

PROPOSED HOUSING DEVELOPMENT

WHARNCLIFFE ARMS

CARLTON

BARNSELY

DRAINAGE STRATEGY

AND PERCOLATION TESTS DETAILS

Revision A Updated 08-11-2016



1. INTRODUCTION

This report determines a drainage strategy for a proposed housing development adjacent to the Wharncliffe Arms, Carlton, Barnsley. It has been updated on the 8th November 2016, to include a revised site layout.

2. PRE-DEVELOPMENT SITE

The pre-development site is immediately adjacent to The Wharncliffe Arms. The public house is now closed and has been converted into two houses.

The development site is the car park to the public house and the rough grass fields immediately adjacent, as shown in the plan below.

The site area is approximately 5100 sq m.



PRE-DEVELOPMENT PLAN

3. PUBLIC SEWERAGE

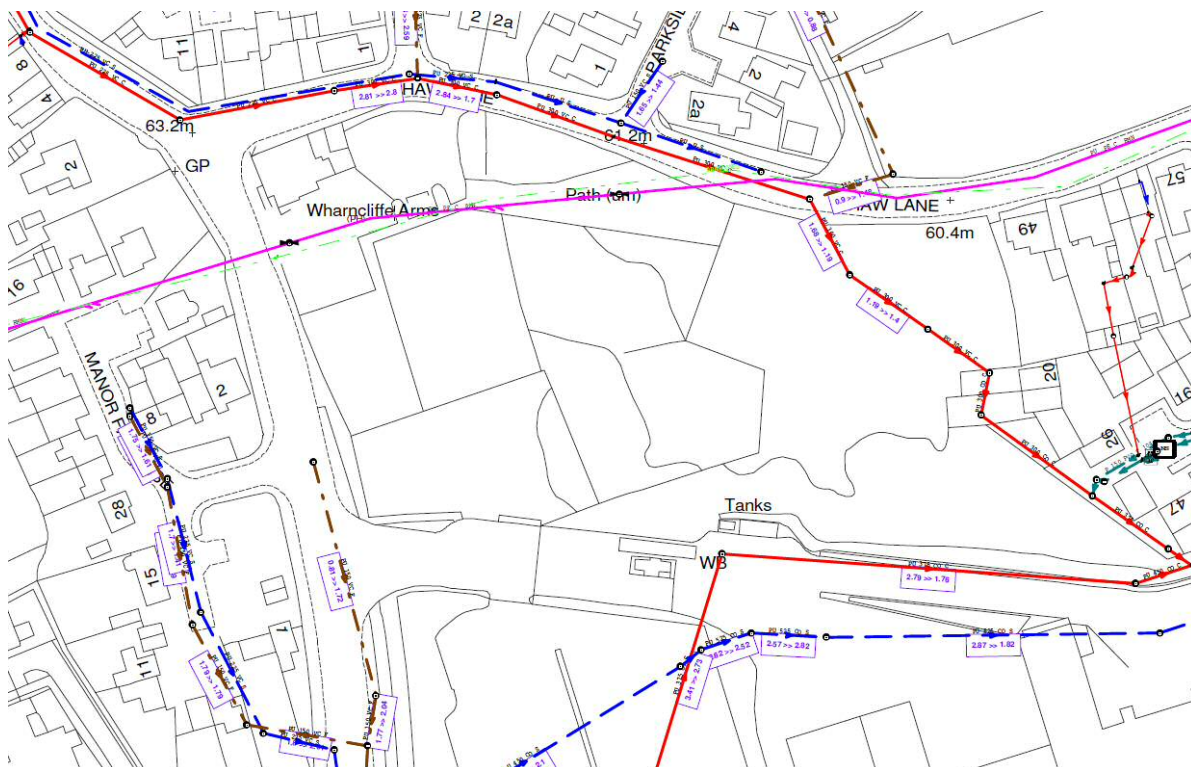
An enquiry has been made to Yorkshire Water for location of public sewers within the area and the public sewer map for this area is shown below.



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Surface water and combined sewers exist within Shaw Lane to the north of the site and also within the access road to the adjacent bakery. The site generally falls to the south, so the sewers within the bakery access would be the preferred connection for any discharges from site.

The sewer plan also a pumping main crossing the site and an easement for future maintenance of the rising main will have to be maintained throughout the length of the pipe crossing the site. The easement width would have to be agreed with Yorkshire Water, which is normally 3m each side of the sewer.



PUBLIC SEWER PLAN

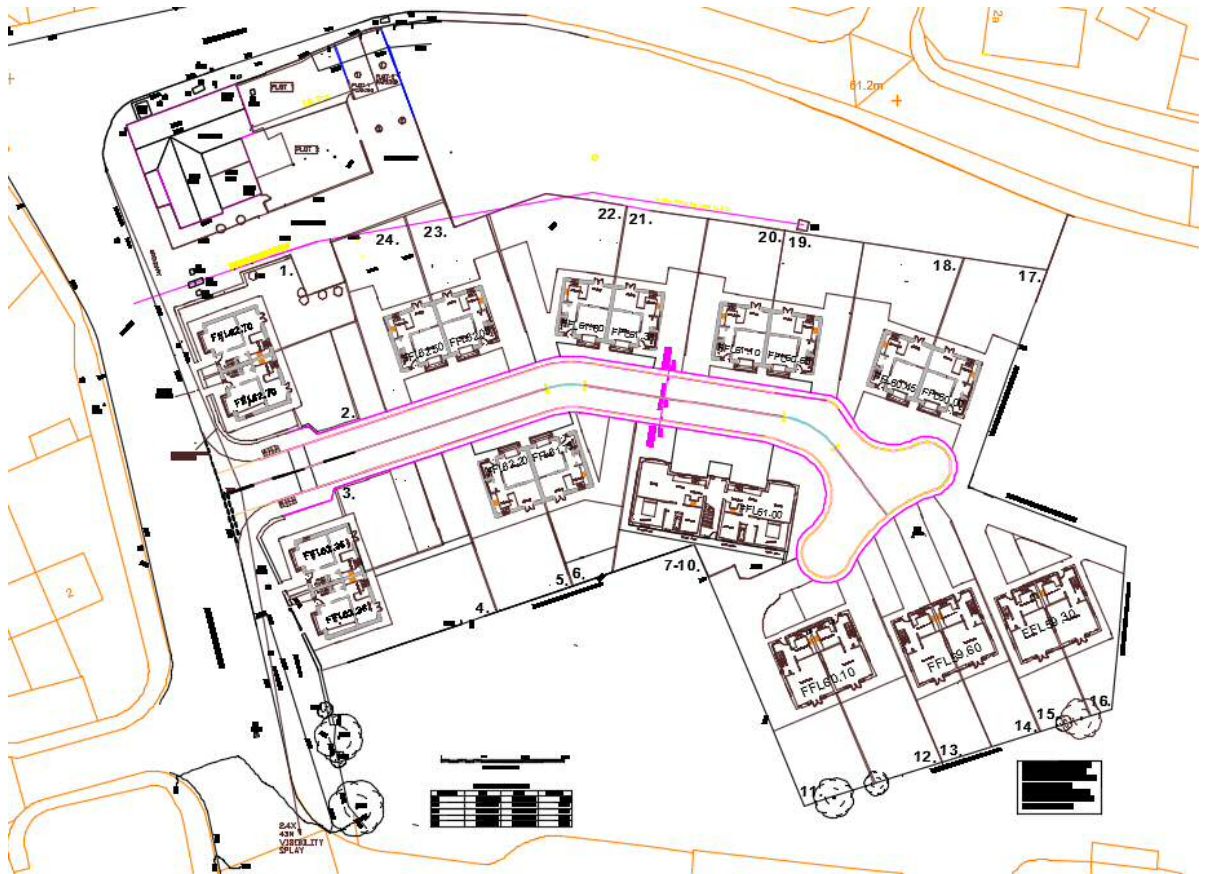
4. POST-DEVELOPMENT SITE

The post -development site will consist of houses, an access road, driveways and gardens.

The development will consist of 17 new houses, all constructed around the access road. Driveways will be provided to all houses and the houses will also have small front gardens and rear gardens.

A layout of the proposed development is shown below.





PROPOSED POST DEVELOPMENT PLAN

The areas of the post-development site are approximately:-

Impermeable areas

Houses and driveways: 2086 square metres

Access Road: 760 square metres

Total 2846 square metres

Permeable areas

Gardens 2200 square metres

5. FOUL DRAINAGE DESIGN

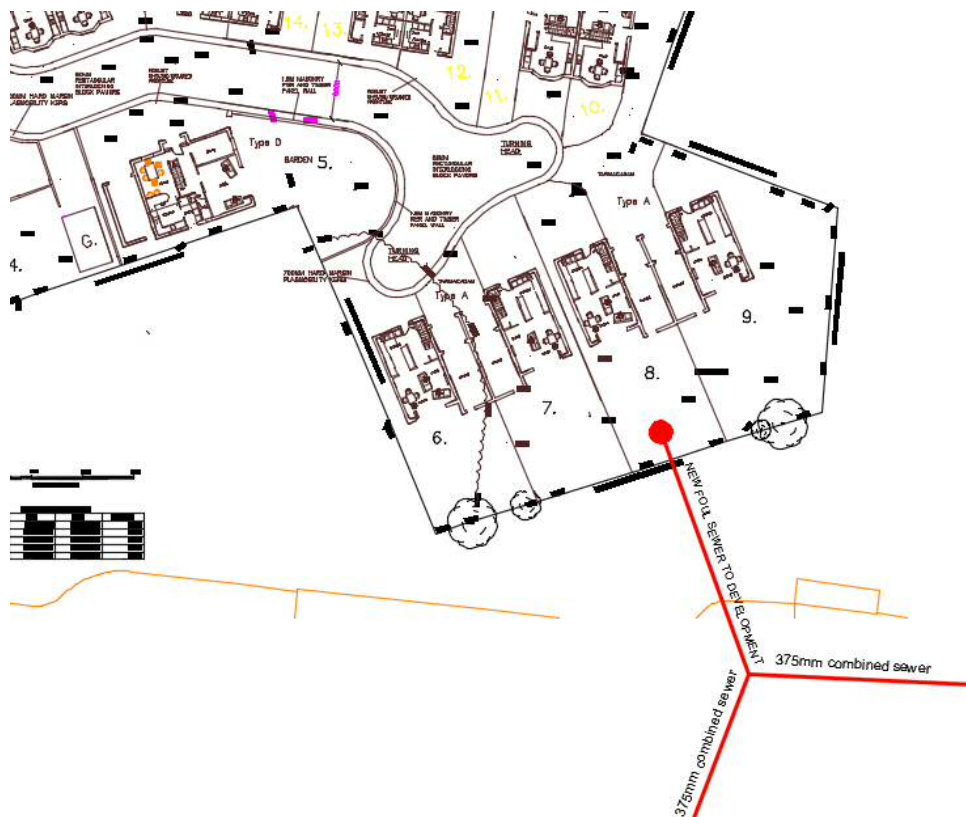


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The housing development should be drained by a separate system of foul drainage. The outfall for the foul system should be made to the existing 375mm combined sewer in the access road to the adjacent bakery. Agreement with Yorkshire Water and the bakery owner should be obtained. The sewer connection could be requisitioned if required, once the site has obtained planning consent.

The connection route should be agreed and care should be taken to avoid any possible utilities within or near the bakery access road.

A plan of a possible route is shown below.



POSSIBLE OFF-SITE FOUL SEWER CONNECTION

6. SURFACE WATER

The surface water from the development site should be disposed of strictly in accordance with the hierarchy within the building regulations. That is, by infiltration, to watercourse or to sewer, in that order.

To determine the suitability of the site to accept infiltration as a disposal method, a comprehensive testing regime was undertaken in accordance with BRE Digest 365.

The BRE Digest 365 requires test pits to be excavated at suitable locations through the development site. The locations chosen are shown below.



INFILTRATION TEST PIT LOCATIONS

Test pits 1 to 4 have been located to determine the suitability of the rear garden areas to infiltrate surface water from the roof and drive areas. These were excavated to approximately 1.5m deep to be a similar depth to that expected for soakaways within these areas. Test pits 5 and 6 were specifically excavated on the line of the proposed access road. These were excavated to 500mm deep, to determine what the likely infiltration would be like at the base of a permeable paving solution for the access road.

All the test pits when excavated were dry and no ground water was encountered. All test pits emptied within 24 hours.

All the test pits were filled with water and the time taken for the water to dissipate was noted. The test sheets are provided at the end of this report.

The infiltration testing provided an infiltration coefficient for each test within each test pit. As would be expected, the 2nd and 3rd tests slowed slightly from the first test as the ground became wetted through the previous tests. The testing is onerous, as the test replicates 3 large storm events immediately after each other.

The lowest of the infiltration coefficients for the 5 test pits are given below:-

TEST PIT	INFILTRATION COEFFICIENT m/hr
1	0.054
2	0.12
3	0.014
4	0.006
5	0.05
6	0.027

A reasonable spread of infiltration coefficients were obtained through the test results. These varied from a very good 0.12 m/hr to a reasonably poor 0.006m/hr. All test pits emptied within 24 hours, no ground water was present and so all test locations would be suitable for infiltration as a method of surface water disposal.

7. SURFACE WATER INFILTRATION DESIGN

The surface water design for this site will be carried out to the current standards for surface water drainage design, with each system being designed to not flood on site within the 1 in 30 year storm event and no flooding of any building or any water going off-site in the 1 in 100 year storm event plus an allowance for climate change.

The houses and driveways could be drained by individual soakaways in rear gardens. The access road, which is to be adopted by the local authority, could be permeable paving and would need to be agreed with Barnsley MBC.

8. CONCLUSIONS

- This development site can be drained successfully.
- Foul water and surface water should have separate systems on site.
- Foul water flows should be connected to the combined public sewer in the bakery access road.
- Surface water from the development should be disposed of by infiltration.



- The adoptable access road should be drained by infiltration and permeable paving would be suitable, subject to approval by Barnsley MBC.

Report by

A handwritten signature in blue ink, appearing to read 'Hugh Morris', with a long horizontal flourish extending to the right.

Hugh Morris BSc CEng MICE
16/10/2015 updated 08/11/2016

APPENDIX

- Infiltration Test Sheets.



PERCOLATION TEST SHEET



METHOD from BRE DIGEST 365

- Excavate a soakage trial pit to the required depth (typically 1.0-2.0 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakage hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakage pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

DETAILS

SITE LOCATION TRIAL PIT N° 1

DATE OF TEST _____

WEATHER CONDITIONS Dry

SIZE OF PIT

LENGTH	WIDTH	DEPTH
2.0m	0.3m	1.5m

9/9		10/9		11/9	
TIME	DIP	TIME	DIP	TIME	DIP
2.00	575mm	10.15	600mm	11.15	610mm
2.15	610mm	10.30	830mm	11.30	780mm
2.30	660mm	10.45	890mm	11.45	840mm
2.45	710mm	11.00	960mm	12.00	900mm
3.00	725mm	11.15	1020mm	12.15	1040mm
3.15	750mm	11.30	1090mm	12.30	1070mm
3.30	840mm	11.45	1130mm	12.45	1120mm
3.45	870mm	12.00	1180mm	1.00	1130mm
4.00	895mm	12.15	1180mm	1.15	1150mm
4.15	910mm	12.30	1180mm	1.30	1190mm
4.30	1110mm	12.45	1230mm	1.45	1270mm
LEFT SIDE EMPTY		1.00	1250mm	2.00	1310mm
NEXT MORNING		1.15	1375mm	2.15	1390mm
		1.30	1450mm	2.30	1425mm
		1.45	EMPTY	2.45	1475mm

3.00 empty

Infiltration
Coefficient, K,

0.058m/hr 0.054m/hr.

**SURVEY
SITE
SERVICES**

- Excavate a soakage trial pit to the required depth (typically 1.0-2.0 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakage hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakage pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

SITE LOCATION TRIAL PIT NO 2.

DATE OF TEST _____

WEATHER CONDITIONS Day

LENGTH	WIDTH	DEPTH
1.5 mms	~ 300	1.5 mms

[illegible]

Inflation
Coefficient, K

 0.18 m/hr 0.12 m/hr

0.12 m / hr.

PERCOLATION TEST SHEET

METHOD from BRE DIGEST 365

- Excavate a soakage trial pit to the required depth (typically 1.0-2.0 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakage hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakage pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

DETAILS

SITE LOCATION TRIAL PIT NO 3

DATE OF TEST Day

WEATHER CONDITIONS _____

SIZE OF PIT

LENGTH	WIDTH	DEPTH
1.9mts	0.300	1.5mts

9/9		10/9		11/9	
TIME	DIP	TIME	DIP	TIME	DIP
2.45	400mm	11.30	420mm	12.00	450mm
3.00	495mm	11.45	510mm	12.15	500mm
3.15	520mm	12.00	550mm	12.30	530mm
3.30	550mm	12.15	575mm	12.45	550mm
3.45	620mm	12.30	610mm	1.00	575mm
4.00	700mm	12.45	635mm	1.15	600mm
4.15	780mm	1.00	690mm	1.30	640mm
4.30	810mm	1.15	720mm	1.45	670mm
4.45	850mm	1.30	780mm	2.00	690mm
5.00	900mm	1.45	820mm	2.15	720mm
LEFT SITE		2.00	845mm	2.30	770mm
		2.15	890mm	2.30	880mm
		2.30	910mm	4.30	910mm
		3.30	960mm	4.45	970mm
		4.30	1120mm	LEFT	SITE

Infiltration Coefficient 0.029 m/hr 0.021 m/hr 0.014 m/hr

ALL EMPTY NEXT MORNING

PERCOLATION TEST SHEET



METHOD from BRE DIGEST 365

- Excavate a soakage trial pit to the required depth (typically 1.0-2.0 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakage hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakage pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

DETAILS

SITE LOCATION TRIAL HOLE NO 4

DATE OF TEST _____

WEATHER CONDITIONS Dry

SIZE OF PIT

LENGTH	WIDTH	DEPTH
1.9m	0.300	1.5m

TIME	DIP	TIME	DIP	TIME	DIP
1:00	160mm	9:30	140mm	7:45	140mm
2:00	360mm	10:30	355mm	8:45	340mm
3:00	440mm	11:30	415mm	9:45	350mm
4:00	475mm	12:30	485mm	10:45	395mm
5:00	520mm	1:30	470mm	11:45	420mm
	LEFT SITE	2:30	510mm	12:45	490mm
8:00am		3:30	590mm	1:45	550mm
NEXT DAY	EMPTY	4:30	620mm	2:45	565mm
		5:30	670mm	3:45	585mm
			LEFT SITE	4:45	610mm
		7:30am			LEFT SITE
		NEXT DAY	EMPTY	NEXT DAY	EMPTY
					08:30am
					(SAT)

Infiltration
Coefficient

0.009m/hr

0.007m/hr

0.006m/hr

PERCOLATION TEST SHEET



METHOD from BRE DIGEST 365

- Excavate a soakage trial pit to the required depth (typically 1.0-2.0 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakage hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakage pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

DETAILS

SITE LOCATION TRIAL HOLE N° 5

DATE OF TEST _____

WEATHER CONDITIONS Dry

SIZE OF PIT

LENGTH	WIDTH	DEPTH
2.2m	300mm	500mm

9/9		10/9		11/9	
TIME	DIP	TIME	DIP	TIME	DIP
1-45	100mm	10-30	140mm	9-15	150mm
2-00	165mm	10-45	210mm	9-30	210mm
2-15	210mm	11-00	270mm	9-45	220mm
2-30	245mm	11-15	320mm	10-00	265mm
2-45	310mm	11-30	370mm	10-15	285mm
3-00	390mm	11-45	400mm	10-30	320mm
3-15	480mm	12-00	430mm	10-45	345mm
3-30	EMPTY	12-15	440mm	11-00	375mm
		12-30	450mm	11-15	400mm
		12-45	480mm	11-30	440mm
		1-00	EMPTY	11-45	485mm
				12-00	EMPTY

Infiltration
coefficient

0.1m/hr

0.09m/hr

0.05m/hr

PERCOLATION TEST SHEET

METHOD from BRE DIGEST 365

- Excavate a soakage trial pit to the required depth (typically 1.0-2.0 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakage hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakage pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

DETAILS

SITE LOCATION Trial Hole No 6

DATE OF TEST _____

WEATHER CONDITIONS Dry

SIZE OF PIT

LENGTH	WIDTH	DEPTH
1.9m	300mm	500mm

9/9		10/9		11/9	
TIME	DIP	TIME	DIP	TIME	DIP
11.45	70mm	12.15	50mm	10.30	50mm
12.00	170mm	12.30	95mm	11.00	65mm
12.15	240mm	12.45	130mm	11.45	120mm
12.30	275mm	1.00	150mm	12.30	180mm
12.45	280mm	1.15	170	1.30	310mm
1.00	320mm	1.30	185	2.30	415mm
1.15	430mm	1.45	190	3.30	480mm
1.30	EMPTY	2.00	210	4.30	EMPTY
		2.15	320		
		2.30	400		
		3.00	EMPTY		

Infiltration coefficient 0.09m/hr 0.059m/hr 0.027m/hr.



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