Foul Water Drainage Strategy
Land at Common Road
Sissinghurst
Cranbrook
TN17 2BH

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1. Background and Introduction

This Foul Water Drainage Strategy accompanies a planning application submitted to Tunbridge Wells Borough Council. The planning application is for residential development on Land at Common Road, Sissinghurst, Cranbrook, TN17 2BH.

2. Development Location and Description

Development Location

The site is situated to the west of Common Road and to the south of Frittenden Road, Sissinghurst. It is a greenfield site and covers 1.6ha, Figure 1. To the south of the site is Sissinghurst C of E Primary School.

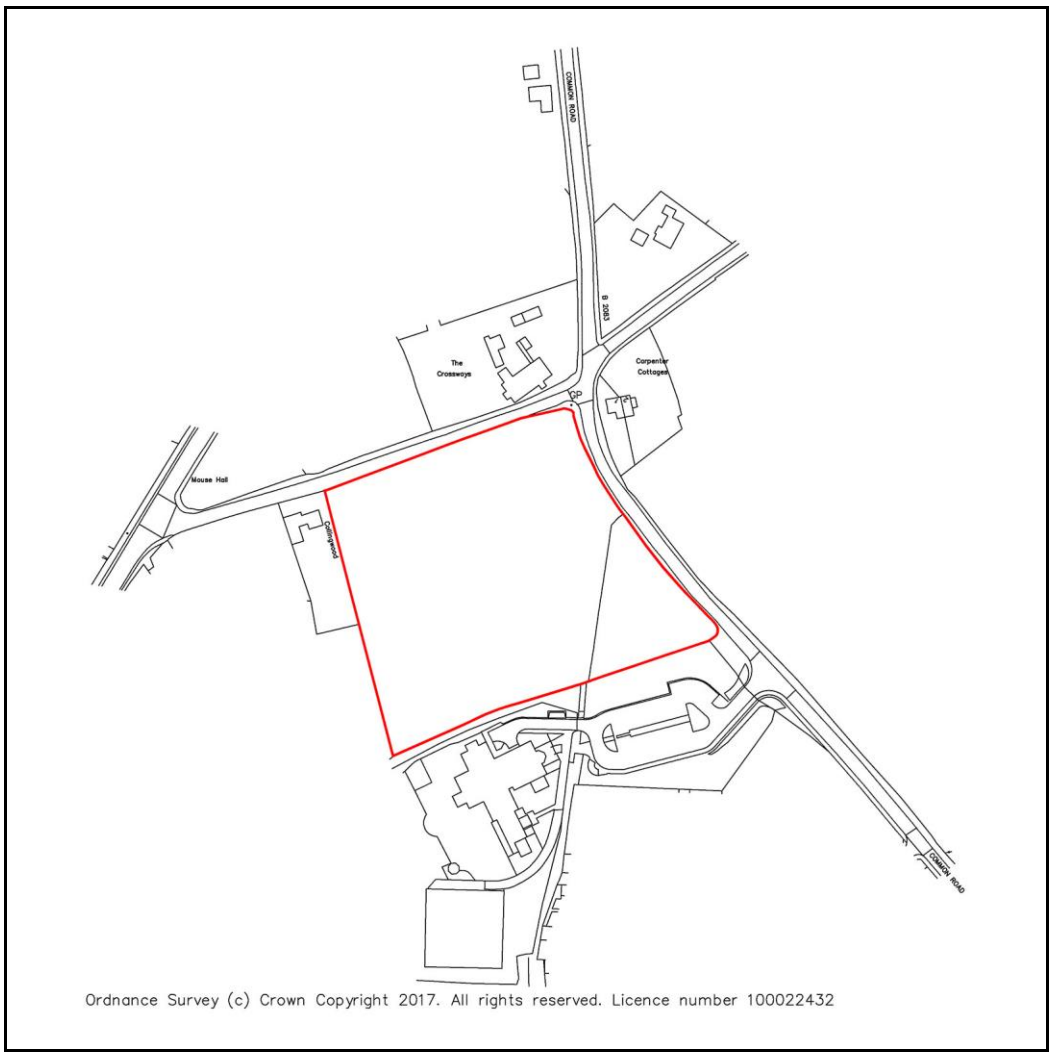

Figure 1. Site location plan.

Development Proposals

An outline planning application is being made for the construction of circa 18 dwellings with all matters reserved except for access, Figure 2.

Figure 2. Proposed development.

3. Site Characteristics

Topography- A detailed topographical survey has been carried out. The site falls from the north to the southeast. The site boundary along Frittenden Road is at 84.75mAOD (Above Ordnance Datum). The site falls to 79.00mAOD at the southeast corner, at an average gradient of approximately 1 in 26, Figure 3.

Figure 3. Local topography.

4. Foul Water Management Strategy

Existing Infrastructure

Southern Water is responsible for the adopted drainage infrastructure in Sissinghurst.

The public sewer record has been obtained from Southern Water, Figure 4.

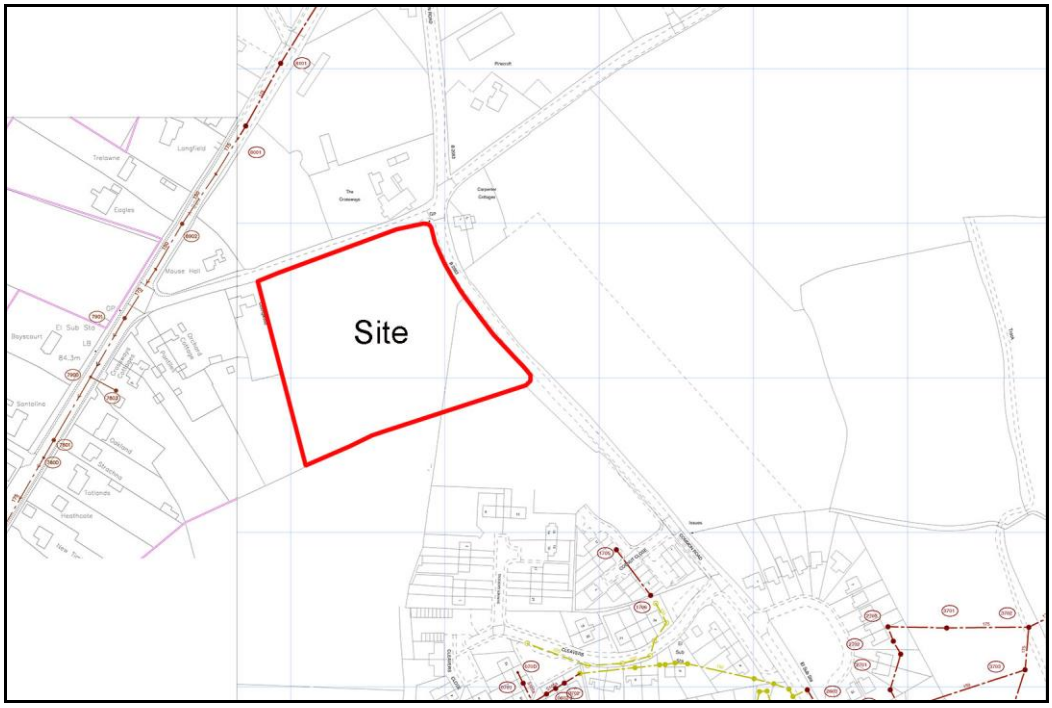

Figure 4. Public sewer record with site edged red. (© Southern Water)

The site is not immediately served by public sewers. The nearest public foul sewers are to the west and south of the site.

The foul sewer to the west runs north to south along the A229. It is 175mm diameter and 85m west of the northwest corner of the site. The closest foul sewer south of the site, within Common Road, is 280m from the southeast corner of the site. The topography enables a connection by gravity to the sewers south of the site. Connection to the closer sewers within the A229 would require a pumped connection.

Sissinghurst C of E Primary School has been constructed to the south of the site. The school is connected to the public foul sewerage network. Drainage plans submitted to Tunbridge Wells Borough Council indicate that the foul drainage runs along Common Road, Figure 5.

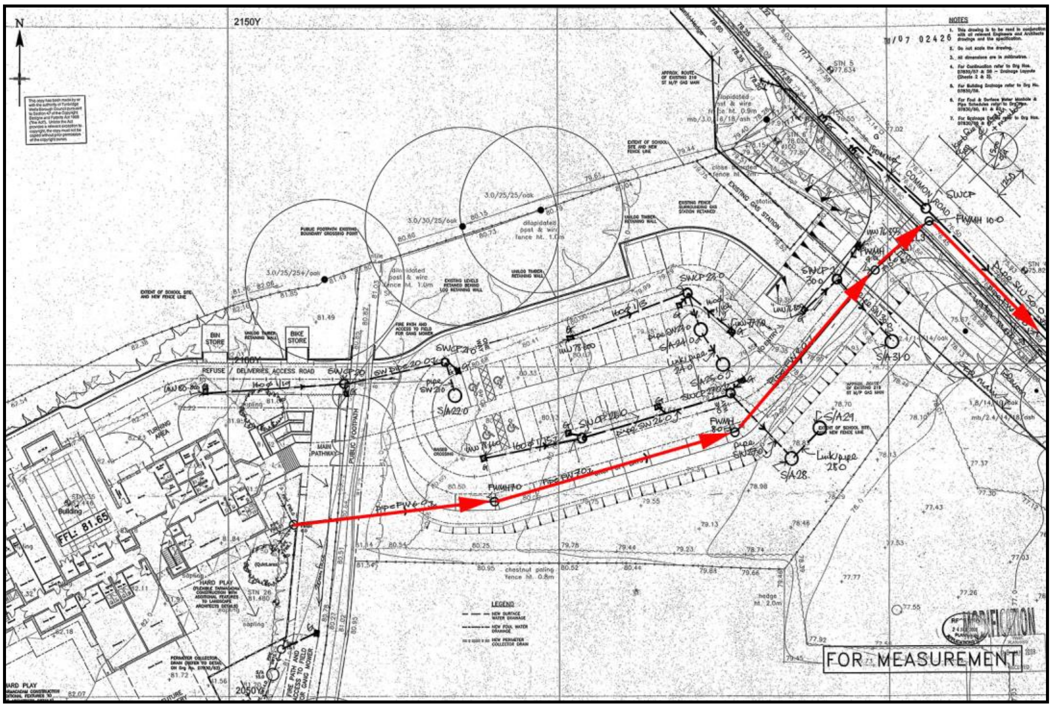

Figure 5. Sissinghurst C of E Primary School foul drainage.

Further investigation should be carried out to determine the location of the school drainage as this may offer a connection point closer to the proposed site than the nearest public sewer shown on the sewer record.

Strategy Approach

This strategy provides a solution for the on-site foul drainage in line with Sewers for Adoption 7th Edition. The topography allows foul water to drain to the public sewer within Common Road by gravity.

Sewers for Adoption 7th Edition states that design flow rates for dwellings should be 4,000 litres per dwelling per day. The proposed development creates circa 18 dwellings. Based on flows of 4,000 litres per dwelling per day the foul flows from the proposed development will be 0.8 l/s.

An illustrative foul drainage layout has been produced based on discharge by gravity to sewers within Common Road, Figure 6.

Figure 6. Illustrative foul drainage layout.

The strategy has been modelled using MicroDrainage System 1 published by Innovyze to ensure that it meets Sewers for Adoption 7th Edition requirements. The model output is presented in Appendix A. Specific points used for the design include;

- Foul sewers with 10 or less connecting properties are modelled as 100mm diameter with a gradient no flatter than 1:80.
- Foul sewers with more than 10 connection properties are modelled as 150mm diameter with a gradient no flatter than 1 in 150.
- A minimum cover of 1.2m has been used for the preliminary design.

Southern Water introduced new connection charges on 1st April 2018. Network reinforcement charges are now recovered through the new infrastructure charge. This is currently £550 per property for developments of less than 20 properties.

Network reinforcement is work that needs to be carried out to the existing network to support development-related growth. This work is needed to ensure there is enough capacity in wastewater network to serve the new homes that are built without impacting on the service to existing customers.

Network Reinforcement may include the following activities:

- Enlarging existing pipes or installing larger new pipes to increase capacity for a specific development, or further expected growth in the future.

- Upsizing existing or proposed pumping stations.
- Providing new cross-connections to improve network capacity under differing network conditions.
- Other infrastructure required to provide network capacity for growth resulting from new development.

The introduction of the new infrastructure change means that the capacity of the existing sewer along Common Road is not a constraint on development, as any necessary upgrades will be carried out by Southern Water and paid for by the new infrastructure charge. The developer will still be responsible for delivering on-site sewers and providing the connection to the existing public sewer.

5. Conclusion

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The development can be adequately served by foul sewers and the proposals are considered to be acceptable from a foul drainage perspective.

Appendix A - Foul Drainage Strategy Design

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes RMB

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	1.500
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
F1.000	47.235	0.600	78.7	0.000	2	0.0	1.500	o	100	Pipe/Conduit
F1.001	29.853	1.222	24.4	0.000	2	0.0	1.500	o	100	Pipe/Conduit
F2.000	33.759	0.422	80.0	0.000	4	0.0	1.500	o	100	Pipe/Conduit
F1.002	20.166	0.252	80.0	0.000	0	0.0	1.500	o	100	Pipe/Conduit
F3.000	42.476	2.174	19.5	0.000	4	0.0	1.500	o	100	Pipe/Conduit
F1.003	32.313	0.404	80.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit
F1.004	19.095	0.127	150.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit
F4.000	16.211	2.005	8.1	0.000	3	0.0	1.500	o	100	Pipe/Conduit
F1.005	19.561	0.130	150.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit
F1.006	36.453	1.664	21.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	82.700	0.000	0.0	2	0.0	9	0.26	0.75	5.9	0.1
F1.001	82.100	0.000	0.0	4	0.0	9	0.49	1.35	10.6	0.2
F2.000	81.300	0.000	0.0	4	0.0	13	0.33	0.74	5.8	0.2
F1.002	80.878	0.000	0.0	8	0.0	17	0.41	0.74	5.8	0.4
F3.000	82.800	0.000	0.0	4	0.0	9	0.53	1.51	11.9	0.2
F1.003	80.576	0.000	0.0	15	0.0	21	0.47	0.98	17.3	0.7
F1.004	80.172	0.000	0.0	15	0.0	24	0.38	0.71	12.6	0.7
F4.000	82.100	0.000	0.0	3	0.0	6	0.64	2.35	18.5	0.1
F1.005	80.045	0.000	0.0	18	0.0	26	0.40	0.71	12.6	0.8
F1.006	79.914	0.000	0.0	18	0.0	17	0.78	1.88	33.2	0.8

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
F1.007	26.180	1.100	23.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit
F1.008	10.000	0.129	77.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.007	78.250	0.000	0.0	18	0.0	17	0.76	1.80	31.8	0.8
F1.008	77.150	0.000	0.0	18	0.0	22	0.50	0.99	17.6	0.8

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
F1	84.000	1.300	Open Manhole	450	F1.000	82.700	100				
F2	83.400	1.300	Open Manhole	450	F1.001	82.100	100	F1.000	82.100	100	
F3	82.600	1.300	Open Manhole	450	F2.000	81.300	100				
F4	83.100	2.222	Open Manhole	450	F1.002	80.878	100	F1.001	80.878	100	
								F2.000	80.878	100	
F5	84.100	1.300	Open Manhole	450	F3.000	82.800	100				
F6	82.900	2.324	Open Manhole	1200	F1.003	80.576	150	F1.002	80.626	100	
								F3.000	80.626	100	
F7	83.100	2.928	Open Manhole	1200	F1.004	80.172	150	F1.003	80.172	150	
F8	83.400	1.300	Open Manhole	450	F4.000	82.100	100				
F9	82.800	2.755	Open Manhole	1200	F1.005	80.045	150	F1.004	80.045	150	
								F4.000	80.095	100	
F10	81.500	1.586	Open Manhole	1200	F1.006	79.914	150	F1.005	79.914	150	
F11	79.600	1.350	Open Manhole	1200	F1.007	78.250	150	F1.006	78.250	150	
F12	78.500	1.350	Open Manhole	1200	F1.008	77.150	150	F1.007	77.150	150	
F	0.000		Open Manhole	0		OUTFALL		F1.008	77.021	150	

PIPELINE SCHEDULES for Foul - Main

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)
F1.000	o	100	F1	84.000	82.700	1.200	Open Manhole	450
F1.001	o	100	F2	83.400	82.100	1.200	Open Manhole	450
F2.000	o	100	F3	82.600	81.300	1.200	Open Manhole	450
F1.002	o	100	F4	83.100	80.878	2.122	Open Manhole	450
F3.000	o	100	F5	84.100	82.800	1.200	Open Manhole	450
F1.003	o	150	F6	82.900	80.576	2.174	Open Manhole	1200
F1.004	o	150	F7	83.100	80.172	2.778	Open Manhole	1200
F4.000	o	100	F8	83.400	82.100	1.200	Open Manhole	450
F1.005	o	150	F9	82.800	80.045	2.605	Open Manhole	1200
F1.006	o	150	F10	81.500	79.914	1.436	Open Manhole	1200
F1.007	o	150	F11	79.600	78.250	1.200	Open Manhole	1200
F1.008	o	150	F12	78.500	77.150	1.200	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)
F1.000	47.235	78.7	F2	83.400	82.100	1.200	Open Manhole	450
F1.001	29.853	24.4	F4	83.100	80.878	2.122	Open Manhole	450
F2.000	33.759	80.0	F4	83.100	80.878	2.122	Open Manhole	450
F1.002	20.166	80.0	F6	82.900	80.626	2.174	Open Manhole	1200
F3.000	42.476	19.5	F6	82.900	80.626	2.174	Open Manhole	1200
F1.003	32.313	80.0	F7	83.100	80.172	2.778	Open Manhole	1200
F1.004	19.095	150.0	F9	82.800	80.045	2.605	Open Manhole	1200
F4.000	16.211	8.1	F9	82.800	80.095	2.605	Open Manhole	1200
F1.005	19.561	150.0	F10	81.500	79.914	1.436	Open Manhole	1200
F1.006	36.453	21.9	F11	79.600	78.250	1.200	Open Manhole	1200
F1.007	26.180	23.8	F12	78.500	77.150	1.200	Open Manhole	1200
F1.008	10.000	77.6	F	0.000	77.021		Open Manhole	0