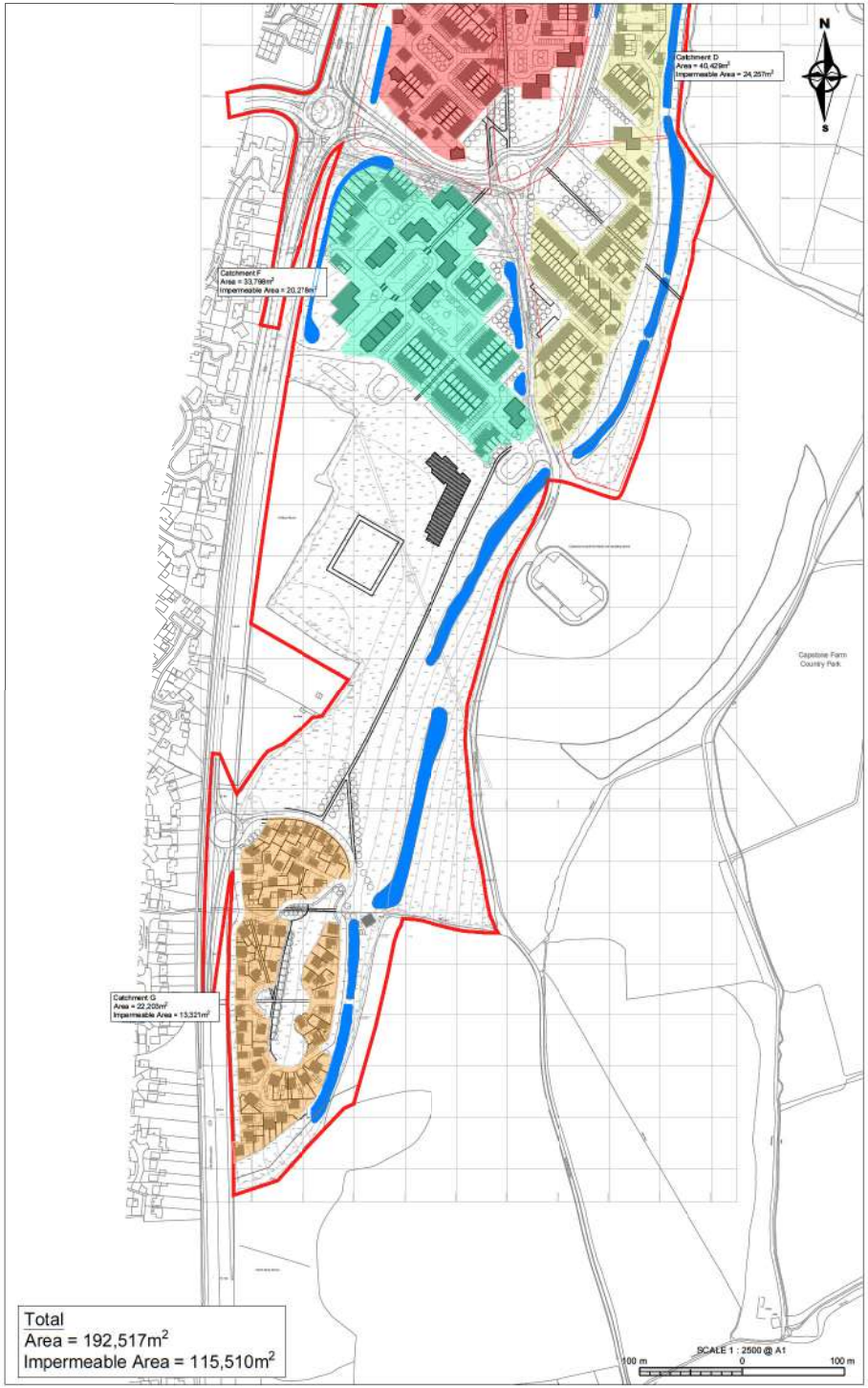
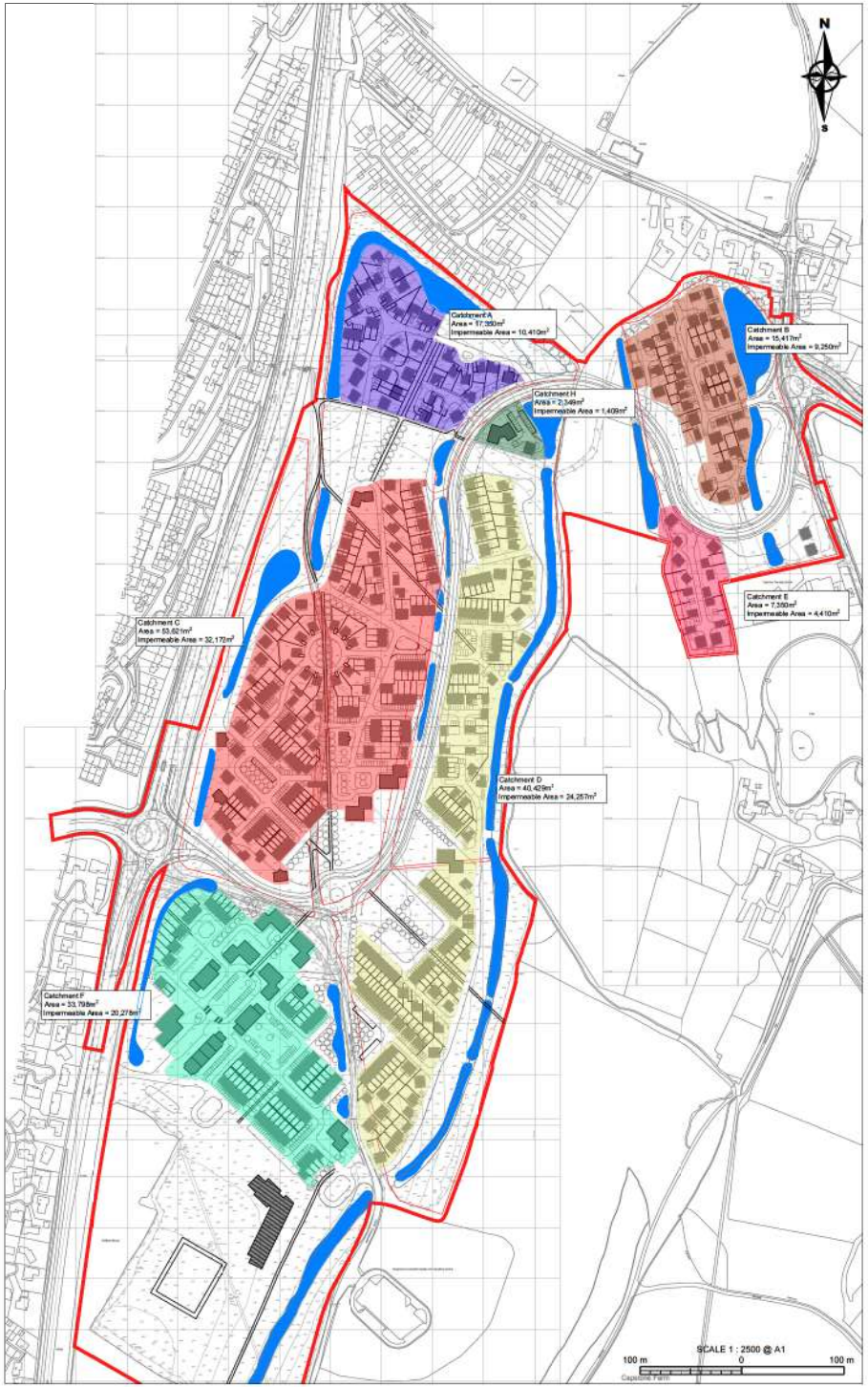
Appendix A.5 – Indicative Drainage Layout



Total
Area = 192,517m²
Impermeable Area = 115,510m²



PRIVATE DRAINAGE AND LEVELS KEY

- CATCHMENT A
- CATCHMENT B
- CATCHMENT C
- CATCHMENT D
- CATCHMENT E
- CATCHMENT F
- CATCHMENT G
- CATCHMENT H

Notes

1. Contains Ordnance Survey data © Crown copyright and database right 2018.
2. All dimensions are in metres unless otherwise stated elsewhere.
3. Proposed drainage positions will be subject to detailed design.
4. The size and extent of the pond will be subject to infiltration testing and trial holes.
5. All drainage systems will need to be installed and designed for suitable loading requirements.

herrington CONSULTING LIMITED
Unit 6-7 Barham Business Park
Elham Valley Road
Canterbury
Kent CT4 6DQ
Tel : 01227 830555
enquiries@herringtonconsulting.co.uk
www.herringtonconsulting.co.uk

Rev	Description	Made	Checked	Date
P1	First issue	LA	SB	11/03/2019

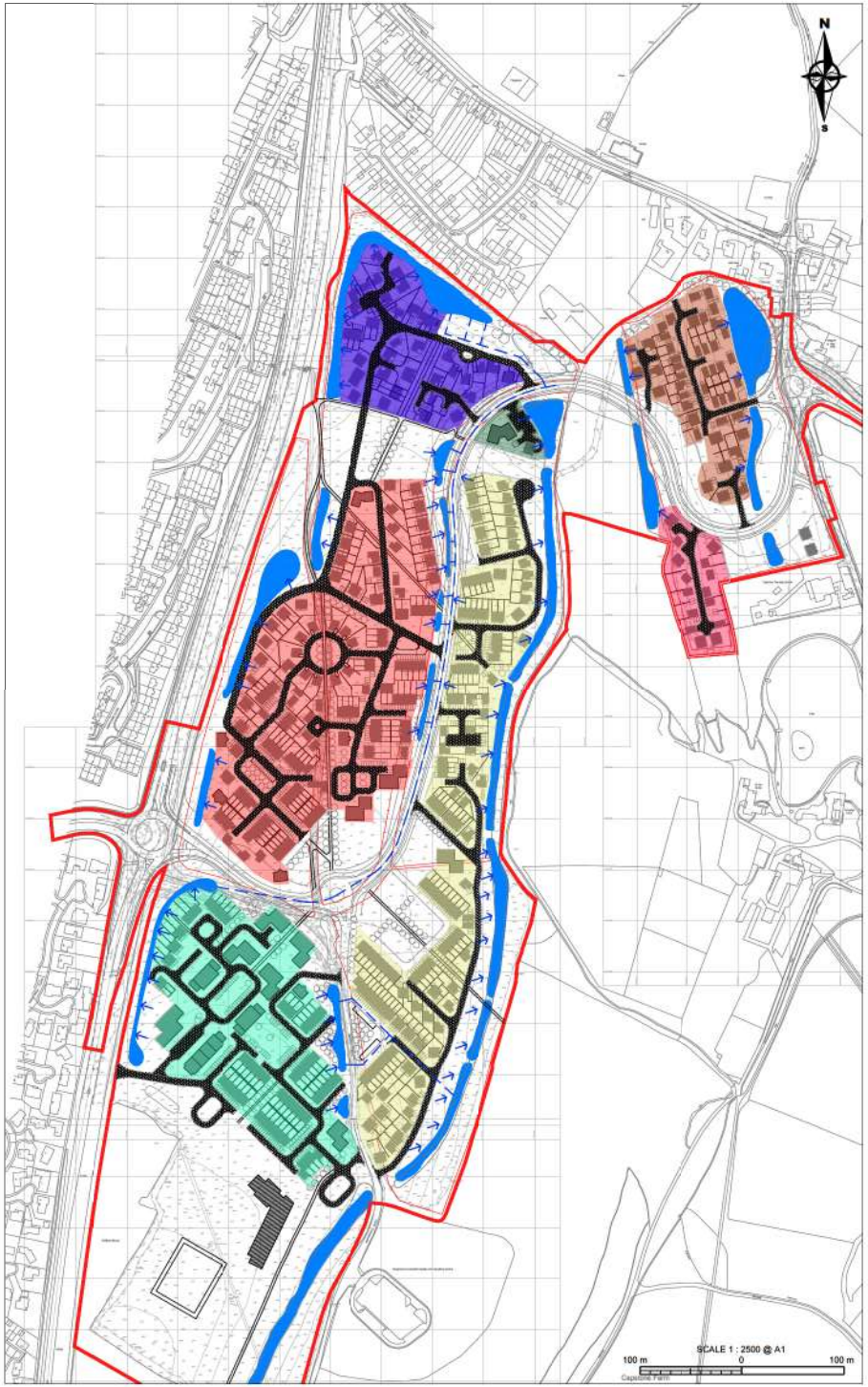
CLIENT: K.D ATTWOOD AND PARTNERS

PROJECT: NORTH DANE WAY, MEDWAY

SCALE	PROJ REF	ORIGINATOR	CHECKED BY
1:2500	2149	LA	SB

DWG REF: CATCHMENT PLAN

DWG No.: HC-2149-500



PRIVATE DRAINAGE AND LEVELS KEY

- CATCHMENT A
- CATCHMENT B
- CATCHMENT C
- CATCHMENT D
- CATCHMENT E
- CATCHMENT F
- CATCHMENT G
- CATCHMENT H
- BIORETENTION SWALE
- PERMEABLE SURFACING
- FLOW DIRECTION
- OVERFLOW PIPE

Notes

1. Contains Ordnance Survey data © Crown copyright and database right 2018.
2. All dimensions are in metres unless otherwise stated elsewhere.
3. Proposed drainage positions will be subject to detailed design.
4. The size and extent of the pond will be subject to infiltration testing and trial holes.
5. All drainage systems will need to be installed and designed for suitable loading requirements.

herrington CONSULTING LIMITED
Unit 6-7 Barham Business Park
Elham Valley Road
Canterbury
Kent CT4 6DQ
Tel : 01227 639555
enquiries@herringtonconsulting.co.uk
www.herringtonconsulting.co.uk

Rev	Description	Made	Checked	Date
P1	First issue	LA	SB	11/03/2019

CLIENT: K.D ATTWOOD AND PARTNERS

PROJECT: NORTH DANE WAY, MEDWAY

SCALE	PROJ REF	ORIGINATOR	CHECKED BY
1:2500	2149	LA	SB

DWG REF: INDICATIVE DRAINAGE LAYOUT

DWG No.: HC-2149-501

Appendix A.6 – Maintenance Schedules

Operation and Maintenance Schedule – Bioretention Swale		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the feature.	Quarterly
	Assess plants for disease infection, poor growth, invasive species etc, remove and replace as necessary.	Quarterly
	Inspect inlets and outlets for blockage.	Quarterly
Regular Maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets and overflows.	Quarterly to biannually
Occasional maintenance	Infill any holes and repair any areas where scouring is present, improve erosion protection if required.	As required following inspections
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch or other medium.	As required
Remedial Actions	Remove and replace filter medium and vegetation above.	As required but likely to be > 20 years

General Operation and Maintenance Table for Bioretention Swales.

Appendix A.7 – Southern Water Feasibility Study

East Hill

Wastewater and Surface Water SL1 Report

Feasibility Study

C-670009-KENT-962
SWS-FEAS-000066

May 2019
Version 1.0

from Southern Water

Record of Issue

Version (Status)	Author	Date	Checked by	Date	Reviewed by	Date	Approved by	Date
0.1 (DRAFT)	W Rickard	25/4/19	S Blaxall	26/04/19	M Beremska	07/05/19		
1.0 (Final)	W Rickard	25/4/19	S Blaxall	26/04/19	M Beremska	07/05/19	I Towner	13/05/19

Distribution

Date	Organisation	Contact	Format	Copies
	Southern Water	Rodrigo Quintana	Word Doc	1
	Southern Water	George Csatlos	Word Doc	1

Contents

1. Background

This report is in response to a feasibility study application for a proposed development at East Hill, Chatham, ME5 7PH. The development is an area of land between Capstone Road and North Dene Road, within the MOTN (Motney Hill) catchment, Kent. The application is for connection of both foul and surface water.

The applicant, Herrington Consulting, has currently submitted an outline application only, therefore unit numbers and positions could be subject to change. This application is to assess if the current network can support the new development, identify the most suitable connection points and assess any necessary upgrade works.

No connection points for either the foul or surface water flows were proposed by the developer.

The development consists of 800 residential dwellings, as well as an estimated 3,000m^2 of commercial premises and an estimated 400-pupil school. There are separate foul and surface water existing netowrks in the vicinity. The application states that 3ha of impermeable area to the east of the development needs to be drained to the separate Southern Water surface water network.

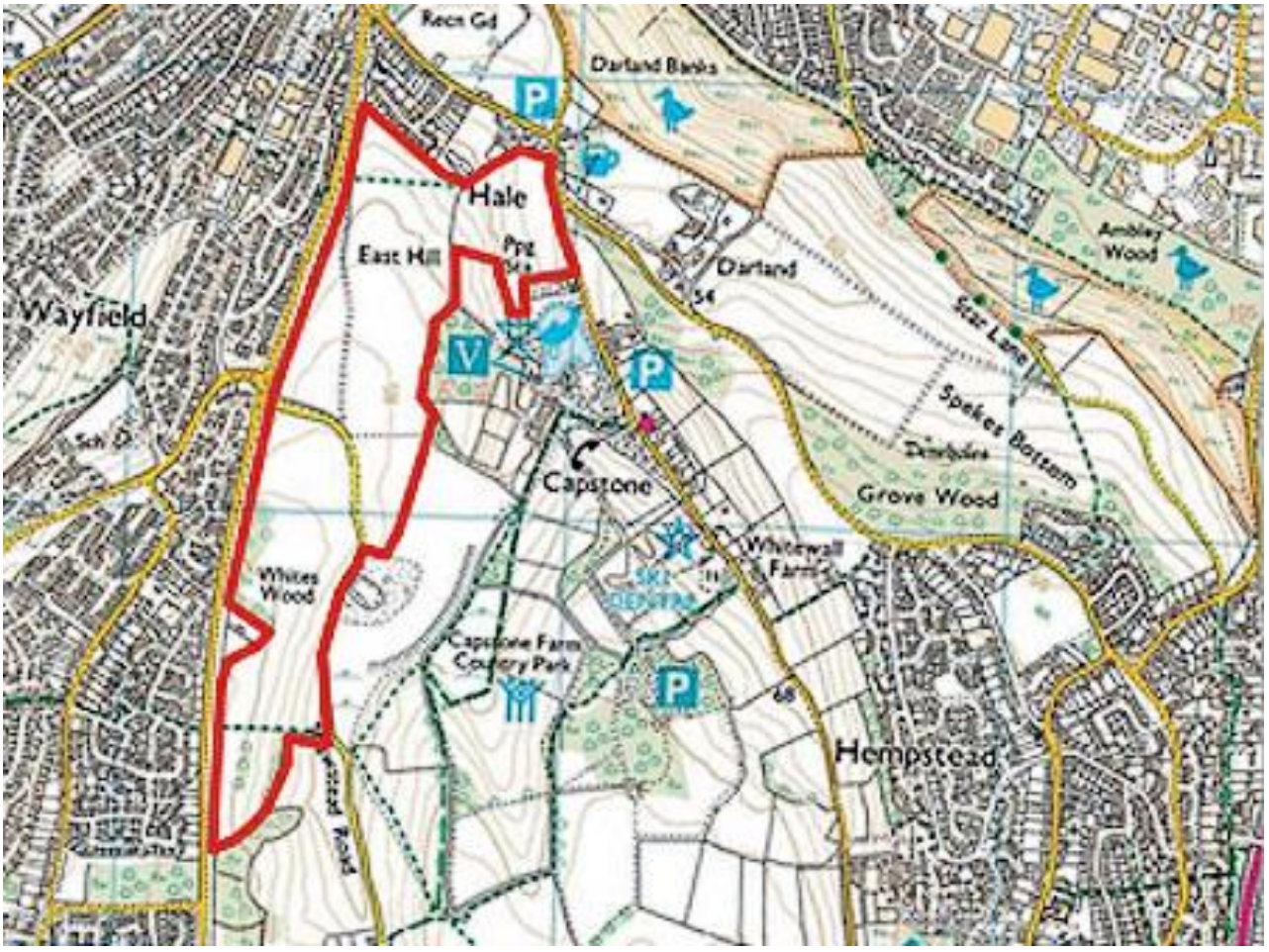


Figure 1 – Development Site

1.1. Hydraulic Modelling

Hydraulic modelling has been undertaken to determine the impacts of the development on the existing network.

Separate foul and surface water models have been used.

The assessment was carried out using 20-year FEH design storms without climate change. The base model was compared to the development model, for all connection scenarios for the foul and surface water systems.

The most suitable connection points have been selected following analysis of the topography of the site. The proposals laid out in this report would allow the site to drain via gravity.

The results showed the following:

Foul Option Connection 1

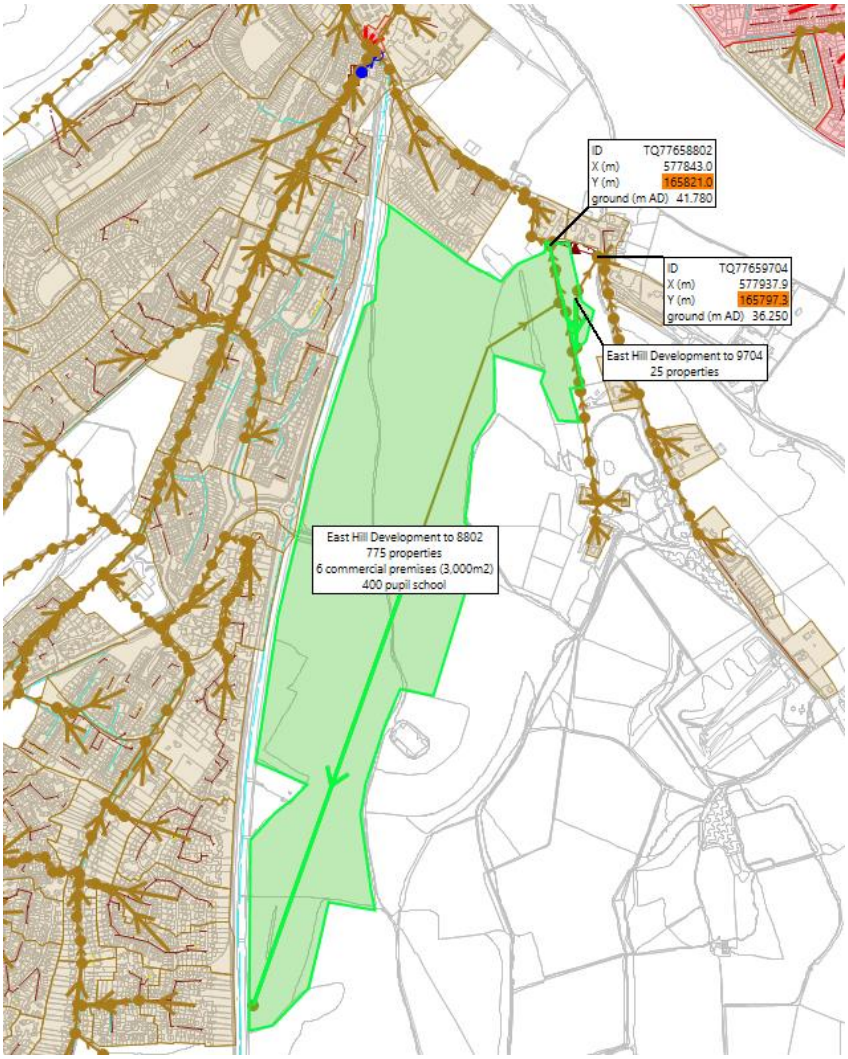


Figure 1 - East Hill Foul Connection Option 1

a) 775No. properties, commercial premises and school to connect to to MH TQ77658802. This manhole is on a 150mm dia. sewer and is located in the north-eastern side of the development site within the site boundary.

It should be noted that although this works hydraulically, it may not be possible to connect the development at this location. The infrastructure charges rules state that the receiving pipe at the development connection must be of equal diameter or larger than the pipe from the development. The size of the pipe from the development is currently unknown, but according to Sewers For Adoption 7, a 225mm diameter pipe may be required for that flow. The exact details would need to be confirmed at further design stages by checking the proposed diameter of the development sewers when the site drainage plan is completed. If the pipe from the development is 225mm and connection to MH TQ77658802 is not possible, this could be resolved by connecting 195m further downstream at MH TQ77657902, where the sewer becomes 225mm diameter.

b) 25No. properties to connect to MH TQ77659704 located just outside of Capstone Road Chatham WPS to the north east of the development. This area drains in a different direction due to site topography.

Option 1 Result:

No additional flooding, surcharge or CSO detriment was predicted by the model as a result of the addition of the development site. The development can connect into the existing Southern Water network without any improvement works.

Foul Option Connection 2

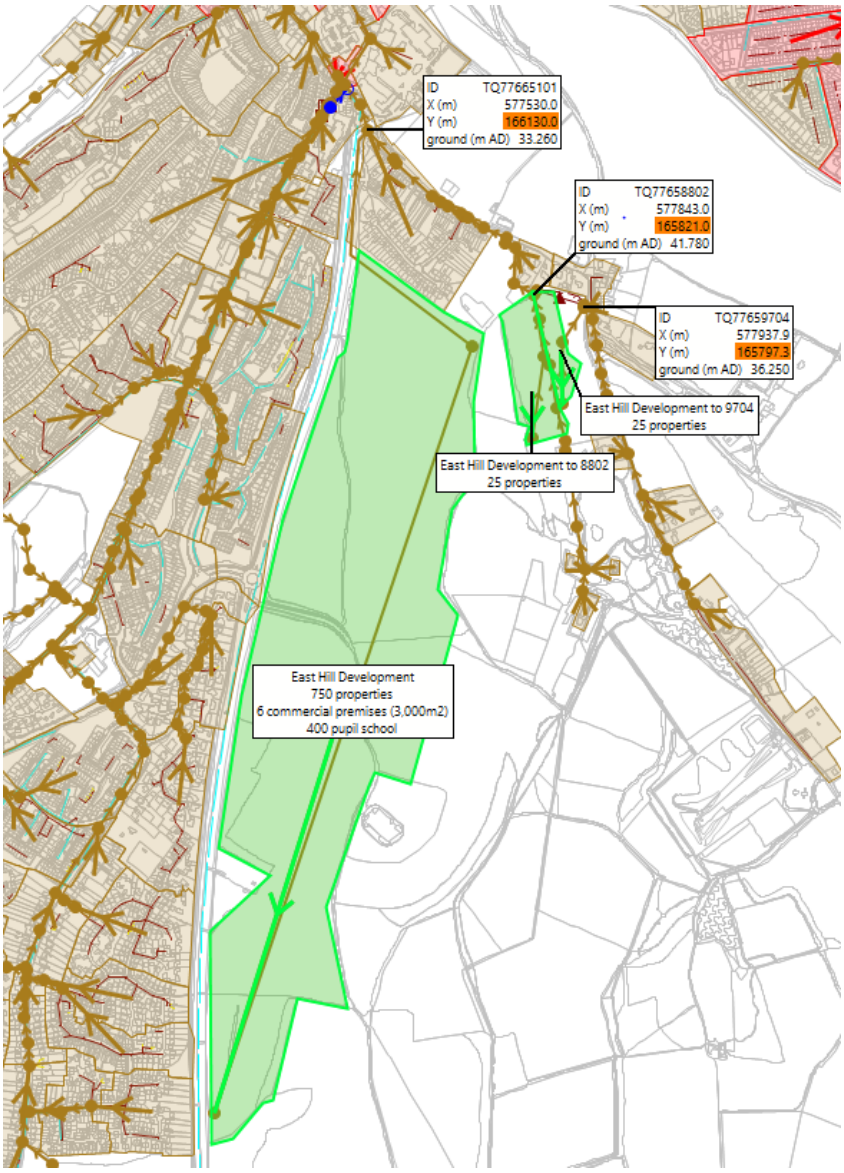


Figure 2 -East Hill Foul Connection Option 2

a) 750No. properties, the school and the commercial premises to connect to MH TQ77665101 located on a 225mm dia. sewer north of the development, on the roundabout at the Capstone Road/ North Dane Way junction. For this connection, approximately 224m of new 225m dia. sewer would need to be constructed in public highway (along North Dane Way), these works are however assumed to be provided by the developer.

b) 25No. properties to connect to MH TQ77658802., located in the north eastern side of the development site within the site boundary

c) 25No. properties to connect to MH TQ77659704, located outside of Capstone Road Chatham WPS to the north east of the development.This area is drained in this direction due to the topography of the site.

Option 2 Result:

No additional flooding, surcharge or CSO detriment was predicted by the model as a result of the addition of the development site. The development can connect into the existing Southern Water network.

Surface Water Connection

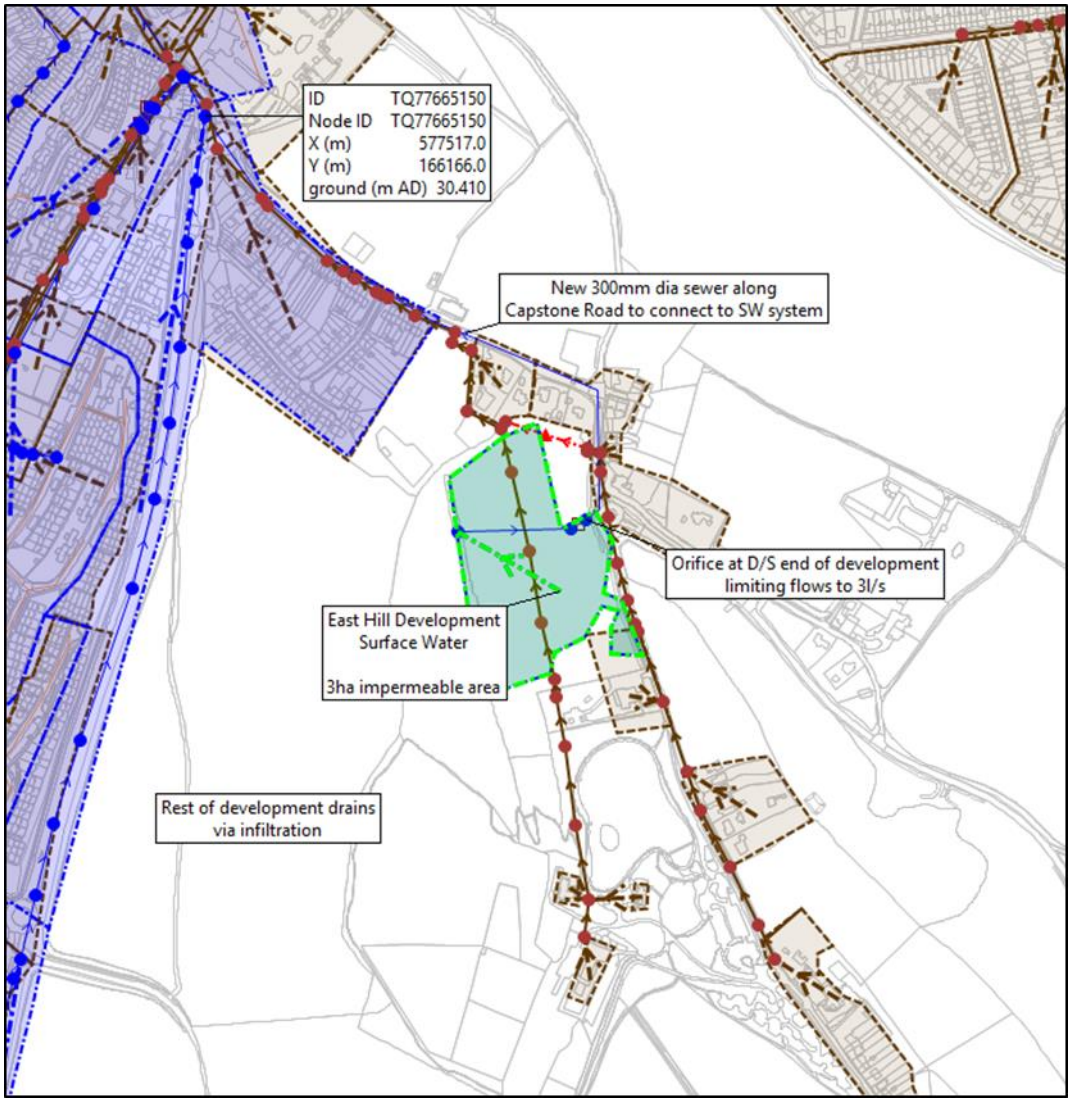


Figure 3 -Surface Water Connection

The surface water system from a small proportion of the site has been modelled connected to the 900mm separate surface water sewer, at MH TQ77665150 on the Capstone Road / North Dane Way roundabout, located 250m to the northwest of the development. This will require 990m of new off-site surface water sewer. The surface water flows from the specified 3ha area of the development have been calculated using the IH24 method and limited to 3 l/s which is the developers proposed attenuation rate. This amount of flow is above the calculated greenfield runoff rate of the development site. The Developer proposes to drain the other area of the site via infiltration which is assumed to be on-site soak aways and suitable sustainable drainage solutions. This proposed 3 l/s

hydraulic restriction is not within Southern Water's acceptable specification so there is a risk that the new network would not be suitable for adoption. This should be highlighted to the applicant.

No increase in spill volume, additional flooding or surcharge detriment was predicted by the model as a result of the addition of the 3 l/s surface water flows from the development site. The development can connect into the existing Southern Water network.

2. Options Analysis

2.1. Options

At this stage there is no preference between the connection points for the foul system.

The surface water connection point has been provided where there is capacity. This will require the developer to install 990m of new off-site gravity sewer between the development and the existing surface water network.

2.2. Site Survey

A site walkover was not required.

2.3. Assumptions and Comments

- It is assumed that further environmental assessment will take place during detailed design to confirm the extent of the environmental constraints outside of the development boundary. It is assumed that all environmental constraints and works within the boundary will be handled by the developer.
- Asset data in corporate records (Asset Miner) have been assumed to be correct.
- The foul water and surface water connection points both require the developer to cross 3rd party land between the development and the road for part of the proposed connection works, so this may be outside of an S106 application. This is a risk.
- The developer is proposing to limit the surface water discharge flow to 3 l/s. This is likely to require a smaller orifice than whould be acceptable for adoption by SWS. There is a risk that Southern Water will not adopt such control device, if offered for adoption.

3. Scope of works

3.1. Infrastructure Requirements

No works are required on the existing Southern Water network. The only works required will be the S98 / S106 works to physically connect from the development boundary to the foul and surface connection points.

3.2. Required Survey(s) for works

Not applicable as no works are proposed apart from the developer's S98 / S106 connection elements.

3.3. Planning and consent

Not applicable.

3.4. Environmental issues

An environmental assessment has not been carried out at this feasibility stage.

4. Conclusion

The foul and surface water flows have been assessed separately at the project sponsors request. Detriment analysis was carried out using 20-year FEH design storms without climate change. Results for all scenarios showed that no flooding or surcharge detriment is predicted as a result of the construction of the development. A CSO spill check was carried out for all connection options using 5-year design storm with climate change. Results have shown that no detriment has been predicted in terms of spill volume.

Both Option 1 and Option 2 foul connections are acceptable. There is no preference between the two at this stage.

For the proposed surface water discharge rate of 3l/s the developer will require on–site attenuation and it should be highlighted that this is essential and could be of significant scale. It should be noted, that the hydraulic check was only carried out for 3 l/s as per the application. It may be possible to accommodate a higher flow, which would reduce the attenuation volume requirements within the developer. This assessment has not been carried out.

APPENDIX A – Desktop Environmental, Third Party and Planning Appraisal

Not applicable at this stage.

APPENDIX B – Hydraulic Modelling Risk Matrix and Report

C-6700009-KENT-96
2_HYD_East Hill_Mod