 10:59 File 6599 - Infiltration	Designed by njackson Checked by	
XP Solutions Source Control 2016.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.500
Area (ha)	1.000	Urban	0.000
SAAR (mm)	1200	Region Number	Region 10

Results l/s

QBAR Rural	10.4
QBAR Urban	10.4
Q100 years	21.6
Q1 year	9.0
Q30 years	17.6
Q100 years	21.6

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The Rational Formula

$$Q_p = CiA/0.36$$

Q_p	368.2l/s	Peak discharge from catchment
A	4.49ha	Catchment area
i	25.2mm/hr	Average rainfall intensity
C	1.2mm/hr	Dimensionless coefficient

Determination of C

Value of C_V		
C _V	0.9	Volumetric runoff coefficient
Value of C_R		
C _R	1.3	Routing coefficient

Determination of i

Determination of M5-60 min and r

M5-60min	19mm	5 year - 60 minute rainfall depth
r	0.264	Ratio of the 5 year - 60 minute rainfall depth to the 5 year - 2 day rainfall depth
D	15min	Rainfall duration
T	1year	Return period

Determination of M5-D

Z ₁	0.58	
M5-D	11.0mm	rainfall depth of 5 year return period for required duration

Determination of MT-D

Z ₂	0.61	
MT-D	6.71mm	rainfall depth of the required return period

Determination of point rainfall intensities

i	26.8mm/hr
---	-----------

Application of areal reduction factor

A	0.0449km ²
ARF	0.94
i	25.2mm/hr

The Rational Formula

$$Q_p = CiA/0.36$$

Q_p	905.3l/s	Peak discharge from catchment
A	4.49ha	Catchment area
i	62.0mm/hr	Average rainfall intensity
C	1.2mm/hr	Dimensionless coefficient

Determination of C

Value of C_V		
C _V	0.9	Volumetric runoff coefficient
Value of C_R		
C _R	1.3	Routing coefficient

Determination of i

Determination of M5-60 min and r

M5-60min	19mm	5 year - 60 minute rainfall depth
r	0.264	Ratio of the 5 year - 60 minute rainfall depth to the 5 year - 2 day rainfall depth
D	15min	Rainfall duration
T	30year	Return period

Determination of M5-D

Z ₁	0.58	
M5-D	11.0mm	rainfall depth of 5 year return period for required duration

Determination of MT-D

Z ₂	1.50	
MT-D	16.50mm	rainfall depth of the required return period

Determination of point rainfall intensities

i	66.0mm/hr
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Application of areal reduction factor

A	0.0449km ²
ARF	0.94
i	62.0mm/hr

The Rational Formula

$$Q_p = CiA/0.36$$

Q_p	1164.8l/s	Peak discharge from catchment
A	4.49ha	Catchment area
i	79.8mm/hr	Average rainfall intensity
C	1.2mm/hr	Dimensionless coefficient

Determination of C

Value of C_V		
C _V	0.9	Volumetric runoff coefficient
Value of C_R		
C _R	1.3	Routing coefficient

Determination of i

Determination of M5-60 min and r

M5-60min	19mm	5 year - 60 minute rainfall depth
r	0.264	Ratio of the 5 year - 60 minute rainfall depth to the 5 year - 2 day rainfall depth
D	15min	Rainfall duration
T	100year	Return period

Determination of M5-D

Z ₁	0.58	
M5-D	11.0mm	rainfall depth of 5 year return period for required duration

Determination of MT-D

Z ₂	1.93	
MT-D	21.23mm	rainfall depth of the required return period

Determination of point rainfall intensities

i	84.9mm/hr
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Application of areal reduction factor

A	0.0449km ²
ARF	0.94
i	79.8mm/hr

Cole Easdon Consultants					Page 1																																																																																																																																					
160 Aztec Aztec West Bristol BS32 4TU			6155 Tetrosyl Storage Calcs 30 yr																																																																																																																																							
Date 26/11/2018 16:59 File 6155 STORAGE CALCS.SRCX			Designed by zbell Checked by																																																																																																																																							
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<table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Control (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>10.400</td><td>0.600</td><td>92.1</td><td>344.9</td><td>O K</td></tr><tr><td>30 min Summer</td><td>10.584</td><td>0.784</td><td>92.5</td><td>450.6</td><td>O K</td></tr><tr><td>60 min Summer</td><td>10.738</td><td>0.938</td><td>92.5</td><td>539.3</td><td>O K</td></tr><tr><td>120 min Summer</td><td>10.837</td><td>1.037</td><td>92.5</td><td>596.2</td><td>O K</td></tr><tr><td>180 min Summer</td><td>10.841</td><td>1.041</td><td>92.5</td><td>598.3</td><td>O K</td></tr><tr><td>240 min Summer</td><td>10.812</td><td>1.012</td><td>92.5</td><td>582.0</td><td>O K</td></tr><tr><td>360 min Summer</td><td>10.727</td><td>0.927</td><td>92.5</td><td>533.2</td><td>O K</td></tr><tr><td>480 min Summer</td><td>10.632</td><td>0.832</td><td>92.5</td><td>478.4</td><td>O K</td></tr><tr><td>600 min Summer</td><td>10.541</td><td>0.741</td><td>92.5</td><td>426.1</td><td>O K</td></tr><tr><td>720 min Summer</td><td>10.459</td><td>0.659</td><td>92.4</td><td>378.9</td><td>O K</td></tr><tr><td>960 min Summer</td><td>10.328</td><td>0.528</td><td>91.2</td><td>303.5</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>10.176</td><td>0.376</td><td>86.8</td><td>216.2</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>10.105</td><td>0.305</td><td>70.6</td><td>175.3</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>10.068</td><td>0.268</td><td>58.9</td><td>154.1</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>10.025</td><td>0.225</td><td>44.9</td><td>129.6</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>10.000</td><td>0.200</td><td>36.9</td><td>115.2</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>9.983</td><td>0.183</td><td>31.7</td><td>105.3</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>9.971</td><td>0.171</td><td>28.0</td><td>98.1</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>9.961</td><td>0.161</td><td>25.1</td><td>92.4</td><td>O K</td></tr><tr><td>15 min Winter</td><td>10.479</td><td>0.679</td><td>92.4</td><td>390.5</td><td>O K</td></tr><tr><td>30 min Winter</td><td>10.693</td><td>0.893</td><td>92.5</td><td>513.7</td><td>O K</td></tr></table>							Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	15 min Summer	10.400	0.600	92.1	344.9	O K	30 min Summer	10.584	0.784	92.5	450.6	O K	60 min Summer	10.738	0.938	92.5	539.3	O K	120 min Summer	10.837	1.037	92.5	596.2	O K	180 min Summer	10.841	1.041	92.5	598.3	O K	240 min Summer	10.812	1.012	92.5	582.0	O K	360 min Summer	10.727	0.927	92.5	533.2	O K	480 min Summer	10.632	0.832	92.5	478.4	O K	600 min Summer	10.541	0.741	92.5	426.1	O K	720 min Summer	10.459	0.659	92.4	378.9	O K	960 min Summer	10.328	0.528	91.2	303.5	O K	1440 min Summer	10.176	0.376	86.8	216.2	O K	2160 min Summer	10.105	0.305	70.6	175.3	O K	2880 min Summer	10.068	0.268	58.9	154.1	O K	4320 min Summer	10.025	0.225	44.9	129.6	O K	5760 min Summer	10.000	0.200	36.9	115.2	O K	7200 min Summer	9.983	0.183	31.7	105.3	O K	8640 min Summer	9.971	0.171	28.0	98.1	O K	10080 min Summer	9.961	0.161	25.1	92.4	O K	15 min Winter	10.479	0.679	92.4	390.5	O K	30 min Winter	10.693	0.893	92.5	513.7	O K
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<table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>62.416</td><td>0.0</td><td>394.5</td><td>17</td></tr><tr><td>30 min Summer</td><td>43.566</td><td>0.0</td><td>551.9</td><td>31</td></tr><tr><td>60 min Summer</td><td>29.238</td><td>0.0</td><td>743.9</td><td>50</td></tr><tr><td>120 min Summer</td><td>19.018</td><td>0.0</td><td>968.2</td><td>86</td></tr><tr><td>180 min Summer</td><td>14.569</td><td>0.0</td><td>1112.7</td><td>120</td></tr><tr><td>240 min Summer</td><td>12.010</td><td>0.0</td><td>1223.2</td><td>156</td></tr><tr><td>360 min Summer</td><td>9.139</td><td>0.0</td><td>1396.4</td><td>222</td></tr><tr><td>480 min Summer</td><td>7.516</td><td>0.0</td><td>1531.4</td><td>286</td></tr><tr><td>600 min Summer</td><td>6.453</td><td>0.0</td><td>1643.5</td><td>350</td></tr><tr><td>720 min Summer</td><td>5.694</td><td>0.0</td><td>1740.1</td><td>408</td></tr><tr><td>960 min Summer</td><td>4.668</td><td>0.0</td><td>1902.3</td><td>522</td></tr><tr><td>1440 min Summer</td><td>3.522</td><td>0.0</td><td>2152.3</td><td>750</td></tr><tr><td>2160 min Summer</td><td>2.651</td><td>0.0</td><td>2432.4</td><td>1104</td></tr><tr><td>2880 min Summer</td><td>2.165</td><td>0.0</td><td>2648.9</td><td>1468</td></tr><tr><td>4320 min Summer</td><td>1.631</td><td>0.0</td><td>2990.6</td><td>2200</td></tr><tr><td>5760 min Summer</td><td>1.334</td><td>0.0</td><td>3264.5</td><td>2936</td></tr><tr><td>7200 min Summer</td><td>1.142</td><td>0.0</td><td>3493.5</td><td>3672</td></tr><tr><td>8640 min Summer</td><td>1.007</td><td>0.0</td><td>3694.5</td><td>4392</td></tr><tr><td>10080 min Summer</td><td>0.905</td><td>0.0</td><td>3874.8</td><td>5136</td></tr><tr><td>15 min Winter</td><td>62.416</td><td>0.0</td><td>442.2</td><td>17</td></tr><tr><td>30 min Winter</td><td>43.566</td><td>0.0</td><td>618.6</td><td>31</td></tr></table>							Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	62.416	0.0	394.5	17	30 min Summer	43.566	0.0	551.9	31	60 min Summer	29.238	0.0	743.9	50	120 min Summer	19.018	0.0	968.2	86	180 min Summer	14.569	0.0	1112.7	120	240 min Summer	12.010	0.0	1223.2	156	360 min Summer	9.139	0.0	1396.4	222	480 min Summer	7.516	0.0	1531.4	286	600 min Summer	6.453	0.0	1643.5	350	720 min Summer	5.694	0.0	1740.1	408	960 min Summer	4.668	0.0	1902.3	522	1440 min Summer	3.522	0.0	2152.3	750	2160 min Summer	2.651	0.0	2432.4	1104	2880 min Summer	2.165	0.0	2648.9	1468	4320 min Summer	1.631	0.0	2990.6	2200	5760 min Summer	1.334	0.0	3264.5	2936	7200 min Summer	1.142	0.0	3493.5	3672	8640 min Summer	1.007	0.0	3694.5	4392	10080 min Summer	0.905	0.0	3874.8	5136	15 min Winter	62.416	0.0	442.2	17	30 min Winter	43.566	0.0	618.6	31																						
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Date 26/11/2018 16:59 File 6155 STORAGE CALCS.SRCX		Designed by zbell Checked by			
XP Solutions		Source Control 2016.1			
<u>Summary of Results for 30 year Return Period</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	10.873	1.073	92.5	617.1	O K
120 min Winter	10.969	1.169	92.5	672.4	O K
180 min Winter	10.952	1.152	92.5	662.7	O K
240 min Winter	10.893	1.093	92.5	628.4	O K
360 min Winter	10.739	0.939	92.5	539.8	O K
480 min Winter	10.581	0.781	92.5	448.8	O K
600 min Winter	10.441	0.641	92.3	368.6	O K
720 min Winter	10.328	0.528	91.2	303.8	O K
960 min Winter	10.182	0.382	87.1	219.5	O K
1440 min Winter	10.100	0.300	69.3	172.8	O K
2160 min Winter	10.049	0.249	52.8	143.2	O K
2880 min Winter	10.020	0.220	43.3	126.6	O K
4320 min Winter	9.987	0.187	32.7	107.2	O K
5760 min Winter	9.967	0.167	26.8	95.7	O K
7200 min Winter	9.953	0.153	22.9	87.7	O K
8640 min Winter	9.943	0.143	20.3	81.9	O K
10080 min Winter	9.935	0.135	18.2	77.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	29.238	0.0	833.3	58	
120 min Winter	19.018	0.0	1084.6	94	
180 min Winter	14.569	0.0	1246.5	132	
240 min Winter	12.010	0.0	1370.2	170	
360 min Winter	9.139	0.0	1564.2	240	
480 min Winter	7.516	0.0	1715.4	304	
600 min Winter	6.453	0.0	1840.9	364	
720 min Winter	5.694	0.0	1949.2	420	
960 min Winter	4.668	0.0	2130.9	520	
1440 min Winter	3.522	0.0	2411.0	750	
2160 min Winter	2.651	0.0	2724.4	1104	
2880 min Winter	2.165	0.0	2967.0	1468	
4320 min Winter	1.631	0.0	3350.0	2196	
5760 min Winter	1.334	0.0	3656.3	2936	
7200 min Winter	1.142	0.0	3912.9	3600	
8640 min Winter	1.007	0.0	4138.1	4376	
10080 min Winter	0.905	0.0	4340.3	5104	
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160 Aztec Aztec West Bristol BS32 4TU	6155 Tetrosyl Storage Calcs 30 yr	
Date 26/11/2018 16:59 File 6155 STORAGE CALCS.SRCX	Designed by zbell Checked by	
XP Solutions	Source Control 2016.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.262	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 3.400

Time (mins)	Area
From:	To: (ha)

0	4 3.400
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Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From:	To: (ha)

0	4 0.000
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160 Aztec Aztec West Bristol BS32 4TU	6155 Tetrosyl Storage Calcs 30 yr	
Date 26/11/2018 16:59 File 6155 STORAGE CALCS.SRCX	Designed by zbell Checked by	
XP Solutions Source Control 2016.1		

Model Details

Storage is Online Cover Level (m) 12.000

Tank or Pond Structure

Invert Level (m) 9.800

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	575.0	1.200	575.0	1.210	0.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0368-9300-2200-9300
Design Head (m)	2.200
Design Flow (l/s)	93.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	368
Invert Level (m)	9.800
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.200	93.0
Flush-Flo™	0.698	92.5
Kick-Flo®	1.506	77.4
Mean Flow over Head Range	-	79.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	10.5	1.200	88.1	3.000	108.1	7.000	163.4
0.200	36.8	1.400	82.7	3.500	116.5	7.500	169.0
0.300	69.2	1.600	79.7	4.000	124.3	8.000	174.4
0.400	87.8	1.800	84.3	4.500	131.7	8.500	179.7
0.500	90.7	2.000	88.8	5.000	138.6	9.000	184.8
0.600	92.1	2.200	93.0	5.500	145.2	9.500	189.7
0.800	92.2	2.400	97.0	6.000	151.5		
1.000	90.6	2.600	100.8	6.500	157.6		

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160 Aztec Aztec West Bristol BS32 4TU		6155 Tetrosyl Storage Calcs 100yr + 40% CC			
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XP Solutions		Source Control 2016.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	10.285	0.485	90.4	666.8	O K
30 min Summer	10.463	0.663	92.4	911.1	O K
60 min Summer	10.644	0.844	92.5	1160.7	O K
120 min Summer	10.786	0.986	92.5	1356.4	O K
180 min Summer	10.834	1.034	92.5	1421.2	O K
240 min Summer	10.851	1.051	92.5	1444.5	O K
360 min Summer	10.850	1.050	92.5	1444.1	O K
480 min Summer	10.823	1.023	92.5	1407.2	O K
600 min Summer	10.785	0.985	92.5	1353.9	O K
720 min Summer	10.740	0.940	92.5	1292.7	O K
960 min Summer	10.647	0.847	92.5	1164.8	O K
1440 min Summer	10.476	0.676	92.4	928.9	O K
2160 min Summer	10.291	0.491	90.5	675.5	O K
2880 min Summer	10.185	0.385	87.2	528.8	O K
4320 min Summer	10.108	0.308	71.6	423.6	O K
5760 min Summer	10.070	0.270	59.5	371.0	O K
7200 min Summer	10.045	0.245	51.3	336.5	O K
8640 min Summer	10.026	0.226	45.3	311.1	O K
10080 min Summer	10.012	0.212	40.7	291.8	O K
15 min Winter	10.346	0.546	91.5	750.8	O K
30 min Winter	10.549	0.749	92.5	1029.7	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	112.612	0.0	698.0	18	
30 min Summer	79.525	0.0	993.1	32	
60 min Summer	53.779	0.0	1361.1	62	
120 min Summer	34.971	0.0	1772.9	110	
180 min Summer	26.617	0.0	2025.3	144	
240 min Summer	21.806	0.0	2213.1	176	
360 min Summer	16.454	0.0	2506.0	246	
480 min Summer	13.443	0.0	2730.5	314	
600 min Summer	11.478	0.0	2914.7	382	
720 min Summer	10.080	0.0	3071.7	448	
960 min Summer	8.199	0.0	3331.5	578	
1440 min Summer	6.111	0.0	3722.0	824	
2160 min Summer	4.538	0.0	4158.5	1172	
2880 min Summer	3.670	0.0	4483.0	1500	
4320 min Summer	2.727	0.0	4991.1	2208	
5760 min Summer	2.211	0.0	5408.4	2936	
7200 min Summer	1.881	0.0	5749.2	3672	
8640 min Summer	1.649	0.0	6048.2	4408	
10080 min Summer	1.478	0.0	6314.6	5136	
15 min Winter	112.612	0.0	783.9	18	
30 min Winter	79.525	0.0	1114.5	32	
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160 Aztec Aztec West Bristol BS32 4TU		6155 Tetrosyl Storage Calcs 100yr + 40% CC			
Date 26/11/2018 17:10 File 6155 STORAGE CALCS.SRCX		Designed by zbell Checked by			
XP Solutions		Source Control 2016.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	10.760	0.960	92.5	1319.9	O K
120 min Winter	10.934	1.134	92.5	1559.4	O K
180 min Winter	10.981	1.181	92.5	1623.2	O K
240 min Winter	10.991	1.191	92.5	1638.2	O K
360 min Winter	10.975	1.175	92.5	1615.5	O K
480 min Winter	10.923	1.123	92.5	1543.4	O K
600 min Winter	10.854	1.054	92.5	1449.1	O K
720 min Winter	10.778	0.978	92.5	1345.4	O K
960 min Winter	10.626	0.826	92.5	1136.1	O K
1440 min Winter	10.372	0.572	91.8	786.3	O K
2160 min Winter	10.165	0.365	86.3	501.3	O K
2880 min Winter	10.109	0.309	71.8	424.2	O K
4320 min Winter	10.053	0.253	54.1	348.1	O K
5760 min Winter	10.023	0.223	44.1	306.1	O K
7200 min Winter	10.002	0.202	37.5	278.4	O K
8640 min Winter	9.988	0.188	33.0	258.0	O K
10080 min Winter	9.976	0.176	29.6	242.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	53.779	0.0	1525.6	60	
120 min Winter	34.971	0.0	1986.8	116	
180 min Winter	26.617	0.0	2269.5	168	
240 min Winter	21.806	0.0	2479.8	190	
360 min Winter	16.454	0.0	2807.8	268	
480 min Winter	13.443	0.0	3059.4	344	
600 min Winter	11.478	0.0	3265.6	416	
720 min Winter	10.080	0.0	3441.6	486	
960 min Winter	8.199	0.0	3732.9	618	
1440 min Winter	6.111	0.0	4170.9	854	
2160 min Winter	4.538	0.0	4658.4	1148	
2880 min Winter	3.670	0.0	5022.1	1500	
4320 min Winter	2.727	0.0	5592.6	2208	
5760 min Winter	2.211	0.0	6058.0	2944	
7200 min Winter	1.881	0.0	6440.0	3672	
8640 min Winter	1.649	0.0	6775.4	4408	
10080 min Winter	1.478	0.0	7075.4	5136	
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160 Aztec Aztec West Bristol BS32 4TU	6155 Tetrosyl Storage Calcs 100yr + 40% CC																																											
Date 26/11/2018 17:10 File 6155 STORAGE CALCS.SRCX	Designed by zbell Checked by																																											
XP Solutions																																												
Source Control 2016.1																																												
<u>Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.262</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 3.400 <table> <tr> <th colspan="3">Time (mins) Area</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>(ha)</th> </tr> <tr> <td>0</td> <td>4</td> <td>3.400</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.000 <table> <tr> <th colspan="3">Time (mins) Area</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>(ha)</th> </tr> <tr> <td>0</td> <td>4</td> <td>0.000</td> </tr> </table>			Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	100	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	19.000	Shortest Storm (mins)	15	Ratio R	0.262	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+40	Time (mins) Area			From:	To:	(ha)	0	4	3.400	Time (mins) Area			From:	To:	(ha)	0	4	0.000
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XP Solutions Source Control 2016.1		

Model Details

Storage is Online Cover Level (m) 12.000

Tank or Pond Structure

Invert Level (m) 9.800

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1375.0	1.200	1375.0	1.210	0.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0368-9300-2200-9300
Design Head (m)	2.200
Design Flow (l/s)	93.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	368
Invert Level (m)	9.800
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.200	93.0
Flush-Flo™	0.698	92.5
Kick-Flo®	1.506	77.4
Mean Flow over Head Range	-	79.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	10.5	1.200	88.1	3.000	108.1	7.000	163.4
0.200	36.8	1.400	82.7	3.500	116.5	7.500	169.0
0.300	69.2	1.600	79.7	4.000	124.3	8.000	174.4
0.400	87.8	1.800	84.3	4.500	131.7	8.500	179.7
0.500	90.7	2.000	88.8	5.000	138.6	9.000	184.8
0.600	92.1	2.200	93.0	5.500	145.2	9.500	189.7
0.800	92.2	2.400	97.0	6.000	151.5		
1.000	90.6	2.600	100.8	6.500	157.6		

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Pipe Volume Check

Length of Pipe Provided	300.00	metres
Diameter of Pipe provided	1500.00	mm
Area of pipe provided	1.767	Sq m
Volume of Pipe provided	530.144	Cu m

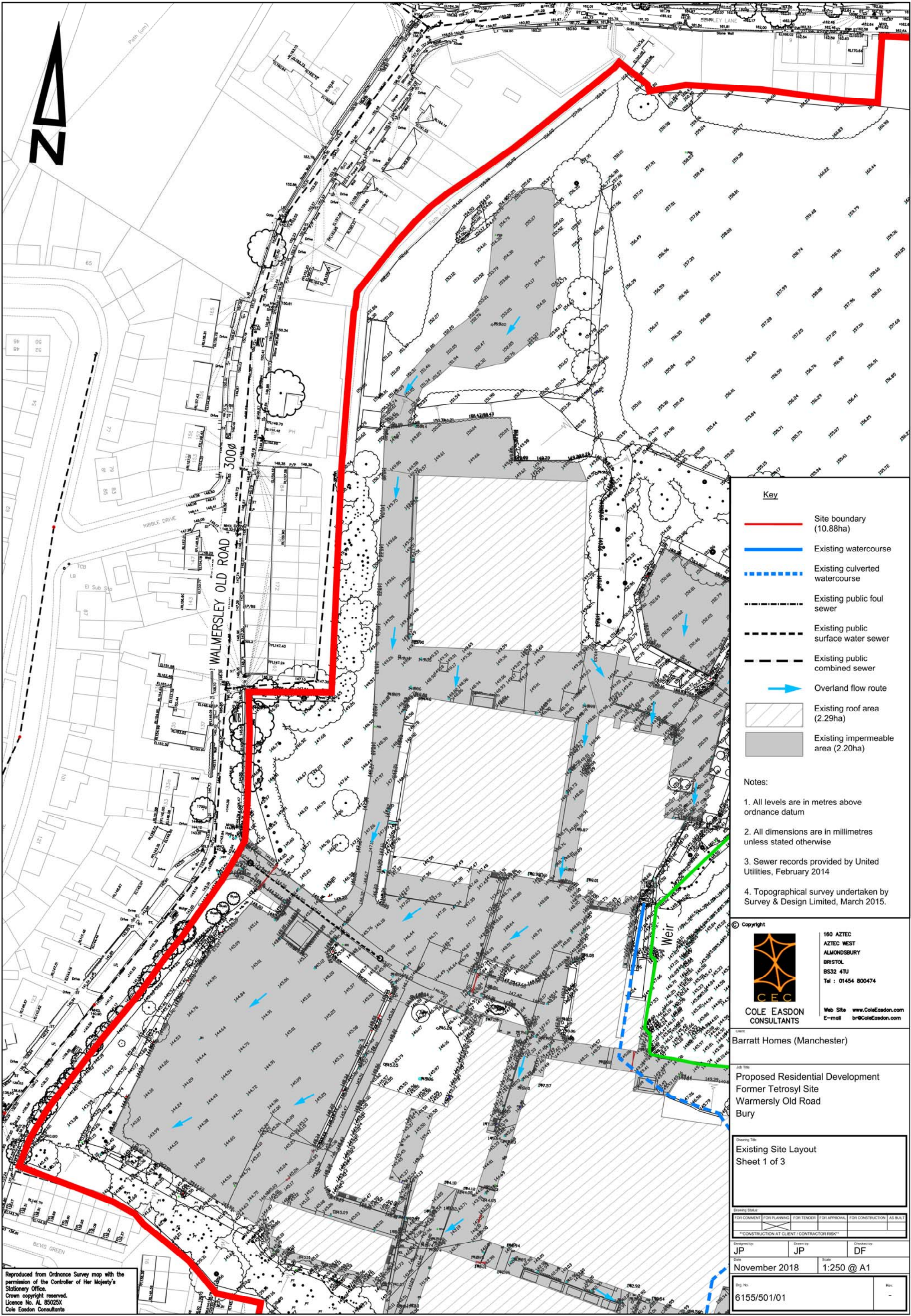
Manhole Volume Check

No of Manholes	12	
Diameter of Manholes	3000	mm
Area of Manholes	7.069	
Avg Depth of MH	1.7	m
Total volumes of manholes	144.20	Cu m

Sum

674.34 Cu m

Appendix 4



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Key

- Site boundary (10.88ha)
- Existing watercourse
- Existing culverted watercourse
- Existing public foul sewer
- Existing public surface water sewer
- Existing public combined sewer
- Overland flow route
- Existing roof area (2.29ha)
- Existing impermeable area (2.20ha)

Notes:

- All levels are in metres above ordnance datum
- All dimensions are in millimetres unless stated otherwise
- Sewer records provided by United Utilities, February 2014
- Topographical survey undertaken by Survey & Design Limited, March 2015.

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Client
Barratt Homes (Manchester)

Job Title
Proposed Residential Development
Former Tetrosyl Site
Walmersley Old Road
Bury

Drawing Title
Existing Site Layout
Sheet 1 of 3

Drawing Status

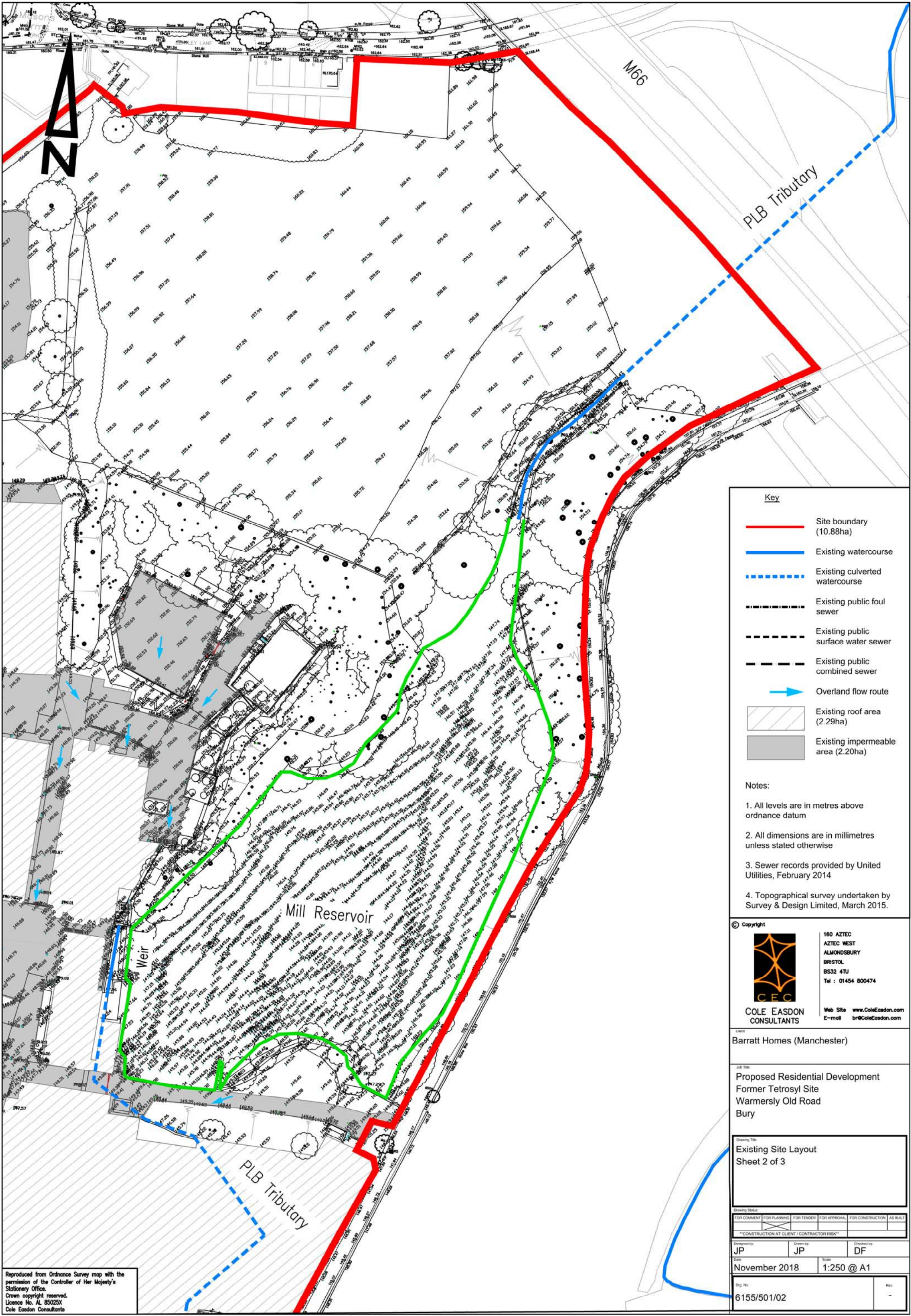
FOR COMMENT	FOR PLANNING	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION	AS BUILT

CONSTRUCTION AT CLIENT / CONTRACTOR RISK

Designed by JP **Drawn by** JP **Checked by** DF

Date November 2018 **Scale** 1:250 @ A1

Dwg. No. 6155/501/01 **Rev.** -



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Notes:

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Client

Barratt Homes (Manchester)

Job Title

Proposed Residential Development
Former Tetrosyl Site
Warmersly Old Road
Bury

Drawing Title

Existing Site Layout
Sheet 2 of 3

Drawing Status

FOR COMMENT	FOR PLANNING	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION	AS BUILT

CONSTRUCTION AT CLIENT / CONTRACTOR RISK

Drawn by

JP

Checked by

JP

DF

Date

November 2018

Scale

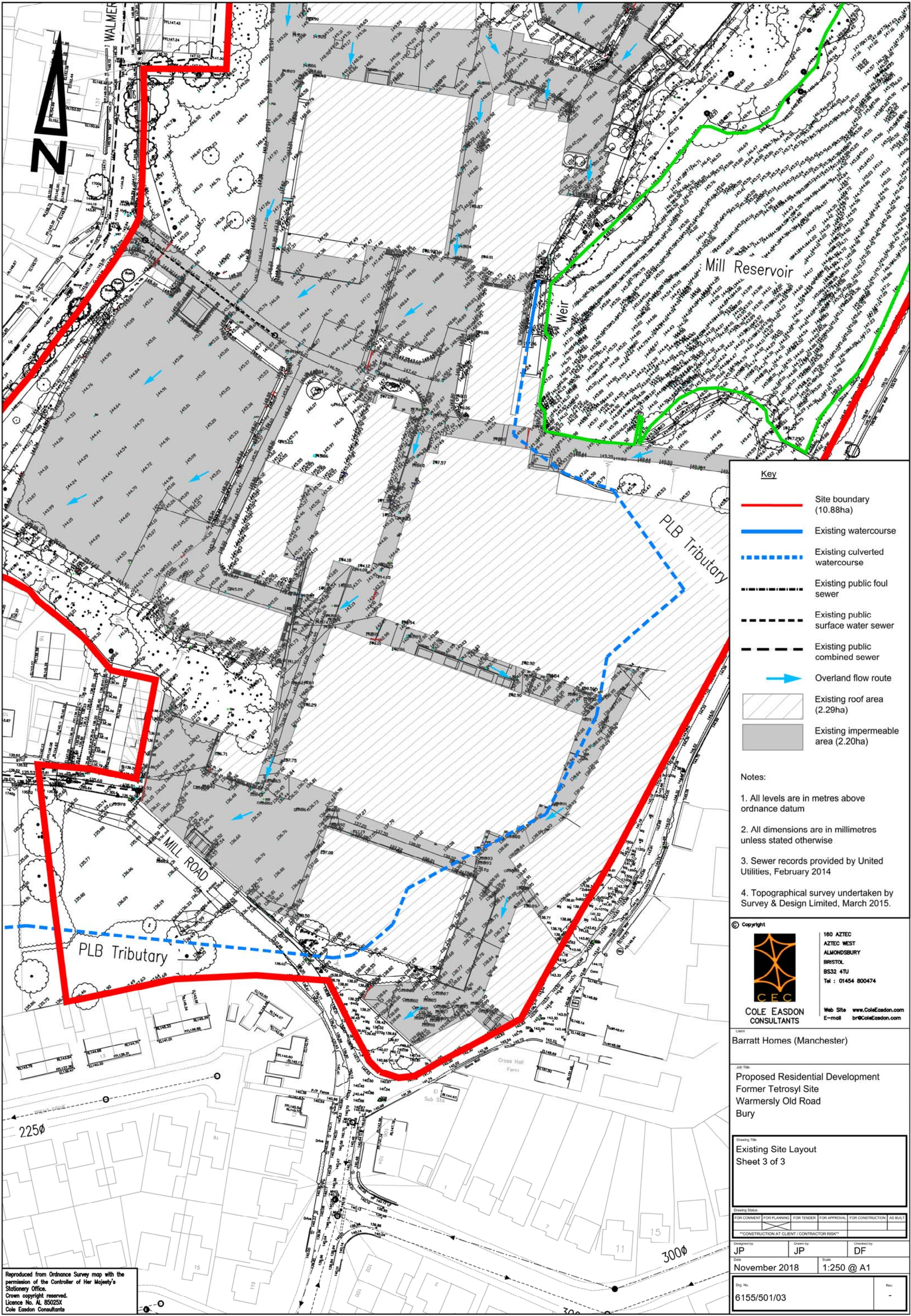
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Client
Barratt Homes (Manchester)

Job Title
**Proposed Residential Development
Former Tetrosyl Site
Warmersly Old Road
Bury**

Drawing Title
**Existing Site Layout
Sheet 3 of 3**

Drawing Status				
FOR COMMENT	FOR PLANNING	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION
CONSTRUCTION AT CLIENT / CONTRACTOR RISK				

Designed by JP	Drawn by JP	Checked by DF
Date November 2018	Scale 1:250 @ A1	

Dwg. No. 6155/501/03	Rev. -
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Proposed Surface Water Drainage Strategy
Surface water runoff from the development site will be managed on site for storms up to the 1:100 year + 40% climate change event without flooding. Post development runoff will be discharged via the use of attenuation SuDS and will be restricted to the equivalent QBAR runoff rate of 93l/s. This will provide significant betterment over the existing unattenuated brownfield runoff rate.

Preliminary calculations indicate that some 1638m³ of storage is required to attenuate flows from the 1:100 year + 40% climate change event. SuDS will comprise 672m³ of online storage within oversized pipes for storms up to the 1:30 year runoff event and 966m³ of offline storage provided in below ground crates, for storms greater than the 1:100 year event up to the 1:100 year + 40% climate change event, subject to detailed design. Outflow from the proposed surface water drainage network will be controlled using a HydroBrake or similar.

Proposed Foul Water Drainage Strategy
Post development foul flows will discharge by gravity from the site to the existing public combined sewer at the junction of Mill Road and Walmersley Old Road.

Proposed Area of permanent water c. 0.8m deep

Proposed Compensatory Flood Storage Area

Proposed v-notch weir flow control from FSA

- Notes:
1. All levels are in metres above ordnance datum
 2. All dimensions are in millimetres unless stated otherwise
 3. Sewer records provided by United Utilities, February 2014
 4. Topographical survey undertaken by Survey & Design Limited, March 2015.
 5. Proposed layout provided by Barratt Homes Manchester. Drawing Ref 456-P-PL02 Rev B

Rev.	Designed Drawn Checked Date	JP ZB DF 29.11.18	Revision Details
A			Change to proposed compensatory FSA, permeable water area and addition of notes

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Client
Barratt Homes (Manchester)

Job Title
Proposed Residential Development
Former Tetrosyl Site
Walmersley Old Road
Bury

Drawing Title
Proposed Site Layout

Drawing Status:			
FOR COMMENT	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION
AS BUILT			
CONSTRUCTION AT CLIENT / CONTRACTOR RISK			
Designed by: JP	Drawn by: JP	Checked by: DF	
Date November 2018	Scale 1:1000 @ A2		
Dwg. No. 6155/502			Rev. A

- Key**
- Site boundary (10.88ha)
 - Existing watercourse
 - Existing culverted watercourse
 - Existing public foul sewer
 - Existing public surface water sewer
 - Existing public combined sewer
 - Design exceedance flow route
 - Proposed open watercourse
 - Proposed surface water pipework

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