English Martyrs

Drainage Strategy

for

MAI Construction

October 2019

CONTENTS

Section Item

1	EXECUTIVE SUMMARY	2
2	INTRODUCTION	2
3	DRAINAGE STRATEGY	2
4	SITE DESCRIPTION	4

APPENDIX A – RELEVANT CORRESPONDENCE

APPENDIX B – TOPOGRAPHICAL SURVEY

APPENDIX C – PUBLIC SEWER RECORDS

APPENDIX D – CCTV SURVEY OF PRIVATE DRAINAGE NETWORK

APPENDIX E – PROPOSED DRAINAGE STRATEGY LAYOUT PLAN

APPENDIX F – PROPOSED DRAINAGE STRATEGY CALCULATIONS

APPENDIX G – RESULTS OF INFILTRATION TESTING

1 EXECUTIVE SUMMARY

This report is for the exclusive use of the client and design team and should not be used in whole or in part by any third parties without the express permission of JEM Consulting Engineers Ltd.

The aim of this study is to carry out Drainage Strategy of suitable scope and detail to support the detailed design of the drainage on site.

2 INTRODUCTION

The proposal is for the construction of 4 new build dwellings to be built on the site of the old tennis courts with associated driveways and gardens. The derelict club house is to be demolished to allow for a construction of a new road that will provide access to the proposed dwellings.

2.1 Consultation

- The Environment Agency (EA)
- Manchester City Council (MCC)
- United Utilities (UU)

Details of our consultations with the above can be found in Appendix A of this report.

3 DRAINAGE STRATEGY

3.1 General

General Arrangement

The general arrangement is indicated on JEM below ground drainage drawings, section and details. These should be referred to when reading this document, and can be found in Appendix E

General Description

The following design calculations have been completed with respect to the proposed below ground drainage design for the development of the existing Brownfield site.

3.2 Foul Drainage

Flows

Foul drainage flows have been determined using the discharge unit method assuming a frequency factor of 0.5. The calculation of flows has been determined using a tabular systems based on the number of WC's baths/showers, sinks, washing machines and dishwashers noted on the architectural plans.

Basis of design

The foul network has been designed in terms of pipe diameter and fall to accept anticipated flow without backing up, maintaining a self cleansing velocity as close to 0.7m/s as practicable and adopting a minimum fall of 1:40.

Methodology

The existing 300mm and 750mm combined sewers in Alness Road have been surveyed and have approximate invert levels adjacent to the site at around 1458mm and 4200mm below ground level respectively. These assumed invert levels have been interpolated from the nearest manholes available for inspection. The 300mm sewer is at a shallow depth and will preclude gravity drainage of the foul drainage based on limiting falls to 1:40 across the site.

The deeper 750mm sewer will be technically difficult to provide a connection given the assumed invert level and would almost certainly require a road closure to ensure safe installation of a new manhole and back dropped connection into the sewer.

As such we have proposed to discharge foul into the existing network on site which drains to south of the site. This is the existing combined connection for the club house and has been surveyed and jetted to ensure its condition is suitable for re-use. Details of the CCTV survey can be found in appendix D

3.3 Surface Water (analysis output appended to the rear of this document)

3.3.1 Methodology

A site investigation has been completed and clay subsoils unsuitable for infiltration methods have been found. Surface water is to discharge into the public combined water sewer below Alness Road at a rate 5l/s as agreed with UU. See Appendix A for correspondence with UU and Appendix G for results of the infiltration tests. It is evident from these tests that infiltration will not be appropriate on this site.

The flow rate to be adopted will consider a 1:100year storm event + 40% increase due to climate change, and this will determine the volume of water required to be attenuated in the 100year storm event. The attenuation tank will temporarily store runoff during storm events. This volume of surface water will be attenuated on site via attenuation tanks as infiltration into the ground and direct discharge to a watercourse is not possible on this site. The discharge rate is to be controlled via a flow control device fitted to the final chamber onsite.

3.3.2 Attenuation design

The existing area of hard standing has been measured. An analysis of the existing 1:30 year storm event was completed to determine the peak flow rate; this was determined at 1l/s. One of the problems with low flow is that the flow controls tend to have problems silting up, and as such UU have requested a maximum flow rate of 5l/s.

Attenuation tank sizing was completed in hydraulic modelling software Micro drainage and is proposed to be formed in Wavin Aquacell crates achieving 95% free volume. The attenuation tank has been sized as 37m2 at a depth of 0.45m.

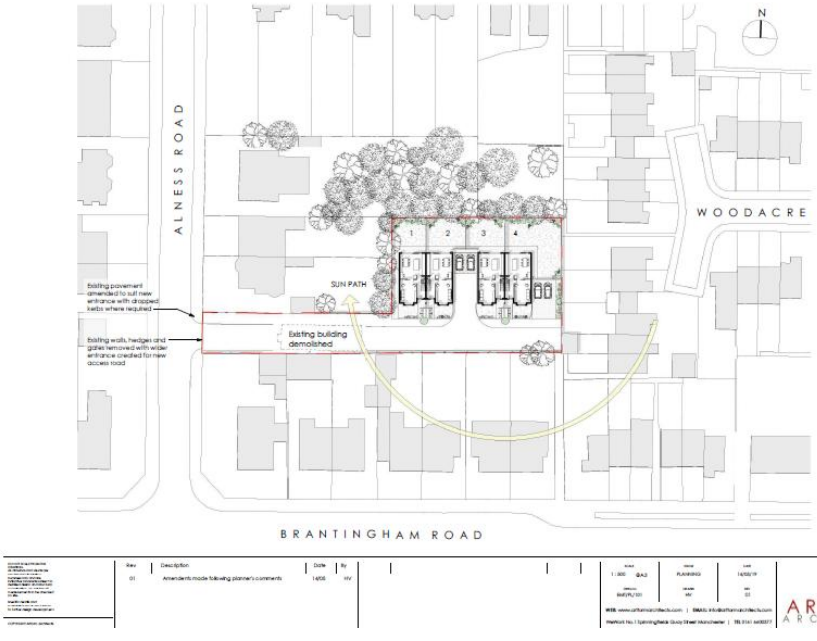
4 SITE DESCRIPTION

4.1 Site Location

59 Alness Road
Manchester
M16 8HW



4.2 Proposed Site



APPENDIX A – RELEVANT CORRESPONDENCE

James Mackey

From: Ibraheem Al Bayati [info@maiconstruction.co.uk]
Sent: 09 October 2019 19:30
To: James Mackey
Subject: FW: Waste water pre development enquiry English Martyrs Alness Road Whalley Range M16 8HW 4200028357
Attachments: 7973h---wastewater-pre-development-enquiry-2018-web-acc.pdf; Site Survey below ground survey.pdf; Drainage Design 1 draft.pdf; Drainage design 2 draft.pdf; land registry.pdf

James,

Please find UU reply below.

Kind regards,

Ibraheem Al Bayati
Director
Info@maiconstruction.co.uk
M 07801857576

15 St. Brannocks Road
Manchester
M21 0UP

MAI CONSTRUCTION

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: Wednesday, October 9, 2019 2:19 PM
To: Ibraheem Al Bayati <info@maiconstruction.co.uk>
Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: FW: Waste water pre development enquiry English Martyrs Alness Road Whalley Range M16 8HW 4200028357

Dear Ibraheem,

We have carried out an assessment of your application which is based on the information provided; this pre development advice will be valid for 12 months

Foul

Foul will be allowed to drain to the public combined sewer network. Our preferred point of discharge would be to the 375mm combined sewer on Alness Road at an unrestricted rate, as proposed.

Surface Water

Surface water from this site should drain to soak away or some other form of infiltration system. I appreciate there is limited space on site, but from the information provided it appears there is a possibility a soakaway could be situated in the rear gardens of the properties whilst maintaining the distances required in the Building Regulations part H3 (section 3.25), please could you confirm (ideally by providing a "soakaway constraints plan")?

Should infiltration testing results be provided (in line with BRE 365) and prove that infiltration is not possible, we would be willing to reconsider our position and allow surface water to be connected to the public combined sewer network at a maximum pass forward flow rate of 5 l/s. In this case our preferred point of discharge would be to the 375mm combined public sewer on Alness road, as proposed.

Connection Application

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

http://www.unitedutilities.com/connecting-public-sewer.aspx

Sewer Adoption Agreement

You may wish to offer the proposed new sewers for adoption. United Utilities assess adoption application based on Sewers adoption 6th Edition and for any pumping stations our company addenda document. Please refer to link below to obtain further guidance and application pack:

http://www.unitedutilities.com/sewer-adoption.aspx

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

Please note, if you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements of Sewers for adoption and United Utilities Asset Standards. The proposed design should give consideration to long term operability and give United Utilities a cost effective proposal for the life of the assets. Therefore, further to this enquiry should you wish to progress a Section 104 agreement, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 agreement, has been assessed and accepted in writing by United Utilities. Any works carried out prior to the technical assessment being approved is done entirely at the developers own risk and could be subject to change.

Kind regards,

Tom

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

Thomas Bethell
Assistant Developer Engineer
Developer Services & Metering (Wastewater)
Customer Services
United Utilities
01925 679 308

From: Ibraheem Al Bayati [mailto:info@maiconstruction.co.uk]
Sent: 27 September 2019 12:26
To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: Waste water pre development enquiry

To whom it may concern,

Please find attached our waste water predevelopment enquiry for the following development:

English Martyrs
Alness Road
Whalley Range
M16 8HW

Kind regards,

Ibraheem Al Bayati
Director
Info@maiconstruction.co.uk
M 07801857576

15 St. Brannocks Road
Manchester
M21 0UP

MAI CONSTRUCTION

development, and shall be maintained until all equipment, machinery and surplus materials have been removed from the site. Nothing shall be stored or placed in any area fenced in accordance with this condition and the ground levels within those areas shall not be altered, nor shall any excavation be made, without the written consent of the local planning authority.

Reason - In order avoid damage to trees/shrubs adjacent to and within the site which are of important amenity value to the area and in order to protect the character of the area, in accordance with policies EN9 and EN15 of the Core Strategy.

15) All tree work should be carried out by a competent contractor in accordance with British Standard BS 3998 "Recommendations for Tree Work".

Reason - In order avoid damage to trees/shrubs adjacent to and within the site which are of important amenity value to the area and in order to protect the character of the area, in accordance with policies EN9 and EN15 of the Core Strategy.

16) Prior to first occupation measures to incorporate bat and bird boxes within the development. The development shall be carried out in accordance with the agreed details.

Reason - To ensure the protection of habitat of species that are protected under the Wildlife and Countryside Act 1981 or as subsequently amended in order to comply with policy EN15 of the Core Strategy Development Plan Document

17). No removal of or works to any hedgerows, trees or shrubs shall take place during the main bird breeding season 1st March and 31st July inclusive, unless a competent ecologist has undertaken a careful, detailed check of vegetation for active birds' nests immediately before the vegetation is cleared and provided written confirmation that no birds will be harmed and/or that there are appropriate measures in place to protect nesting bird interest on site. Any such written confirmation should be submitted to the local planning authority.

Reason - To ensure the protection of habitat of species that are protected under the Wildlife and Countryside Act 1981 or as subsequently amended and to comply with policy EN15 of the Core Strategy.

18) No drainage shall be installed until the full details of a surface water drainage scheme has been submitted to and approved in writing by the City Council as local planning authority.

Reason: To promote sustainable development, secure proper drainage and to manage the risk of flooding and pollution, pursuant to Policy DM1 in the Core Strategy Development Plan Document and the policies and guidance within the NPPF and NPPG.

19) No development hereby permitted shall be occupied until details of the implementation, maintenance and management of the sustainable drainage scheme have been submitted to and approved by the local planning authority. The scheme

shall be implemented and thereafter managed and maintained in accordance with the approved details. Those details shall include:

a. Verification report providing photographic evidence of construction as per design drawings;
b. As built construction drawings if different from design construction drawings;
c. Management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime.

Reason: To promote sustainable development, secure proper drainage and to manage the risk of flooding and pollution, pursuant to Policy DM1 in the Core Strategy Development Plan Document and the policies and guidance within the NPPF and NPPG.

20) Prior to the installation of any boundary treatment on site as identified on drawing reference EMT/PL/102 rev 01 details of the materials and finishes of all boundary treatments shall be submitted and approved in writing by the City Council as local planning authority. The details shall include measures incorporated into garden boundaries to facilitate the movement of hedgehogs across and around the site. The approved boundary treatments associated to each residential dwellinghouse shall be installed prior to the first occupation of that dwelling and thereafter be retained and maintained.

Reason - To ensure that the appearance of the development is acceptable to the City Council as local planning authority in the interests of the visual amenity of the area within which the site is located and to enhance the biodiversity of the site in order to comply with policies SP1, EN9 and DM1 of the Core Strategy.

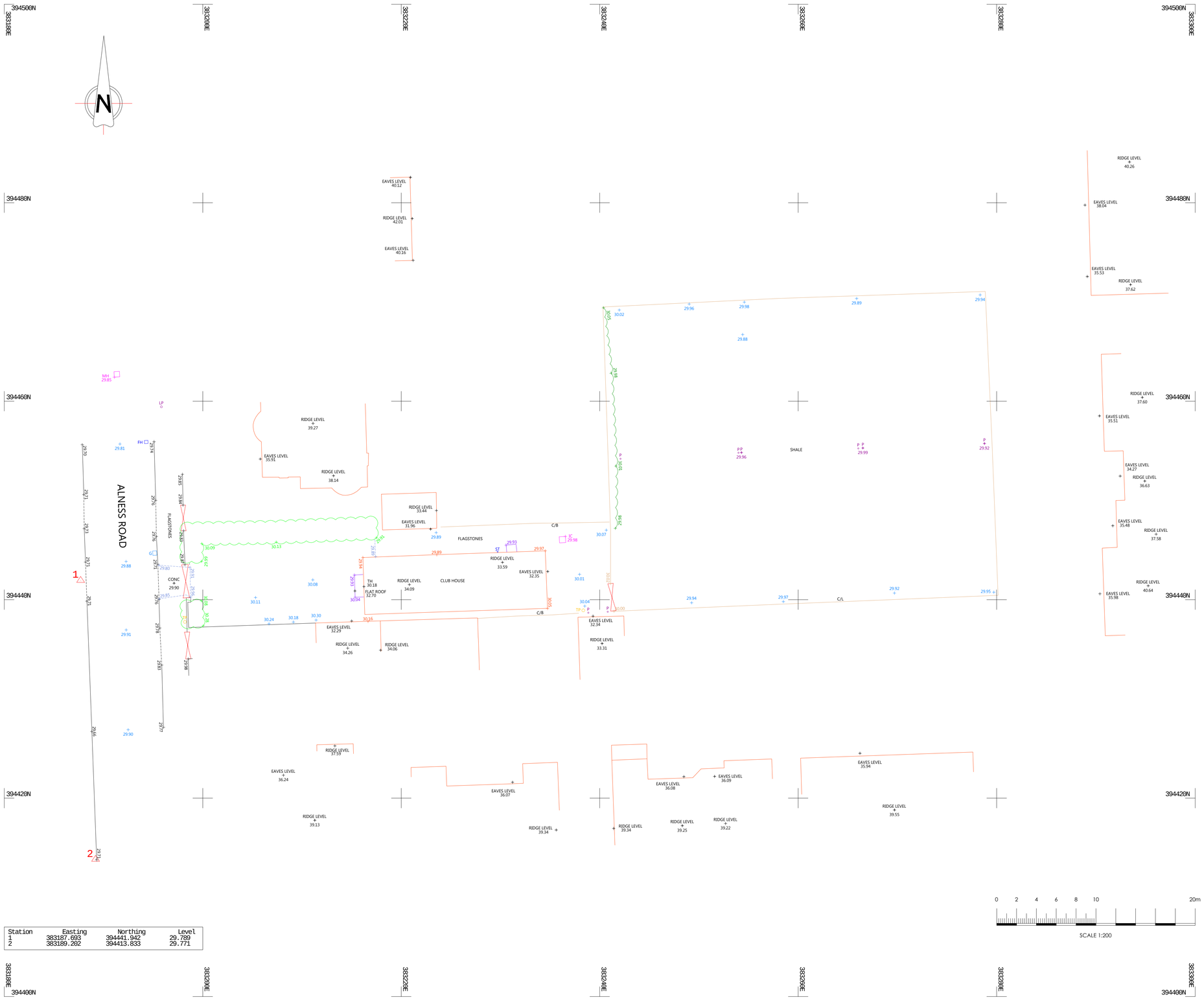
Local Government (Access to Information) Act 1985

The documents referred to in the course of this report are either contained in the file(s) relating to application ref: 121945/FO/2018 held by planning or are City Council planning policies, the Unitary Development Plan for the City of Manchester, national planning guidance documents, or relevant decisions on other applications or appeals, copies of which are held by the Planning Division.

The following residents, businesses and other third parties in the area were consulted/notified on the application:

Sport England
Environmental Health
Highway Services
Parks, Leisure & Events
Neighbourhood Team Leader (Arboriculture)
Whalley Range Forum
Greater Manchester Police
Highway Services
Environmental Health

APPENDIX B – TOPOGRAPHICAL SURVEY



Station	Easting	Northing	Level
1	383187.693	394441.942	29.789
2	383189.202	394413.833	29.771

0 2 4 6 8 10 20m

SCALE 1:200

Abbreviations/Symbols (Measured Building Surveys):

C:	Window Cill Height
H:	Window Head Height
BH:	Beam Height
DH:	Door Height
COL:	Column
SVP:	Soil Vent Pipe
FL:	Floor Level
TH:	Threshold Level
2.50	Floor to Ceiling Height
	Vaulted Ceiling

Line types

	Hedge Lines
	Drainage Runs
	Overhead Electricity Cables
	Overhead Telephone Cables

Symbols

	Tree/Bush		Glass House
	Control Station		Osbm
	Borehole		
	Trial Hole		

Abbreviations (Topographic Survey):

AH:	Arch Height
AV:	Air Valve
BB:	Belisha Beacon
BOX:	Electricity Box, Cables Box, Etc.
BOL:	Bollard
BT/IC:	British Telecom Inspection Chamber
BS:	Bus Stop
BS/LP:	Bus Stop / Lamp Post
CATV:	CATV Inspection Chamber
CCTV:	Closed Circuit Television
CL:	Cellar Light
C.PIT:	Catch Pit
ER:	Earth Rod
EC:	Electricity Inspection Chamber
EP:	Electricity Pole
FH:	Fire Hydrant
FP:	Flag Pole
GV:	Gas Valve
G:	Gully
IC:	Inspection Chamber
KO:	Kerb Outlet
LP:	Lamp Post
LB:	Letter Box
LC:	Lighting Column
MKR:	Marker
MH:	Manhole
MP:	Mooring Point
MS:	Mile Stone
NYNEX:	Nynex Inspection Chamber
O/H:	Over Hang
P:	Post
PO/IC:	Post Office Inspection Chamber
R/S:	Road Sign
RE:	Rodding Eye
RTW:	Retaining Wall
S/P:	Sign Post
SNP:	Street Name Plate
ST:	Stop Tap
SV:	Stop Valve
T:	Telecom Inspection Chamber
TCB:	Telephone Call Box
TH:	Threshold Level
TL:	Traffic Light
TP:	Telegraph Pole
TROUGH:	Trough
WO:	Water Outlet
WM:	Water Meter

Fence Descriptions:

B/W:	Barbed Wire
C/B:	Close Boarded
C/BARRIER:	Crash Barrier
C/L:	Chain Link
C/P:	Chestnut Paling
C/I:	Corrugated Iron
I/R:	Iron Railing
MISC:	Miscellaneous
P/R:	Post & Rail
P/W:	Post & Wire
P/C:	Post & Chain
S/PAL:	Steel Palisade
W/M:	Wire Mesh

Survey Notes:

Coordinates and Levels related to Ordnance Survey Datum - GPS OSGB36

Revision	Date	Description

CPLS

ices

Chris Partington Land Surveyors

44a Green Lane
Sale
Cheshire
M33 5PP
t: 0161 976 1194
www.cpls.co.uk e:survey@cpls.co.uk

Client

Artform Architects

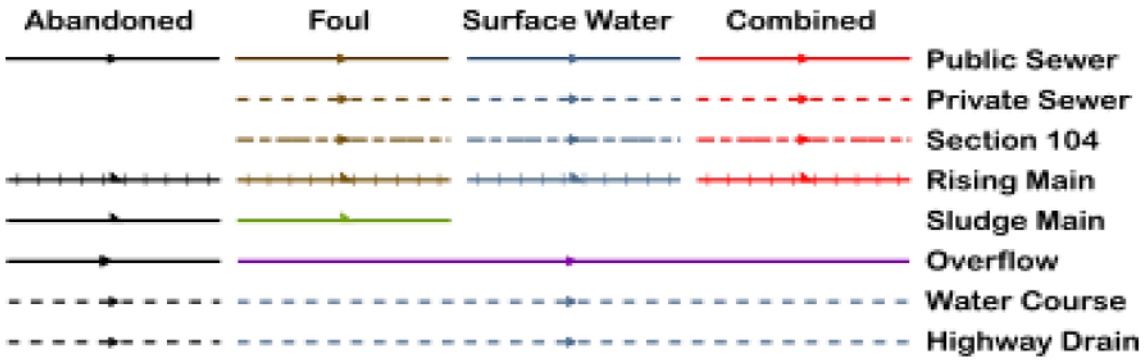
Project

English Martyrs Tennis Club, Whalley Range
Site Survey

Scale	1:200	Surveyed By	C G P
		Date	10.01.18
Drawing No.		Checked By	CPLS
		Date	11.01.18
110118CP-01		Drawn By	J C
		Date	11.01.18

APPENDIX C – PUBLIC SEWER RECORDS

Wastewater Symbology



All point assets follow the standard colour convention: red – combined, brown - foul, blue – surface water, purple - overflow

- Manhole
- HS Head of System
- ES Extent of Survey
- RE Rodding Eye
- IN Inlet
- DP Discharge Point
- HY Vortex
- PE Penstock
- WO Washout Chamber
- VA Valve
- AV Air Valve
- NRV Non Return Valve
- SO Soakaway
- GU Gully
- CA Cascade
- FM Flow Meter
- HA Hatch Box
- OI Oil Interceptor
- SM Summit
- DS Drop Shaft
- OP Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- IC Inspection Chamber
- Bifurcation Chamber
- LH Lamp Hole
- T Junction / Saddle
- CA Catchpit
- VC Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- T Network Storage Tank
- V Sewer Overflow
- WwTW Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- CK Control Kiosk
- Change of Characteristic



United Utilities
helping life flow smoothly

SEWER RECORDS

Address or Site Reference

57 ALNESS ROAD,
MANCHESTER,
M16 8HW

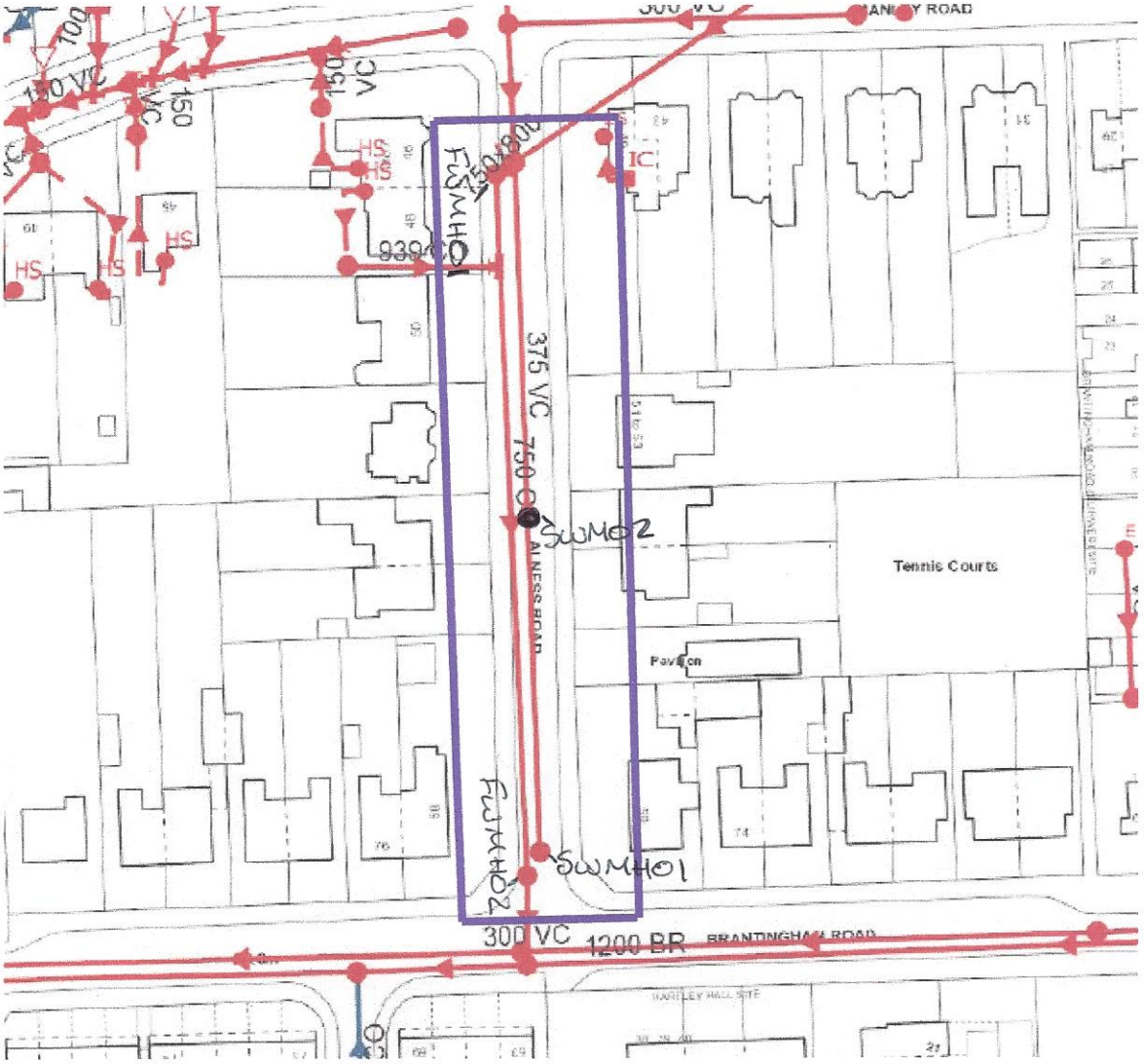
Scale: 1:1250
Date: 17/05/2019

Printed by: Property Searches

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

Crown copyright and database rights 2017 Ordnance Survey 100022432. Unauthorised reproduction will infringe these copyrights.

APPENDIX D – CCTV SURVEY OF PRIVATE DRAINAGE NETWORK


FWMH01
SWMH02
SWMH01
FWMH02
375 VC
750 CO
300 VC
1200 BR
BRANTINGHAM ROAD
ALNESS ROAD
Tennis Courts
Pavilion
HS
IC

English Martyrs 2 - CCTV Survey Report : 19/09/19

Name :	NORTH WEST DRAIN SERVICES LTD
Contact :	
Location :	Unit G10 Falcon Mill
Town :	Bolton
Region :	Lancashire
Postcode :	BL1 8BL
Tel :	01204 689677
Mobile :	07756631110 / 07429611080
Email :	drainservices@googlemail.com
Fax :	

Client Information

Name :	Mai Construction
Contact :	
Location :	
Town :	
Region :	
Postcode :	
Tel :	
Mobile :	
Email :	
Fax :	

Site Information

Name :	English Martyrs
Contact :	
Location :	Alness Road
Town :	Whalley Range
Region :	Manchester
Postcode :	M16 8HW
Tel :	
Mobile :	
Email :	
Fax :	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	1	Grade 3 Defects	0	Grade 4 Defects	1	Grade 5 Defects	0

Graded defect count per section

This section shows the number of graded defects per individual survey. A grade 5 defect being serious and indicating more urgent repair. Grade 3-4 defects are less serious and are less urgent concerning repair. Grade 1-2 defects are relatively minor and could be monitored and/or repaired if thought necessary.

Section: 1 **Start:** FWMH01 **End:** FWMH02 **Road:** Alness Road

Length: 114 **Use:** Foul **Depth:** 3300 **Place:** Whalley Range

From To	Dia	Material	G1 - 2	G3 - 4	G5
00.00m - 114.00m	750	Concrete	0	1	0

Section: 2 **Start:** SWMH02 **End:** SWMH01 **Road:** Alness Road

Length: 50.1 **Use:** Surface Water **Depth:** 1600 **Place:** Whalley Range

From To	Dia	Material	G1 - 2	G3 - 4	G5
00.00m - 10.90m	300	Vitrified Clay (i.e. all clayware)	1	0	0
10.90m - 50.10m	225	Vitrified Clay (i.e. all clayware)	0	0	0

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	1	Grade 3 Defects	0	Grade 4 Defects	1	Grade 5 Defects	0

Site: Alness Road Whalley Range

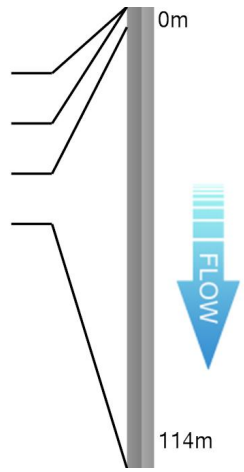
Section 1

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
Mai Construction	Alness Road	Whalley Range		Tony Pritchard	19/09/2019

Start Node Ref:	FWMH01	Finish Node Ref:	FWMH02	Direction:	D	Height/Dia:	750
Start Node Depth:	3300	Finish Node Depth:	4600	Use:	F	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	CO	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	114	

Position	Code	Description	CD	Pic	Grade
00.00m	MH	Start node type, manhole			0
00.00m	WL	Water level 0%			0
05.00m	RMJ	Mass of roots 10% at joint		0_2	4
114.00	MHF	Finish node type, manhole			0



Total grades for project

Grade 1 Defects	0	Grade 2 Defects	1	Grade 3 Defects	0	Grade 4 Defects	1	Grade 5 Defects	0

Descriptive Report with Remarks and Observation Images

Pos	Code	Description	Image
00.00m	MH	Start node type, manhole FWMH01	
00.00m	WL	Water level: 0% Height/Diameter	
05.00m	RMJ	Mass of roots: 10% Cross sectional area loss at joint - Grade 4	Image Provided - Ref: 0_2 
114.00m	MHF	Finish node type, manhole FWMH02	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	1	Grade 3 Defects	0	Grade 4 Defects	1	Grade 5 Defects	0

Site: Alness Road Whalley Range

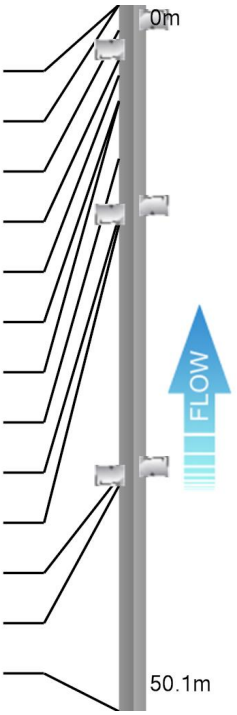
Section 2

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
Mai Construction	Alness Road	Whalley Range		Tony Pritchard	19/09/2019

Start Node Ref:	SWMH02	Finish Node Ref:	SWMH01	Direction:	U	Height/Dia:	300
Start Node Depth:	1600	Finish Node Depth:	1300	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	50.1	

Position	Code	Description	CD	Pic	Grade
00.00m	MH	Start node type, manhole			0
00.00m	WL	Water level 0%			0
01.80m	JN	Junction 9 : 150mm Diameter			0
03.90m	JN	Junction 3 : 150mm Diameter			0
05.00m	WL	S1 Water level 10%	S1	1_4	0
06.80m	WL	F1 Water level 10%	F1		0
06.90m	CL	Crack, longitudinal 12		1_5	2
10.90m	SC	Dimension of drain/sewer changes : 225mm Diameter			0
15.00m	JN	Junction 9 : 150mm Diameter			0
15.60m	JN	Junction 3 : 150mm Diameter			0
33.50m	JN	Junction 9 : 150mm Diameter			0
34.10m	JN	Junction 3 : 150mm Diameter			0
50.10m	MHF	Finish node type, manhole			0



Total grades for project

Grade 1 Defects	0	Grade 2 Defects	1	Grade 3 Defects	0	Grade 4 Defects	1	Grade 5 Defects	0

Descriptive Report with Remarks and Observation Images

Total grades for project

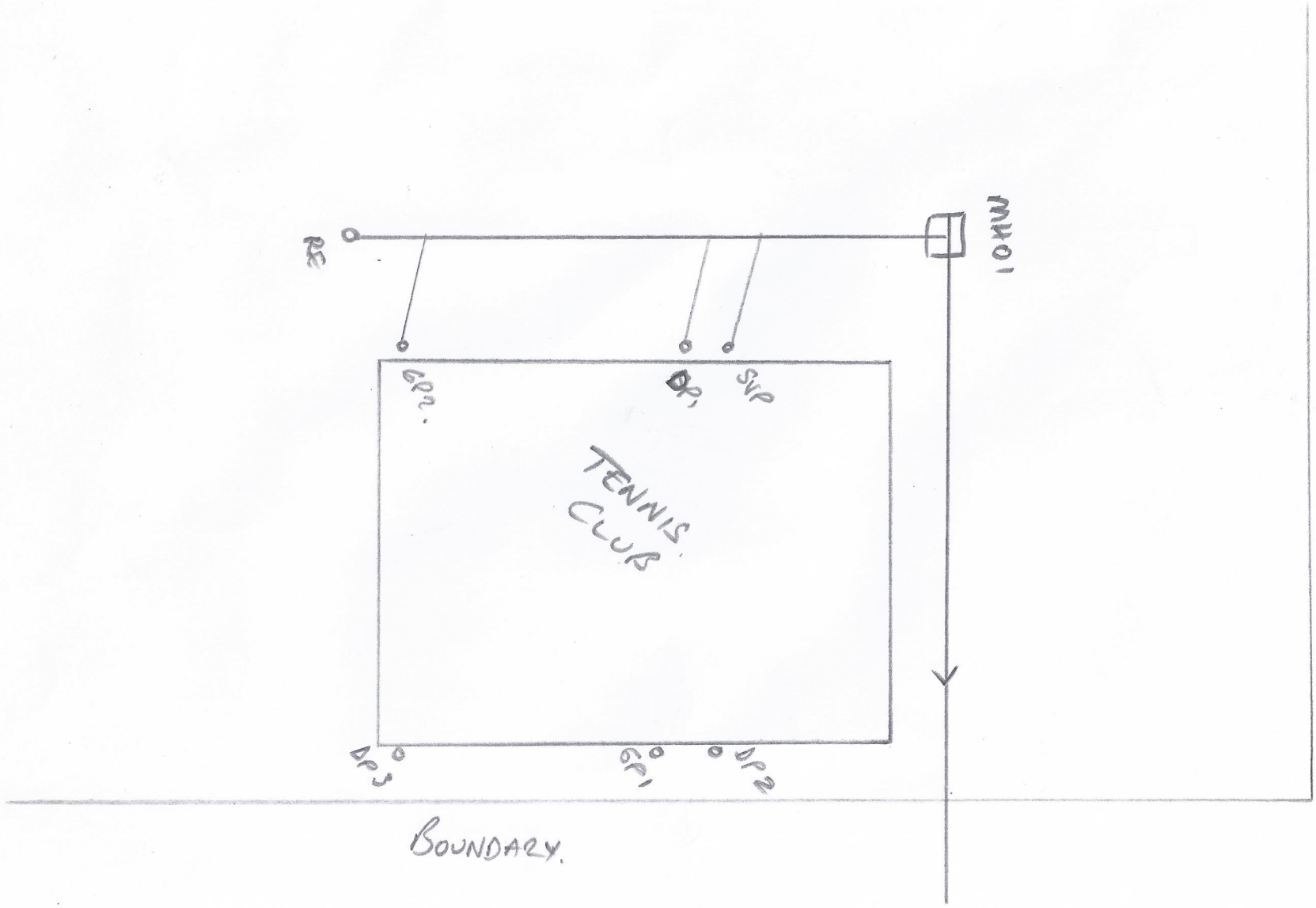
Grade 1 Defects	0	Grade 2 Defects	1	Grade 3 Defects	0	Grade 4 Defects	1	Grade 5 Defects	0

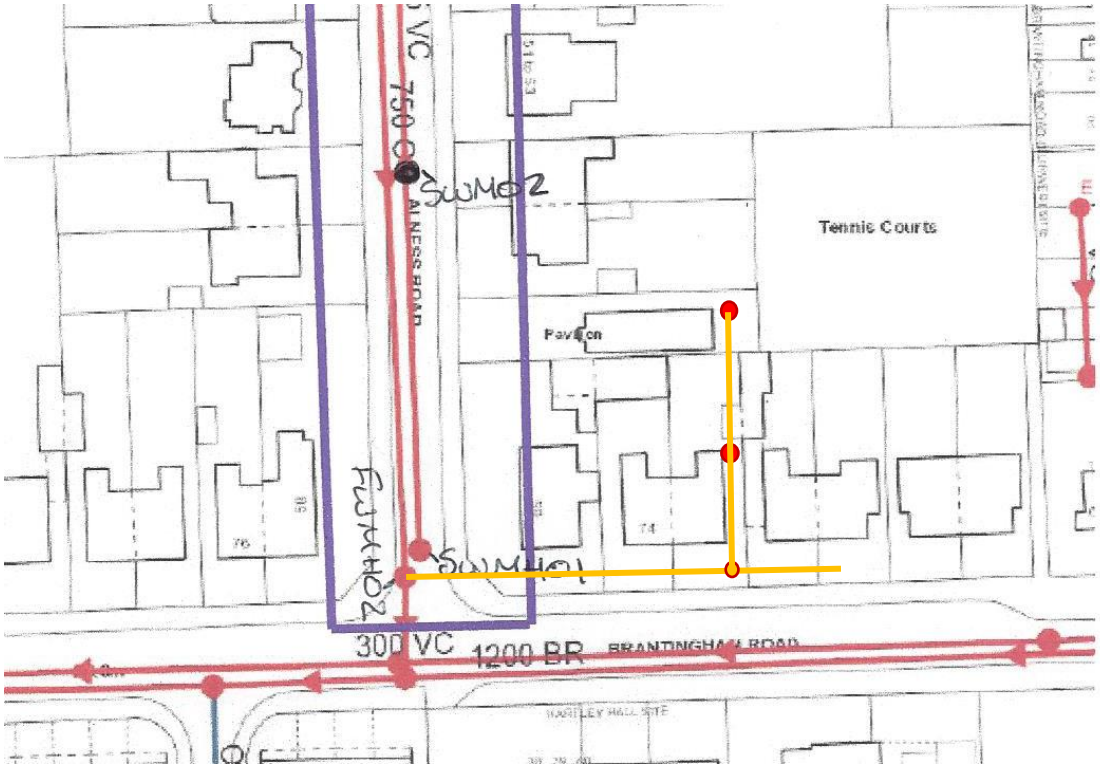
Pos	Code	Description	Image
00.00m	MH	Start node type, manhole SWMH02	
00.00m	WL	Water level: 0% Height/Diameter	
01.80m	JN	Junction at 9 o'clock: 150mm Diameter	
03.90m	JN	Junction at 3 o'clock: 150mm Diameter	
05.00m	S1 WL	Water level5m - 6.8m: 10% Height/Diameter	Image Provided - Ref: 1_4 
06.80m	F1 WL	Water levelDefect End: 10% Height/Diameter	
06.90m	CL	Crack, longitudinal at 12 o'clock - Grade 2	Image Provided - Ref: 1_5 
10.90m	SC	Dimension of drain/sewer changes: 225mm Diameter	
15.00m	JN	Junction at 9 o'clock: 150mm Diameter	
15.60m	JN	Junction at 3 o'clock: 150mm Diameter	
33.50m	JN	Junction at 9 o'clock: 150mm Diameter	
34.10m	JN	Junction at 3 o'clock: 150mm Diameter	
50.10m	MHF	Finish node type, manhole SWMH01	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	1	Grade 3 Defects	0	Grade 4 Defects	1	Grade 5 Defects	0

WHALLEY RANGE
TENNIS CLUB.




Tennis Courts
Pavilion
300 VC
1200 BR
BRANDINGHAM ROAD

English Martyrs - CCTV Survey Report : 04/06/19

Name :	NORTH WEST DRAIN SERVICES LTD
Contact :	
Location :	Unit G10 Falcon Mill
Town :	Bolton
Region :	Lancashire
Postcode :	BL1 8BL
Tel :	01204 689677
Mobile :	07756631110 / 07429611080
Email :	drainservices@googlemail.com
Fax :	

Client Information

Name :	Mai Construction
Contact :	
Location :	
Town :	
Region :	
Postcode :	
Tel :	
Mobile :	
Email :	
Fax :	

Site Information

Name :	English Martyrs
Contact :	
Location :	Alness Road
Town :	Whalley Range
Region :	Manchester
Postcode :	M16 8HW
Tel :	
Mobile :	
Email :	
Fax :	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Graded defect count per section

This section shows the number of graded defects per individual survey. A grade 5 defect being serious and indicating more urgent repair. Grade 3-4 defects are less serious and are less urgent concerning repair. Grade 1-2 defects are relatively minor and could be monitored and/or repaired if thought necessary.

Section: 1 **Start:** MH01 **End:** Pipe A **Road:** Alness Road
Length: 18.7 **Use:** Combined **Depth:** 980 **Place:** Whalley Range

From To	Dia	Material	G1 - 2	G3 - 4	G5
00.00m - 06.80m	150	Vitrified Clay (i.e. all clayware)	1	1	0
06.80m - 18.70m	100	Vitrified Clay (i.e. all clayware)	0	0	0

Section: 2 **Start:** MH01 **End:** Z **Road:** Alness Road
Length: 7.3 **Use:** Combined **Depth:** 980 **Place:** Whalley Range

From To	Dia	Material	G1 - 2	G3 - 4	G5
00.00m - 07.30m	150	Vitrified Clay (i.e. all clayware)	3	0	0

Section: 3 **Start:** FWMH01 **End:** FWMH02 **Road:** Alness Road
Length: 19.5 **Use:** Foul **Depth:** 0 **Place:** Whalley Range

From To	Dia	Material	G1 - 2	G3 - 4	G5
00.00m - 19.50m	150	Vitrified Clay (i.e. all clayware)	7	3	0

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Site: Alness Road Whalley Range

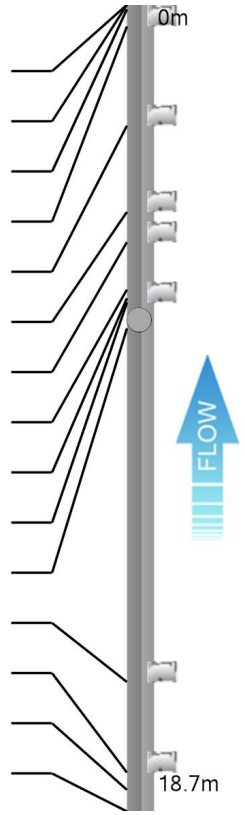
Section 1

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
Mai Construction	Alness Road	Whalley Range		Tony Pritchard	04/06/2019

Start Node Ref:	MH01	Finish Node Ref:	Pipe A	Direction:	U	Height/Dia:	150
Start Node Depth:	980	Finish Node Depth:	0	Use:	C	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	18.7	

Position	Code	Description	CD	Pic	Grade
00.00m	MH	Start node type, manhole			0
00.00m	WL	Water level 0%			0
00.10m	RMJ	Mass of roots 15% at joint		0_2	4
00.50m	JN	Junction 9 : 100mm Diameter		0_3	0
02.80m	JN	Junction 9 : 100mm Diameter			0
04.80m	JN	Junction 9 : 100mm Diameter			0
05.50m	JN	Junction 9 : 100mm Diameter			0
06.60m	JD	Joint displaced medium		0_7	2
06.80m	SC	Dimension of drain/sewer changes : 100mm Diameter			0
06.90m	JN	Junction 9 : 100mm Diameter			0
07.50m	JN	Junction 12 : 100mm Diameter			0
15.70m	JN	Junction 9 : 100mm Diameter			0
17.80m	JN	Junction 9 : 100mm Diameter			0
18.20m	LUF	Line of drain/sewer deviates up [full]			0
18.70m	REF	Finish node type, rodding eye			0



Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Descriptive Report with Remarks and Observation Images

Pos	Code	Description	Image
00.00m	MH	Start node type, manhole MH01	
00.00m	WL	Water level: 0% Height/Diameter	
00.10m	RMJ	Mass of roots: 15% Cross sectional area loss at joint - Grade 4	Image Provided - Ref: 0_2 
00.50m	JN	Junction at 9 o'clock: 100mm Diameter Roots Growing Into Line From Junction	Image Provided - Ref: 0_3 
02.80m	JN	Junction at 9 o'clock: 100mm Diameter	
04.80m	JN	Junction at 9 o'clock: 100mm Diameter	
05.50m	JN	Junction at 9 o'clock: 100mm Diameter	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Pos	Code	Description	Image
06.60m	JDM	Joint displaced medium - Grade 2	Image Provided - Ref: 0_7 
06.80m	SC	Dimension of drain/sewer changes: 100mm Diameter	
06.90m	JN	Junction at 9 o'clock: 100mm Diameter	
07.50m	JN	Junction at 12 o'clock: 100mm Diameter	
15.70m	JN	Junction at 9 o'clock: 100mm Diameter	
17.80m	JN	Junction at 9 o'clock: 100mm Diameter	
18.20m	LUF	Line of drain/sewer deviates up [full]	
18.70m	REF	Finish node type, rodding eye Pipe A	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Site: Alness Road Whalley Range

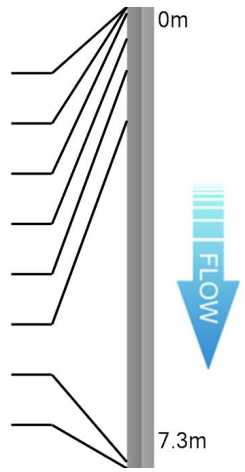
Section 2

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
Mai Construction	Alness Road	Whalley Range		Tony Pritchard	04/06/2019

Start Node Ref:	MH01	Finish Node Ref:	Z	Direction:	D	Height/Dia:	150
Start Node Depth:	980	Finish Node Depth:	0	Use:	C	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	7.3	

Position	Code	Description	CD	Pic	Grade
00.00m	MH	Start node type, manhole			0
00.00m	WL	Water level 0%			0
00.10m	RFJ	Fine Roots 10% at joint		1_2	2
00.50m	DES	Settled deposits fine 20%		1_3	2
01.00m	WL	Water level 30%		1_4	0
01.80m	CUW	Loss of vision, camera under water		1_5	0
07.20m	DES	Settled deposits fine 50%		1_6	2
07.30m	SA	Survey abandoned			0



Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Descriptive Report with Remarks and Observation Images

Pos	Code	Description	Image
00.00m	MH	Start node type, manhole MH01	
00.00m	WL	Water level: 0% Height/Diameter	
00.10m	RFJ	Fine Roots: 10% Cross sectional area loss at joint - Grade 2	Image Provided - Ref: 1_2 
00.50m	DES	Settled deposits fine: 20% Cross sectional area loss - Grade 2	Image Provided - Ref: 1_3 
01.00m	WL	Water level: 30% Height/Diameter	Image Provided - Ref: 1_4 

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Pos	Code	Description	Image
01.80m	CUW	Loss of vision, camera under water	Image Provided - Ref: 1_5 
07.20m	DES	Settled deposits fine: 50% Cross sectional area loss - Grade 2	Image Provided - Ref: 1_6 
07.30m	SA	Survey abandoned Abandoned Due To Silt And Debris	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Site: Alness Road Whalley Range

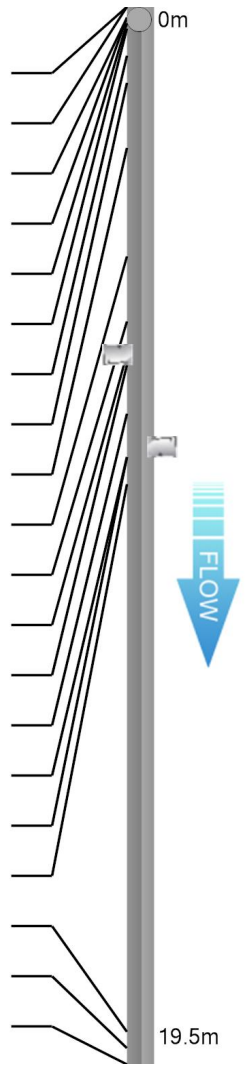
Section 3

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
Mai Construction	Alness Road	Whalley Range		Tony Pritchard	04/06/2019

Start Node Ref:	FWMH01	Finish Node Ref:	FWMH02	Direction:	D	Height/Dia:	150
Start Node Depth:	0	Finish Node Depth:	0	Use:	F	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	19.5	

Position	Code	Description	CD	Pic	Grade
00.00m	MH	Start node type, manhole			0
00.00m	WL	Water level 0%			0
00.20m	RFJ	Fine Roots 15% at joint		2_2	2
00.20m	CMJ	Cracks, multiple 11-1 at joint		2_3	3
00.30m	JN	Junction 12 : 150mm Diameter			0
00.40m	WL	S1 Water level 10%	S1	2_5	0
00.90m	WL	F1 Water level 10%	F1		0
01.40m	CCJ	Crack, circumferential 12-12 at joint		2_6	2
02.60m	JD	Joint displaced medium		2_7	2
04.60m	JD	Joint displaced medium		2_8	2
05.80m	CCJ	Crack, circumferential 12-12 at joint		2_9	2
06.40m	CMJ	Cracks, multiple 12-12 at joint		2_10	3
06.60m	JN	Junction 3 : 150mm Diameter			0
07.50m	CCJ	Crack, circumferential 12-12 at joint		2_12	2
08.30m	JN	Junction 9 : 150mm Diameter			0
08.30m	DER	Settled deposits coarse 25%		2_14	3
08.80m	CCJ	Crack, circumferential 12-12 at joint		2_15	2
18.90m	LLQ	Line of drain/sewer deviates left [quarter]			0
19.20m	LLQ	Line of drain/sewer deviates left [quarter]			0
19.50m	MHF	Finish node type, manhole			0



Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Descriptive Report with Remarks and Observation Images

Pos	Code	Description	Image
00.00m	MH	Start node type, manhole FWMH01	
00.00m	WL	Water level: 0% Height/Diameter	
00.20m	RFJ	Fine Roots: 15% Cross sectional area loss at joint - Grade 2	Image Provided - Ref: 2_2 
00.20m	CMJ	Cracks, multiple from 11 o'clock to 1 o'clock at joint - Grade 3	Image Provided - Ref: 2_3 
00.30m	JN	Junction at 12 o'clock: 150mm Diameter	
00.40m	S1 WL	Water level0.4m - 0.9m: 10% Height/Diameter	Image Provided - Ref: 2_5 
00.90m	F1 WL	Water levelDefect End: 10% Height/Diameter	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Pos	Code	Description	Image
01.40m	CCJ	Crack, circumferential from 12 o'clock to 12 o'clock at joint - Grade 2	Image Provided - Ref: 2_6 
02.60m	JDM	Joint displaced medium - Grade 2	Image Provided - Ref: 2_7 
04.60m	JDM	Joint displaced medium - Grade 2	Image Provided - Ref: 2_8 

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Pos	Code	Description	Image
05.80m	CCJ	Crack, circumferential from 12 o'clock to 12 o'clock at joint - Grade 2	Image Provided - Ref: 2_9 
06.40m	CMJ	Cracks, multiple from 12 o'clock to 12 o'clock at joint - Grade 3	Image Provided - Ref: 2_10 
06.60m	JN	Junction at 3 o'clock: 150mm Diameter	
07.50m	CCJ	Crack, circumferential from 12 o'clock to 12 o'clock at joint - Grade 2	Image Provided - Ref: 2_12 
08.30m	JN	Junction at 9 o'clock: 150mm Diameter	

Total grades for project

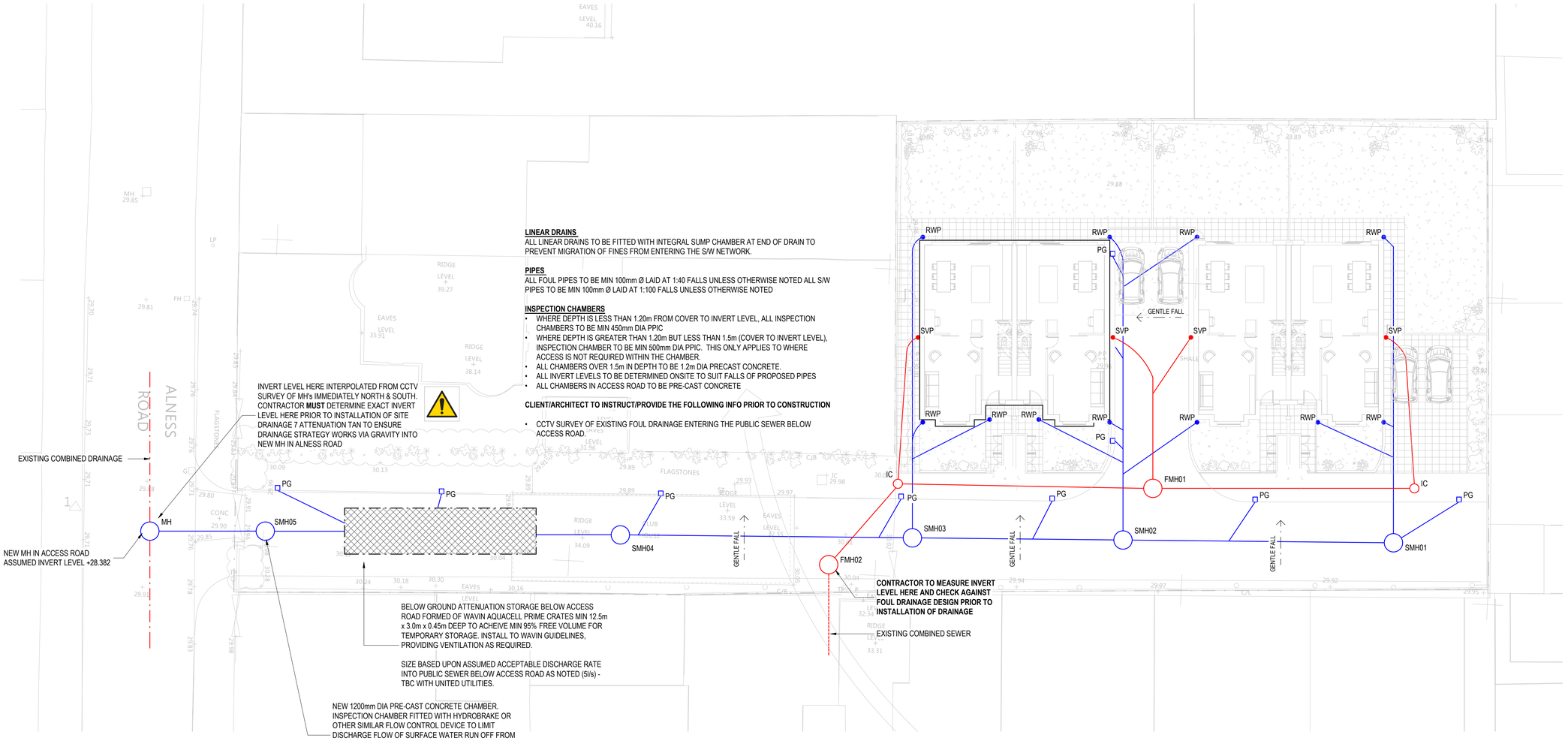
Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

Pos	Code	Description	Image
08.30m	DER	Settled deposits coarse: 25% Cross sectional area loss - Grade 3 Debris Coming From Junction Line	Image Provided - Ref: 2_14 
08.80m	CCJ	Crack, circumferential from 12 o'clock to 12 o'clock at joint - Grade 2	Image Provided - Ref: 2_15 
18.90m	LLQ	Line of drain/sewer deviates left [quarter]	
19.20m	LLQ	Line of drain/sewer deviates left [quarter]	
19.50m	MHF	Finish node type, manhole FWMH02	

Total grades for project

Grade 1 Defects	0	Grade 2 Defects	11	Grade 3 Defects	3	Grade 4 Defects	1	Grade 5 Defects	0

APPENDIX E – PROPOSED DRAINAGE STRATEGY LAYOUT PLAN



LINEAR DRAINS
ALL LINEAR DRAINS TO BE FITTED WITH INTEGRAL SUMP CHAMBER AT END OF DRAIN TO PREVENT MIGRATION OF FINES FROM ENTERING THE S/W NETWORK.

PIPES
ALL FOUL PIPES TO BE MIN 100mm Ø LAID AT 1:40 FALLS UNLESS OTHERWISE NOTED ALL S/W PIPES TO BE MIN 100mm Ø LAID AT 1:100 FALLS UNLESS OTHERWISE NOTED

INSPECTION CHAMBERS
- WHERE DEPTH IS LESS THAN 1.20m FROM COVER TO INVERT LEVEL, ALL INSPECTION CHAMBERS TO BE MIN 450mm DIA PPIC
- WHERE DEPTH IS GREATER THAN 1.20m BUT LESS THAN 1.5m (COVER TO INVERT LEVEL), INSPECTION CHAMBER TO BE MIN 500mm DIA PPIC. THIS ONLY APPLIES TO WHERE ACCESS IS NOT REQUIRED WITHIN THE CHAMBER.
- ALL CHAMBERS OVER 1.5m IN DEPTH TO BE 1.2m DIA PRECAST CONCRETE.
- ALL INVERT LEVELS TO BE DETERMINED ONSITE TO SUIT FALLS OF PROPOSED PIPES
- ALL CHAMBERS IN ACCESS ROAD TO BE PRE-CAST CONCRETE

CLIENT/ARCHITECT TO INSTRUCT/PROVIDE THE FOLLOWING INFO PRIOR TO CONSTRUCTION

- CCTV SURVEY OF EXISTING FOUL DRAINAGE ENTERING THE PUBLIC SEWER BELOW ACCESS ROAD.

PROPOSED DRAINAGE LAYOUT

SCALE: 1 : 150

GENERAL NOTES:

1. THIS DRAWING IS COPYRIGHT AND THE PROPERTY OF JEM CONSULTING ENGINEERS LTD AND IS NOT TO BE COPIED IN WHOLE OR IN PART EXCEPT UNDER A WRITTEN AGREEMENT.
2. DO NOT SCALE THIS DRAWING. ANY DISCREPANCY IS TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
4. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE
5. ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND SAFETY AT WORK ACT ARE SATISFIED.
6. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

DRAINAGE LEGEND:

SMH — DENOTES PROPOSED SURFACE WATER MANHOLE (600mm & 1200mm Ø AS NOTED)

RWP — DENOTES RAINWATER PIPE (150mm Ø U.N.O)

FMH — DENOTES PROPOSED FOUL WATER MANHOLE (600mm & 1200mm Ø AS NOTED)

IC — DENOTES PROPOSED FOUL INSPECTION CHAMBER/MANHOLE

SVP — DENOTES SOIL VENT PIPE (150mm Ø U.N.O)

DENOTES LOCATION OF LINEAR DRAINS. ALL LINEAR DRAINS TO BE FITTED WITH INTEGRAL SUMP CHAMBER AT END OF DRAIN TO PREVENT MIGRATION OF FINES FROM ENTERING THE S/W NETWORK..

PG — DENOTES PROPOSED GULLY & 100mm Ø CONNECTION U.N.O

Rev:	Description:	Date:	By:	Chkd:
A	General drainage layout updated, PG introduced, Attenuation Tank size amended	29.10.19	GO	JMc
-	First Formal Issue	26.09.19	GO	JMc

JEM Consulting Engineers
South Grove, Sale, Manchester, M33 3AR
james.mackey@jemconsult.co.uk

Status: PRELIMINARY

Project: ENGLISH MARTYS TENNIS CLUB

Drg Title: PROPOSED DRAINAGE LAYOUT

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	GO	GO	JMc	JMc

Scale: As indicated

Project No:	Originator:	Type:	Role:	Category / Number:	Rev:
1809 -	JEM -	DR -	STR -	102 -	A

Model Name:Model Name

APPENDIX F – PROPOSED DRAINAGE STRATEGY CALCULATIONS

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.361	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.068	4-8	0.022

Total Area Contributing (ha) = 0.090

Total Pipe Volume (m³) = 3.004

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	16.000	0.160	100.0	0.030	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	14.300	0.143	100.0	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	22.000	0.190	115.8	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	18.800	0.300	62.7	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	10.000	0.155	64.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.20	29.330	0.030	0.0	0.0	0.0	1.31	52.0	4.1
1.001	50.00	5.39	29.170	0.060	0.0	0.0	0.0	1.31	52.0	8.1
1.002	50.00	5.69	29.027	0.075	0.0	0.0	0.0	1.21	48.3	10.2
1.003	50.00	5.88	28.837	0.090	0.0	0.0	0.0	1.65	65.8	12.2
1.004	50.00	6.01	28.537	0.090	0.0	0.0	0.0	1.25	22.2	12.2

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
sw 01	29.980	0.650	Open Manhole	1200	1.000	29.330	225				
sw 02	29.980	0.810	Open Manhole	1200	1.001	29.170	225	1.000	29.170	225	
sw 03	29.980	0.953	Open Manhole	1200	1.002	29.027	225	1.001	29.027	225	
sw 04	29.980	1.143	Open Manhole	1200	1.003	28.837	225	1.002	28.837	225	
sw 05	29.980	1.443	Open Manhole	1200	1.004	28.537	150	1.003	28.537	225	
Access Rd MH	29.980	1.598	Open Manhole	0		OUTFALL		1.004	28.382	150	

No coordinates have been specified, layout information cannot be produced.

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	sw 01	29.980	29.330	0.425	Open Manhole	1200
1.001	o	225	sw 02	29.980	29.170	0.585	Open Manhole	1200
1.002	o	225	sw 03	29.980	29.027	0.728	Open Manhole	1200
1.003	o	225	sw 04	29.980	28.837	0.918	Open Manhole	1200
1.004	o	150	sw 05	29.980	28.537	1.293	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	16.000	100.0	sw 02	29.980	29.170	0.585	Open Manhole	1200
1.001	14.300	100.0	sw 03	29.980	29.027	0.728	Open Manhole	1200
1.002	22.000	115.8	sw 04	29.980	28.837	0.918	Open Manhole	1200
1.003	18.800	62.7	sw 05	29.980	28.537	1.218	Open Manhole	1200
1.004	10.000	64.5	Access Rd MH	29.980	28.382	1.448	Open Manhole	0

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.030	0.030	0.030
1.001	-	-	100	0.030	0.030	0.030
1.002	-	-	100	0.015	0.015	0.015
1.003	-	-	100	0.015	0.015	0.015
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.090	0.090	0.090

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	Access Rd MH	29.980	28.382	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.361		

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: sw 05, DS/PN: 1.004, Volume (m³): 2.3

Unit Reference	MD-SHE-0101-5000-1300-5000
Design Head (m)	1.300
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	101
Invert Level (m)	28.537
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	5.0	Kick-Flo®	0.798	4.0
Flush-Flo™	0.384	5.0	Mean Flow over Head Range	-	4.4

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)	Depth (m)	Flow (l/s)
0.100	3.4	0.800	4.0	2.000	6.1	4.000	8.5	7.000	11.0
0.200	4.7	1.000	4.4	2.200	6.4	4.500	9.0	7.500	11.4
0.300	4.9	1.200	4.8	2.400	6.7	5.000	9.4	8.000	11.8
0.400	5.0	1.400	5.2	2.600	6.9	5.500	9.8	8.500	12.1
0.500	4.9	1.600	5.5	3.000	7.4	6.000	10.3	9.000	12.5
0.600	4.8	1.800	5.8	3.500	7.9	6.500	10.7	9.500	12.8

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

Storage Structures for Storm

Tank or Pond Manhole: sw 05, DS/PN: 1.004

Invert Level (m) 28.537

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	37.5	0.450	37.5	0.451	0.0

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.363	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	sw 01	15 Winter	2	+0%	100/60 Winter				29.378	-0.177
1.001	sw 02	15 Winter	2	+0%	100/30 Winter				29.237	-0.158
1.002	sw 03	15 Winter	2	+0%	100/30 Winter				29.102	-0.150
1.003	sw 04	15 Winter	2	+0%	100/30 Summer				28.907	-0.155
1.004	sw 05	30 Winter	2	+0%	5/15 Winter				28.668	-0.019

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	sw 01	0.000	0.10		4.7	OK	
1.001	sw 02	0.000	0.19		8.6	OK	
1.002	sw 03	0.000	0.24		10.6	OK	
1.003	sw 04	0.000	0.21		12.6	OK	
1.004	sw 05	0.000	0.21		4.2	OK	

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.363 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	sw 01	15 Winter	5	+0%	100/60 Winter				29.384	-0.171
1.001	sw 02	15 Winter	5	+0%	100/30 Winter				29.246	-0.149
1.002	sw 03	15 Winter	5	+0%	100/30 Winter				29.113	-0.139
1.003	sw 04	15 Winter	5	+0%	100/30 Summer				28.917	-0.145
1.004	sw 05	30 Winter	5	+0%	5/15 Winter				28.710	0.023

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	sw 01	0.000	0.13		6.0	OK	
1.001	sw 02	0.000	0.24		11.1	OK	
1.002	sw 03	0.000	0.31		13.8	OK	
1.003	sw 04	0.000	0.28		16.3	OK	
1.004	sw 05	0.000	0.23		4.5	SURCHARGED	

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.363	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	sw 01	15 Winter	30	+0%	100/60 Winter				29.397	-0.158
1.001	sw 02	15 Winter	30	+0%	100/30 Winter				29.270	-0.125
1.002	sw 03	15 Winter	30	+0%	100/30 Winter				29.143	-0.109
1.003	sw 04	15 Winter	30	+0%	100/30 Summer				28.945	-0.117
1.004	sw 05	60 Winter	30	+0%	5/15 Winter				28.821	0.134

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	sw 01	0.000	0.19		8.8	OK	
1.001	sw 02	0.000	0.40		18.2	OK	
1.002	sw 03	0.000	0.51		22.5	OK	
1.003	sw 04	0.000	0.46		27.0	OK	
1.004	sw 05	0.000	0.25		4.9	SURCHARGED	

©1982-2019 Innovyze

Pickfords Wharf Clink Street London, SE1 9DG		
Date 20/10/2019 22:05 File Sw Design.MDX	Designed by MRRB Checked by	
Innovyze	Network 2019.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.363 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

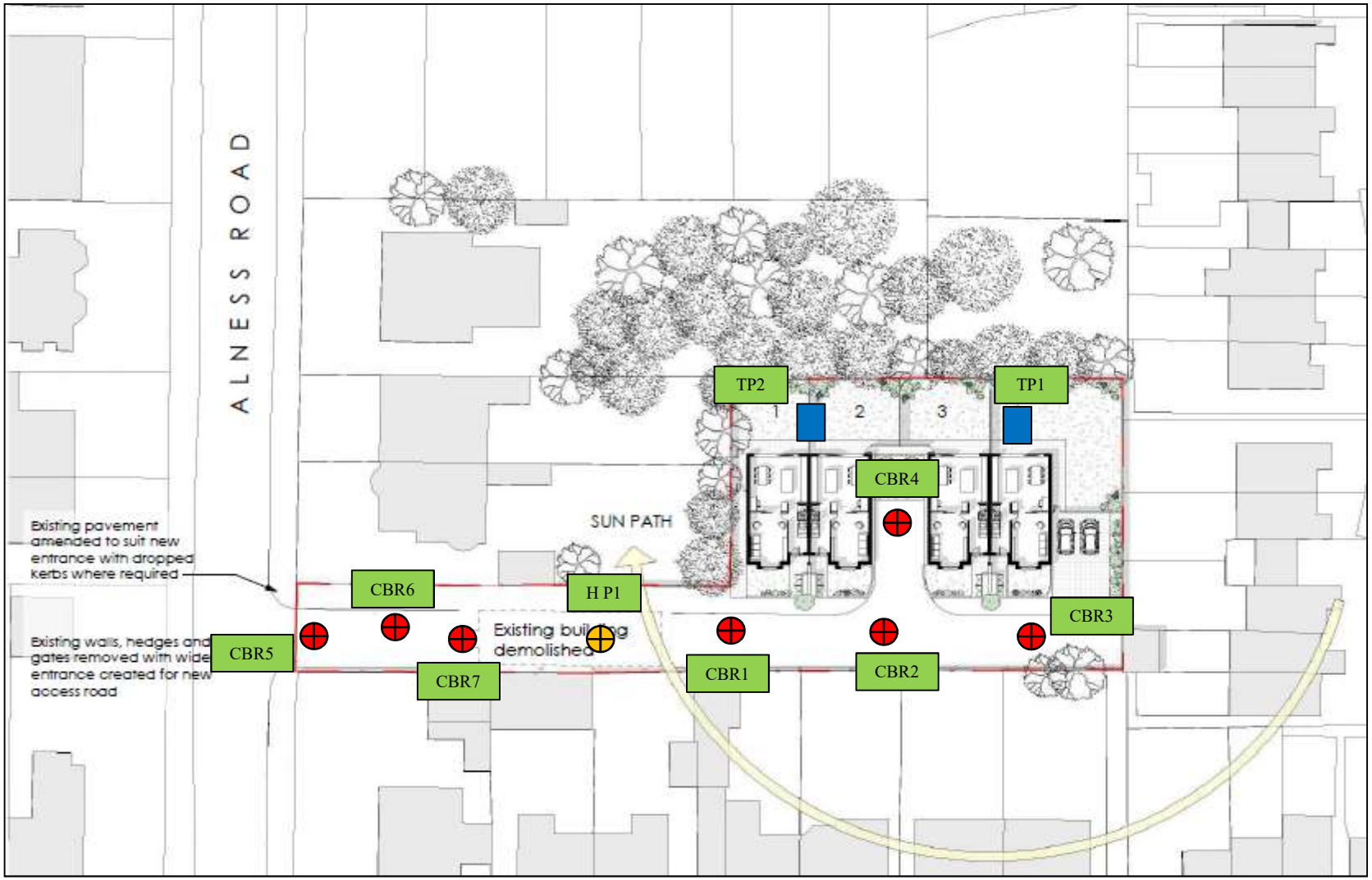
Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	sw 01	60 Winter	100	+40%	100/60 Winter				29.747	0.192
1.001	sw 02	60 Winter	100	+40%	100/30 Winter				29.744	0.349
1.002	sw 03	60 Winter	100	+40%	100/30 Winter				29.739	0.487
1.003	sw 04	60 Winter	100	+40%	100/30 Summer				29.730	0.668
1.004	sw 05	60 Winter	100	+40%	5/15 Winter				29.720	1.033

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	sw 01	0.000	0.19		8.6	FLOOD RISK	
1.001	sw 02	0.000	0.38		17.3	FLOOD RISK	
1.002	sw 03	0.000	0.49		21.5	FLOOD RISK	
1.003	sw 04	0.000	0.43		25.7	FLOOD RISK	
1.004	sw 05	0.000	0.25		5.0	FLOOD RISK	

©1982-2019 Innovyze

APPENDIX G – RESULTS OF INFILTRATION TESTING



Key

CBR test | Trial pit/Soakaway | Hand pit

Not to Scale

Approximate exploratory hole locations - Proposed Development Plan – Extract taken from Drawing provided by client.

Drawn:	Checked:	Authorised:
G Boultbee	D Daniels	C Eccles
Date: October 19	Date: October 19	Date: October 19

TerraConsult Ltd.
Bold Business Centre
Bold Lane, Sutton
St. Helens, Merseyside
WA9 4TX

TerraConsult

Client: MAI Construction

Project: English Martyrs, Manchester

Infiltration Test Report

TerraConsult

Carried out by:	Date:	Method:				Trial pit dimensions:	Before:	After:	Location:	Grid: OSGB
GB	04/10/19	BRE Digest DG 365: 2016				Length (m):	1.45	1.45	mE:	
Chkd by:	Test no:	Granular infill:	Datum height (m agl):	Depth to water: Start:	End:	Width (m):	0.63	0.63	mN:	
DD	1	None	0.00	0.82	0.83	Depth (m):	1.30	1.30	m OD:	

Elapsed time (mins):	Water depth (m below datum):	Elapsed time (mins):	Water depth (m below datum):
0	0.82		
1	0.82		
2	0.825		
3	0.825		
4	0.825		
5	0.825		
6	0.825		
7	0.825		
8	0.825		
9	0.825		
10	0.825		
22	0.83		
40	0.83		
120	0.83		
140	0.83		

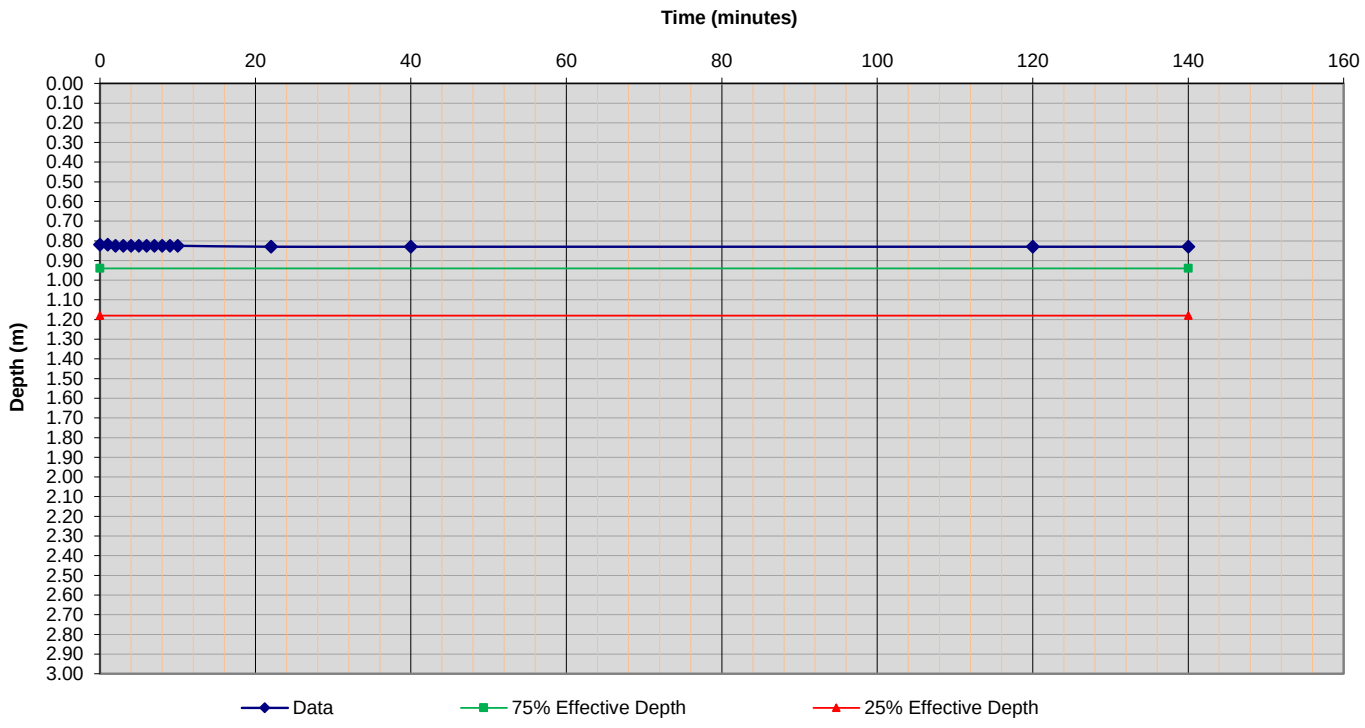
Effective depth (m):		Elapsed time (mins) (from graph):	
75%	0.94	75%	
50%	1.06		
25%	1.18	25%	

Base area of pit	0.91	m^2
Mean surface area through which outflow occurs	1.91	m^2
Volume outflow between 75 and 25% effective depth	0.22	m^3

Soil infiltration rate, f	N/A	$m^3/m^2/s$
Soil infiltration rate, f	N/A	m/hr
Percolation Value, vp	N/A	s/mm

TEST NOT VALID - INSUFFICEINT INFILTRATION TO CALCULATE RATE

Notes:
1. Test carried out in natural strata - Very soft sandy slightly gravelly CLAY.



AGS

Notes: For explanation of symbols and abbreviations see Key Sheet.
All depths in meters.

Issue: Draft

Project: English Matyrs, Manchester
Proj. No: 4738
Client: MAI Construction

Test reference: **TP1**

Infiltration Test Report

TerraConsult

Carried out by:	Date:	Method:				Trial pit dimensions:	Before:	After:	Location:	Grid: OSGB
GB	04/10/19	BRE Digest DG 365: 2016				Length (m):	1.12	1.12	mE:	
Chkd by:	Test no:	Granular infill:	Datum height (m agl):	Depth to water: Start:	End:	Width (m):	0.59	0.59	mN:	
DD	1	None	0.00	0.99	0.99	Depth (m):	1.40	1.40	m OD:	

Elapsed time (mins):	Water depth (m below datum):	Elapsed time (mins):	Water depth (m below datum):
0	0.99		
1	0.99		
2	0.985		
3	0.985		
4	0.985		
5	0.985		
6	0.985		
7	0.985		
8	0.985		
9	0.985		
10	0.985		
15	0.99		
30	0.99		
40	0.99		
50	0.99		
120	0.99		
180	0.99		
220	0.99		

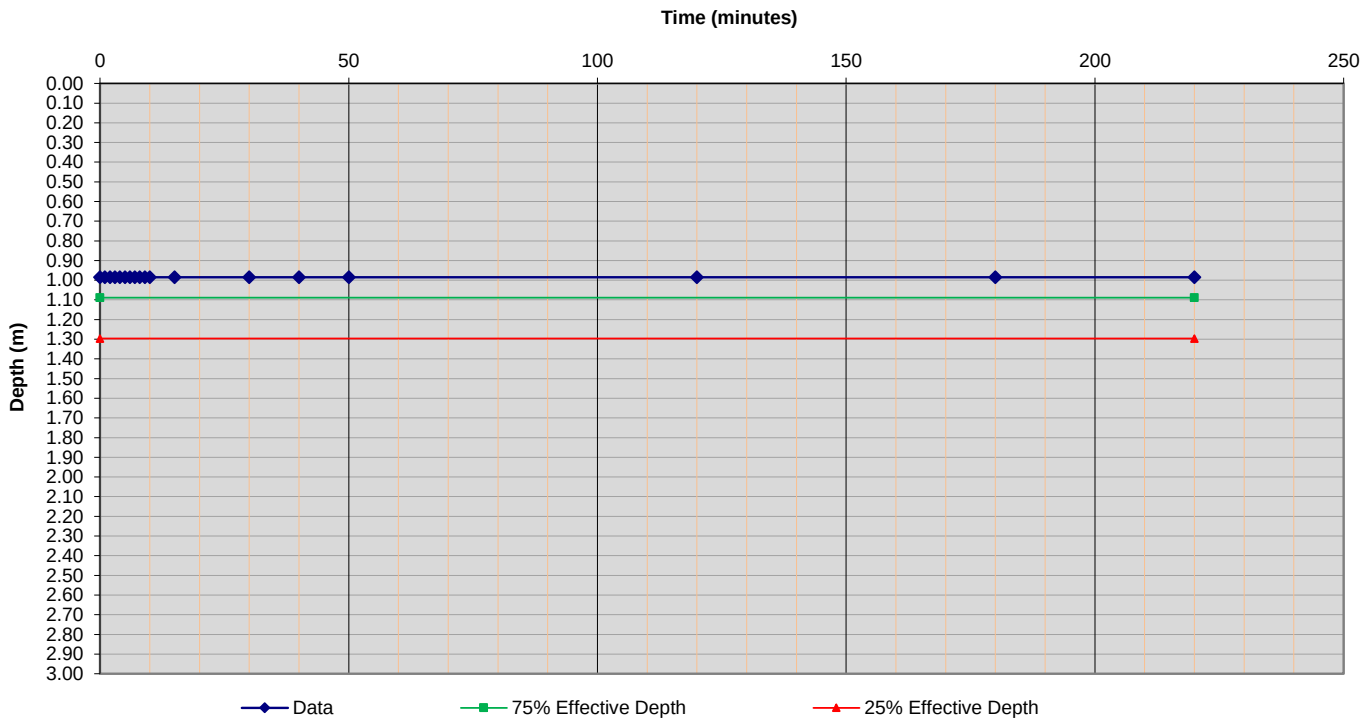
Effective depth (m):		Elapsed time (mins) (from graph):	
75%	1.09	75%	
50%	1.19		
25%	1.30	25%	

Base area of pit	0.66	m^2
Mean surface area through which outflow occurs	1.37	m^2
Volume outflow between 75 and 25% effective depth	0.14	m^3

Soil infiltration rate, f	N/A	$m^3/m^2/s$
Soil infiltration rate, f	N/A	m/hr
Percolation Value, vp	N/A	s/mm

TEST NOT VALID - INSUFFICEINT INFILTRATION TO CALCULATE RATE

Notes:
1. Test carried out in natural strata - Very soft sandy slightly gravelly CLAY.



AGS

Notes: For explanation of symbols and abbreviations see Key Sheet.
All depths in meters.

Issue: Draft

Project: English Matyrs, Manchester
Proj. No: 4738
Client: MAI Construction

Test reference: **TP2**