

# Technical design note

Project name	Wingates, Bolton		
Design note title	Planning Condition 5 of 16770/23 – Realignment of Chorley Road		
Document reference	15992-HYD-XX-XX-TN-D-0002		
Author	Chloe Fell		
Revision	P1		
Date	25 March 2024	Approved	<input type="checkbox"/>

## 1.1 Introduction

This Technical Note has been prepared by Hydrock Consultants Ltd on behalf of Harworth to discharge Planning Condition 5 of 16770/23 and seek to demonstrate that the temporary drainage from the A6, to the proposed outfall will provide enough storage capacity to drain the impermeable area from the A6.

Planning permission ref. 16770/23 is for the realignment of the A6 Chorley Road and construction of an access to serve the approved employment development on land to the south.

Planning Condition 5 of 16770/23 reads as follows -

*Prior to the commencement of any groundworks, full details of the proposed temporary and/or permanent surface water drainage works shall be submitted to and approved in writing by the local planning authority. Before these details are submitted an assessment shall be carried out to investigate the potential for disposing of surface water by means of a sustainable drainage system in accordance with the principles set out in the National Planning Policy Framework, and the results of the assessment provided to the Local Planning Authority. Where a sustainable drainage system is to be provided, the submitted details shall:*

- 1) Provide information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of the receiving groundwater and/or surface waters.*
- 2) Include a timetable for its implementation, and*
- 3) Provide a management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime*

*The approved works shall be implemented in full prior to the road being first opened for use by traffic and those works as approved shall be retained thereafter in accordance with the approved details.*

*Reason: To ensure the site provides satisfactory means of surface water drainage and to comply with policies CG1.5 and CG2.2 of Bolton's Core Strategy.*

*Reason for pre-commencement condition: The solution for surface water disposal must be understood prior to works commencing on site as it could affect how underground works are planned and carried out.*

## 1.2 Proposed Temporary Drainage

The catchment/impermeable area of the A6 is 0.731Ha, which once the employment development site has been constructed will drain south into the proposed private infrastructure drainage network, draining through the pipe network down to an attenuation pond where it eventually outfalls into an existing ditch.

The construction of the A6 precedes any work on the main internal site, therefore it is intended to temporarily drain the area utilising a combination of ditches, construction of main drainage and temporary drainage pipes to the proposed swale outfall until the main site drainage is constructed.

The temporary drainage layout can be found in Appendix A.

In the temporary scenario, the surface water runoff from the A6 will discharge via a 525mm diameter pipe, from the A6 manhole SW05 where it will enter a temporary ditch –

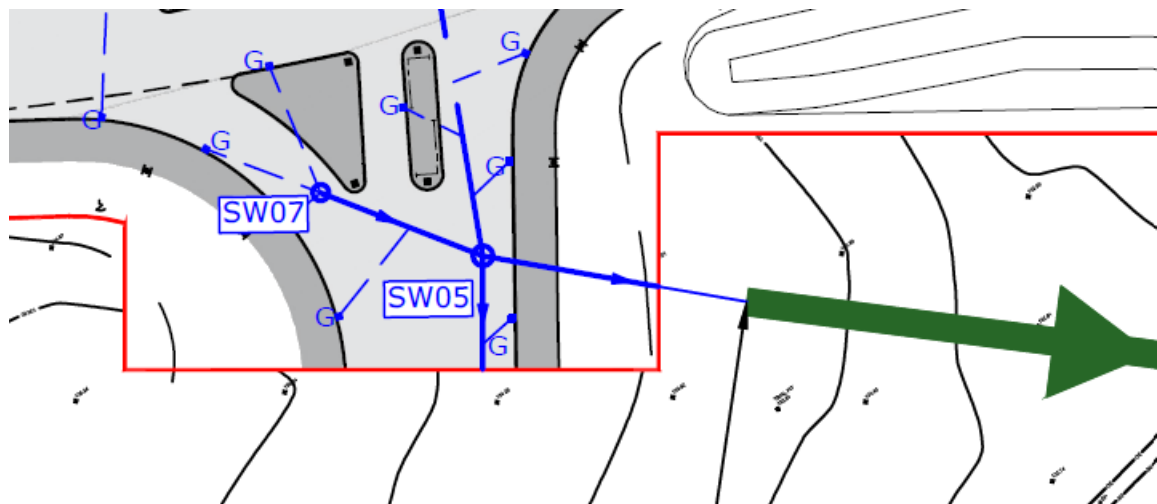


Figure 2 – Extract from BE Design drawing NWK 180009-BED-EX-00-DR-C-0921

The proposed temporary ditch cross section will have 1 in 2 side slopes, be at least 0.5 metre in depth and have a 1 metre base with check dams up to 2m in height. This will provide approximately 601m<sup>3</sup> of attenuation/storage. The layout of the ditch can be seen below in Figure 3 and can also be seen in Appendix A.

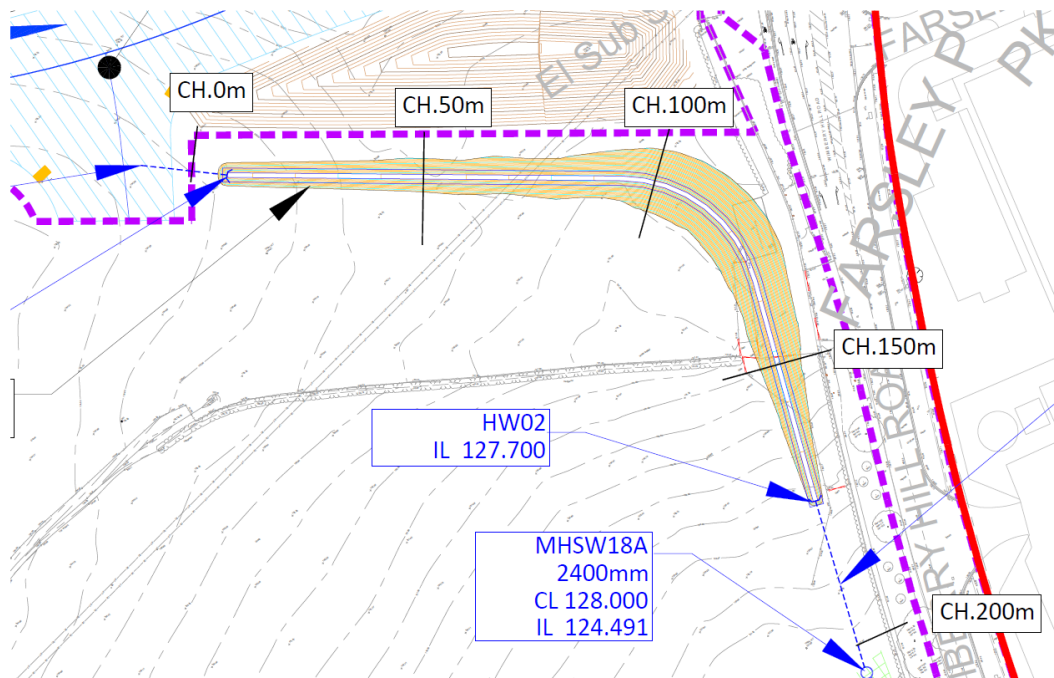


Figure 3 – Proposed Temporary Ditch

From the ditch, there will be a short section of 225mm pipe then a series of large diameter manholes and 1500mm diameter pipes which will be constructed as part the temporary drainage but will remain in place and be utilised for the proposed main site drainage.

These 1500mm diameter pipes are 180m in length, which provide an additional 318m<sup>3</sup> of attenuation/storage.

This results in a total of 919m<sup>3</sup> of storage available within the temporary drainage network which is enough attenuation/storage for the A6 impermeable area.

From there the A6 runoff passes through a Hydrobrake manhole at a rate of 5.96l/s, then through a 150mm diameter temporary flexi pipe, which runs under where the proposed attenuation pond for the main site will be located and then out to a proposed swale, which will also form part of the main site drainage network in the permanent state.

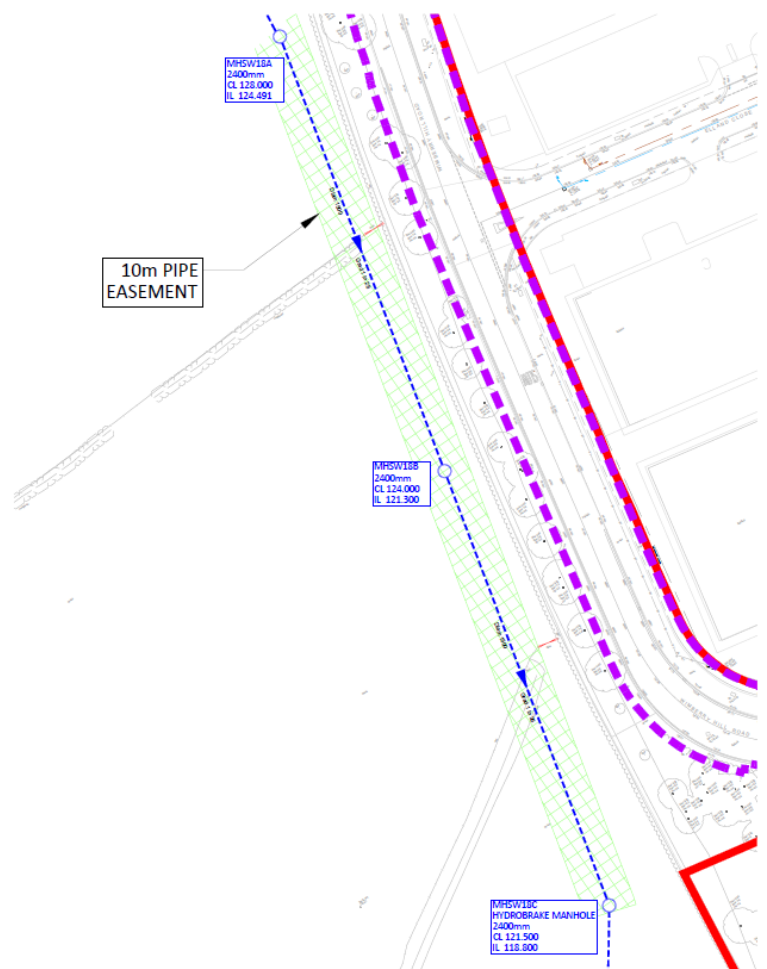


Figure 4 – Construction of main site drainage pipes

The surface water runoff then outfalls into the existing ditched watercourse via a headwall.

We have consulted the LLFA at Bolton Council to see whether there is a requirement for Land Drainage Consent to outfall into the brook and they have confirmed as long as the outfall does not encroach into the open cross section of watercourse ie it is set into the bank, therefore no loss in cross section of the watercourse, then the outfall will not require Land Drainage Consent (LDC).

### 1.3 Hydraulic Calculations

Hydrock have carried out a quick storage estimate using Microdrainage software that estimates the amount of attenuation/storage capacity required for the impermeable area of the A6 with the below parameters –

Return Period – 100 years

M5-60(mm) – 19.000

Ratio R – 0.292

Impermeable Area – 0.731Ha

Maximum allowable discharge – 5.96L/s

Climate Change – 40%

The output can be seen below –

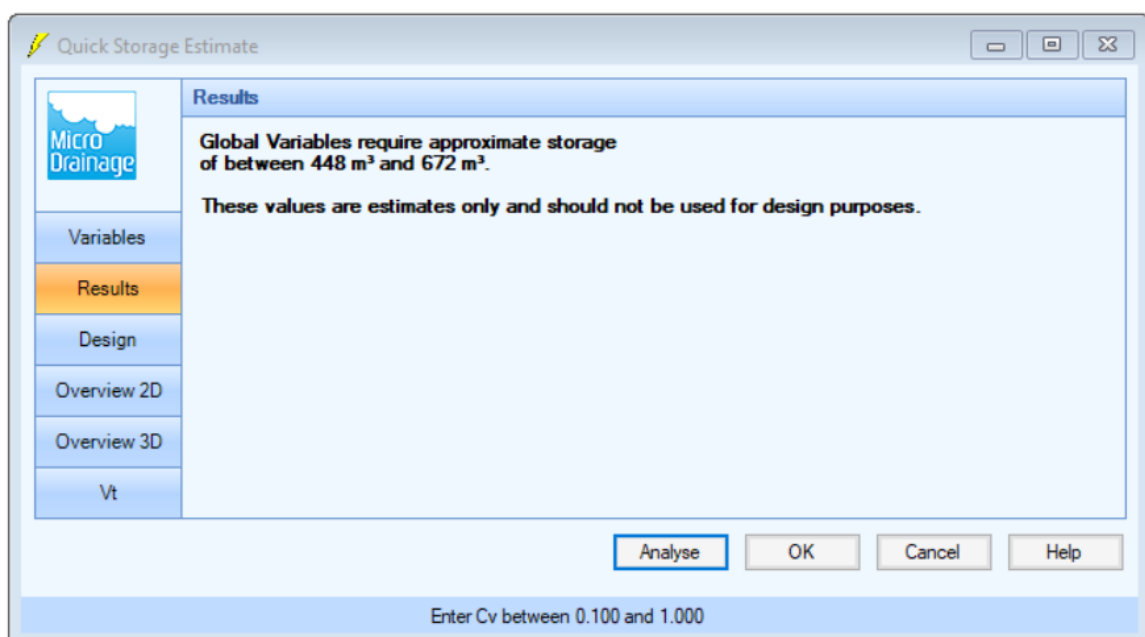


Figure 1 – Quick Storage Estimate

This was used to determine the size of the ditch required, then further Microdrainage calculations were carried out to check that no above ground flooding for the 1 in 30-year storm event should occur and that the maximum runoff rate does not exceed 5.96L/s.

A climate change allowance of 40% has been applied to the drainage model, these calculations can be seen in Appendix B.

## 1.4 Water Quality

The primary pollution control measure for the A6 will be in the form of utilising some of the proposed SuDS features for the wider private surface water network. This includes the proposed swale to the south of the site and the proposed temporary ditch, which will provide pollution control through filtration and settlement. The A6 drainage is also drained via trapped gullies, allowing silt and debris to settle in the base of the chamber and water to exit.

## 1.5 Timetable for Implementation

The temporary drainage will be constructed during the A6 Road Construction period, which commences early September for a duration of 23 weeks.

## 1.6 Management and Maintenance

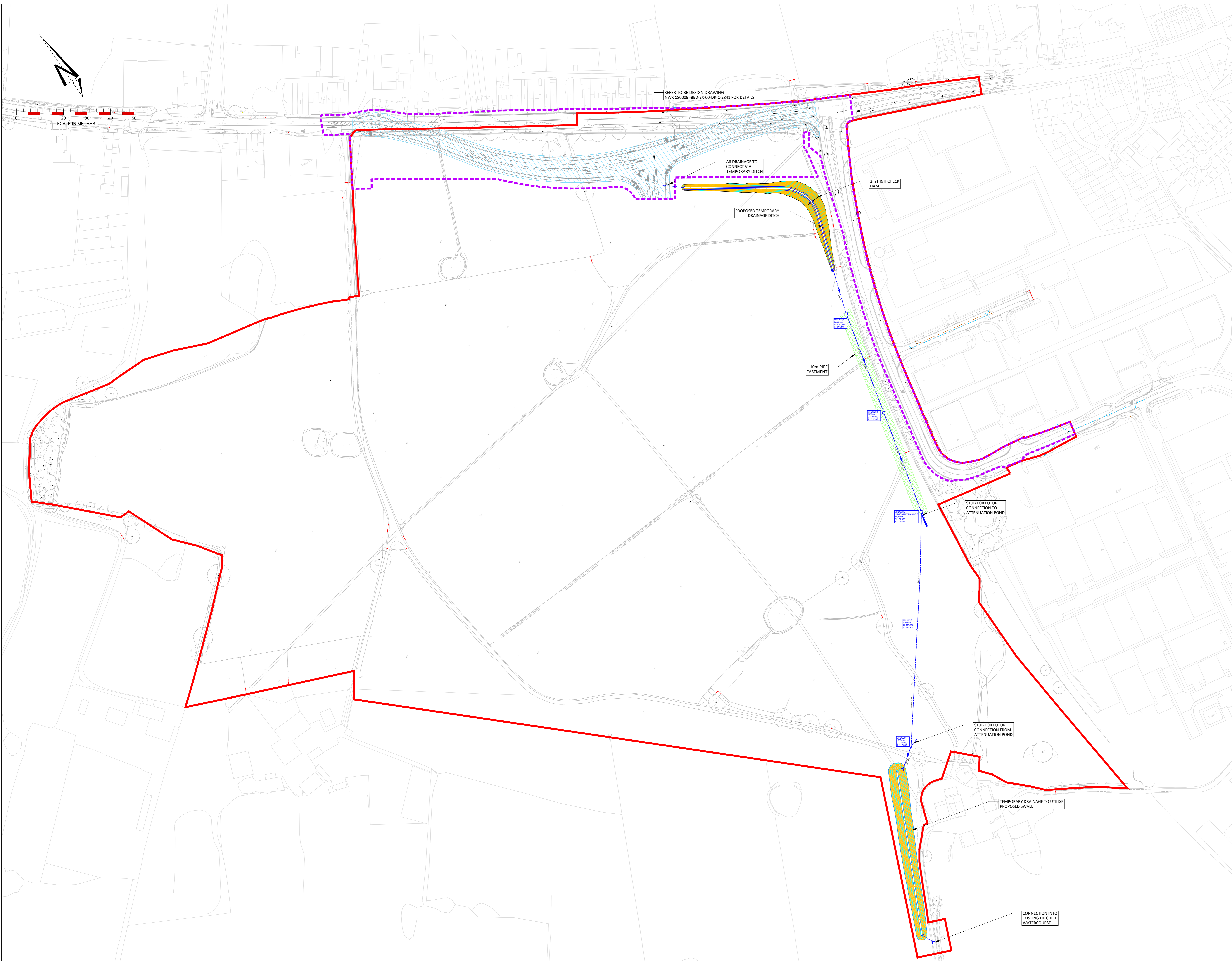
Maintenance is to be carried out by the Section 278 contractor for 12 months after completion of the highway, unless handed over to main site contractor before such time. The Main site contractor is then to maintain until the temporary drain is abandoned as it will be replaced by/connected to the permanent drainage, by which time a private management company will maintain the drainage infrastructure as part of a site-wide management and maintenance schedule.

The maintenance of the temporary drainage will be in line with the below table –

Item	Maintenance	Frequency per year
<b>Gullies</b>	Removal of silt accumulation from mud bucket. Gratings checked for operation/damage – replaced if required.	2
<b>Surface Water Manholes, Flow Controls</b>	Manhole covers checked for operation/damage – seating's re-greased or replaced as required. Check for blockages and or damage to invert channel/inlets – jetting pipe runs if blocked, any damage to be repaired. All access ladders & other associated ironworks to be checked for corrosion & fixings to be checked for deterioration. To be repaired or replaced dependant of extent of damage. All catch pits/Vortex Separators to have silt/solid accumulation removed & base jetted clean.	1
<b>Headwalls</b>	Visual inspection and repair of damaged structure. Check grating for debris and clear if necessary.	1
<b>Dry swales</b>	Vegetation/grass within the attenuation swale should be maintained appropriately to allow establishment and promote habitat formation, without impeding the operation of the inlet and outlet structure.	2

## *Appendix A*





**Notes:**

- All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
- This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

**KEY**

- PROPOSED SURFACE WATER
- PROPOSED HEADWALL
- A6 SURFACE WATER CATCHMENT (HIGHWAY DRAINAGE TO BE DESIGNED BY BE DESIGN)
- PHASE 1 BOUNDARY
- SLOT IN/OUT BOUNDARY

P4	07.03.24	Temporary Ditch Amended	CF	NB
P3	23.02.24	Minor Amendments	CF	NB
P2	15.12.23	Ditch Amended	JM	NB
P1	04.12.23	First Issue	JM	NB
Rev	Date	Description	By	Ctd

Architect:

Hydrock

Hydrock Consultants Ltd  
 25 Balfour Street  
 2nd Floor  
 Walsley, Rotherham  
 S64 5PE  
 Tel: 0114 272 2722  
 www.hydrock.com

Client:

# Harworth

Project Title:

WINGATES  
BOLTON

Drawing Title:

WINGATES S278 SURFACE WATER  
TEMPORARY OUTFALL

Drawing Status:

**PRELIMINARY ISSUE**

Hydrock Job No: C15592

Drawn	Checked	Scale @ Plot	Date	Issue Date
JM	NB	1:1000	04.12.2023	04.12.2023

Drawing Number: 15592-HYD-XX-XX-SK-D-0015

Revision: P4



## *Appendix B*



.  
.  
.  
Temporary Drainage from A6 Wingates



Date 26/03/2024  
File Temporary Drainage.MDX  
Designed by CF  
Checked by NB

Innovyze Network 2020.1.3

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
E1.000	39.766	0.270	147.3	0.731	5.00	0.0	0.600		o	525	Pipe/Conduit
E1.001	89.449	0.633	141.3	0.000	0.00	0.0		0.100	2 \_ /	1000	1:2 Ditch
E1.002	72.367	0.927	78.1	0.000	0.00	0.0		0.100	2 \_ /	1000	1:2 Ditch
E1.003	31.160	0.623	50.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit
E1.004	90.000	3.214	28.0	0.000	0.00	0.0	0.600		o	1500	Pipe/Conduit
E1.005	90.000	2.571	35.0	0.000	0.00	0.0	0.600		o	1500	Pipe/Conduit
E1.006	99.886	0.829	120.5	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit
E1.007	99.851	0.900	110.9	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit
E1.008	20.196	0.090	225.0	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit
E1.009	141.610	3.110	45.5	0.000	0.00	0.0		0.045	3 \=/	1000	1:3 Swale
E1.010	8.458	0.017	500.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
E1.000	129.530	0.731	0.0	1.84	399.1
E1.001	129.260	0.731	0.0	0.91	10267.0
E1.002	128.627	0.731	0.0	1.37	23833.1
E1.003	127.700	0.731	0.0	1.85	73.7
E1.004	124.491	0.731	0.0	8.12	14346.8
E1.005	121.300	0.731	0.0	7.26	12829.2
E1.006	118.729	0.731	0.0	0.91	16.2
E1.007	117.900	0.731	0.0	0.95	16.8
E1.008	117.000	0.731	0.0	1.20	133.0
E1.009	116.910	0.731	0.0	3.44	52302.6
E1.010	113.800	0.731	0.0	0.44	7.8

Temporary Drainage from A6 Wingates



Date 26/03/2024  
File Temporary Drainage.MDX

Designed by CF  
Checked by NB

Innovyze Network 2020.1.3

Manhole Schedules for Existing

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
E1	131.400	1.870	Open Manhole	1200	E1.000	129.530	525				
E2	131.400	2.140	Open Manhole	2400	E1.001	129.260	1000	E1.000	129.260	525	
E3	131.340	2.713	Open Manhole	9000	E1.002	128.627	1000	E1.001	128.627	1000	
E5	129.000	1.300	Open Manhole	1200	E1.003	127.700	225	E1.002	127.700	1000	
E6	128.000	3.509	Open Manhole	2400	E1.004	124.491	1500	E1.003	127.077	225	1311
E7	124.000	2.723	Open Manhole	2400	E1.005	121.300	1500	E1.004	121.277	1500	
E8	121.500	2.771	Open Manhole	1200	E1.006	118.729	150	E1.005	118.729	1500	
E9	119.250	1.350	Open Manhole	1200	E1.007	117.900	150	E1.006	117.900	150	
E10	119.000	2.000	Open Manhole	1200	E1.008	117.000	375	E1.007	117.000	150	
E11	119.000	2.090	Open Manhole	1200	E1.009	116.910	1000	E1.008	116.910	375	
E12	119.000	5.200	Open Manhole	1200	E1.010	113.800	150	E1.009	113.800	1000	
E	119.000	5.217	Open Manhole	0		OUTFALL		E1.010	113.783	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
E1	364480.737	407580.080	364480.737	407580.080	Required	
E2	364511.022	407554.309	364511.022	407554.309	Required	
E3	364588.216	407509.118	364588.216	407509.118	Required	
E5	364570.152	407439.042	364570.152	407439.042	Required	
E6	364561.569	407409.088	364561.569	407409.088	Required	
E7	364539.750	407321.773	364539.750	407321.773	Required	
E8	364517.932	407234.457	364517.932	407234.457	Required	
E9	364458.106	407154.470	364458.106	407154.470	Required	



.  
.
   
.

Temporary Drainage from A6  
Wingates



Date 26/03/2024  
File Temporary Drainage.MDX

Designed by CF  
Checked by NB

Innovyze

Network 2020.1.3

Manhole Schedules for Existing

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
E10	364397.036	407075.472	364397.036	407075.472	Required	
E11	364380.433	407063.973	364380.433	407063.973	Required	
E12	364314.537	406938.629	364314.537	406938.629	Required	
E	364316.018	406930.301			No Entry	



PIPELINE SCHEDULES for Existing

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
E1.000	o	525	E1	131.400	129.530	1.345	Open Manhole	1200
E1.001	2 \_ /	1000	E2	131.400	129.260	1.840	Open Manhole	2400
E1.002	2 \_ /	1000	E3	131.340	128.627	2.413	Open Manhole	9000
E1.003	o	225	E5	129.000	127.700	1.075	Open Manhole	1200
E1.004	o	1500	E6	128.000	124.491	2.009	Open Manhole	2400
E1.005	o	1500	E7	124.000	121.300	1.200	Open Manhole	2400
E1.006	o	150	E8	121.500	118.729	2.621	Open Manhole	1200
E1.007	o	150	E9	119.250	117.900	1.200	Open Manhole	1200
E1.008	o	375	E10	119.000	117.000	1.625	Open Manhole	1200
E1.009	3 \=/	1000	E11	119.000	116.910	1.940	Open Manhole	1200
E1.010	o	150	E12	119.000	113.800	5.050	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
E1.000	39.766	147.3	E2	131.400	129.260	1.615	Open Manhole	2400
E1.001	89.449	141.3	E3	131.340	128.627	2.413	Open Manhole	9000
E1.002	72.367	78.1	E5	129.000	127.700	1.000	Open Manhole	1200
E1.003	31.160	50.0	E6	128.000	127.077	0.698	Open Manhole	2400
E1.004	90.000	28.0	E7	124.000	121.277	1.223	Open Manhole	2400
E1.005	90.000	35.0	E8	121.500	118.729	1.271	Open Manhole	1200
E1.006	99.886	120.5	E9	119.250	117.900	1.200	Open Manhole	1200
E1.007	99.851	110.9	E10	119.000	117.000	1.850	Open Manhole	1200
E1.008	20.196	225.0	E11	119.000	116.910	1.715	Open Manhole	1200
E1.009	141.610	45.5	E12	119.000	113.800	5.050	Open Manhole	1200
E1.010	8.458	500.0	E	119.000	113.783	5.067	Open Manhole	0

Free Flowing Outfall Details for Existing

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
E1.010	E	119.000	113.783	0.000	0	0

.  
.  
.Temporary Drainage from A6  
Wingates

Date 26/03/2024

Designed by CF

File Temporary Drainage.MDX

Checked by NB

Innovyze

Network 2020.1.3


### Simulation Criteria for Existing

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

### Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.306		

Hydrock Consultants Ltd		Page 6
.	Temporary Drainage from A6	
.	Wingates	
.		
Date 26/03/2024	Designed by CF	
File Temporary Drainage.MDX	Checked by NB	
Innovyze	Network 2020.1.3	

Online Controls for Existing

Complex Manhole: E3, DS/PN: E1.002, Volume (m³): 1118.9

Weir

Discharge Coef 0.544 Width (m) 9.000 Invert Level (m) 128.627

Orifice

Diameter (m) 0.020 Discharge Coefficient 0.600 Invert Level (m) 126.994

Hydro-Brake® Optimum Manhole: E8, DS/PN: E1.006, Volume (m³): 159.0


Unit Reference	MD-SHE-0108-6000-1500-6000
Design Head (m)	1.500
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	108
Invert Level (m)	118.729
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	6.0
Flush-Flo™	0.448	6.0
Kick-Flo®	0.918	4.8
Mean Flow over Head Range	-	5.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.7	1.200	5.4	3.000	8.3	7.000	12.4
0.200	5.4	1.400	5.8	3.500	8.9	7.500	12.8
0.300	5.8	1.600	6.2	4.000	9.5	8.000	13.2
0.400	6.0	1.800	6.5	4.500	10.1	8.500	13.6
0.500	6.0	2.000	6.9	5.000	10.6	9.000	14.0
0.600	5.9	2.200	7.2	5.500	11.1	9.500	14.4
0.800	5.4	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		



. . .	Temporary Drainage from A6 Wingates	
Date 26/03/2024 File Temporary Drainage.MDX	Designed by CF Checked by NB	
Innovyze	Network 2020.1.3	

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

Simulation Criteria


Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 363767 407242 SD 63767 07242
Data Type	Point
Cv (Summer)	0.750
Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.000	E1	15 Winter	2	+0%	100/15 Summer			
E1.001	E2	1440 Winter	2	+0%				
E1.002	E3	1440 Winter	2	+0%				
E1.003	E5	1440 Winter	2	+0%				
E1.004	E6	960 Winter	2	+0%				
E1.005	E7	1440 Winter	2	+0%				
E1.006	E8	1440 Winter	2	+0%	100/360 Winter			
E1.007	E9	1440 Winter	2	+0%				
E1.008	E10	1440 Winter	2	+0%				
E1.009	E11	120 Summer	2	+0%				
E1.010	E12	360 Summer	2	+0%				


.	Temporary Drainage from A6 Wingates	
.		
.		

Date 26/03/2024	Designed by CF	
File Temporary Drainage.MDX	Checked by NB	

Innovyze	Network 2020.1.3
----------	------------------

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

PN	US/MH Name	Water	Surcharged	Flooded	Half Drain		Pipe	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
E1.000	E1	129.737	-0.318	0.000	0.32		110.8	OK	
E1.001	E2	129.639	-1.761	0.000	0.00		7.7	OK	
E1.002	E3	129.639	-1.701	0.000	0.00		0.8	OK	
E1.003	E5	127.713	-0.212	0.000	0.01		0.8	OK	
E1.004	E6	124.492	-1.499	0.000	0.00		0.9	OK	
E1.005	E7	121.301	-1.499	0.000	0.00		0.8	OK	
E1.006	E8	118.769	-0.110	0.000	0.05		0.8	OK	
E1.007	E9	117.921	-0.129	0.000	0.05		0.8	OK	
E1.008	E10	117.013	-0.362	0.000	0.01		0.8	OK	
E1.009	E11	116.912	-2.088	0.000	0.00		1.0	OK	
E1.010	E12	113.839	-0.111	0.000	0.13		0.8	OK	

. . .	Temporary Drainage from A6 Wingates	
Date 26/03/2024 File Temporary Drainage.MDX	Designed by CF Checked by NB	
Innovyze	Network 2020.1.3	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		


Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 363767 407242 SD 63767 07242
Data Type	Point
Cv (Summer)	0.750
Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.000	E1	1440 Winter	30	+0%	100/15 Summer			
E1.001	E2	1440 Winter	30	+0%				
E1.002	E3	1440 Winter	30	+0%				
E1.003	E5	1440 Winter	30	+0%				
E1.004	E6	960 Summer	30	+0%				
E1.005	E7	1440 Winter	30	+0%				
E1.006	E8	1440 Winter	30	+0%	100/360 Winter			
E1.007	E9	1440 Winter	30	+0%				
E1.008	E10	1440 Winter	30	+0%				
E1.009	E11	240 Summer	30	+0%				
E1.010	E12	240 Summer	30	+0%				



.	Temporary Drainage from A6 Wingates	
.		
.		

Date 26/03/2024	Designed by CF	
File Temporary Drainage.MDX	Checked by NB	

Innovyze	Network 2020.1.3
----------	------------------

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

PN	US/MH Name	Water	Surcharged	Flooded	Half Drain		Pipe	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
E1.000	E1	129.972	-0.083	0.000	0.04		12.5	OK	
E1.001	E2	129.972	-1.428	0.000	0.00		11.8	OK	
E1.002	E3	129.972	-1.368	0.000	0.00		1.0	OK	
E1.003	E5	127.715	-0.210	0.000	0.01		1.0	OK	
E1.004	E6	124.492	-1.499	0.000	0.00		1.0	OK	
E1.005	E7	121.301	-1.499	0.000	0.00		1.0	OK	
E1.006	E8	118.772	-0.107	0.000	0.06		1.0	OK	
E1.007	E9	117.923	-0.127	0.000	0.06		1.0	OK	
E1.008	E10	117.015	-0.360	0.000	0.01		1.0	OK	
E1.009	E11	116.912	-2.088	0.000	0.00		1.0	OK	
E1.010	E12	113.839	-0.111	0.000	0.14		0.9	OK	

.  
.  
.  
Date 26/03/2024  
File Temporary Drainage.MDX  
Innovyze

Temporary Drainage from A6 Wingates  
Designed by CF  
Checked by NB  
Network 2020.1.3



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


Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 363767 407242 SD 63767 07242
Data Type	Point
Cv (Summer)	0.750
Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
E1.000	E1	960 Winter	100	+40%	100/15 Summer			
E1.001	E2	960 Winter	100	+40%				
E1.002	E3	960 Winter	100	+40%				
E1.003	E5	960 Winter	100	+40%				
E1.004	E6	960 Winter	100	+40%				
E1.005	E7	960 Winter	100	+40%				
E1.006	E8	1440 Winter	100	+40%	100/360 Winter			
E1.007	E9	1440 Winter	100	+40%				
E1.008	E10	1440 Winter	100	+40%				
E1.009	E11	1440 Winter	100	+40%				
E1.010	E12	1440 Winter	100	+40%				

.	Temporary Drainage from A6 Wingates	
.		
.		

Date 26/03/2024	Designed by CF	
File Temporary Drainage.MDX	Checked by NB	

Innovyze	Network 2020.1.3
----------	------------------

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

PN	US/MH Name	Water	Surcharged	Flooded	Half Drain		Pipe	Status
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap. (l/s)	Overflow (l/s)	Time (mins)	
E1.000	E1	130.279	0.224	0.000	0.08		29.3	SURCHARGED
E1.001	E2	130.274	-1.126	0.000	0.00		28.7	OK
E1.002	E3	130.269	-1.071	0.000	0.00		13.6	OK
E1.003	E5	127.768	-0.157	0.000	0.20		13.6	OK
E1.004	E6	124.500	-1.491	0.000	0.00		13.6	OK
E1.005	E7	121.310	-1.490	0.000	0.00		13.6	OK
E1.006	E8	120.175	1.296	0.000	0.37		5.9	SURCHARGED
E1.007	E9	117.962	-0.088	0.000	0.35		5.9	OK
E1.008	E10	117.055	-0.320	0.000	0.05		5.9	OK
E1.009	E11	116.922	-2.078	0.000	0.00		5.9	OK
E1.010	E12	113.914	-0.036	0.000	0.94		5.9	OK

PN	US/MH Name	Level Exceeded
E1.000	E1	
E1.001	E2	
E1.002	E3	
E1.003	E5	
E1.004	E6	
E1.005	E7	
E1.006	E8	
E1.007	E9	
E1.008	E10	
E1.009	E11	
E1.010	E12	