

Project Title: Proposed Residential Development, Tankersley, Barnsley

Project No: 86-05

Client: Benell Investments

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Proposed drainage design:

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Prepared by: KAN	Date: 21/10/2016	Checked by: KGP	Date: 21/10/2016	Approved by: KGP	Date: 21/10/2016
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Revisions

Ref	Date	Description	Checked	Approved
A	8/12/2016	Sheet 2 revised – connection into existing surface water sewer in Worsborough View as requested by YW	KGP	KGP

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DESIGN PHILOSOPHY

A) DESCRIPTION

It is proposed to re-develop an existing working man club site in Tankersley for residential properties.

EXISTING SITE

The current 920m² site is all impermeable. Only one drainage system is present on site and therefore understood to be combined considering the age of the building.

Soakaway testing and ground investigation results show one location on site with Good permeability but the rest of the site mudstone. The site therefore is not suitable for soakaways and positive drainage is required. See attached test information.

PROPOSED SURFACE

Proposed development surface water drainage to be a gravity system discharging into the last existing combined Manhole MH 7 before discharging into YW sewer as existing. Proposed impermeable area is 380m² compared to 920m² and therefore 58% less area and flow into the existing system. Based on 50mm/hr rainfall flow from the proposed site would be 5.3l/s.

PROPOSED FOUL

Proposed development foul water drainage to be a gravity system comprising new manholes and re-using existing where possible discharging into the last existing combined Manhole MH 7 before discharging into YW sewer as existing.

B) DESIGN CODES

- The Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.
- BS EN 12056-2:2000 Gravity drainage systems inside buildings – Part 2: Sanitary pipework, layout and calculation

C) CDM

- Construction method statement to be provided by contractor prior to construction
- Designers Residual Hazards Register has been prepared

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EXISTING AND PROPOSED DEVELOPEMENT SURFACE WATER RUN-OFF 6hr 1 in 100 year

DESIGN DATA

Site location =	Tankersley
Rainfall intensity, i (l/s) =	50
Impemeable area, Ai (m ²) =	380
Routing coefficient, Cr =	1
Volumetric run-off coefficient, Cv =	1

RESULTS

Surface water discharge from the proposed site:
Q (proposed site)= 5.3 l/s

PROPOSED SITE

Rate of run-off, Q = $A_p \times i \times C_r \times C_v \times 2.78$

Q proposed = 5.3 l/s

DESIGN NOTES

1. Surface water storage design is in accordance with the Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.

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DESIGN DATA

Rainfall return period (years) =

1 in 100

Earth gravity, g (m/s^2) =

9.81

Pipe (plastic) roughness, K_s (mm) =

0.06

Kinematic viscosity of water, ν (m^2/s) =

 $1.14E-06$

SURFACE WATER PIPES

Pipe Ref	Sub-area	Sum of areas	Sub-area total	Sum of areas	Pipe diameter	Upstream Pipe IL	Downstream Pipe IL	Pipe length	Gradient G%	Gradient	Pipe full velocity, V	Pipe capacity	Rainfall intensity	Actual discharge	OK/FAIL
MH to MH	m ²	m ²	ha	ha	mm	m AD	m AD	m		1/G%	m/sec	Q l/sec	mm/hr	Q l/sec	
S1 - S2	70	70	0.007	0.007	100	164.150	164.000	10.67	0.014	71.1	1.154	9.07	120	2.335	OK
S2 - S3	70	140	0.007	0.014	100	164.000	163.800	17.4	0.011	87.0	1.037	8.14	120	4.670	OK
S3 - S4	70	210	0.007	0.021	100	163.800	163.600	12.8	0.016	64.0	1.221	9.59	120	7.006	OK
S4 - S6	0	210	0.000	0.021	100	163.600	162.300	9.9	0.131	7.6	3.716	29.19	120	7.006	OK
S5 - S6	60	60	0.006	0.006	100	162.450	162.300	10.2	0.015	68.0	1.182	9.29	120	2.002	OK
S6 - S8	50	320	0.005	0.032	100	162.300	161.300	13	0.077	13.0	2.818	22.14	120	10.675	OK
S7 - S8	60	60	0.006	0.006	100	161.850	161.300	10.35	0.053	18.8	2.325	18.26	120	2.002	OK
S8 - EXG drain in road	0	380	0.000	0.038	100	161.300	161.100	5.2	0.038	26.0	1.964	15.42	120	12.677	OK

Existing drain to be minimum 1.2m deep. To be checked and confirmed on site.

NOTES

1. Design in accordance with the Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.

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SURFACE WATER MANHOLES

MH Ref	Pipe size	MH CL	Pipe IL	MH depth	MH location	Pipe cover, m	Pipe cover OK/ Concrete surround	MH Dia	MH Material	MH Type	MH Cover Class
S1	100	164.875	164.150	0.72	Field	0.62	OK	0.450	Plastic	Type 1	B125
S2	100	165.500	164.000	1.50	Road	1.40	OK	0.450	Plastic	Type 1	D400
S3	100	165.400	163.800	1.60	Road	1.50	OK	0.450	Plastic	Type 1	D400
S4	100	164.875	163.600	1.28	Field	1.18	OK	0.450	Plastic	Type 1	B125
S5	100	163.000	162.450	0.55	Field	0.45	Concrete surround	0.450	Plastic	Type 1	B125
S6	100	163.400	162.300	1.10	Road	1.00	Concrete surround	0.450	Plastic	Type 1	D400
S7	100	162.550	161.850	0.70	Field	0.60	OK	0.450	Plastic	Type 1	B125
S8	100	162.340	161.300	1.04	Road	0.94	Concrete surround	0.450	Plastic	Type 1	D400

NOTES

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DESIGN DATA

Pipe roughness, Ks (mm) (when $V < 1\text{ l/s}$) =	1.5	Earth gravity, $g\text{ (m/s}^2\text{)} =$	9.81
Pipe roughness, Ks (mm) (when $V > 1\text{ l/s}$) =	0.6	Kinematic viscosity of water, $\nu\text{ (m/s}^2\text{)} =$	1.14E-06

FOUL WATER APPLIANCES

Appliance	DU (l/s) System	No per Plot		Usage	K value	Flowrate
		1 and 2	3 and 4			
Kitchen Sink	1.3	1	1	Dwelling	0.5	Intermittent
Bath	1.3	1	1	Hotel	0.7	Frequent
WC (6L)	2	3	2	Public	1.0	Congested
Wash basin	0.5	3	2	Laboratory	1.2	Special
Washing MC 6kg	0.8	1	1			
Dishwasher		1	1			
Total l/s		10.9	8.4			

FOUL WATER PIPE DESIGN

Pipe Ref	Outlet pipe dia	Upstream I.L.	Downstream I.L.	Pipe length	Gradient		V	Pipe capacity	Total DU From Table	K Usage Factor	Pipe flow $Q_{ww} = K\sqrt{\sum DU}$	OK / FAIL
MH to MH	mm	m AD	m AD	m	G%	1/G%	m/sec	Q l/sec	l/s		l/sec	
F1 - F2	100	164.700	164.500	6.8	0.03	34.00	1.1	8.98	10.9	0.50	1.65	OK
F2 - EXG MH 3	100	164.500	164.200	7	0.04	23.33	1.4	10.85	21.8	0.50	2.33	OK
EXG MH 6 - F3	150	162.190	161.800	6.6	0.06	16.92	2.1	37.74	21.8	0.50	2.33	OK
F3 - F4	150	161.800	161.200	9.4	0.06	15.67	2.2	39.23	30.2	0.50	2.75	OK
F4 - EXG MH 7	150	161.200	161.000	3.2	0.06	16.00	2.2	38.82	38.6	0.50	10.41	OK

NOTES

1. Calculations based on BS EN 12056 - Gravity Drainage Systems Inside Buildings - Part 2: Sanitary Pipework, Layout and Calculation



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PROPOSED FOUL WATER MANHOLES

Ref	Pipe size	MH CL	Pipe IL	MH depth	MH location	Pipe cover, m	Pipe cover OK/ Concrete surround	MH Diameter, m	MH Material	MH Type	MH Cover Class	
	m	m	m	m	in	m		m				
F1	100	165.400	164.700	0.70	Field	0.60	OK	0.45	Plastic	Type 1	B125	
F2	100	165.400	164.500	0.90	Road	0.80	Concrete Cover	0.45	Plastic	Type 1	B125	
F3	150	163.470	161.800	1.67	Road	1.52	OK	0.45	Plastic	Type 1	B125	
F4	150	162.400	161.200	1.20	Road	1.05	Concrete Cover	0.45	Plastic	Type 1	D400	

EXISTING COMBINED MANHOLES TO BE RE-USED AS PROPOSED FOUL WATER MANHOLES

Ref	Pipe size	MH CL	Pipe IL	MH depth	MH location	Pipe cover, m	Pipe cover OK/ Concrete surround	MH Diameter, m	MH Material	MH Type	MH Cover Class	
	m	m	m	m	in	m		m				
EXG MH 3	150	165.430	164.200	1.23	Road	1.08	OK	1.2	Concrete	Brick	D400	
EXG MH 6	150	163.940	162.190	1.75	Road	1.60	OK	1.2	Concrete	Brick	D400	

EXISTING COMBINED WATER MANHOLES

Ref	Pipe	MH CL	Pipe IL	MH	MH	Pipe	Pipe cover OK/ Concrete	MH	MH	MH Type	MH Cover	
	m	m	m	m	in	m		m				
EXG MH 7	150	162.750	161.000	1.75	Road	1.60	OK	1.2	Concrete	Brick	D400	

NOTES

1. Calculations based on BS EN 12056 - Gravity Drainage Systems Inside Buildings - Part 2: Sanitary Pipework, Layout and Calculation