




SEMMMS A6 to Manchester Airport Relief Road

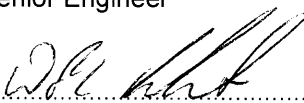
Drainage Strategy Report

1007/6.7/062



Prepared by: 
Paul Bainbridge
Senior Engineer

Checked by: 
Martin Houghton
Associate Director

Approved by: 
Bill Buckhurst
Regional Director

Rev No	Comments	Checked by	Approved by	Date
1	Issued for Information	MCBH	PJ	16.08.11
2	Revised in line with highway design Test Run 1	MCBH	BB	22.03.13
3	Revised in line with latest highway design Test Run 1, and Stockport Metropolitan Borough Council's comments	MCBH	BB	23.04.13
4	Appendix A updated. Paragraph 3.7 update.	MCBH	BB	26.04.13
5	Updated following planning review	MCBH	BB	03.10.13

Lynnfield House, Church Street , Altrincham, Cheshire, WA14 4DZ
Telephone: 0161 927 8200 Website: <http://www.aecom.com>

Job No: 60212470

Reference: 60212470 / HIG / 001

Date Created: August 2011

This document is confidential and the copyright of AECOM Limited. Any unauthorised reproduction or usage by any person other than the addressee is strictly prohibited.

Table of Contents

1	Introduction.....	2
2	Existing Drainage and Catchments	4
3	Design Approach	6
4	Results & Recommendations	9
	Appendix A – Drawings	12
	Appendix B – Calculations	12
	Appendix C – Correspondence.....	12
	Appendix A – Drawings	13
	Appendix B – Calculations	14
	Appendix C – Correspondence.....	15

1 Introduction

1 Introduction

AECOM have been commissioned by Stockport Metropolitan Borough Council to undertake the highway drainage design for the proposed A6 to Manchester Airport Relief Road (A6MARR). This proposed road is intended to link the existing A6 (Buxton Road) in Stockport to the existing Ringway Road West at Manchester Airport. This project forms part of the overall SEMMMS (South East Manchester Multi Modal Strategy) that recommends a programme of works in the South East Manchester area that includes extensions to the Metrolink system, railway improvements and major new roads. This report details the overall drainage strategy for the link road and summarises the work to date on the drainage design for this part of the overall scheme. This report shall also support the three planning applications from Stockport Metropolitan Borough Council, Manchester City Council and Cheshire East Council.

Refer to **Appendix A** for drawings showing the part of the A6MARR scheme that this project covers.

The agreed deliverables of this design are to be achieved with the following actions;

1. Review existing drainage information and highlight any additional information that is required.
2. Consultation with the Environmental Consultant for the scheme (Mouchel) and the Environment Agency. Determine any restrictions on peak flow rates and storage requirements based on these consultations. Consultation with United Utilities to discuss any capacity issues with the public sewers that we intend to connect to, and subsequent flow restrictions.
3. Define design parameters based on 1 and 2. Design drainage networks, attenuate necessary flows (any attenuated flows will either be based on Greenfield runoff rates or on input from the Environment Agency and/or United Utilities.)
4. Produce proposed drainage scheme based on existing information and the aforementioned consultations, and latest highway design (Test Run 1). Provide plans of pipe networks, details on attenuation methods used and storage volumes and methods.
5. The drainage scheme is at a preliminary design stage, therefore recommendations shall be made in this report as to what additional work is required to progress the preliminary design to to construction information, by the appointed Contractor.
 - In summary, this design has been developed in sufficient detail to ensure;It can be constructed.
 - Will satisfy Planning Policy Statement 25, specifically on design parameters relating to storage requirements, water quality and outfall criteria.

Consequently any future assessments or design development does not represent a lack of information at this stage, nor does it represent an incomplete design at present. The drainage design principles set out in this design package will be adhered for any future designs.

2 Existing Drainage and Catchments

2 Existing Drainage and Catchments

Areas of the scheme that are greenfield currently discharge to several watercourses / tributaries. The major watercourses such as Lady Brook and Norbury Brook are shown on the drawings in the Appendices.

There are several locations where existing drainage networks are evident, in areas where there is existing highway infrastructure. For example, the section of the existing A555 between Woodford Road and Wilmslow Road.

The existing catchments within the scheme limits are shown in **Appendix A: Drawings 60212470-HIG-0531 to 0532**. How these catchments have been used to determine allowable runoff rates for the proposed link road as it replaces existing greenfield areas is discussed in **Section 3 Design Approach**.

There are a number of public sewers that need to be considered in the drainage design. Discussions have taken place between AECOM and the United Utilities Planning Liaison Team (Neil O'Brien and Daniel McDermott). Records of these discussions are shown in Appendix C.

There are several outfalls on the scheme that discharge into watercourses / tributaries that are an Environment Agency asset. Refer to **Appendix C: EA Letter 18/05/2011**, that confirms a number of proposals AECOM had presented them with in reference to the drainage design strategy and the flood risk assessment. The one that relates to this report is the method of determining existing greenfield runoff rates. This letter confirms the use of the Institute of Hydrology Report No. 124: Flood Estimation for Small Catchments is acceptable in determining greenfield runoff rate. How this method is used to determine proposed flow rates from the proposed highway drainage is discussed in **Section 3 Design Approach**. Further details of the discussions with United Utilities are also included in this section.

3 Design Approach

3 Design Approach

The proposed drainage networks have been modelled using Microdrainage software.

3.1 Attenuation

For the catchments that are more than 75% permeable, the method of determining the rural runoff rate is the Institute of Hydrology Report 124: Flood Estimation for Small Catchments (IH124 Method). This is carried out using Microdrainage Source Control Software, which allows the user to input the variables needed to calculate the rural runoff for specific return periods. Calculation 60212470-CALC-003 (in **Appendix B**) summarizes this method and relates to each part of the scheme.

This is the basis of the proposed flow rates from the new highway as it outfalls to various watercourses throughout the route. It has been agreed in principle with The Environment Agency that all proposed outfalls into any Environment Agency assets will be restricted to the rural runoff peak flow as calculated using the IH124 method. This is following AECOM's initial consultation meeting with Sandrine Thomas (Environment Agency) on 19th April 2011.

3.2 Storm Return Periods

The Design Manual for Roads and Bridges (DMRB), Volume 4 Section 2 Part 3 (HD 33/06 Surface and Sub-Surface Drainage Systems for Highways) states that sealed carrier drains must be designed for a return period of one year with no surcharge. The networks must also be designed to ensure that surcharge levels for the return period of 5 years do not exceed the cover levels of the manhole / catchpit chambers. An allowance for climate change of 20% is also included.

CIRIA C697 The SUDS Manual, states the drainage system should be designed to cater for the 30 year return period without causing significant unplanned flooding. It also states that for the 100 year return period, protection against flooding from any watercourse also needs to be considered. Therefore any online storage directly upstream of a watercourse has been designed to accommodate the maximum water level for the 100 year return period critical storm.

3.3 The proposed drainage layouts

The highway runoff from the proposed highway will be conveyed to sealed carrier drains via ancillary drainage. This ancillary drainage is in the form of slot drainage located in the proposed central reserve, and gullies located at edge of carriageway. Slot drains have been deemed appropriate due to the presence of a central concrete barrier running through the majority of the link road to minimise the cross-sectional catchment width. Refer to Appendix A Drawing 1007/DF3/TCS/198 for typical cross sections through the carriageway provided to AECOM by Stockport MBC. This will be installed as per details shown in the Manual of Contract Documents for Highway Works; Highway Construction Details. The use of kerb drains may also be employed; however the precise method of surface water collection is beyond the scope of this report and will be confirmed at detail design. Attenuated flows are being achieved using hydrobrakes. Hydrobrakes are used due to the benefits with regards to minimising the storage required. The subsequent storage required upstream of the hydrobrakes is provided by either oversized pipes/tanks or ponds. These features are detailed further on the drawings in the Appendices.

Layout of the drainage networks has been designed based on the following information;

- Layouts of the latest design Test Run 1 were provided to AECOM by Stockport Metropolitan Borough Council (MBC) in February 2013, in the form of 2 dimensional and 3 dimensional AutoCAD layouts.
- The latest topographical survey, provided to AECOM by Stockport MBC in April 2011.
- AECOM's previously issued preliminary drainage layout drawings. These were issued to Stockport MBC in August 2011, and were updated based on Test Run 1 highway design.
- Existing as built information. Networks that are connecting to an existing drainage system, be it highway drainage or public sewers are designed with this in mind. Other existing underground services, in particular existing rising mains and the existing oil pipeline line from the Oil refinery located to the west of Woodford Road have been considered. Existing drainage that is relevant to the scheme is detailed further in Section 4 of this document.

3.4 Earthworks Drainage

Filter drains are being used to convey earthworks drainage to, in the first instance, an existing watercourse / tributary. Where this is not possible the earthworks drainage is connected to the highway drainage.

3.5 Contributing Areas

The contributing area for each pipe has been split into impermeable areas (made up of carriageways, footways and cycleways) and permeable areas (made up of roadside verges, earthworks). For permeable areas, a runoff coefficient is applied. The runoff coefficient for a permeable area can be between 0 and 0.3 (Table E.3 2008, from BS EN 752:2008). For this scheme the figure of 0.3 has been used. The area of catchment entering each pipe can then be added to a model of the proposed drainage network using Windes Microdrainage Software.

3.6 Level Design

The cover levels of the manhole/catchpit within each network are based on the latest topographical information and latest highway design information (refer to section 3.3 for further details on this information). From this data a composite model was created which combined the topographical survey with the proposed highway design of DF Test Run 1.

The minimum pipe cover depth for the proposed carrier drains is 1.2m. The minimum pipe cover depth for the proposed filter drains (located in grassed areas) is 0.9m. Both these depths are to pipe soffit and are based on guidance given in Sewers for Adoption 6th Edition. The proposed gradients of the pipes are designed to provide self cleansing (minimum 1m/s full bore velocity) whilst keeping the pipe as shallow as is practical.

Several areas of the proposed road design include relatively steep gradients. BS EN 752 2008 states certain considerations are to be made when installing steep pipes including air entrainment and erosion. A definitive maximum pipe gradient or pipe velocity is not specified. In order to mitigate this based on other publication guidance, a maximum velocity of 2.5 metres per second has been applied in the design of all the proposed drainage networks for this scheme. In this case backdrops have been used to maintain these gradients.

3.7 Pollution Control Measures

Earthworks drainage will incorporate sumps to reduce the risk of sand / silt reaching the outfall. This level of detail is outside the scope of this report and will be included in detailed design.

The treatment of highway runoff has been specified by Mouchel's as part of their role as Environmental Consultants for the scheme.

4 Results & Recommendations

4 Results & Recommendations

Drawings 60212470-HIG-0501 to 0516 show each of the proposed outfalls and the proposed flows rates at each outfall. Each network is now summarised and any specific requirements that are not fully explained in the above **Section 3 Design Approach**. Some networks are split into several smaller networks so that the earthworks portion of the network can have a separate outfall than the highway drainage into the watercourse. This is to reduce the amount of online storage, as there is no need to attenuate existing permeable greenfield areas that are to be replaced with permeable earthworks. In these instances the networks are described as one network for clarity.

Network A

Network A drains the proposed A6 road (diverting current A6 route) and part of the A6 to Manchester Airport Relief Road (A6MARR), and adjacent earthworks. The majority of this network discharges to existing greenfield runoff rates into Ox Hey / Threaplehurst Brook. Online storage for the highway runoff is provided via a hydrobrake and pond.

A portion of the new A6 (Buxton Road) will discharge into the public sewer. This has been agreed in principle with United Utilities. Refer to drawing 60212470-HIG-0501 for further details and location.

Network B

Network B drains the part of the A6MARR into Lady Brook. The earthworks drainage discharges to Lady Brook, and also to Norbury Brook, as this brook runs parallel to much of the earthworks in this area. Online storage for the highway drainage is provided via a hydrobrake and pond. Refer to drawing 60212470-HIG-0504 for location of this pond.

A diverted bus route at the location where the existing Buxton Road crosses the A6MARR will discharge into the public sewer. This has been agreed in principle with United Utilities. Refer to drawing 60212470-HIG-0502 for further details and location.

Network C

Network C drains part of the A6MARR into Lady Brook. Due to the longitudinal falls of the link road this is achieved using a pumping station located adjacent to a low point in the road. This is then pumped to the outfall location into Lady Brook. Earthworks drainage discharges into Lady Brook, and also into an unnamed water tributary. Online storage for the highway runoff is provided via a hydrobrake and pond. Refer to drawing 60212470-HIG-0504 for location of this pond.

Network D and E

Networks D and E drain part of the A6MARR into the existing drainage networks on the A555. This existing drainage network then discharges into an existing pumping station and storage. This is then pumped into Spath Brook. The existing pumping station is referred to as Pumping Station 4, for which AECOM has as built drawings. The information on the drawings does not provide any flow rates from the pumping station. However, previous correspondence from Cheshire County Council stated that the pumping station was designed to accommodate an additional 700m of dual carriageway runoff.

Due to the proposed alignment of the A6MARR, there is more than 700m of carriageway drainage connecting into the existing drainage network upstream of the pumping stations. The flow rates at this connection point have therefore been attenuated to match the peak flows of a catchment size that equates to 700m of additional carriageway.

In order to provide suitable peak discharge rates into the existing drainage network based on the above parameters, a drainage network was designed in Windes that simulated 700m of additional dual carriageway runoff entering the existing drainage system. The peak flow rates for the 2, 5, 30 and 100 year return period critical storms were used as the maximum allowable peak flows for the equivalent return periods for the actual proposed drainage network. Attenuation was required as the proposed network was larger than 700m of dual carriageway.

Refer to drawing 60212470-HIG-0509 for the location of the proposed connections to the existing A555 drainage network.

Network F

Network F drains the part of the A6MARR that runs from Styal Road to Shadowmoss Road. This drainage discharges into the existing Shadowmoss Lane pumping station. It will discharge to this location via the proposed Ringway Road Improvement Works drainage scheme, which is intended to be completed prior to the construction of the A6MARR scheme. Refer to drawing 60212470-HIG-516 for details of this area.

The previous version of this report contained information on several more proposed drainage network west of Network F. This area is now part of the separate scheme: Ringway Road Highway Improvement Works (RRHIW). The end of the A6MARR scheme and the start of the RRHIW scheme can be seen on drawing 60212470-HIG-0516.

Network L

Network L drains the A6MARR from its location to the east of Wilmslow Road to its location 500m east of Styal Road. This network then outfalls to an existing pumping station east of Wilmslow Road, adjacent to Spath Brook. The existing pumping station is referred to as Pumping Station 3 and currently receives the highway drainage for the existing A555 to the east of Wilmslow Road. The pumping station 3 reference is taken from as built drawings received from SMBC. The proposed flow from network L into this pumping station is attenuated to greenfield runoff rates and online storage will be required upstream of the pumping station.

No details are available for the pumping rates of this pumping station. It has therefore been assumed that a new set of pumps will be required. For design purposes it has been assumed that the existing pump is designed to the 1 in 2 year return period. This flow has been estimated by assessment of the current drainage catchment. The additional runoff due to the A6MARR has been amended using the Institute of Hydrology Report 124 analysis. These two flows have been added together to calculate the new pumping rate. This has then been built into the Windes model for the design.

Network M

Network M drains part of the A6MARR east of Styal Road and discharges to an existing culvert/pipe that crosses the existing Ringway Road / Tedder Drive junction and flows in a northerly direction. This then discharges into Gatley Brook north of the link road. Further information on the existing culvert / pipe from Ringway Road / Tedder Drive junction to the outfall into Gatley Brook is required as discussions with The Environment Agency and United Utilities confirm that this pipe / culvert is neither an Environment Agency asset or a public sewer. The Environment Agency have confirmed that they have no objection, in principle, to discharging to Gatley Brook at greenfield runoff rates. Further investigations into the location and ownership of this infrastructure will determine whether any further agreements are required in order to connect to this culvert / pipe will be carried out at detailed design.

4.1 Recommendations / Further Work.

As discussed above, networks D and E discharge to an existing drainage infrastructure. Historically, Cheshire County Council have stated that the existing pumping station that these networks ultimately drain to can accommodate an additional 700m of carriageway. It would be prudent to confirm this parameter with Cheshire County Council at the outset of any detail design works in this part of the scheme.

At the west end of the scheme there are interactions between the A6MARR drainage and highway design, and the Ringway Road Highway Improvement Works scheme. Therefore the development of these areas and the interfaces with the rest of needs to be closely coordinated between all parties involved in future design layouts / works.

Network M currently discharges to a culvert / pipe that then appears to discharge to Gatley Brook. This culvert / pipe is not an Environment Agency Owned asset or a public sewer, as confirmed by the EA and United Utilities. Therefore further investigations as to the ownership of this sewer/culvert will be required before this preliminary design can be developed.

This report details the drainage strategy for the A6 to Manchester Airport Relief Road Scheme. Discussions have been undertaken with both the Environment Agency and United Utilities to confirm approval in principle of the discharge points for the scheme. Preliminary networks have been built and modelled to demonstrate compliance with these agreements and to assist in identification of storage areas and additional land required for the scheme¹.

There are a number of design principles that will need to be adhered to as the current design develops into construction information, via the appointed contractor.

Appendix A – Drawings

Drawings 60212470-HIG-0501 to 0516: Drainage Layout Sheets 1 to 16
Drawings 60212470-HIG-0531: Catchment Details Sheet 1
60212470-HIG-0532: Catchment Details Sheet 1

Appendix B – Calculations

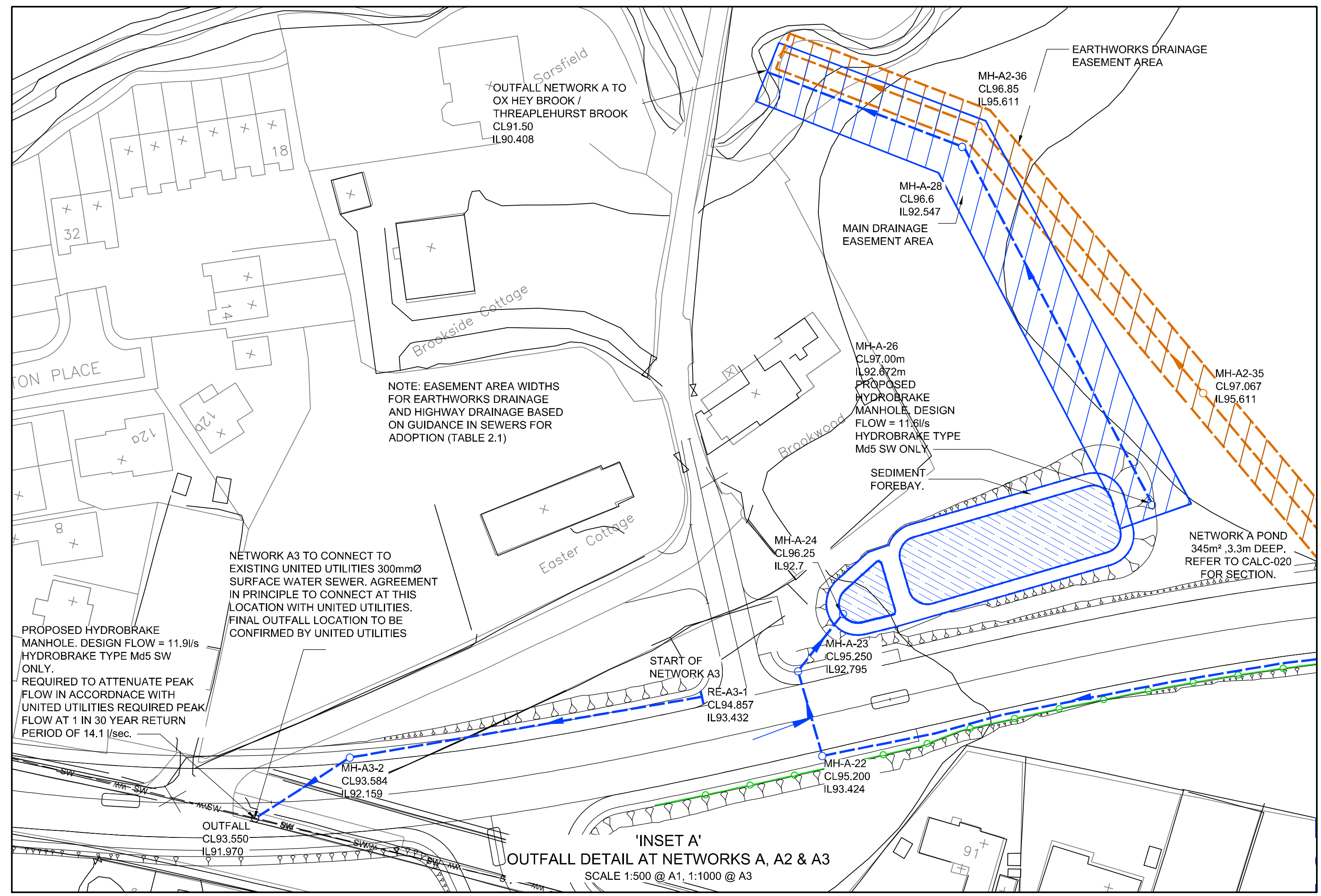
Calculations 60212470-CALC-003: Existing Catchment Summary
60212470-CALC-020: Section through Network SWS A at outfall
60212470-CALC-021: Section through Network SWS B at outfall
60212470-CALC-022: Section through Network SWS C at outfall

Appendix C – Correspondence

Correspondence Environment Agency Letter 18/05/11
Environment Agency email regarding proposed outfall to Gatley Brook
United Utilities email confirming outfall locations to the public sewer

Appendix A – Drawings

Drawings	60212470-HIG-0501 to 0516: Drainage Layout Sheets 1 to 16
Drawings	60212470-HIG-0531: Catchment Details Sheet 1
	60212470-HIG-0532: Catchment Details Sheet 1

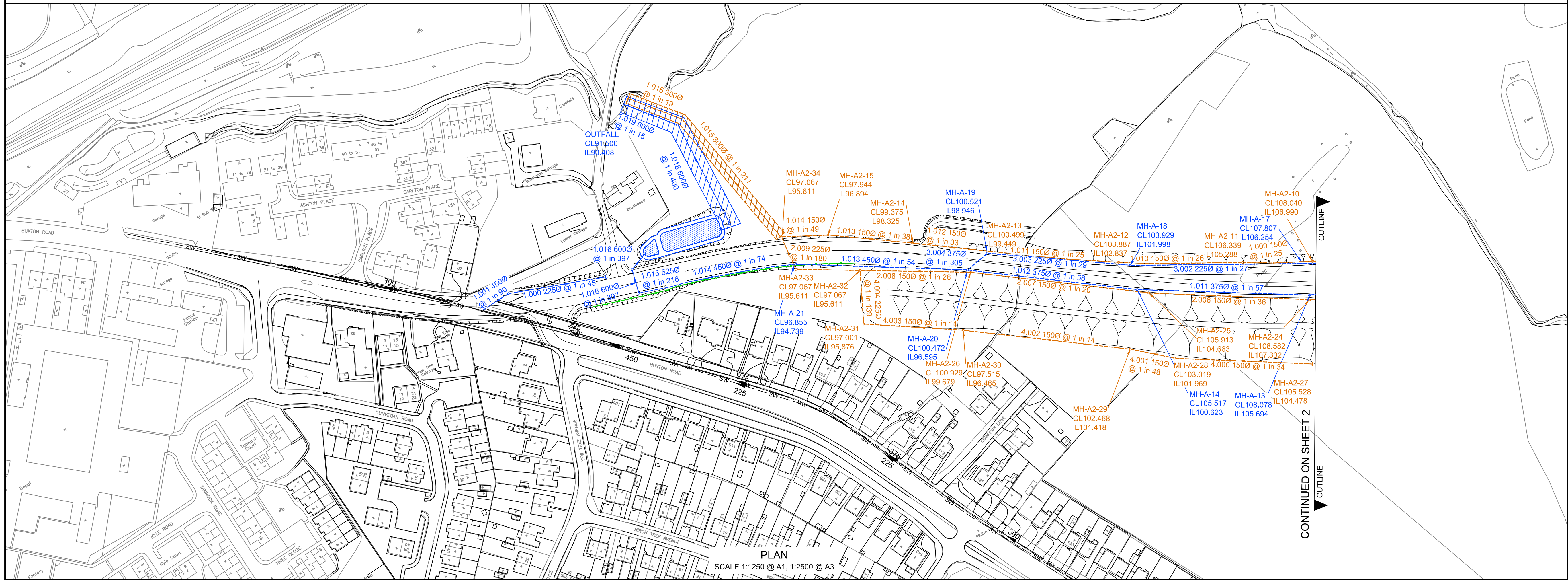


PROPOSED DISCHARGE RATE WITH 20% CLIMATE CHANGE ALLOWANCE (l/s)

NETWORK	2	5	30	100
A	10.7	12.1	15.1	17.0
A3	9.4	11.9	14.8	14.9

- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - PROPOSED PIPE NETWORK NAME AND NUMBER
 - PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED). MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)



Rev	Date	Detail	Made	Chk'd	App'd
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMC COMMENTS	JR	PB	MCBH
P04	25.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	05.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMC	VUM	MCBH	PJ
P02	11.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	EC	MCBH	PJ

STOCKPORT METROPOLITAN BOROUGH COUNCIL

SEMMS A6 RELIEF ROAD

DRAINAGE LAYOUT NETWORK A, A2 & A3 SHEET 1

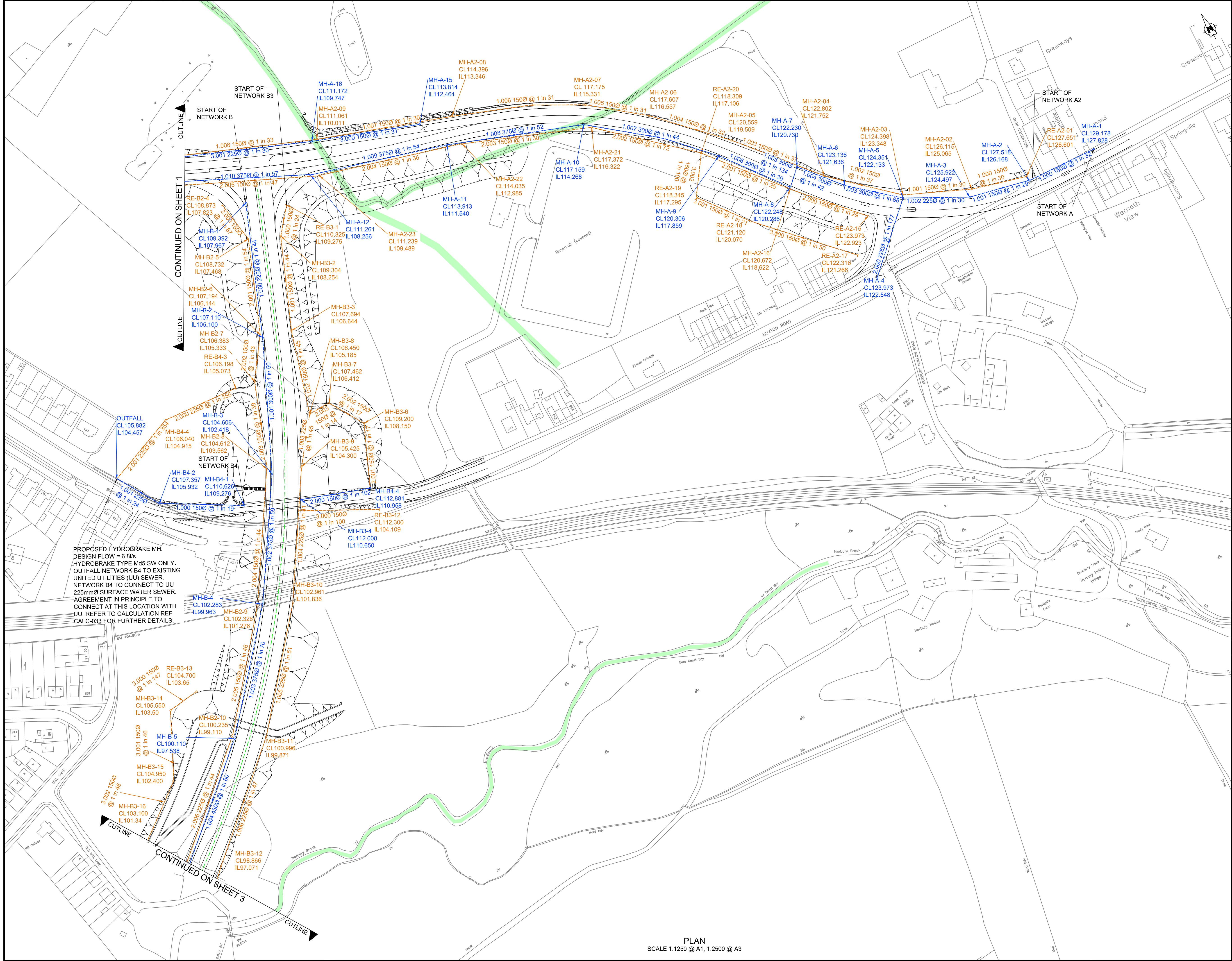
Design: PB CAD: EC
Chk'd: MCBH App'd: PJ
Date: 06.06.11 Scale: AS SHOWN



AECOM
Lynnfield House, Church Street, ALTRINCHAM, WA14 4DZ
Tel: +44 (0) 161 927 8200 Fax: +44 (0) 161 927 8499 www.aecom.com

No. 60212470-HIG-0501 P05

CAD File: F:\Projects\Highways - SEMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0501.dwg, Plotted on 4/26/2013 4:17 PM by Bambridge, Paul



- NOTES** DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
- ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:**
- w—w— EXISTING DRAINAGE (COMBINED)
 - sw--- EXISTING DRAINAGE (SURFACE)
 - ~ ~ ~ EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - ~ ~ ~ PROPOSED CULVERT
 - ▲ PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
 - MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - ▭ PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - ↔ DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

PROPOSED HYDROBRAKE MH. DESIGN FLOW = 6.8l/s HYDROBRAKE TYPE M45 SW ONLY. OUTFALL NETWORK B4 TO EXISTING UNITED UTILITIES (UU) SEWER. NETWORK B4 TO CONNECT TO UU 225mmØ SURFACE WATER SEWER. AGREEMENT IN PRINCIPLE TO CONNECT AT THIS LOCATION WITH UU. REFER TO CALCULATION REF CALC-033 FOR FURTHER DETAILS.

PROPOSED DISCHARGE RATE WITH 20% CLIMATE CHANGE ALLOWANCE (l/s)

NETWORK	RETURN PERIOD (years)			
	2	5	30	100
B4	8.1	8.1	8.1	8.1

Rev	Date	Detail	Made	Chk'd	App'd
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMBC COMMENTS	JR	PB	MCBH
P04	15.03.13	AMENDMENTS FOLLOWING TR1 DESIGN	JR	PB	MCBH
P03	05.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	12.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	EC	MCBH	PJ

Client: **STOCKPORT METROPOLITAN BOROUGH COUNCIL**

Project: **SEMMS A6 RELIEF ROAD**

Title: **DRAINAGE LAYOUT NETWORK A, A2, B, B2 & B3 SHEET 2**

Design: PB CAD: EC
 Chk'd: MCBH App'd: PJ
 Date: 06.06.11 Scale: AS SHOWN

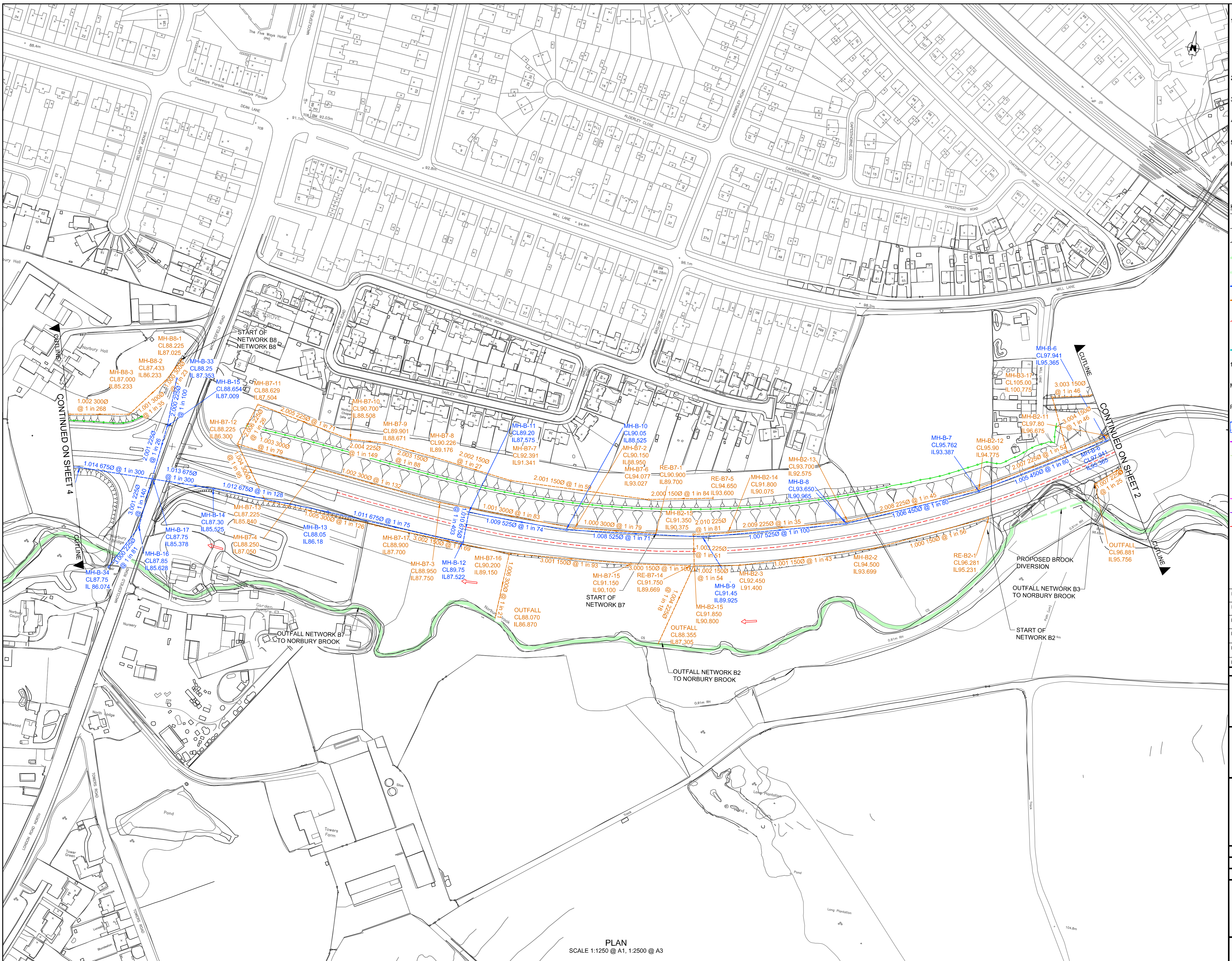
AECOM

AECOM
 Lynnfield House, Church Street,
 ALTRINCHAM, WA14 4DZ

Tel: +44 (0) 161 927 8200
 Fax: +44 (0) 161 927 8499
 www.aecom.com

No. 60212470-HIG-0502 P05

PLAN
 SCALE 1:1250 @ A1, 1:2500 @ A3



- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- wv--- EXISTING DRAINAGE (COMBINED)
 - sw--- EXISTING DRAINAGE (SURFACE)
 - c--- EXISTING CULVERT
 - w--- EXISTING WATERCOURSE
 - s--- PROPOSED SYPHON
 - h--- PROPOSED HIGHWAY DRAINAGE
 - e--- PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - c--- PROPOSED CULVERT
 - o--- PROPOSED OUTFALL LOCATION
 - r--- PROPOSED RISING MAIN
 - 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
 - MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - p--- PROPOSED POND/TANK
 - l--- LIMIT OF DEVIATION
 - f--- PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - d--- DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - o--- EXISTING OIL PIPELINE
 - p--- PROPOSED OIL PIPELINE
 - s--- PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED). MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

P06	25.04.13	SLOT DRAIN LOCATION AMENDED	JR	PB	MCBH
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMBC COMMENTS	JR	PB	MCBH
P04	15.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	05.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	12.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	EC	MCBH	PJ

Rev	Date	Detail	Made	Chk'd	App'd
-----	------	--------	------	-------	-------

Client: STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project: SEMMMS A6 RELIEF ROAD

Title: DRAINAGE LAYOUT NETWORK B, B2 & B3 SHEET 3

Design: PB	CAD: EC
Chk'd: MH	App'd: PJ
Date: 06.06.11	Scale: AS SHOWN



AECOM
Lynfield House, Church Street,
ALTRINCHAM, WA14 4DZ

Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

No. 60212470-HIG-0503

P06

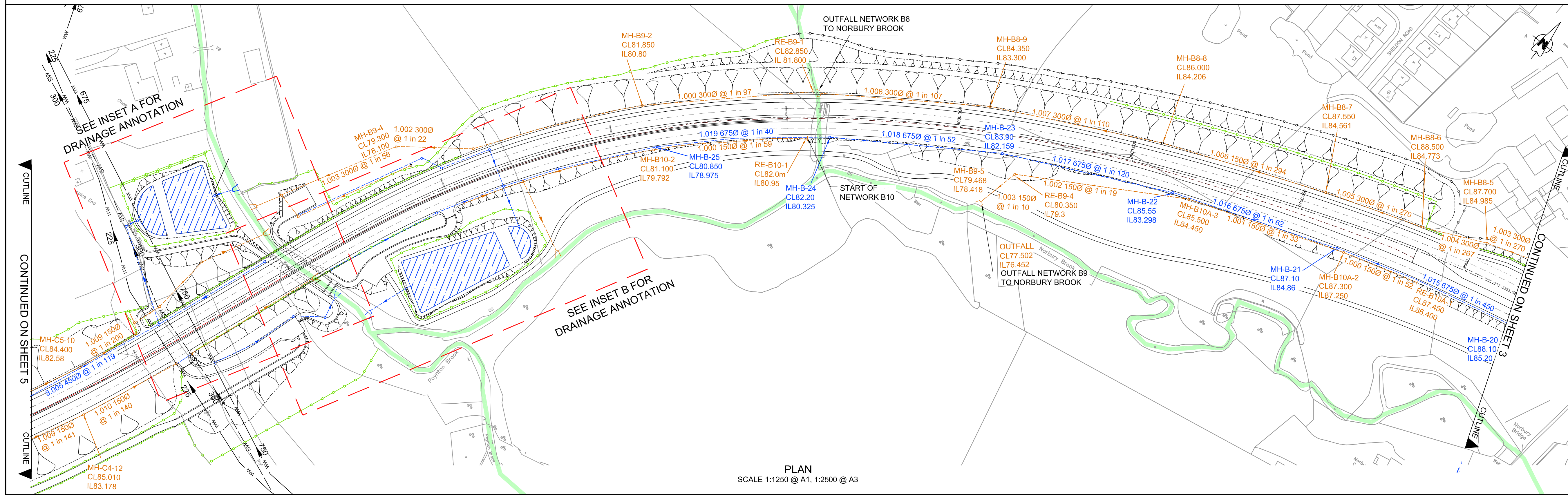
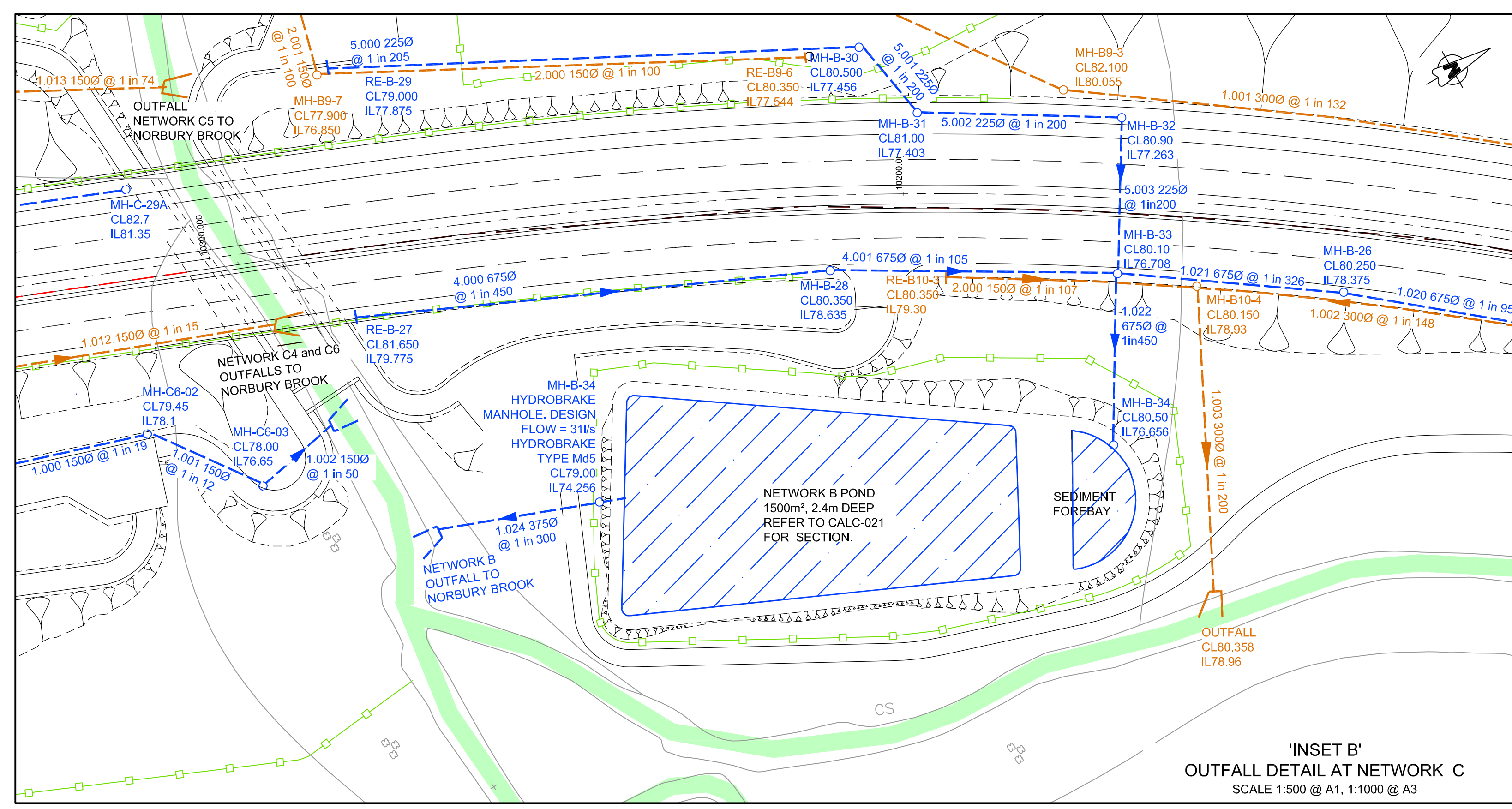
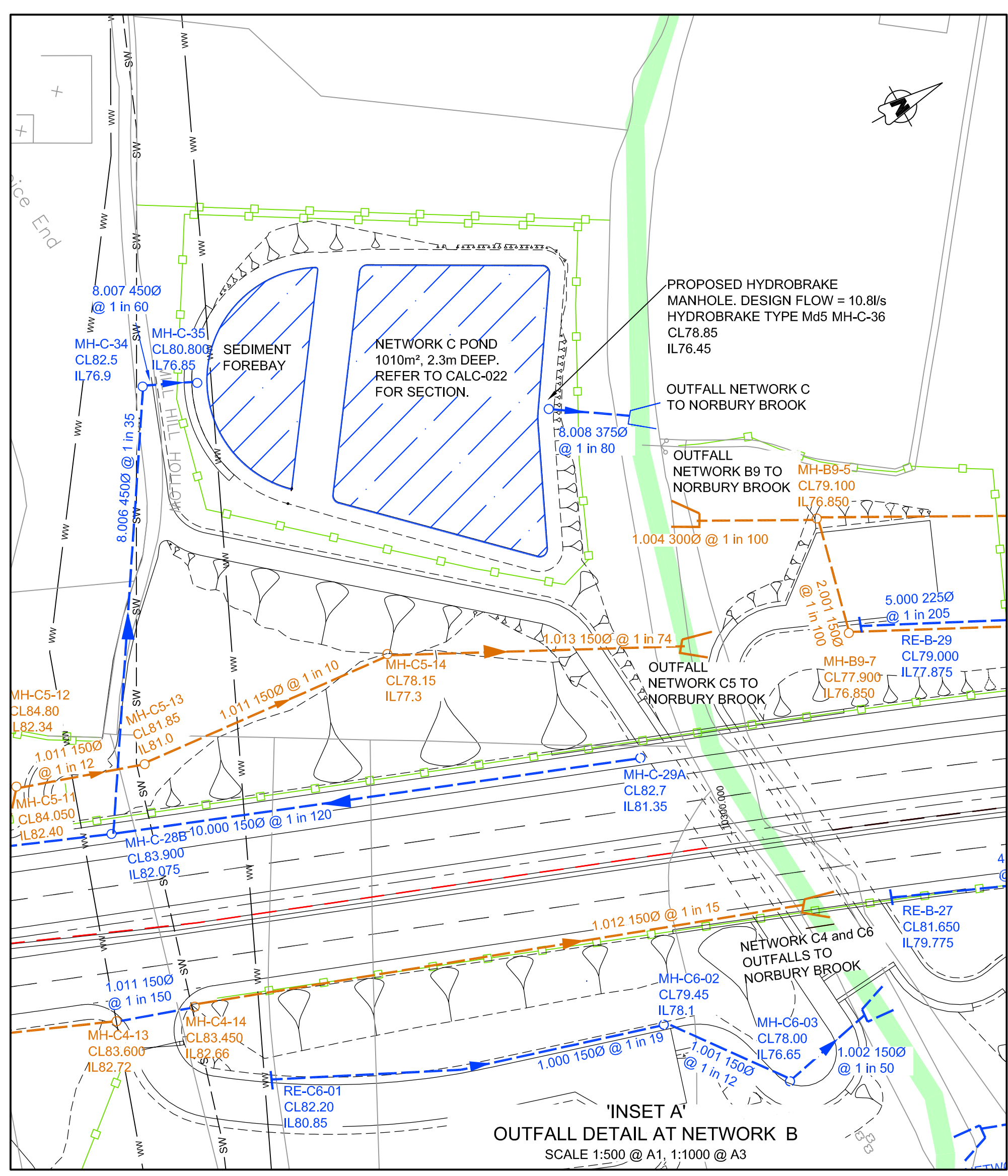
PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3

PROPOSED DISCHARGE RATE WITH 20% CLIMATE CHANGE ALLOWANCE (l/s)

NETWORK	RETURN PERIOD (years)			
	2	5	30	100
B	29.5	29.5	33.5	39.4
C	20.5	21.0	22.1	23.1

- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - PROPOSED PIPE NETWORK NAME AND NUMBER
 - PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKER OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)



Rev	Date	Detail	Made	Chk'd	App'd
P07	03.10.13	NETWORK B POND RELOCATED	AJH	PB	MCBH
P06	25.04.13	UPDATED FOLLOWING SMBC COMMENTS	JR	PB	MCBH
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN AND SMBC COMMENTS	JR	PB	MCBH
P04	25.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	11.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	13.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	EC	MCBH	PJ

STOCKPORT METROPOLITAN BOROUGH COUNCIL

SEMMMS A6 RELIEF ROAD

DRAINAGE LAYOUT NETWORK B, C, & EARTHWORKS NETWORKS SHEET 4

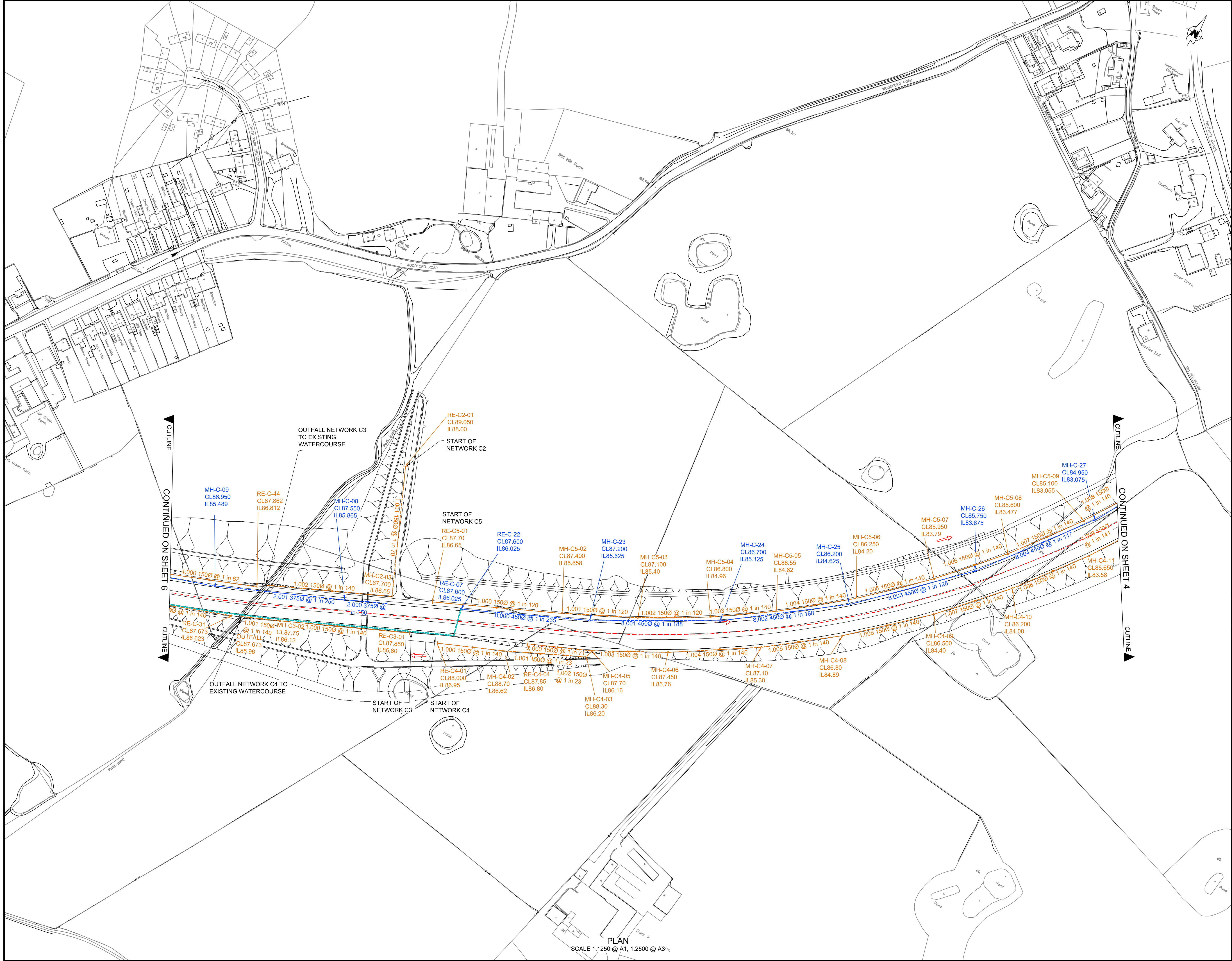
Design: PB CAD: EC
Chk'd: MCBH App'd: PJ
Date: 06.06.11 Scale: AS SHOWN

AECOM

AECOM
Lynnfield House, Church Street,
ALTRINCHAM, WA14 4DZ

Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

No. 60212470-HIG-0504 P07



NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
- ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
- ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
- PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
- ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
- ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

KEY:

- EXISTING DRAINAGE (COMBINED)
- SW --- EXISTING DRAINAGE (SURFACE)
- EXISTING CULVERT
- EXISTING WATERCOURSE
- PROPOSED SYPHON
- PROPOSED HIGHWAY DRAINAGE
- PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
- PROPOSED CULVERT
- PROPOSED OUTFALL LOCATION
- PROPOSED RISING MAIN
- 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
- MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
- RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
- PROPOSED POND/TANK
- LIMIT OF DEVIATION
- PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
- DIRECTION OF PROPOSED HIGHWAY LONGFALL
- EXISTING OIL PIPELINE
- PROPOSED OIL PIPELINE
- PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED). MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

Rev	Date	Detail	Made	Chk'd	App'd
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN AND SMBC COMMENTS	JR	PB	MCBH
P04	18.03.13	DESIGN FREEZE FOR DRAINAGE COMMENTS FROM SMBC	JR	PB	MCBH
P03	05.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	12.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	EC	MCBH	PJ

Client: **STOCKPORT METROPOLITAN BOROUGH COUNCIL**

Project: **SEMMS A6 RELIEF ROAD**

Title: **GENERAL ARRANGEMENT NETWORK C SHEET 5**

Design:	PB	CAD:	AJR
Chk'd:	MH	App'd:	PJ
Date:	27.05.11	Scale:	AS SHOWN

AECOM

AECOM
Lynnfield House, Church Street,
ALTRINCHAM, WA14 4DZ

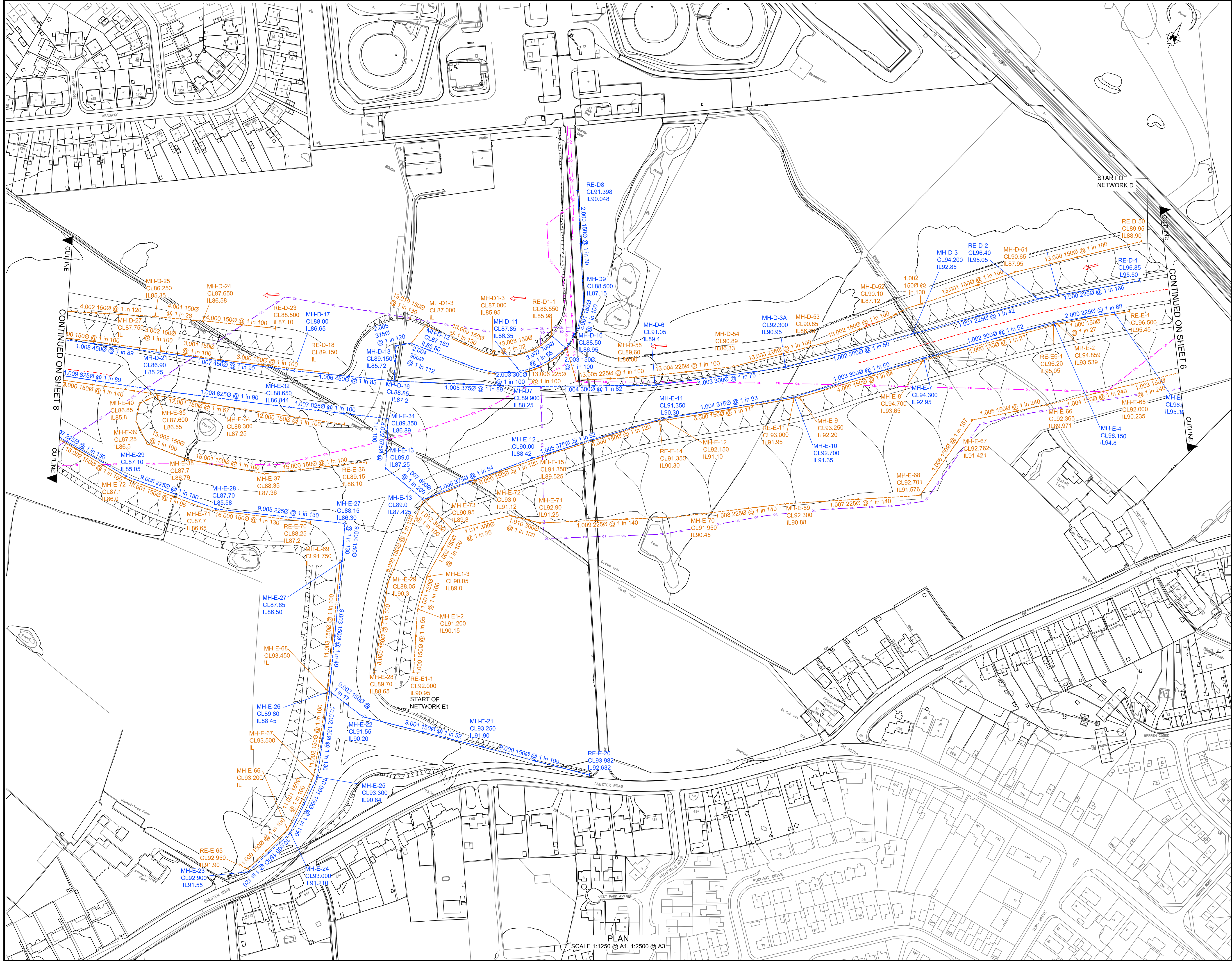
Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

No. 60212470-HIG-0505

Rev: P05

PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3/m

CAD File: F:\projects\Highways - SEMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0505.dwg; Plotted on 4/26/2013 3:42 PM by Baimbridge, Paul



- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - PROPOSED PIPE NETWORK NAME AND NUMBER
 - PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

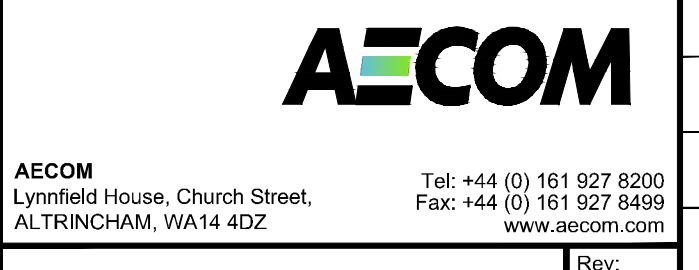
Rev	Date	Detail	Made	Chk'd	App'd
P06	26.04.13	UPDATED FOLLOWING SMBC COMMENTS	JR	PB	MCBH
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN AND SMBC COMMENTS	JR	PB	MCBH
P04	18.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	12.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	11.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	AJR	MCBH	PJ

Client: **STOCKPORT METROPOLITAN BOROUGH COUNCIL**

Project: **SEMMMS A6 RELIEF ROAD**

Title: **DRAINAGE LAYOUT NETWORK D & E SHEET 7**

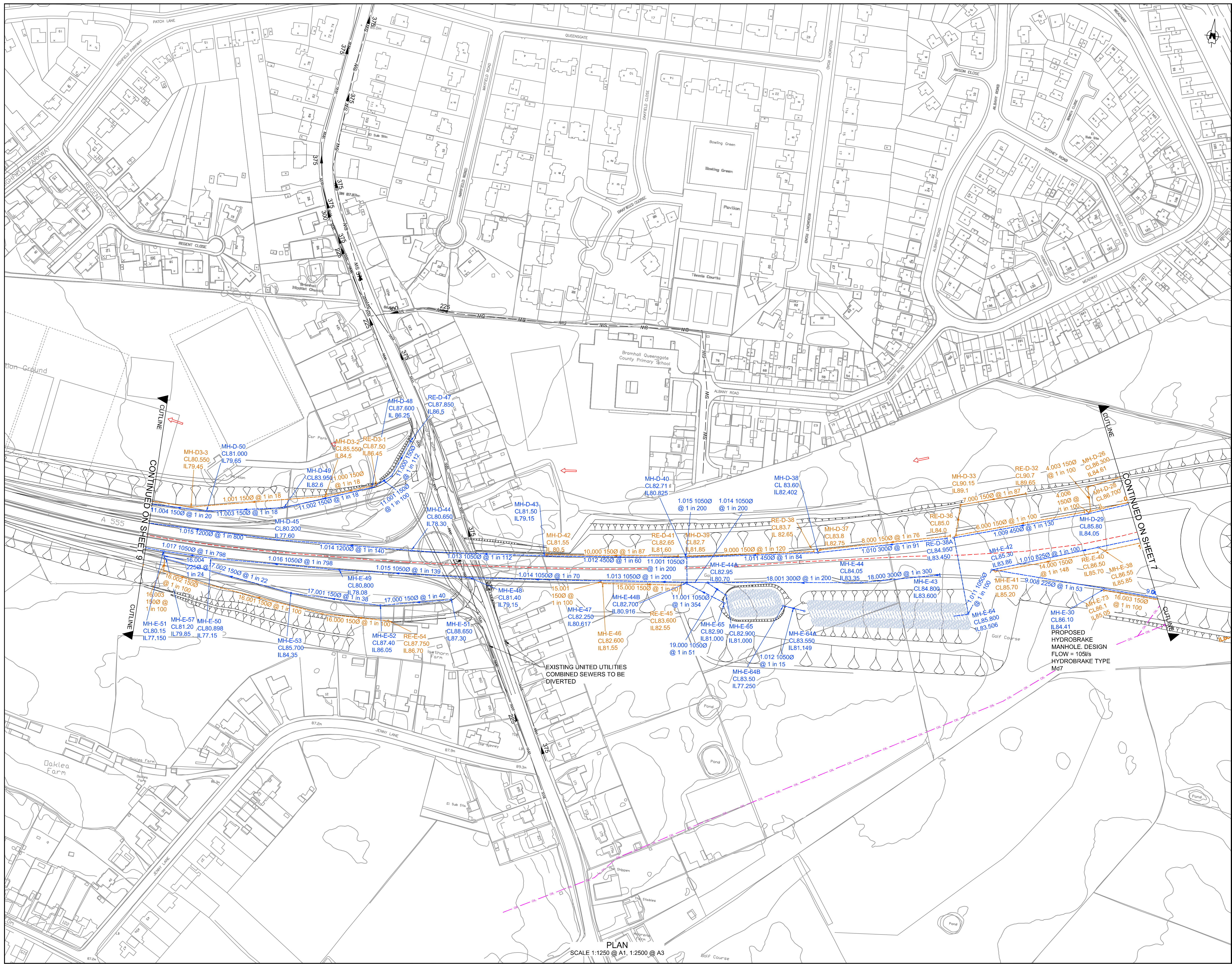
Design: PB	CAD: AJR
Chk'd: MCBH	App'd: PJ
Date: 06.06.11	Scale: AS SHOWN



No. 60212470-HIG-0507 P06

PLAN SCALE 1:1250 @ A1, 1:2500 @ A3

CAD File: F:\projects\Highways - SEMMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0507.dwg; Plotted on 4/26/2013 2:56 PM by Bambridge, Paul



- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
 - MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

P06	26.04.13	UPDATED FOLLOWING SMCB COMMENTS	JR	PB	MCBH
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMCB COMMENTS	JR	PB	MCBH
P04	16.03.13	DESIGN FREEZE FOR DRAINAGE COMMENTS FROM SMCB	JR	PB	MCBH
P03	12.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMCB	VUM	MCBH	PJ
P02	13.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMCB	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	AJR	MCBH	PJ
Rev	Date	Detail	Made	Chk'd	App'd

Client: STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project: SEMMMS A6 RELIEF ROAD

Title: DRAINAGE LAYOUT NETWORK D & E SHEET 8

Design:	PB	CAD:	AJR
Chk'd:	MCBH	App'd:	PJ
Date:	06.06.11	Scale:	AS SHOWN

AECOM

AECOM
Lynfield House, Church Street,
ALTRINCHAM, WA14 4DZ

Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

Rev: No. 60212470-HIG-0508 P06

PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3

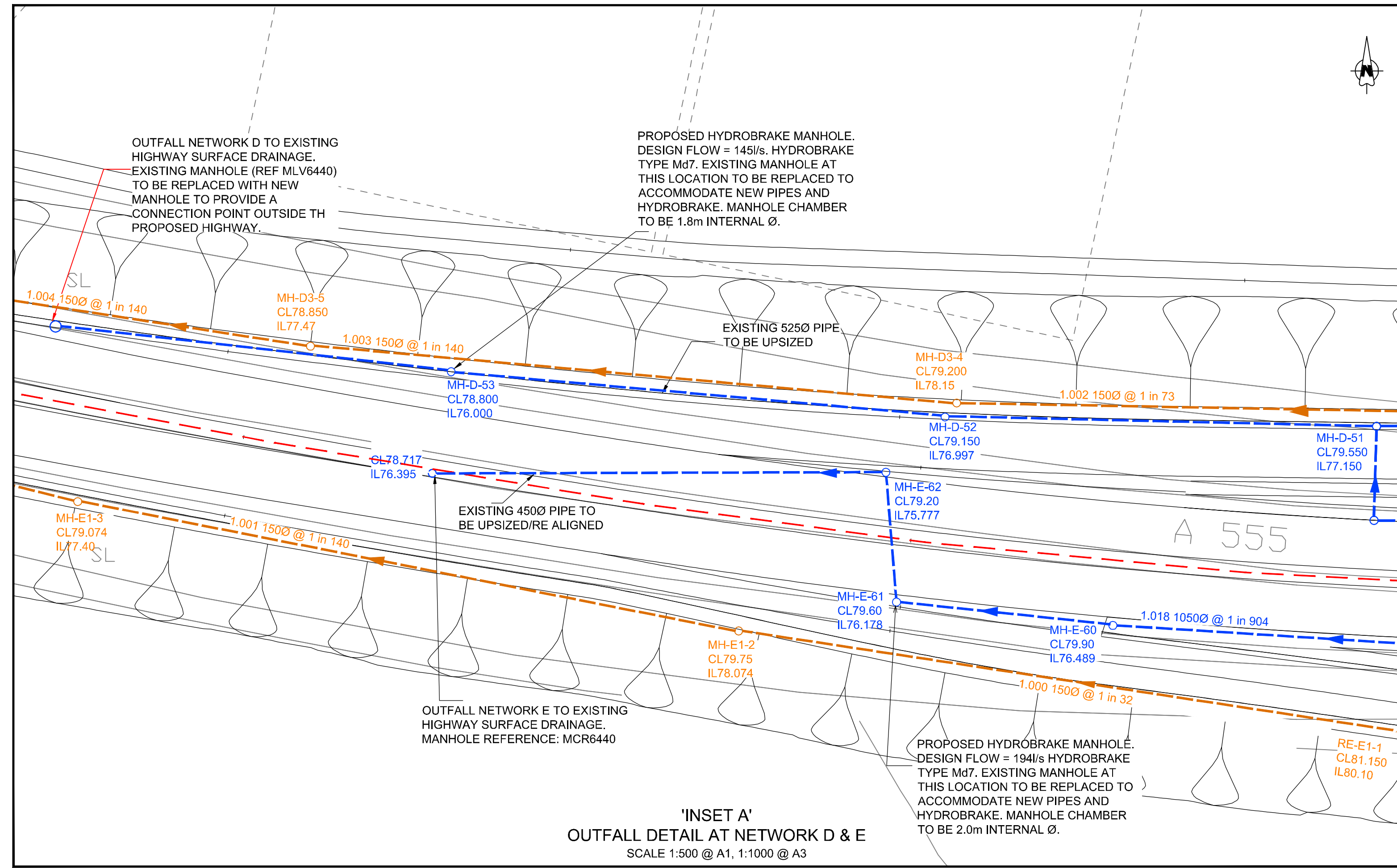
PROPOSED DISCHARGE RATE WITH 20% CLIMATE CHANGE ALLOWANCE (l/s):

NETWORK	RETURN PERIOD (years)			
	2	5	30	100
D	110.0	122.0	194.0	196.0
E	187.0	214.0	281.0	281.0

AT DP3 STAGE OF SCHEME, CHESHIRE COUNTY COUNCIL CONFIRMED EXISTING PUMPING STATION 4 (SEE SHEET 10) COULD ACCOMMODATE AN ADDITIONAL 700m OF NEW HIGHWAY RUNOFF. THIS IS TO BE CONFIRMED WITH CHESHIRE COUNTY COUNCIL PRIOR TO DETAIL DESIGN BEING CARRIED OUT.

PROPOSED DISCHARGE RATE WITH 20% CLIMATE CHANGE ALLOWANCE FOR 700m ADDITIONAL HIGHWAY ONLY (l/s):

RETURN PERIOD (years)	RETURN PERIOD (years)			
	2	5	30	100
289	360	468	524	



- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - sw- EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
 - MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED). MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

Rev	Date	Detail	Made	Chk'd	App'd
P06	26.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMBC COMMENTS	JR	PB	MCBH
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMBC COMMENTS	JR	PB	MCBH
P04	18.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	12.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	13.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	AJR	MCBH	PJ

Client: STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project: SEMMMS A6 RELIEF ROAD

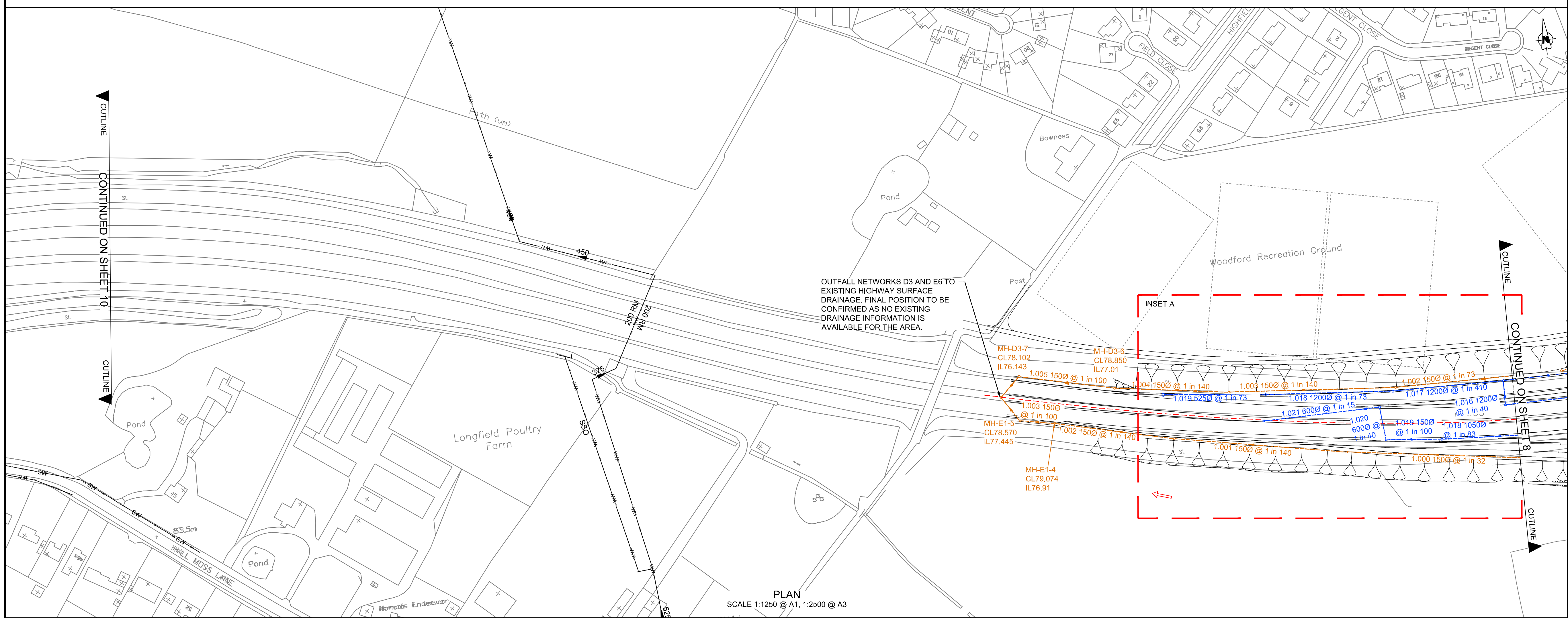
Title: GENERAL ARRANGEMENT NETWORK D & E SHEET 9

Design: PB CAD: AJR
Chk'd: MCBH App'd: PJ
Date: 06.06.11 Scale: AS SHOWN

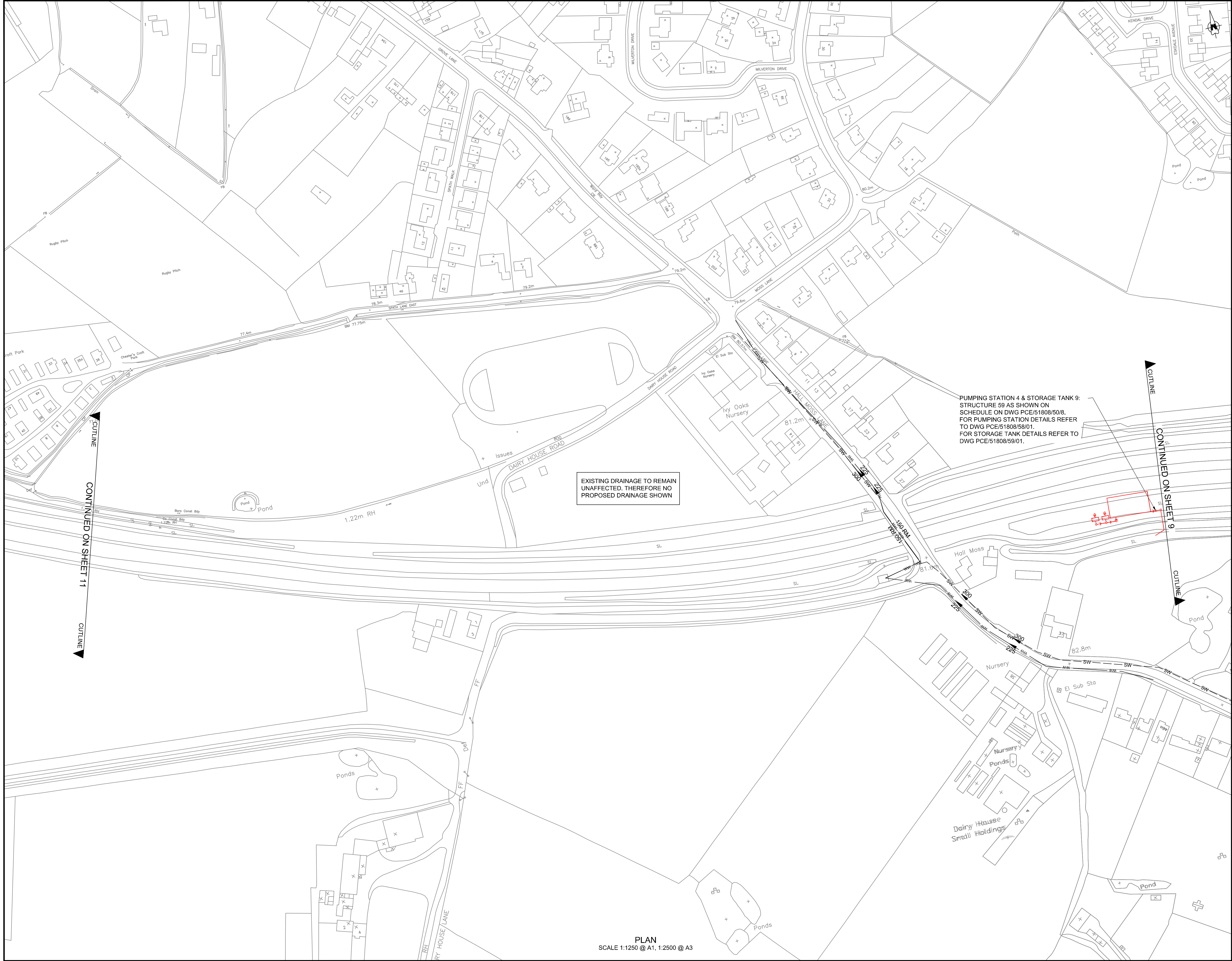


AECOM
Lynnfield House, Church Street,
ALTRINCHAM, WA14 4DZ
Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 9499
www.aecom.com

No. 60212470-HIG-0509 Rev: P06



cm T CAD File - F:\projects\Highways - SEMMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0509.dwg; Plotted on 4/26/2013 10:53 AM by Bainbridge, Paul



NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
- ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
- ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
- PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
- ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
- ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

KEY:

- ww— EXISTING DRAINAGE (COMBINED)
- sw— EXISTING DRAINAGE (SURFACE)
- c— EXISTING CULVERT
- w— EXISTING WATERCOURSE
- p— PROPOSED SYPHON
- h— PROPOSED HIGHWAY DRAINAGE
- e— PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
- c— PROPOSED CULVERT
- o— PROPOSED OUTFALL LOCATION
- r— PROPOSED RISING MAIN
- 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
- MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
- RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
- p— PROPOSED POND/TANK
- l— LIMIT OF DEVIATION
- f— PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
- >— DIRECTION OF PROPOSED HIGHWAY LONGFALL
- o— EXISTING OIL PIPELINE
- p— PROPOSED OIL PIPELINE
- s— PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKER® OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

Rev	Date	Detail	Made	Chk'd	App'd
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMBC COMMENTS	JDR	PB	MCBH
P04	15.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	11.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	11.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	EC	MCBH	PJ

Client: **STOCKPORT METROPOLITAN BOROUGH COUNCIL**

Project: **SEMMMS A6 RELIEF ROAD**

Title: **DRAINAGE LAYOUT SHEET 10**

Design: PB	CAD: EC
Chk'd: MCBH	App'd: PJ
Date: 06.06.11	Scale: AS SHOWN

AECOM

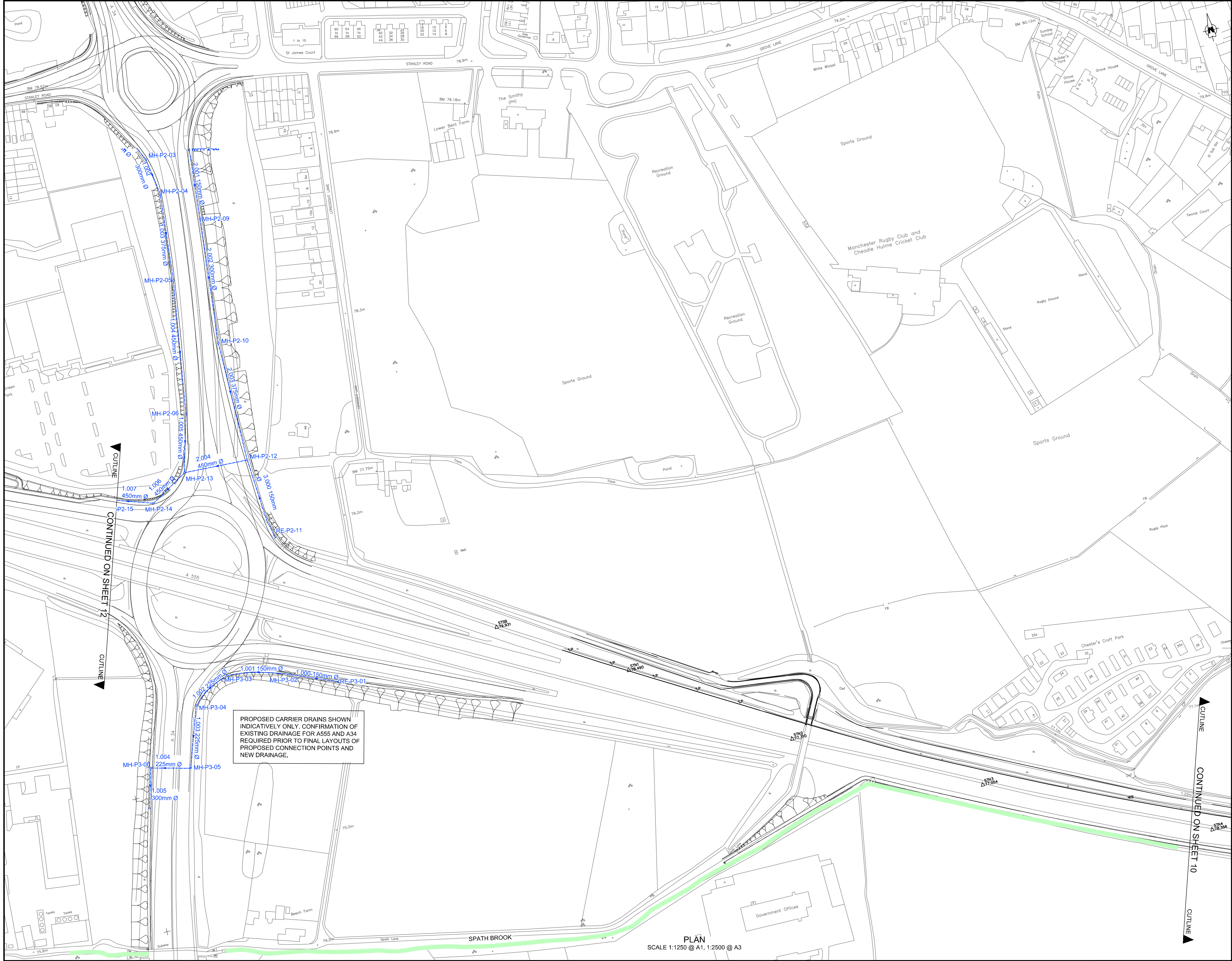
AECOM
Lynnfield House, Church Street,
ALTRINCHAM, WA14 4DZ

Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

Rev: **No. 60212470-HIG-0510** P05

PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3

CAD File: F:\projects\Highways - SEMMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0510.dwg. Plotted on 4/26/2013 3:40 PM by Bambridge, Paul



- NOTES:**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:**
- EXISTING DRAINAGE (COMBINED)
 - SW- EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
 - MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMBC COMMENTS	JR	PB	MCBH
P04	12.07.11	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	05.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	12.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	EC	MCBH	PJ

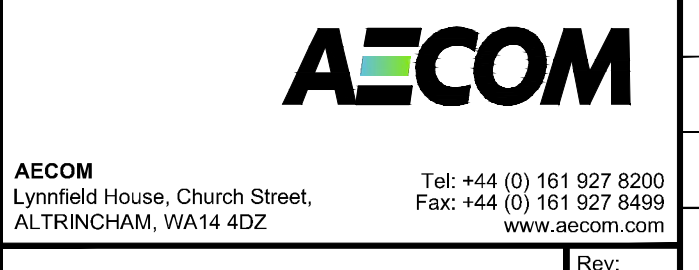
Rev	Date	Detail	Made	Chk'd	App'd
-----	------	--------	------	-------	-------

Client: **STOCKPORT METROPOLITAN BOROUGH COUNCIL**

Project: **SEMMMS A6 RELIEF ROAD**

Title: **DRAINAGE LAYOUT SHEET 11**

Design: PB	CAD: EC
Chk'd: MCBH	App'd: PJ
Date: 06.06.11	Scale: AS SHOWN



AECOM
Lynnfield House, Church Street, ALTRINCHAM, WA14 4DZ
Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

No. 60212470-HIG-0511 P05

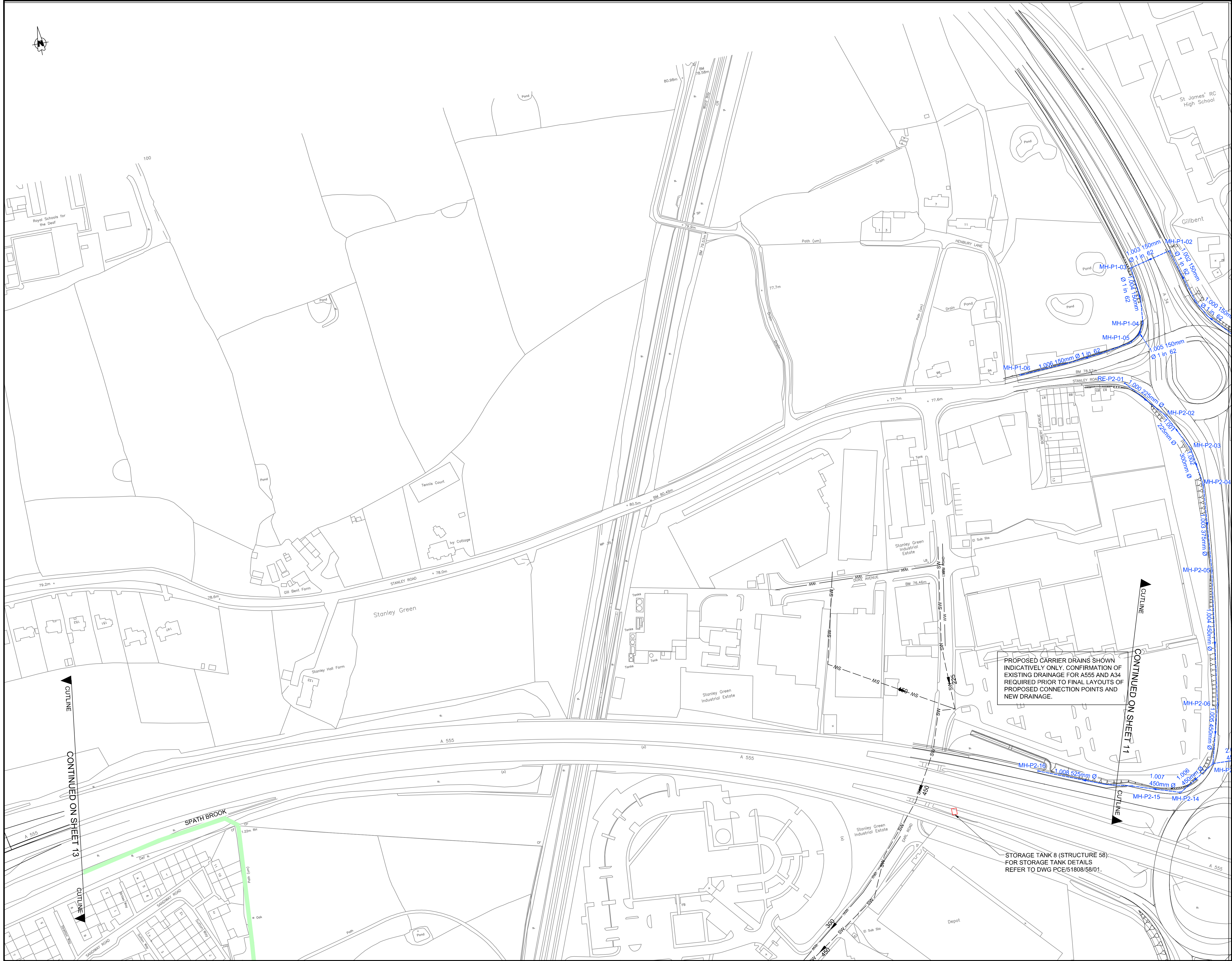
PROPOSED CARRIER DRAINS SHOWN INDICATIVELY ONLY. CONFIRMATION OF EXISTING DRAINAGE FOR A555 AND A34 REQUIRED PRIOR TO FINAL LAYOUTS OF PROPOSED CONNECTION POINTS AND NEW DRAINAGE.

PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3

CONTINUED ON SHEET 12

CONTINUED ON SHEET 10

CAD File: F:\projects\Highways - SEMMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0511.dwg, Plotted on 4/26/2013 3:40 PM by Bambridge, Paul



NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
- ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
- ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
- PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
- ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
- ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

KEY:

- w--- EXISTING DRAINAGE (COMBINED)
- sw--- EXISTING DRAINAGE (SURFACE)
- w--- EXISTING CULVERT
- w--- EXISTING WATERCOURSE
- w--- PROPOSED SYPHON
- w--- PROPOSED HIGHWAY DRAINAGE
- w--- PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
- w--- PROPOSED CULVERT
- w--- PROPOSED OUTFALL LOCATION
- w--- PROPOSED RISING MAIN
- 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
- MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
- RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
- w--- PROPOSED POND/TANK
- w--- LIMIT OF DEVIATION
- w--- PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
- w--- DIRECTION OF PROPOSED HIGHWAY LONGFALL
- w--- EXISTING OIL PIPELINE
- w--- PROPOSED OIL PIPELINE
- w--- PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

Rev	Date	Detail	Made	Chk'd	App'd
P06	28.04.13	VIEWPORT AMENDED IN DRAWING LAYOUT	JR	PB	MCBH
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMBC COMMENTS	JR	PB	MCBH
P04	15.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	11.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	12.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	EC	MCBH	PJ

Client: STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project: SEMMMS A6 RELIEF ROAD

Title: DRAINAGE LAYOUT SHEET 12

Design: PB	CAD: EC
Chk'd: MCBH	App'd: PJ
Date: 06.06.11	Scale: AS SHOWN

AECOM

AECOM
Lynfield House, Church Street,
ALTRINCHAM, WA14 4DZ

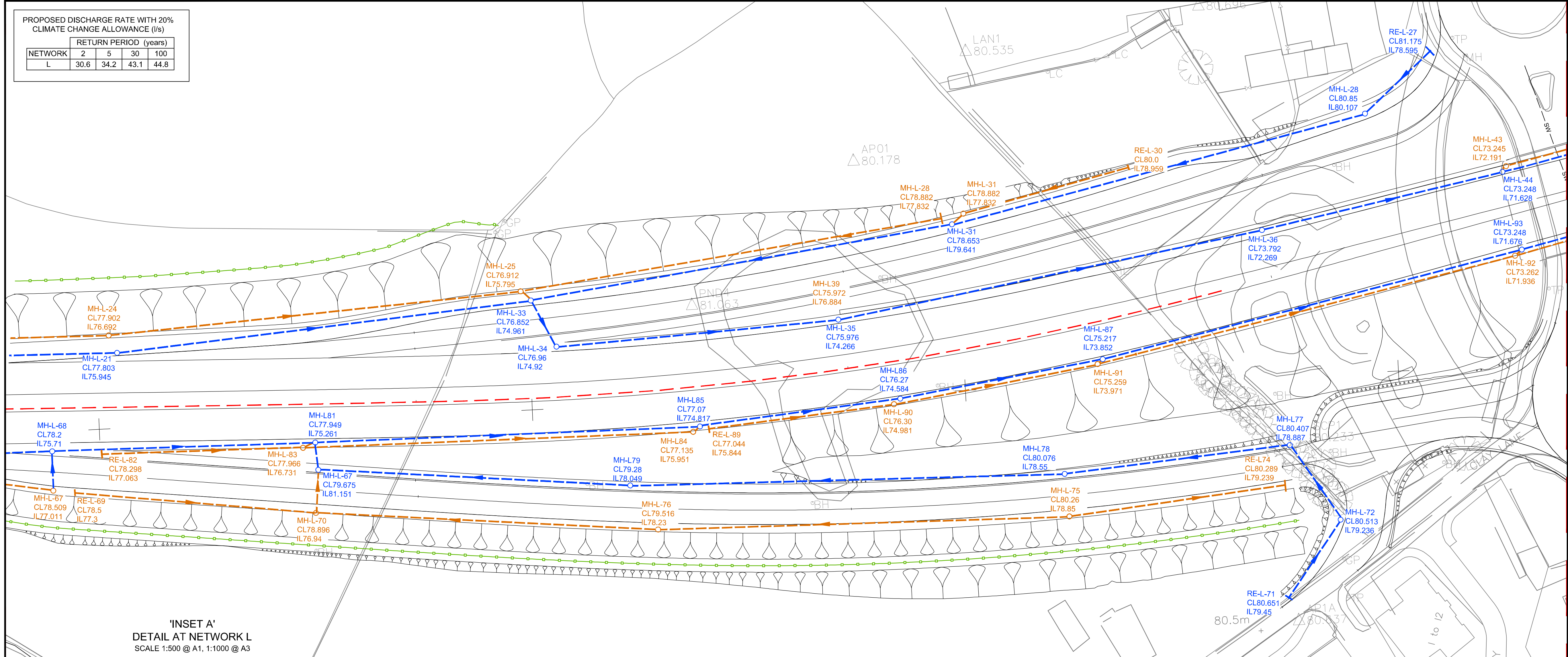
Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

Rev: No. 60212470-HIG-0512 P06

CAD File: F:\projects\Highways - SEMMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0512.dwg; Plotted on 4/26/2013 3:39 PM by Bainbridge, Paul

PROPOSED DISCHARGE RATE WITH 20% CLIMATE CHANGE ALLOWANCE (l/s)

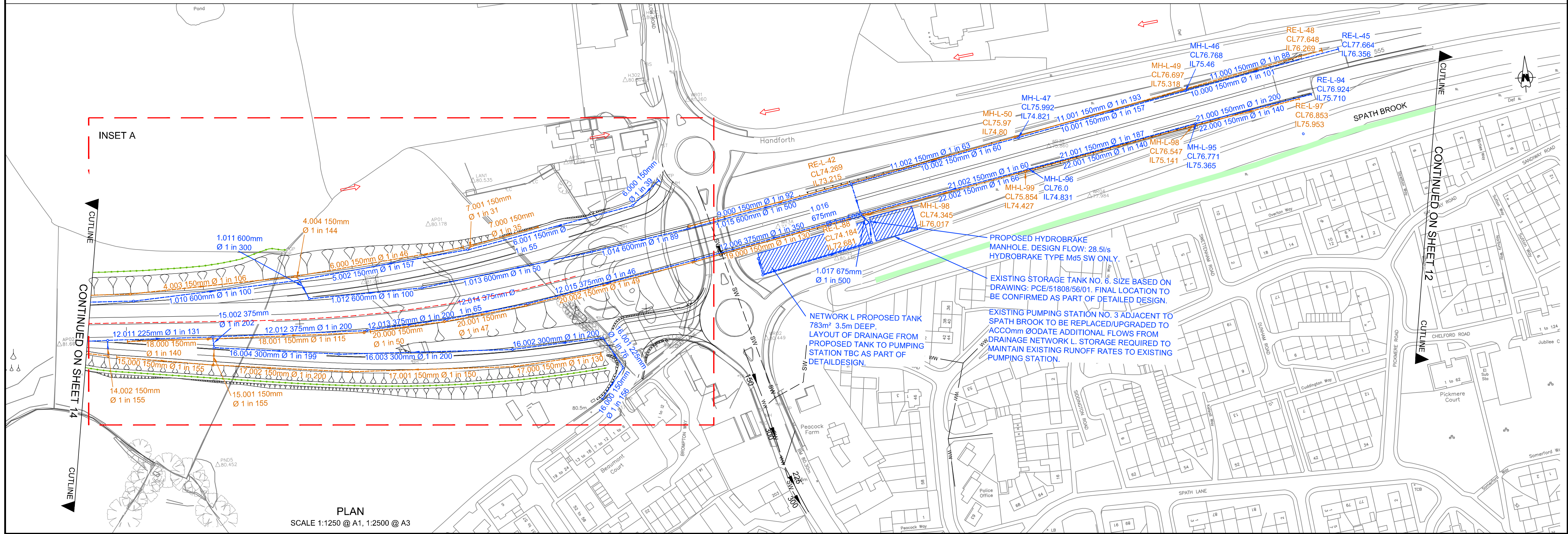
NETWORK	RETURN PERIOD (years)			
	2	5	30	100
L	30.6	34.2	43.1	44.8



'INSET A'
DETAIL AT NETWORK L
SCALE 1:500 @ A1, 1:1000 @ A3

- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - PROPOSED PIPE NETWORK NAME AND NUMBER
 - PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)



PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3

Rev	Date	Detail	Made	Chk'd	App'd
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMC COMMENTS	JDR	PB	MCBH
P04	15.03.13	AMENDED TO TR1 DESIGN	JDR	PB	MCBH
P03	11.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMC	VUM	MCBH	PJ
P02	12.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	AJR	MCBH	PJ

Client:
STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project:
SEMMS A6 RELIEF ROAD

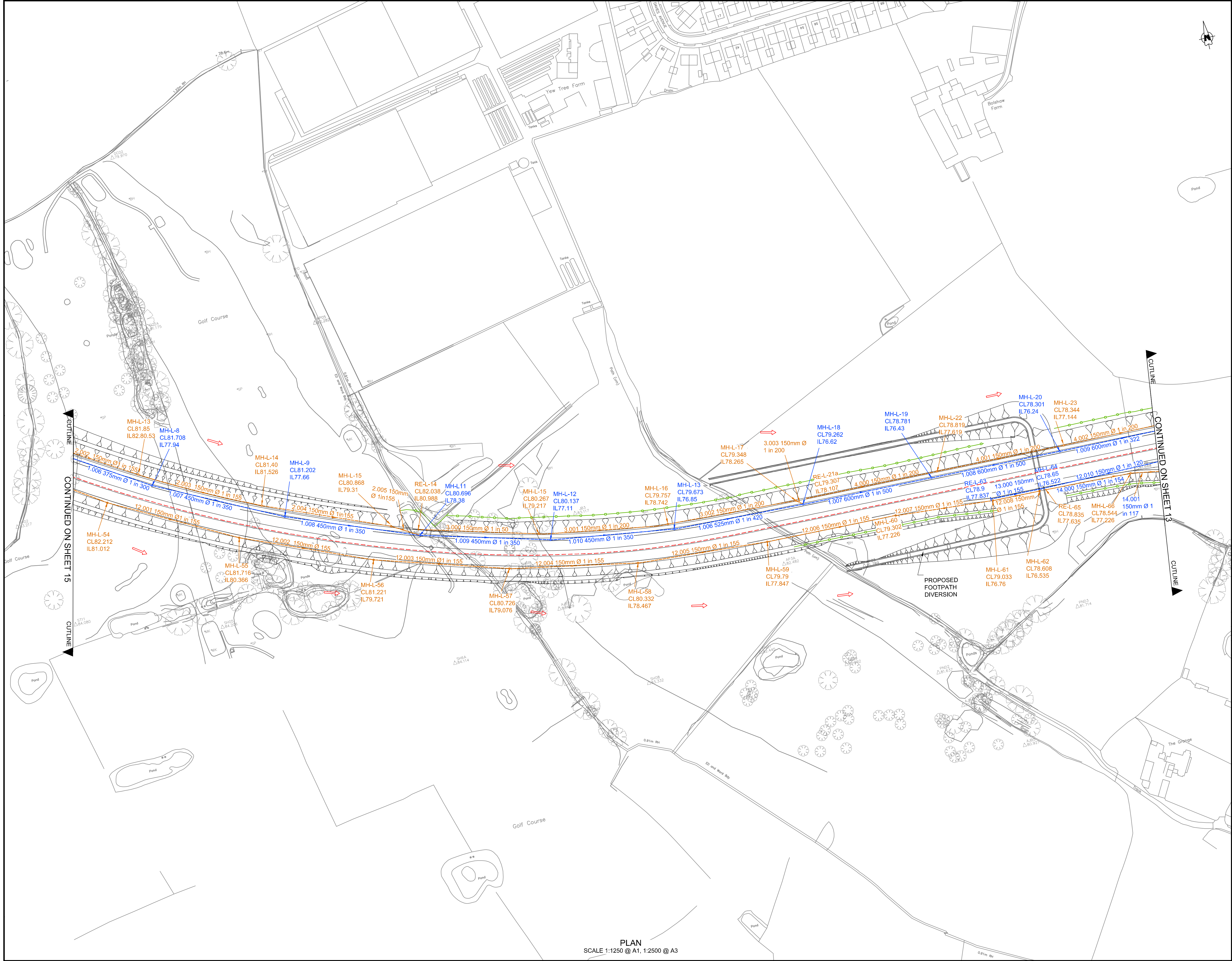
Title:
DRAINAGE LAYOUT NETWORK L SHEET 13

Design:	PB	CAD:	AJR
Chk'd:	MCBH	App'd:	PJ
Date:	06.06.11	Scale:	AS SHOWN



No. 60212470-HIG-0513 P05

CAD File: F:\projects\Highways - SEMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0513.dwg, Plotted on 4/26/2013 4:19 PM by Bambridge, Paul



- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
 - MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED). MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

Rev	Date	Detail	Made	Chk'd	App'd
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMCB COMMENTS	JR	PB	MCBH
P04	15.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P03	11.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMCB	VUM	MCBH	PJ
P02	12.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMCB	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	AJR	MCBH	PJ

Client:
STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project:
SEMMS A6 RELIEF ROAD

Title:
DRAINAGE LAYOUT NETWORK L SHEET 14

Design: PB	CAD: AJR
Chk'd: MCBH	App'd: PJ
Date: 06.06.11	Scale: AS SHOWN

AECOM

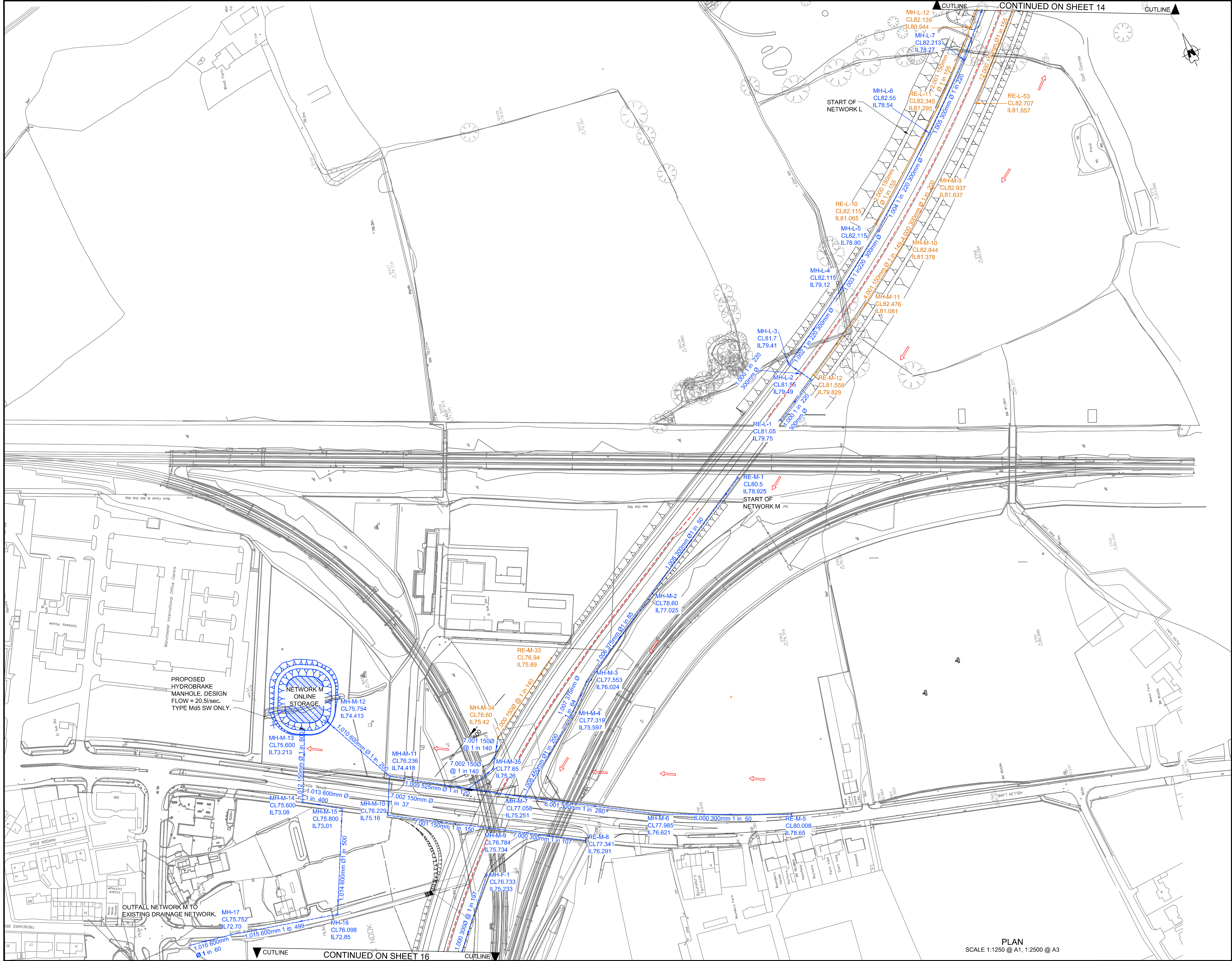
AECOM
Lynnfield House, Church Street,
ALTRINCHAM, WA14 4DZ

Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

Rev:
No. 60212470-HIG-0514 P05

PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3

CAD File: F:\projects\Highways - SEMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0514.dwg, Plotted on 4/26/2013 3:36 PM by Bambridge, Paul



- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - PROPOSED PIPE NETWORK NAME AND NUMBER
 - PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLIPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED), MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)

Rev	Date	Detail	Made	Chk'd	App'd
P05	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMBC COMMENTS	JR	PB	MCBH
P04	15.03.13	AMENDED FROM TR1 DESIGN	JR	PB	MCBH
P03	11.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P02	12.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMBC	VUM	MCBH	PJ
P01	06.06.11	FIRST ISSUE FOR COMMENT	AJR	MCBH	PJ

Client:
STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project:
SEMMS A6 RELIEF ROAD

Title:
DRAINAGE LAYOUT NETWORK L & M SHEET 15

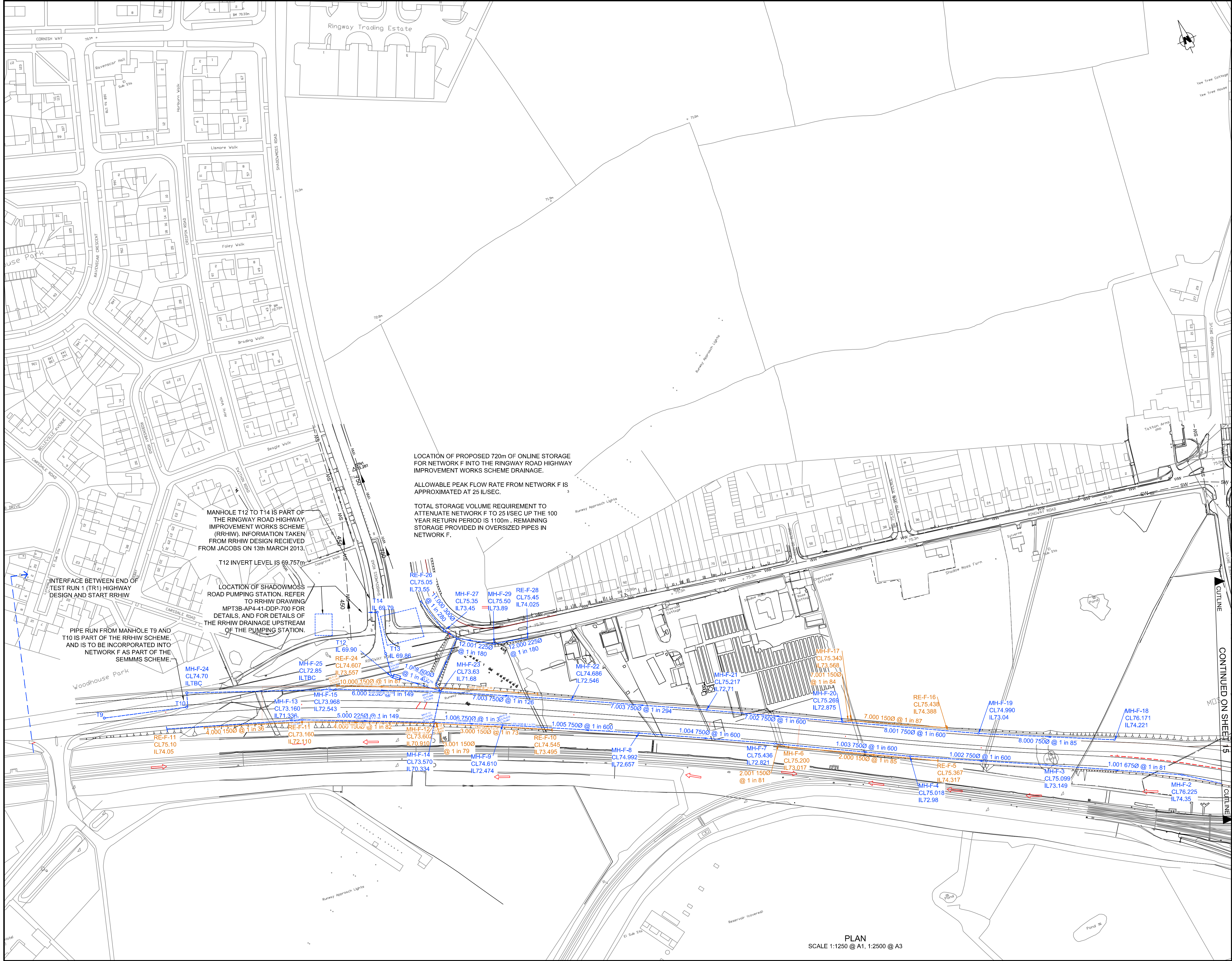
Design: PB	CAD: AJR
Chk'd: MCBH	App'd: PJ
Date: 06.06.11	Scale: AS SHOWN

AECOM
 Lymington House, Church Street, ALTRINCHAM, WA14 4DZ
 Tel: +44 (0) 161 927 8200 Fax: +44 (0) 161 927 8499 www.aecom.com

No. 60212470-HIG-0515 P05

PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3

CAD File: F:\projects\Highways - SEMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0515.dwg, Plotted on 4/26/2013 3:35 PM by Bainbridge, Paul



LOCATION OF PROPOSED 720m OF ONLINE STORAGE FOR NETWORK F INTO THE RINGWAY ROAD HIGHWAY IMPROVEMENT WORKS SCHEME DRAINAGE.

ALLOWABLE PEAK FLOW RATE FROM NETWORK F IS APPROXIMATED AT 25 l/SEC.

TOTAL STORAGE VOLUME REQUIREMENT TO ATTENUATE NETWORK F TO 25 l/SEC UP THE 100 YEAR RETURN PERIOD IS 1100m³. REMAINING STORAGE PROVIDED IN OVERSIZED PIPES IN NETWORK F.

MANHOLE T12 TO T14 IS PART OF THE RINGWAY ROAD HIGHWAY IMPROVEMENT WORKS SCHEME (RRHW). INFORMATION TAKEN FROM RRHW DESIGN RECEIVED FROM JACOBS ON 13th MARCH 2013.

T12 INVERT LEVEL IS 69.757m

LOCATION OF SHADOWMOSS ROAD PUMPING STATION. REFER TO RRHW DRAWING MPT3B-AP4-41-DDP-700 FOR DETAILS. AND FOR DETAILS OF THE RRHW DRAINAGE UPSTREAM OF THE PUMPING STATION.

INTERFACE BETWEEN END OF TEST RUN 1 (TR1) HIGHWAY DESIGN AND START RRHW

PIPE RUN FROM MANHOLE T9 AND T10 IS PART OF THE RRHW SCHEME, AND IS TO BE INCORPORATED INTO NETWORK F AS PART OF THE SEMMMS SCHEME.

- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND THE AECOM DRAINAGE STRATEGY REPORT, DOCUMENT REFERENCE 60212470-HIG-002. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF AECOM.
 - ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
 - ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
 - PIPES Ø IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL WORKS TO BE IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SHW).
 - ALL EARTHWORKS/GROUNDWATER DRAINAGE PIPES TO BE FILTER DRAINS WITH THE EXCEPTION OF PIPES RUNNING ACROSS HIGHWAY. THESE PIPES ARE TO BE UNPERFORATED CARRIER DRAINS.

- KEY:
- EXISTING DRAINAGE (COMBINED)
 - SW- EXISTING DRAINAGE (SURFACE)
 - EXISTING CULVERT
 - EXISTING WATERCOURSE
 - PROPOSED SYPHON
 - PROPOSED HIGHWAY DRAINAGE
 - PROPOSED EARTHWORKS / GROUNDWATER DRAINAGE
 - PROPOSED CULVERT
 - PROPOSED OUTFALL LOCATION
 - PROPOSED RISING MAIN
 - 1.005/A PROPOSED PIPE NETWORK NAME AND NUMBER
 - MH-A-1 PROPOSED MANHOLE/CATCHPIT NETWORK NAME AND NUMBER
 - RE-A-1 PROPOSED RODDING EYE NUMBER AND NETWORK NAME
 - PROPOSED POND/TANK
 - LIMIT OF DEVIATION
 - PROPOSED FENCELINE (TAKEN FROM LATEST HIGHWAY DESIGN LAYOUT)
 - DIRECTION OF PROPOSED HIGHWAY LONGFALL
 - EXISTING OIL PIPELINE
 - PROPOSED OIL PIPELINE
 - PROPOSED 300mm INTERNAL Ø SLOPPFORM SLOT DRAIN (BY EXTRUDAKERB OR SIMILAR APPROVED). MAXIMUM LENGTH BETWEEN OUTFALLS APPROX 300m (TBC AT DETAIL DESIGN)
 - PROPOSED UNATTENUATED DISCHARGE RATE WITH 20% CLIMATE CHANGE ALLOWANCE (l/s)

NETWORK	RETURN PERIOD (years)			
	2	5	30	100
F	110.2	139.0	192.6	228.1

Rev	Date	Detail	Made	Chk'd	App'd
P06	22.04.13	UPDATED FOLLOWING REVISED TR1 DESIGN & SMCB COMMENTS	JR	PB	MCBH
P05	15.03.13	AMENDED TO TR1 DESIGN	JR	PB	MCBH
P04	05.01.12	SEMMMS DRAINAGE DESIGN UPDATED IN LINE WITH LATEST RRHW DESIGN	VUM	MCBH	SM
P03	11.08.11	AMENDMENTS FOLLOWING COMMENTS FROM SMCB	VUM	MCBH	PJ
P02	11.07.11	AMENDMENTS FOLLOWING COMMENTS FROM SMCB	VUM	MCBH	PJ

Client: STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project: SEMMMS A6 RELIEF ROAD

Title: DRAINAGE LAYOUT NETWORKS F & M SHEET 16

Design: PB	CAD: VUM
Chk'd: MCBH	App'd: PJ
Date: 06.06.11	Scale: AS SHOWN

AECOM

AECOM
Lynfield House, Church Street,
ALTRINCHAM, WA14 4DZ

Tel: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8499
www.aecom.com

No. 60212470-HIG-0516 P06

PLAN
SCALE 1:1250 @ A1, 1:2500 @ A3

CAD File: F:\projects\Highways - SEMMMS A6 Relief Road\01 Autocad\01 Output\60212470-HIG-0516.dwg, Plotted on 4/26/2013 3:43 PM by Bambridge, Paul

Appendix B – Calculations

Calculations	60212470-CALC-003: Existing Catchment Summary
	60212470-CALC-020: Section through Network SWS A at outfall
	60212470-CALC-021: Section through Network SWS B at outfall
	60212470-CALC-022: Section through Network SWS C at outfall

SEMMMS A6 Relief Road				
Document Ref:	60212470-CALC-003			
By:	JR	Checked:	PB	Date: Apr-13

EXISTING CATCHMENT SUMMARY

Existing Catchment Details					
Catchment Area Ref	Permeable Area (m ²)	Impermeable Area (m ²)	Total Area (m ²)	Total Area (Ha)	% of total area that is Impermeable
1	119457.1	23621.3	143078.4	14.3	16.5
2	421167.1	15177.5	436344.6	43.6	3.5
3	987328.6	54562.9	1041891.6	104.2	5.2
4	466919.3	5666.6	472585.9	47.3	1.2
5	147796.8	10510.6	158307.3	15.8	6.6
6	340420.1	34472.3	374892.4	37.5	9.2
7	104971.7	5342.8	110314.5	11.0	4.8
8	377149.9	13935.2	391085.0	39.1	3.6
9	0.0	77004.3	77004.3	7.7	100.0
10	223716.5	0.0	223716.5	22.4	0.0
11	66932.5	11426.7	78359.3	7.8	14.6
12	40464.2	26375.5	66839.7	6.7	39.5

Results of IH 124 Mean Annual Flood Analysis (see Note 1)								
QBAR Rural (l/s)	QBAR Urban (l/s)	Q 2 Year (total for catchment)	Q 2 Year (total per hectare)	Q 30 Years (total for catchment)	Q 30 Years (total per hectare)	Q 100 Years (total for catchment)	Q 100 Years (total per hectare)	Catchment Area Ref
80	102.2	97.4	6.8	166.4	11.6	196.6	13.7	1
243.9	257.7	241.2	5.5	433.2	9.9	527.4	12.1	2
537.2	582.6	546.6	5.2	975.2	9.4	1182.8	11.4	3
264.2	269.2	251.2	5.3	455.1	9.6	556.9	11.8	4
88.5	98	92.2	5.8	163.5	10.3	197.7	12.5	5
209.5	241.3	227.7	6.1	399.9	10.7	480.7	12.8	6
61.7	66.5	62.3	5.6	111.4	10.1	135.2	12.3	7
218.6	231.3	216.5	5.5	388.8	9.9	473.2	12.1	8
Analysis not appropriate for areas where impermeable area is >75% of catchment.								
127.3	127.3	118.5	5.3	215.7	9.6	264.7	11.8	10
43.8	54.5	51.9	6.6	89.2	11.4	105.9	13.5	11
37.7	64.5	63.3	9.5	99.9	14.9	113.4	17.0	12

Note 1: Institute of Hydrology Method of determining rural runoff is used for above catchments over 50 hectares. The Interim Code of Practice recommends that for areas of less than 50 hectares, a 50 hectare figure is used and the result is linearly interpolated for actual area. The Microdrainage Source Control ICP Suds method has been used to achieve this automatically for areas less than 50 hectares.

Outfall Description	Outfall Ref	Network Ref	Network is within Catchment:	Total Imp Area (m2)	Total Perm Area (m2)	Total Area (ha)	2yr RP maximum allowable discharge rate (l/s)	30yr RP maximum allowable discharge rate (l/s)	100yr RP maximum allowable discharge rate (l/s)
Outfall to Ox Hey Brook / Threaplehurst Brook	A	SWS A	1 & 2	20991	0	2.1	11.6	20.8	25.4
Outfall to Norbury Brook	B	SWS B	2.3 & 4	59584	0	6.0	31.3	55.8	67.6
Outfall to Lady Brook	C	SWS C	4.5 & 6	41163	17942	4.7	24.7	44.8	54.8
Outfall to existing Highway surface drainage (Manhole ref: MLV6440)	D	SWS D	7,8	46022	31473	5.5			
Outfall to existing Highway surface drainage (Manhole ref: MCR6440)	E	SWS E	7,8	37491.3	32229.4	4.7			
Outfall to Shadowmoss Rd Pumping Station	F	SWS F	12	58421.0	15233.0	6.3	59.7	94.1	106.9
Outfall to PUMPING STATION 3 & STORAGE TANK 6, Oakmere Road	L	SWS L	10	49050	13962	5.3	28.2	51.3	63.0
Outfall to existing 600 dia combined sewer, Styal Road	M	SWS M	11	18243	3255.6	1.9	12.7	21.9	26.0

Project: SEMMMS A6 RELIEF ROAD

Ref: CALC 020

Section: SECTION THROUGH NETWORK A DRAINAGE / POND

Job No: 60212470

PRELIMINARY DRAINAGE DESIGN FOR HIGHWAY DESIGN 'TEST RUN 1'

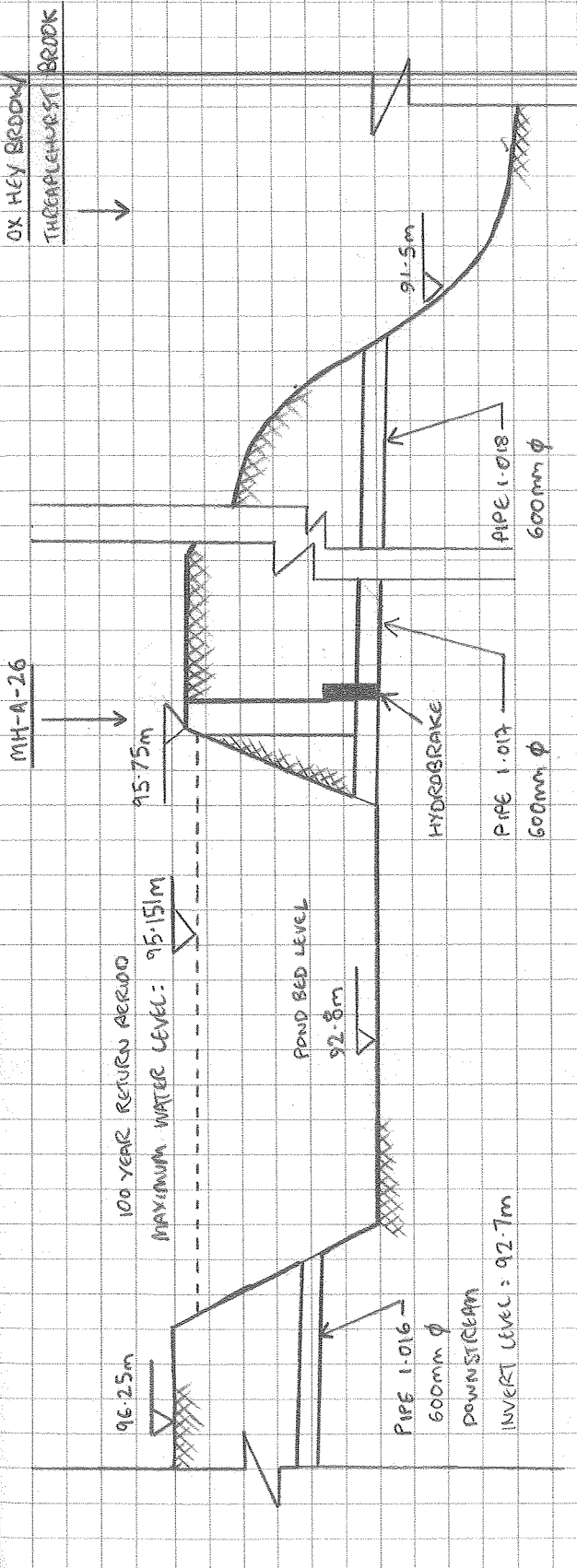
Date: MARCH 2013

Made by: FRANKRIDGE

Checked by: MAM

Sheet No: 7 of 7

SECTION THROUGH PROPOSED POND (NETWORK A)



OUTFALL DETAILS (20% ALLOWANCE FOR CLIMATE CHANGE APPLIED)

- MAXIMUM WATER LEVEL FOR THE 100 YEAR RETURN PERIOD =
- 1 YEAR RETURN PERIOD; MAXIMUM DISCHARGE RATE AT OUTFALL = $10.7 \text{ } \frac{1}{\text{SEC}}$ ALLOWABLE = $11.6 \text{ } \frac{1}{\text{SEC}}$.
- 5 YEAR RETURN PERIOD; MINOR SURCHARGING ONLY
- 30 YEAR RETURN PERIOD; MAXIMUM DISCHARGE RATE AT OUTFALL = $15.1 \text{ } \frac{1}{\text{SEC}}$ ALLOWABLE = $20.8 \text{ } \frac{1}{\text{SEC}}$.
SURCHARGING, BUT NO FLOODING
- 100 YEAR RETURN PERIOD; MAXIMUM DISCHARGE RATE AT OUTFALL = $17 \text{ } \frac{1}{\text{SEC}}$ ALLOWABLE = $25.4 \text{ } \frac{1}{\text{SEC}}$.
MAXIMUM WATER LEVEL AT POND = 95.15 m \therefore 100 YEAR MAXIMUM WATER LEVEL IS WITHIN POND EXTENTS.

HYDROBRAKE DETAILS:

- DESIGN HEAD: 1m
- DESIGN FLOW: $11.6 \text{ } \frac{1}{\text{SEC}}$
- HYDROBRAKE TYPE: M05 SW ONLY
- DIAMETER: 134mm
- COVER LEVEL: 95.75m
- INVERT LEVEL: 92.672m

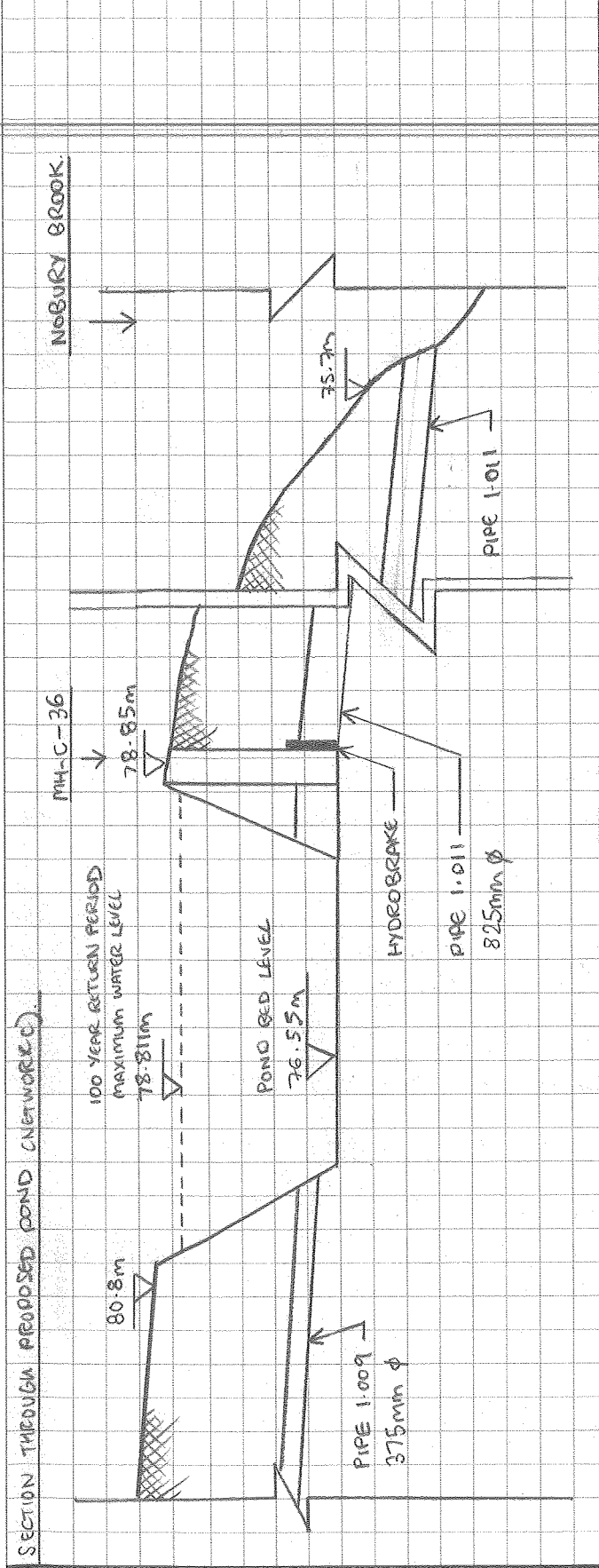
REFER TO DRAWING 60212470-HIG-0501 FOR FURTHER DETAILS OF NETWORK A DRAINAGE.

Project: SEMMMS AS RELIEF ROAD
 Section: SECTION THROUGH NETWORK C DRAINAGE / POND.
 Job No: 60212470
 Date: MARCH 2013
 Ref: CAC-022

Made by: PAINTBRIDGE

Checked by: MUM

Sheet No: 1 of 1



OUTFALL DETAILS. (200% ALLOWANCE FOR CLIMATE CHANGE APPLIED).

MAXIMUM WATER LEVEL FOR 100 YEAR RETURN PERIOD =

2 YEAR RETURN PERIOD; MAXIMUM DISCHARGE RATE AT OUTFALL = 19.8 l/s (ALLOWABLE = 24.7 l/sec)

5 YEAR RETURN PERIOD; MINOR SURCHARGING ONLY

30 YEAR RETURN PERIOD; MAXIMUM DISCHARGE RATE AT OUTFALL = 22.0 l/s (ALLOWABLE = 44.8 l/sec)

SURCHARGING BUT NO FLOODING

100 YEAR RETURN PERIOD; MAXIMUM DISCHARGE RATE AT OUTFALL = 23.3 l/s (ALLOWABLE = 54.8 l/sec)

MAXIMUM WATER LEVEL AT POND = 78.811m = 100 YEAR MAXIMUM WATER LEVEL IS WITHIN POND EXTENTS.

HYDROBRAKE DETAILS

DESIGN HEAD: 1m

DESIGN FLOW: 10.8 l/sec

HYDROBRAKE TYPE: MDS SW ONLY

DIAMETER: 134mm

COVER LEVEL:

INVERT LEVEL:

REFER TO DRAWING 60212470-HIG-0504
 FOR FURTHER DETAILS OF NETWORK C DRAINAGE

Appendix C – Correspondence

Correspondence Environment Agency Letter 18/05/11

Environment Agency email regarding proposed outfall to Gatley Brook

United Utilities email confirming outfall locations to the public sewer

Mr M Wilson BEng (Hons)
Engineer, Water
AECOM
Lynnfield House
Church Street
Altrincham, Cheshire WA14 4DZ

Our Ref PRRWAR717

Date: 18 May 2011

Dear Matt

**PUBLIC REGISTER AND ENVIRONMENTAL INFORMATION REQUEST
SEMMMS flood risk and drainage**

Thank you for your email regarding the above. Requests for recorded information are generally governed by the Freedom of Information Act 2000 (FOIA). The information you have requested is environmental and is therefore exempt from the provisions of FOIA by FOIA s.39(1). We have therefore considered your request under the Environmental Information Regulations 2004 (EIR). Please find our response below.

Your enquiry

You have set out below some of the issues that you need to agree with us in relation to flood risk and drainage.

Proposed Drainage

A full surface water drainage proposal is currently being developed, with due consideration being given to SUDS components where practicable. This will be summarised in the meeting tomorrow.

As discussed during the meeting on 19 April 2011, the approach taken to deal with surface water runoff discharge is acceptable in principle and we look forward to receive further information.

Discharges to Watercourses

We are in the process of identifying a number of potential locations for surface water discharges to watercourses. We wish to confirm that the proposed catchments and discharge locations are acceptable to the EA, and agree any restrictions on the discharges. We will be able to present you with this information tomorrow – we have produced a plan of the route showing proposed locations, catchment sizes, existing runoff estimates using the IoH 124 method etc.

At the meeting on 19 April 2011 the catchments defined appeared acceptable and once we have received the plan with the proposed outfall locations we will be able to visit those sites and provide further advice for the consent applications if required.

Discharge to Groundwater

Appleton House, 430 Birchwood Boulevard, Birchwood, Warrington, WA3 7WD
Customer Services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

Should discharge by infiltration be found to be possible at any location along the route (following appropriate infiltration testing), would this be acceptable to the EA?

The underlying objective with any infiltration of surface water run-off to ground is to comply with the requirements of the Environmental Permitting Regulations 2010. These essentially prohibit the entry of hazardous substances to groundwater and limit the entry of non-hazardous substances to groundwater so that pollution does not occur.

The acceptability of any scheme will therefore be dependent on the vulnerability of the groundwater in the area and the treatment that the run-off is subject to prior to infiltration. Each proposal would therefore need to be considered on a site specific basis.

Proposed watercourse culverting

We have identified approximately 11 locations where the proposed highway crosses an existing 'watercourse'. A number of these watercourses are simply field drains for which we need to maintain the continuity of flow. Some, such as Baguley Brook are more defined watercourses. We will be sizing the required culverts as part of the FRA. Where no detailed flow estimate is available either from previous modelling or EA data, we propose to use the IoH124 method to estimate the flow in the watercourses based on local topography. We will be looking to confirm with you that this method is acceptable for application to all culverts.

Can you confirm if the culverts need to be sized to cater for the estimated 1 in 100 year + climate change flow or the 1 in 1000 year flow? This will be used as a basis for the minimum culvert size, the actual proposed size will also consider:

- Buildability;
- Any EA or LA requirements for access through culverts and pedestrian/vehicle access upstream/downstream of culverts;
- Any ecological requirements

Response DFR: Any proposed culvert should pass the 1 in 100 year plus climate change allowance flood flow. The ecological report prepared by Mouchel should inform the design of those culverts to mitigate for any ecological issues. Sue Slamon explained during the meeting that any culvert should provide connectivity for any protected species. Please provide the list of those 11 locations with the OS grid references so that the appropriate data can be provided.

Ox Hey Brook

A realignment of the Ox Hey Brook (Ordinary Watercourse currently within Hazel Grove Golf Course, tributary of Threaphurst Brook) forms part of the proposals. A rough location plan is shown below with the approximate diversion location shown in red.



We understand Ox Hey Brook is not main river – can you confirm if it is an Ordinary Watercourse or a Critical Ordinary Watercourse? Has any hydraulic modelling of Ox Hey Brook been undertaken by/for the EA? If so, what type of model is this (JFlow, ISIS etc.); What is the upstream extent of this model; and what would be the cost of obtaining flood levels in the vicinity of the proposed development? Is the EA aware of any flooding incidents from Ox Hey Brook and/or its tributaries in the vicinity of the proposed development?

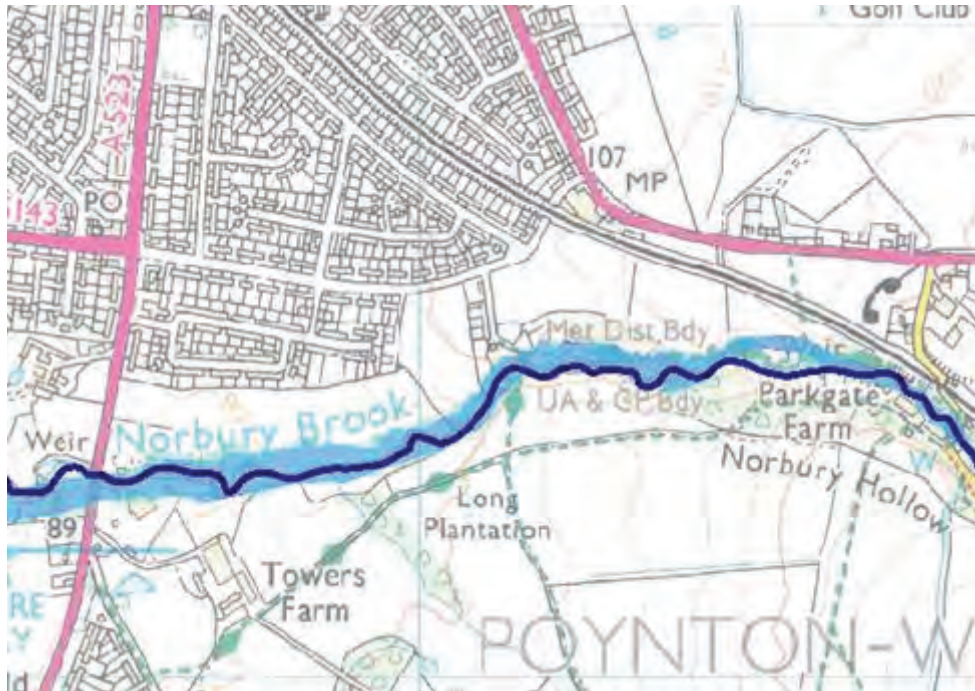
What are the EA's general requirements in relation to the proposed diversionary work?

We would wish for the watercourse to be diverted in an open channel and the diverted watercourse should not increase flood risks elsewhere.

Ox Hey Brook is not main river. It was not classed as a critical ordinary watercourse in the 2003/4 review. No hydraulic modelling has been undertaken by the EA on this watercourse. We have no record of flooding at this location, but the absence of recorded flooding does not mean that the location has never been flooded, nor that flooding may not occur in the future.

Norbury Brook

The proposed road runs alongside Norbury Brook for some distance. The current proposal is for a short diversion of Norbury Brook to be undertaken at the location shown below – at Hazel Grove, south of Mill Lane and Old Mill Lane. Approximate diversion location is shown in red.



We understand that flood extents for Norbury Brook in the vicinity of the proposed development, as shown on the current EA flood maps, are based on the EA's original JFlow S105 modelling – is this correct?

We undertook some detailed hydraulic modelling in 2006 to inform a previous FRA for this section of the route (Report attached including full details of the modelling methodology and hydrology used). We wish to confirm with the EA that the results of this modelling are acceptable for use in the current study. We would specifically look for confirmation that: (a) The 'existing' flood outline which were generated are accepted as being a more accurate representation than those currently shown on the EA flood maps; (b) The hydraulic analysis of the proposed watercourse diversion and results of this are accepted by the EA. I have attached a copy of the original report so that this may be reviewed; the relevant sections are:

- 4 Flow Estimation (and Appendix 1 Model Group 7/7a);
- 5 Hydraulic Modelling;
- 6.6 Existing Flood Extent Maps for Norbury Brook;
- 9 Flow Analysis of Norbury Brook (analysis of the proposed diversion).

What are the EA's general requirements in relation to the proposed diversionary work?

We have passed the electronic model received on a CD by post to our FRM team to review the hydrology and hydraulic modelling. We will provide a response to this question at a later date.

Any diversion should be in keeping with the surrounding area and ensure that there is no increase in flood risks upstream or downstream.

Baguley Brook is Main River as far upstream as SJ8195586154. There is an ISIS model to this point. Further upstream, which is where the proposed route crosses the watercourse, it is not main river and it has not been modelled. This upstream

Appleton House, 430 Birchwood Boulevard, Birchwood, Warrington, WA3 7WD

Customer Services line: 08708 506 506

Email: enquiries@environment-agency.gov.uk

Website: www.environment-agency.gov.uk

non main river section was not classed as a critical ordinary watercourse in the 2003/4 review.

We have no record of flooding at this location, but the absence of recorded flooding does not mean that the location has never been flooded, nor that flooding may not occur in the future.

Baguley Brook

Baguley Brook and its tributaries are crossed by the proposed development. We understand Baguley Brook is not main river – can you confirm if it is an Ordinary Watercourse or a Critical Ordinary Watercourse? Has any hydraulic modelling of Baguley Brook and/or its tributaries been undertaken by/for the EA? If so, what type of model is this (JFlow, ISIS etc.); What is the upstream extent of this model; and what would be the cost of obtaining flood levels in the vicinity of the proposed development? Is the EA aware of any flooding incidents from Baguley Brook and/or its tributaries in the vicinity of the proposed development?

Baguley Brook is Main River as far upstream as SJ8195586154. There is an ISIS model to this point. Further upstream, which is where the proposed route crosses the watercourse, it is not main river and it has not been modelled. This upstream non main river section was not classed as a critical ordinary watercourse in the 2003/4 review.

We have no record of flooding at this location, but the absence of recorded flooding does not mean that the location has never been flooded, nor that flooding may not occur in the future.

Historical Flood Records

With reference to the proposed route, are there any recorded historical flood incidents which we should be aware of?

With reference to the proposed route we have no record of flooding, but the absence of recorded flooding does not mean that the location has never been flooded, nor that flooding may not occur in the future.

Other Flood Risk Considerations

In respect of the proposed highway route, are there any further significant considerations which we should be aware of or any other requirements to be addressed in the FRA?

We have discussed during the meeting on 19 April 2011 our requirements for the proposed scheme and we have no further comments to make at this stage.

Rights of appeal

We hope that our response has addressed all of the questions that you have asked. However, if you are not satisfied with our response to your request for information, you can contact us to ask for our decision to be reviewed. If you are still not satisfied following this, you can make an appeal to the Information Commissioner, who is the statutory regulator for Freedom of Information. Their contact details are: Office of the Information Commissioner, Wycliffe House, Water Lane, Wilmslow, Cheshire SK9 5AF . Tel: 01625 545700. Fax: 01625 524 510

Appleton House, 430 Birchwood Boulevard, Birchwood, Warrington, WA3 7WD
Customer Services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

email: mail@ico.gsi.gov.uk
Website: <http://www.ico.gov.uk>

Yours sincerely,

A black rectangular box containing a white handwritten signature that reads "K McA Linden".

Katie McA Linden
Customer Services Officer
01925 54345

Appleton House, 430 Birchwood Boulevard, Birchwood, Warrington, WA3 7WD
Customer Services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

Bainbridge, Paul

From: Bate, Graham [graham.bate@environment-agency.gov.uk]
Sent: 16 August 2011 14:10
To: Bainbridge, Paul
Subject: RE: SEMMMS flood risk and drainage

Hello Paul,

Thank you for your email regarding the above.

I can confirm that there would be no objections in principle, from a flood risk viewpoint, to the discharge of surface water into the existing sewer. As this discharge will be introducing additional flow into the sewer, an investigation should be undertaken to determine what effects this would have, to ensure that a flooding problem is not created, nor any existing aggravated.

Kind regards,

Graham.

Graham Bate | Development & Flood Risk Engineer, Team East |

Environment Agency | ☎ 01925 543413 | Fax ☎ 01925 852260 |

📍 Appleton House, 430 Birchwood Boulevard, Warrington, WA3 7WD |

From: Bainbridge, Paul [mailto:paul.bainbridge@aecom.com]
Sent: 16 August 2011 12:47
To: Bate, Graham
Subject: FW: SEMMMS flood risk and drainage
Importance: High

Good afternoon Graham,

Please find below email from Sandrine as discussed earlier.

Can you confirm that The Environment Agency would have no objections to a proposed outfall into this watercourse, with peak flows attenuated to existing greenfield runoff rates.

Many thanks, Paul

Paul Bainbridge BEng (Hons)
Engineer
D +44 (0) 161 927 8321
paul.bainbridge@aecom.com
AECOM
Lynnfield House, Church Street,
Altrincham, Cheshire WA14 4DZ
Board: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8399
www.aecom.com

From: Thomas, Sandrine [mailto:sandrine.thomas@environment-agency.gov.uk]
Sent: 01 August 2011 14:41

To: Bainbridge, Paul
Cc: Molina, Victoria U
Subject: RE: SEMMMS flood risk and drainage

Dear Paul

I can confirm that the culvert in question is not an Environment Agency owned asset and from the sewer records we have access to (which are the same as United Utilities) it appears that it does discharge into Gatley Brook

Any additional runoff connecting into a watercourse via the sewer would need to be attenuated to greenfield runoff rate.

Regards
Sandrine

Sandrine Thomas | Development & Flood Risk Team East |

Environment Agency | ☎ 01925 543 405 | Fax ☎ 01925 852 260 |

📍 Appleton House, 430 Birchwood Boulevard, Warrington, WA3 7WD |

From: Bainbridge, Paul [mailto:paul.bainbridge@aecom.com]
Sent: 29 July 2011 11:06
To: Thomas, Sandrine
Cc: Molina, Victoria U
Subject: RE: SEMMMS flood risk and drainage

Click [here](#) to report this email as spam.

Hi Sandrine,

I am currently working on the drainage design for the SEMMMS relief road scheme. The attached PDF shows one of the proposed outfalls points of the SEMMMS road highway drainage into an Environment Agency owned asset (Gatley Brook). United Utilities have confirmed that the sewer/culvert at Tedder Drive / Ringway Road junction is not a public sewer. Their records also indicate that it is not a highway sewer, although we are in the process of checking this with the local authority. Could you confirm if this sewer/culvert, from Tedder Drive to its existing discharge point is an Environment Agency owned asset?

It would appear that this sewer/culvert discharges into Gatley Brook – are you able to confirm this? United Utilities have stated they will not allow a connection to the 600mm diameter combined sewer in Styal Road. The attached shows all the records we have on the existing drainage in this area.

Would the attached proposal to discharge part of the proposed SEMMMS road highway drainage be acceptable to the Environment Agency, and if so is there a maximum allowable discharge rate we would be required to adhere to?

I look forward to your response, please give me a call if you require any further information or have any queries.

Thanks, Paul

Paul Bainbridge BEng (Hons)
Engineer

D +44 (0) 161 927 8321
paul.bainbridge@aeom.com
AECOM
Lynnfield House, Church Street,
Altrincham, Cheshire WA14 4DZ
Board: +44 (0) 161 927 8200
Fax: +44 (0) 161 927 8399
www.aecom.com

From: Wilson, Matthew G.
Sent: 18 April 2011 12:59
To: 'Thomas, Sandrine'
Cc: Bainbridge, Paul; Houghton, Martin CB
Subject: SEMMMS flood risk and drainage

Hi Sandrine,

As a precursor to tomorrow's meeting I've set out below some of the issues we need to agree with the EA in relation to flood risk and drainage. I don't expect you will be able to fully address these before the meeting, but they will form the basis of the discussions and our consultation requirements with the EA. Please let me know if I need to address any of these to the Customer Service Team or a mapping specialist.

Proposed Drainage

A full surface water drainage proposal is currently being developed, with due consideration being given to SUDS components where practicable. This will be summarised in the meeting tomorrow.

Discharges to Watercourses

We are in the process of identifying a number of potential locations for surface water discharges to watercourses. We wish to confirm that the proposed catchments and discharge locations are acceptable to the EA, and agree any restrictions on the discharges. We will be able to present you with this information tomorrow – we have produced a plan of the route showing proposed locations, catchment sizes, existing runoff estimates using the IoH 124 method etc.

Discharge to Groundwater

Should discharge by infiltration be found to be possible at any location along the route (following appropriate infiltration testing), would this be acceptable to the EA?

Proposed watercourse culverting

We have identified approximately 11 locations where the proposed highway crosses an existing 'watercourse'. A number of these watercourses are simply field drains for which we need to maintain the continuity of flow. Some, such as Baguley Brook are more defined watercourses. We will be sizing the required culverts as part of the FRA. Where no detailed flow estimate is available either from previous modelling or EA data, we propose to use the IoH124 method to estimate the flow in the watercourses based on local topography. We will be looking to confirm with you that this method is acceptable for application to all culverts.

Can you confirm if the culverts need to be sized to cater for the estimated 1 in 100 year + climate change flow or the 1 in 1000 year flow? This will be used as a basis for the minimum culvert size, the actual proposed size will also consider:

- Buildability;
- Any EA or LA requirements for access through culverts and pedestrian/vehicle access upstream/downstream of culverts;
- Any ecological requirements

Ox Hey Brook

A realignment of the Ox Hey Brook (Ordinary Watercourse currently within Hazel Grove Golf Course, tributary of Threaphurst Brook) forms part of the proposals. A rough location plan is shown below with the approximate diversion location shown in red.



We understand Ox Hey Brook is not main river – can you confirm if it is an Ordinary Watercourse or a Critical Ordinary Watercourse? Has any hydraulic modelling of Ox Hey Brook been undertaken by for the EA? If so, what type of model is this (JFlow, ISIS etc.); What is the upstream extent of this model; and what would be the cost of obtaining flood levels in the vicinity of the proposed development? Is the EA aware of any flooding incidents from Ox Hey Brook and/or its tributaries in the vicinity of the proposed development?

What are the EA's general requirements in relation to the proposed diversionary work?

Norbury Brook

The proposed road runs alongside Norbury Brook for some distance. The current proposal is for a short diversion of Norbury Brook to be undertaken at the location shown below – at Hazel Grove, south of Mill Lane and Old Mill Lane. Approximate diversion location is shown in red.



We understand that flood extents for Norbury Brook in the vicinity of the proposed development, as shown on the current EA flood maps, are based on the EA's original JFlow S105 modelling – is this correct?

We undertook some detailed hydraulic modelling in 2006 to inform a previous FRA for this section of the route (Report attached including full details of the modelling methodology and hydrology used). We wish to confirm with the EA that the results of this modelling are acceptable for use in the current study. We would specifically look for confirmation that: (a) The 'existing' flood outline which were generated are accepted as being a more accurate representation than those currently shown on the EA flood maps; (b) The hydraulic analysis of the proposed watercourse diversion and results of this are accepted by the EA. I have attached a copy of the original report so that this may be reviewed; the relevant sections are:

- 4 Flow Estimation (and Appendix 1 Model Group 7/7a);
- 5 Hydraulic Modelling;
- 6.6 Existing Flood Extent Maps for Norbury Brook;
- 9 Flow Analysis of Norbury Brook (analysis of the proposed diversion).

-
What are the EA's general requirements in relation to the proposed diversionary work?

Baguley Brook

Baguley Brook and its tributaries are crossed by the proposed development. We understand Baguley Brook is not main river – can you confirm if it is an Ordinary Watercourse or a Critical Ordinary Watercourse? Has any hydraulic modelling of Baguley Brook and/or its tributaries been undertaken by/for the EA? If so, what type of model is this (JFlow, ISIS etc.); What is the upstream extent of this model; and what would be the cost of obtaining flood levels in the vicinity of the proposed development? Is the EA aware of any flooding incidents from Baguley Brook and/or its tributaries in the vicinity of the proposed development?

Historical Flood Records

With reference to the proposed route, are there any recorded historical flood incidents which we should be aware of?

Other Flood Risk Considerations

In respect of the proposed highway route, are there any further significant considerations which we should be aware of or any other requirements to be addressed in the FRA?

Regards,

Matt Wilson BEng (Hons)

Engineer, Water

D +44 (0)161 927 8058

mattthew.wilson@aecom.com

AECOM

Lynnfield House

Church Street

Altrincham, Cheshire WA14 4DZ

T +44 (0)161 927 8200 F +44 (0)161 927 8499

www.aecom.com

Find out more about [ONE](#), AECOM's global e-magazine

This email is confidential and is for the intended recipient only. If you are not the intended recipient, please contact the author and you must not disclose or use the contents in any way. The author bears responsibility for any legal action or disputes arising from views or professional advice expressed which do not relate to the business of AECOM Ltd.

AECOM Limited Registered in England No: 1846493

Registered Office: AECOM House, 63-77 Victoria Street, St Albans, Herts, AL1 3ER

Please consider the environment before printing this e-mail

Information in this message may be confidential and may be legally privileged. If you have received this message by mistake, please notify the sender immediately, delete it and do not copy it to anyone else.

We have checked this email and its attachments for viruses. But you should still check any attachment before opening it.

We may have to make this message and any reply to it public if asked to under the Freedom of Information Act, Data Protection Act or for litigation. Email messages and attachments sent to or from any Environment Agency address may also be accessed by someone other than the sender or recipient, for business purposes.

If we have sent you information and you wish to use it please read our terms and conditions which you can get by calling us on 08708 506 506. Find out more about the Environment Agency at www.environment-agency.gov.uk

This email is confidential and is for the intended recipient only. If you are not the intended recipient, please contact the author and you must not disclose or use the contents in any way. The author bears responsibility for any legal action or disputes arising from views or professional advice expressed which do not relate to the business of AECOM Ltd.

AECOM Limited Registered in England No: 1846493

Registered Office: AECOM House, 63-77 Victoria Street, St Albans, Herts, AL1 3ER

Please consider the environment before printing this e-mail

Molina, Victoria U

From: Planning Liaison [PlanningLiaison@uuplc.co.uk]
Sent: 11 August 2011 14:43
To: Molina, Victoria U
Cc: Cartledge, Jonathan; Greenhalgh, John; McDermott, Daniel
Subject: RE: FAO Neil O'Brien - SEMMMS A6 Relief Road drainage proposals

Victoria,

Please see my comments in red below for each enquiry.

Regards

Neil

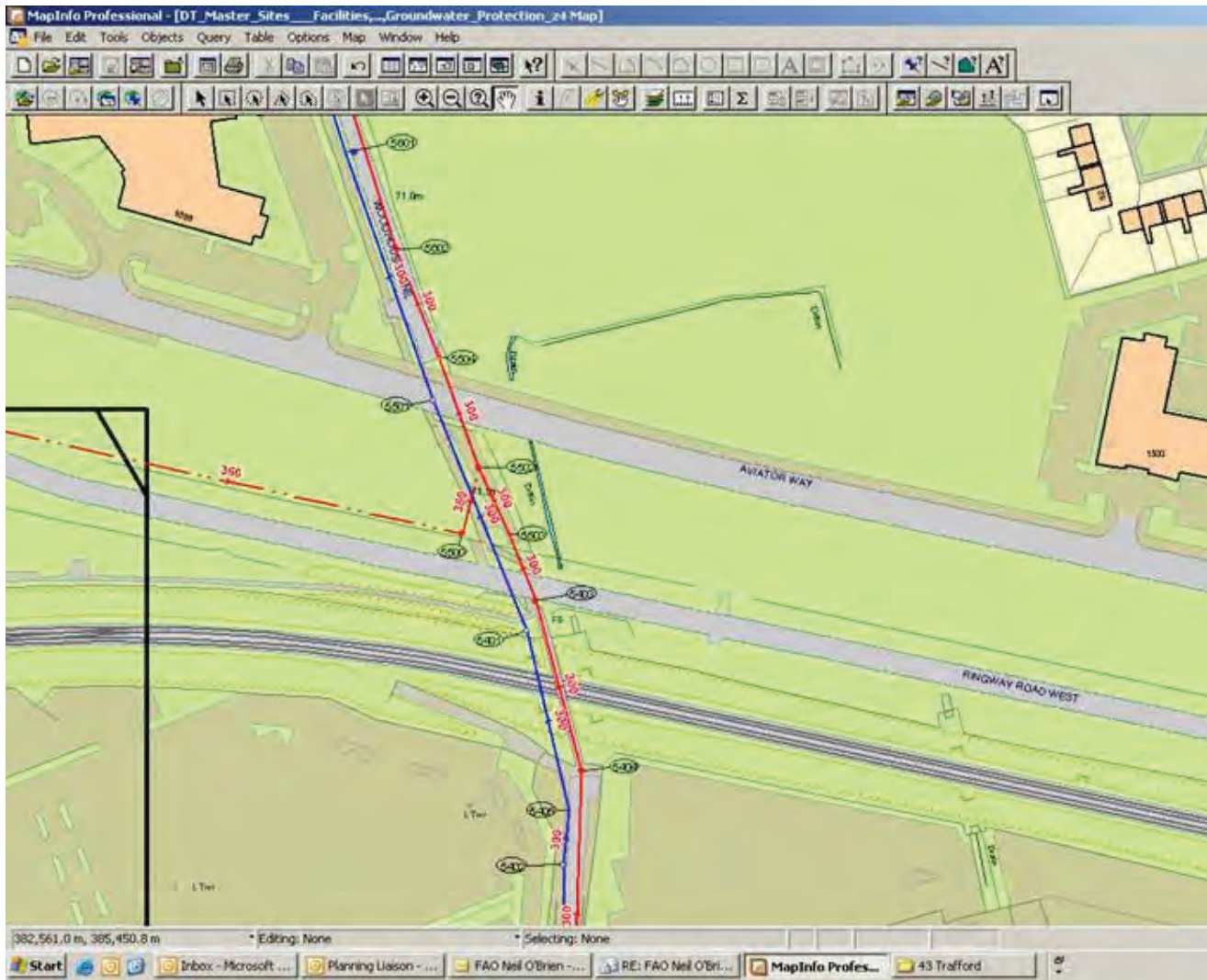
From: Molina, Victoria U [mailto:victoria.molina@aecom.com]
Sent: 05 August 2011 11:11
To: Planning Liaison
Cc: McDermott, Daniel; Bainbridge, Paul
Subject: FAO Neil O'Brien - SEMMMS A6 Relief Road drainage proposals

Good morning Neil,

My name is Victoria and I am working on the SEMMMS project with Paul Bainbridge. I requested some information to Daniel last week and I have tried to contact him today via phone but I have been told he is not in. We need the information in order to progress our design so I would be really thankful if you can have a look at the issues mentioned on emails below.

Also, we have been given as a connection point MH 5401 for one of our networks but our topographical information shows a drain crossing the road just before our proposed network reaches that manhole so can we connect into the same pipe but 35m approx downstream of MH 5401?

Please note that when mentioning "the same pipe" I am referring to the proposed diverted pipe and not to the existing one crossing the road. See sketch below:



Daniel has all the relevant sketches of our proposals but if you need that information just let me know and I will forward it to you.

Thank you for your help,
Victoria

Victoria Molina
Graduate Engineer, Transportation
D: +44 (0)161 927 8329
victoria.molina@aecom.com

AECOM
Lynnfield House
Church Street
Altrincham, WA14 4DZ
T: +44 (0)161 927 8200
www.aecom.com

From: Molina, Victoria U
Sent: 04 August 2011 16:44

To: 'McDermott, Daniel'
Subject: RE: Semmms

Good afternoon Daniel,

Did you have any chance to check my first 2 questions on the email below? As far as I know, the last one was discussed between you and Paul by the phone so I just need a final check of the outfall positions for network A3 and B4.

Regards,
Victoria

Victoria Molina
Graduate Engineer, Transportation
D: +44 (0)161 927 8329
victoria.molina@aecom.com

AECOM
Lynnfield House
Church Street
Altrincham, WA14 4DZ
T: +44 (0)161 927 8200
www.aecom.com

From: Molina, Victoria U
Sent: 28 July 2011 15:18
To: 'McDermott, Daniel'
Cc: Bainbridge, Paul
Subject: RE: Semmms

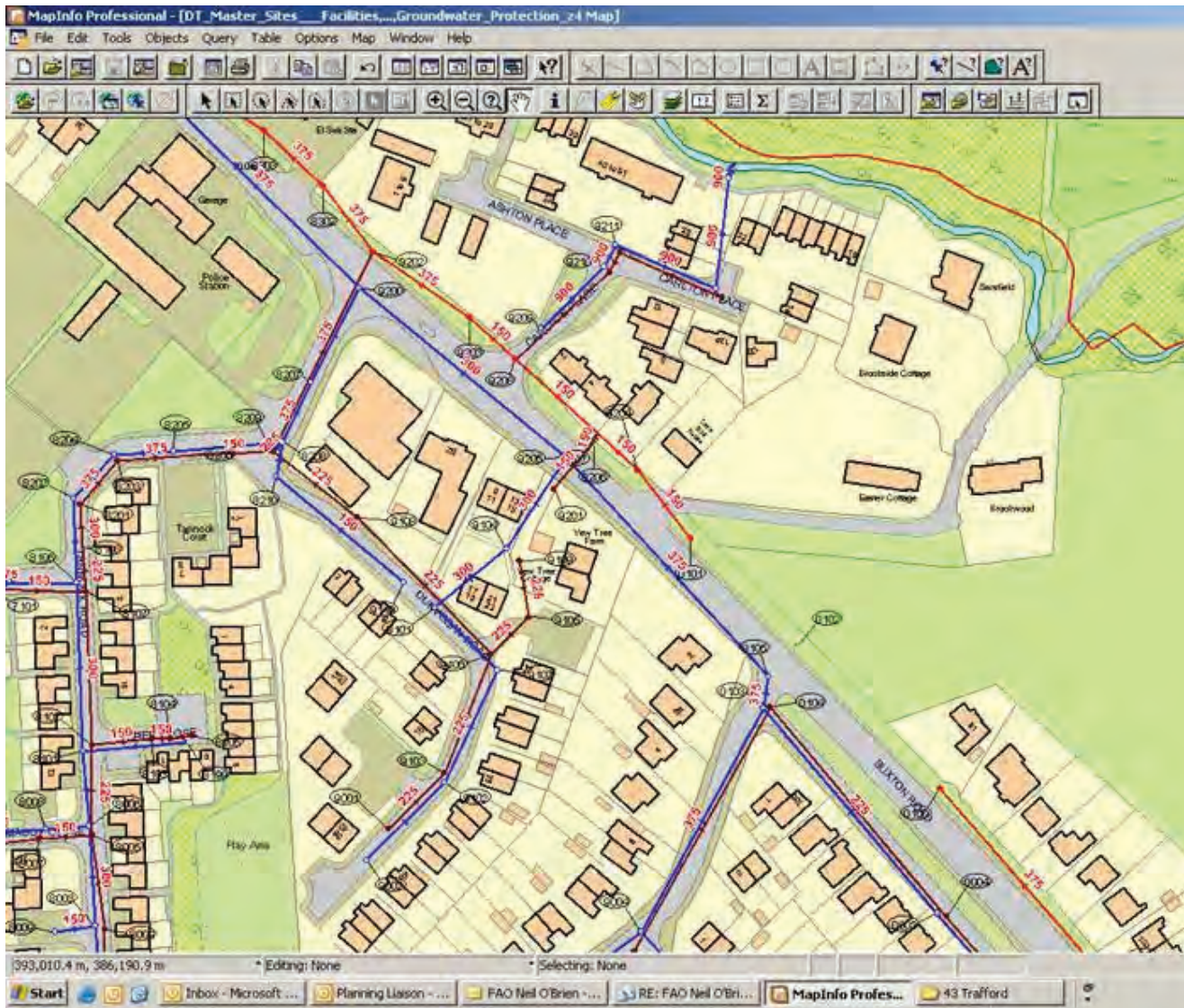
Good evening Daniel,

Thanks for your reply.

I have been revising the information you provided and I just want to double-check few issues.

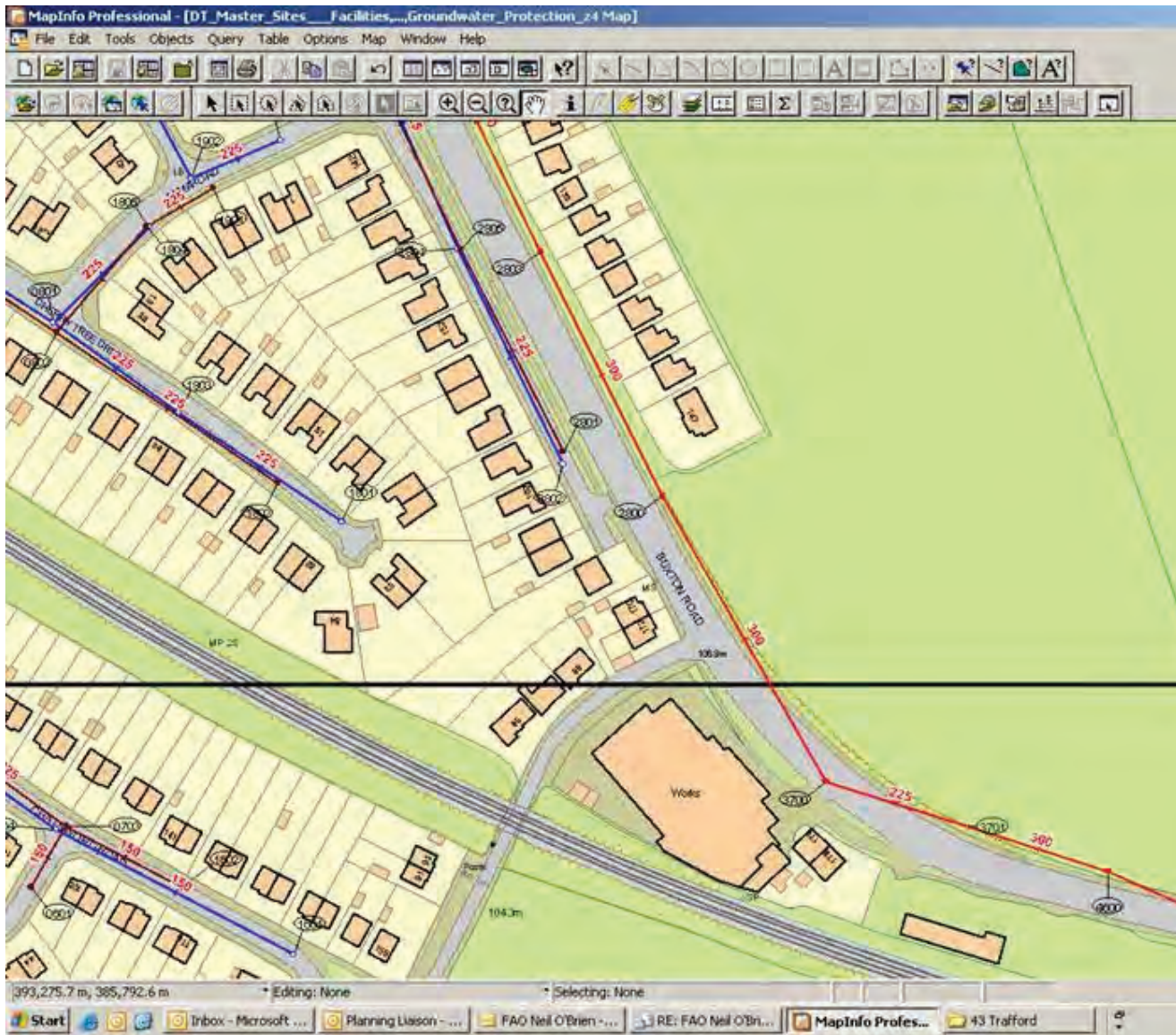
For network A3, we were planning to connect around these coordinates 393010,386190 (mentioned on SK04). I know we were referring to MH0103 but unfortunately this was due to a mistake in our records. Can you please advise if the proposed network can connect to a manhole closer to that area than the one you have provided (0104) as there is a branch running through that location and it is part of the same network.

UU would have not objection to you connecting to the surface water sewer in the area of Yew Tree Farm (as shown below), by means of a manhole. At the previously agreed rate



For network B4, you are quoting a manhole located on the Westbound footway. According to our records, there is a branch running through the Eastbound footway. We were planning to connect into this branch as it is closer to our works extent. What is the reason for not been allowed to do so? These are the coordinates where we wanted to connect: 393275, 385792 possibly with a saddle connection. If that connection type is not possible but we can still use a manhole on the Eastbound please let us know which one and the flow rate for it.

The above co-ordinates relate to the 300mm combined sewer (as shown below). UU will not allow any surface water connects to combined sewers.



Finally, for Network M, as per your response on 22nd June: “With regards to drawings ending 0515 and 0516 UU will have no objection to the highway drainage being connected into the inlet chamber node 8201 (grid Reference 383854 385294).” And your response on the email below “United Utilities Is not responsible for water courses and therefore we have not interest in discharges to water courses.” I understand that manhole 8201 is part of a highway drainage network and therefore UU is not responsible for it, being enough if our proposed network is attenuated to avoid exceeding the existing rural runoff for that area. Please advise if I have misunderstood the information.

Culverted watercourses are the responsibility of the land owner. If the land owner is the highway authority then the highway authority will be responsible for it

Regards,
Victoria

Victoria Molina
Graduate Engineer, Transportation
D: +44 (0)161 927 8329
victoria.molina@aecom.com

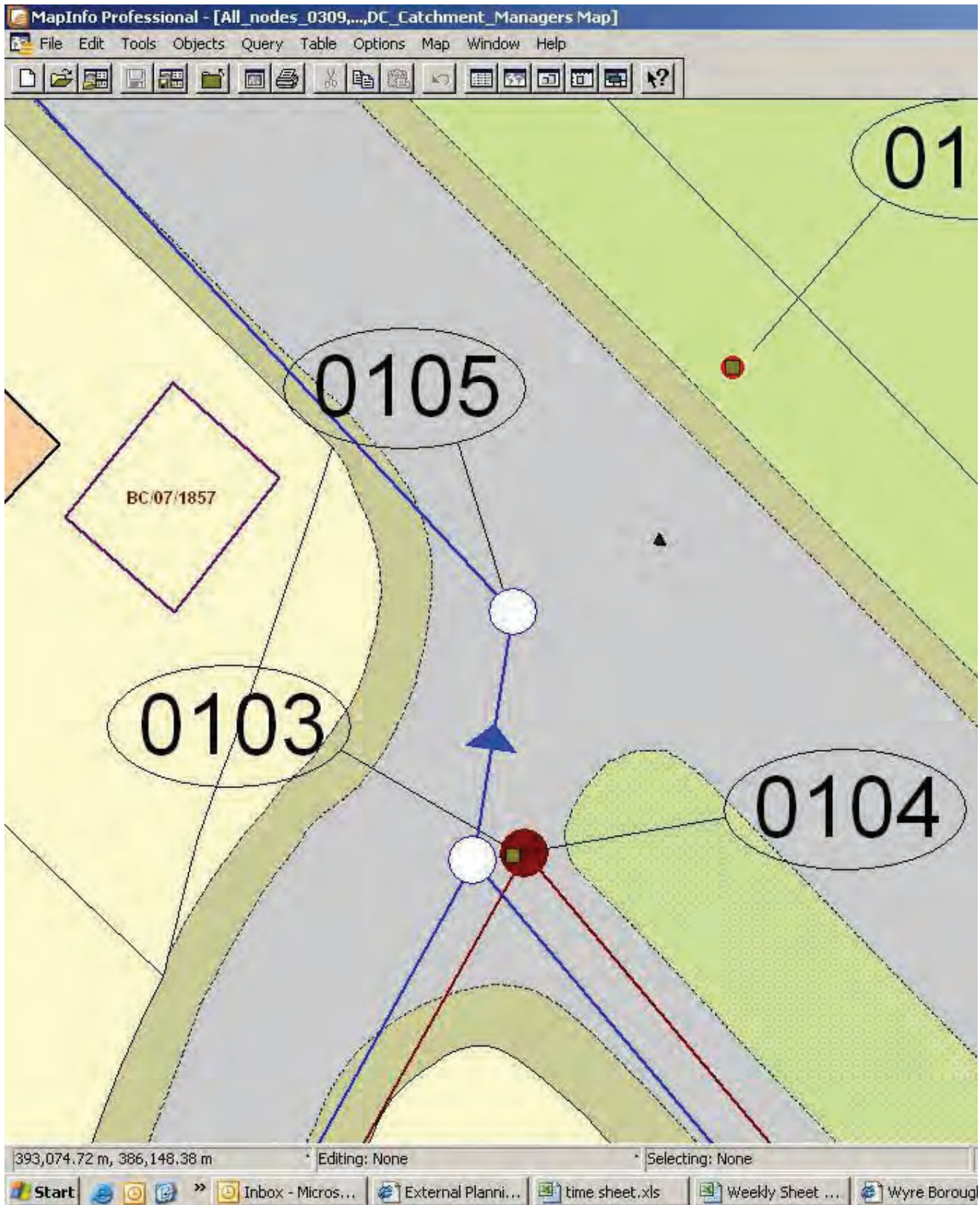
AECOM

Lynnfield House
Church Street
Altrincham, WA14 4DZ
T: +44 (0)161 927 8200
www.aecom.com

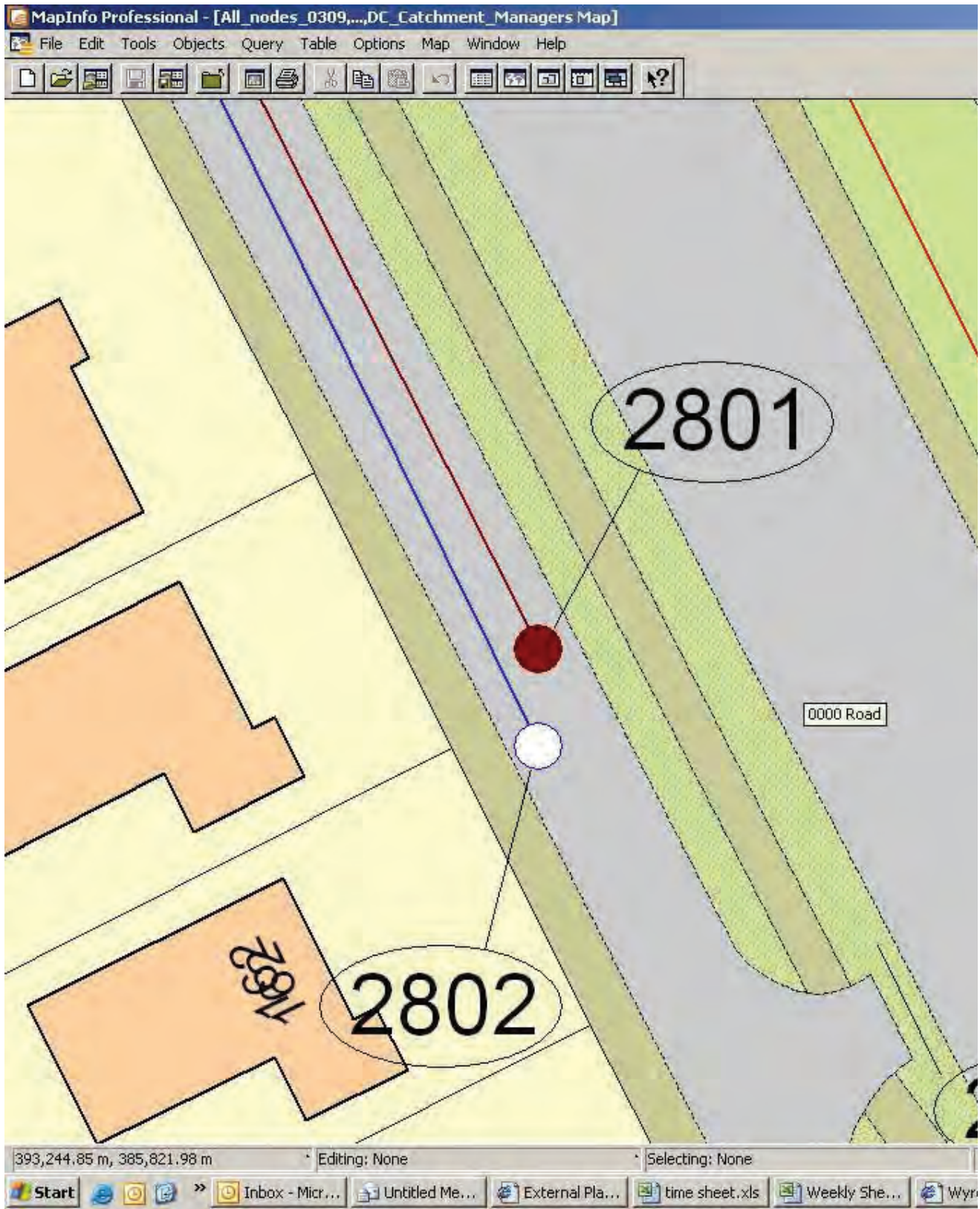
From: McDermott, Daniel [mailto:Daniel.McDermott@uuplc.co.uk]
Sent: 26 July 2011 10:15
To: Molina, Victoria U
Subject: Semmms

Connections to the public network at the locations below shown at the rates below are acceptable to United Utilities in Principal.

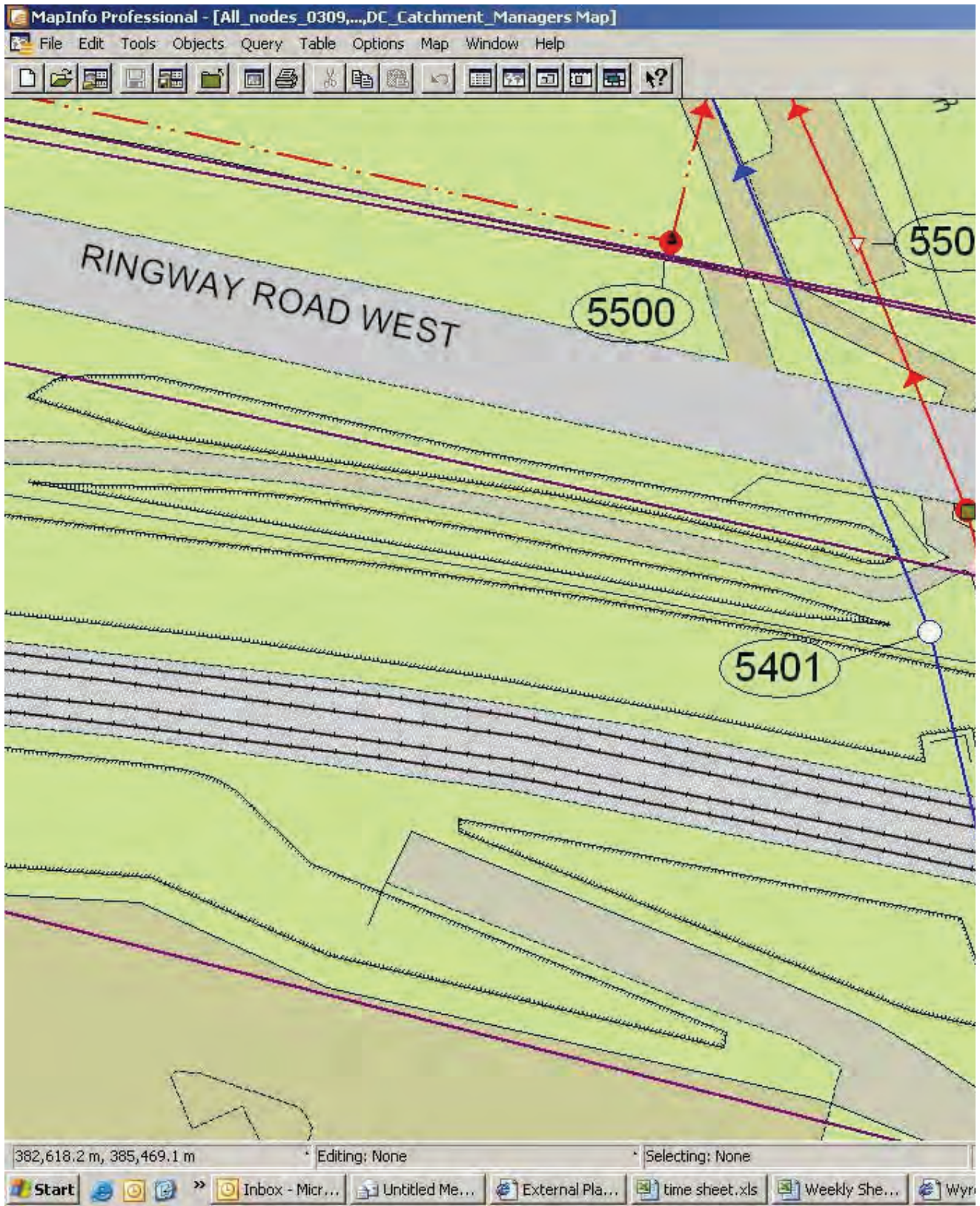
14.9Ls connected into Surface Water manhole reference 0104 is acceptable, please note that 0103 is according to our records a foul sewer and we will not permit connection of surface water to this sewer. Please see plan below



8.1Ls connected into Surface water manhole reference 2802 is acceptable, please note that 2801 is according to our records a foul sewer and we will not permit connection of surface water to this sewer. Please see plan below

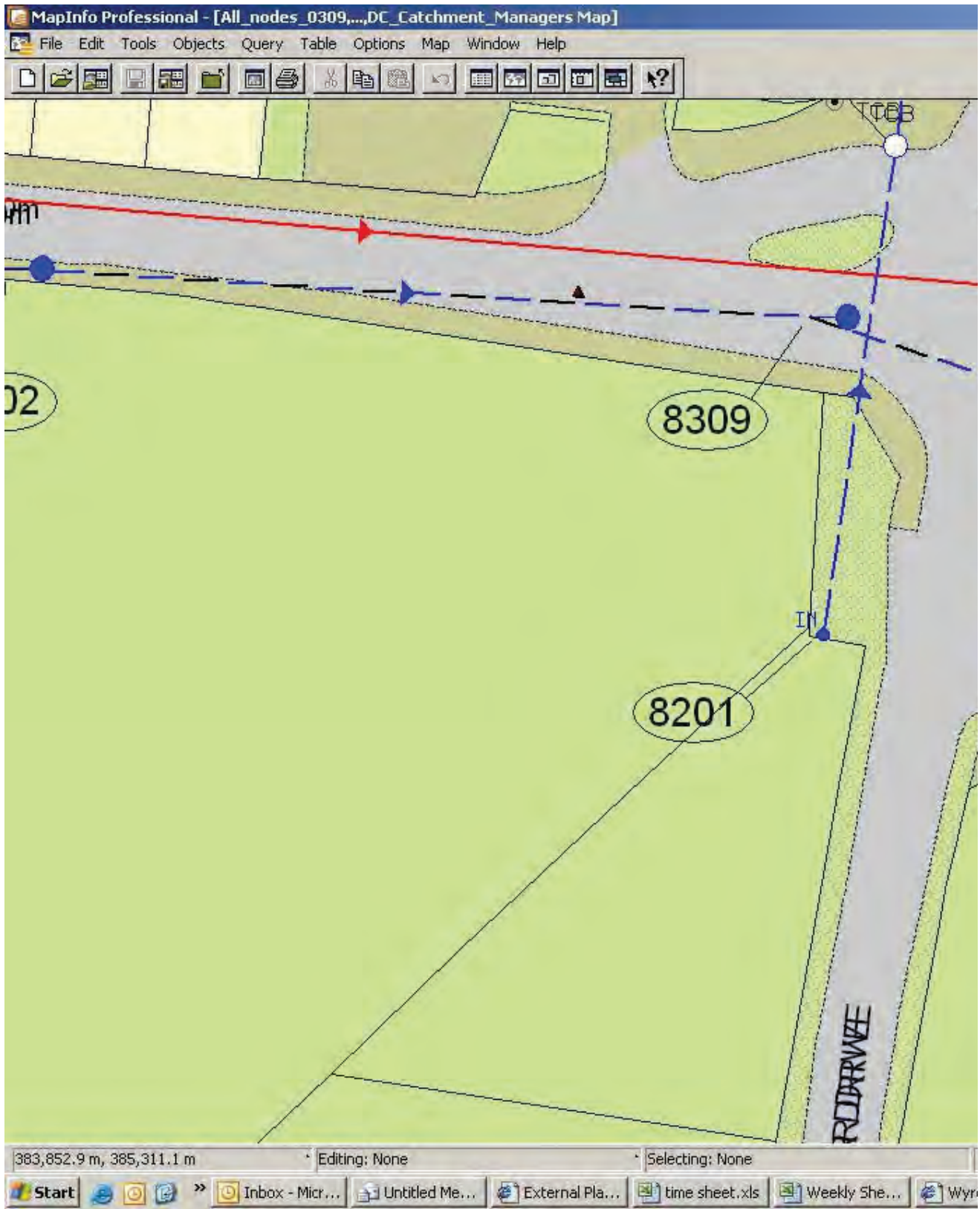


14.1Ls (1in30) connected into Surface water manhole reference 5401 is acceptable.



United Utilities Is not responsible for water courses and therefore we have not interest in discharges to water courses.

Please see the plan below.



Regards

Daniel McDermott
Asset Protection
United Utilities
Email Planning.liaison@uuplc.co.uk
Tel: 01925 678305

=====
=====
The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries
=====
=====

Find out more about [ONE](#), AECOM's global e-magazine

This email is confidential and is for the intended recipient only. If you are not the intended recipient, please contact the author and you must not disclose or use the contents in any way. The author bears responsibility for any legal action or disputes arising from views or professional advice expressed which do not relate to the business of AECOM Ltd.

AECOM Limited Registered in England No: 1846493
Registered Office: AECOM House, 63-77 Victoria Street, St Albans, Herts, AL1 3ER

Please consider the environment before printing this e-mail

=====
=====
The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries
=====
=====