PROPOSED DRAINAGE STRATEGY **SEPTEMBER 2023**

Date : 05.09.23

Project : Kilnwood Vale – Neighbourhood Centre

Project Ref : 2300200 – Kilnwood Vale – Neighbourhood Centre

Report Ref : JL-2300200-R01

DOCUMENT CONTROL

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	Issued for planning	JL	MSL	JEC	05.09.23
A	Issue for planning	MSL	MSL	JEC	09.10.24

1.0 INTRODUCTION

1.1 Ardent Consulting Engineers (hereafter referred to as Ardent) have been appointed by Crest Nicholson South to provide information on the drainage strategy to support a Reserved Matters Planning Application for the Neighbourhood Centre Phase of the Kilnwood Vale Masterplan, specifically for land at Kilnwood Vale, Horsham, West Sussex, RH12 0DE.

1.2 The Reserved Matters Application is pursuant to outline planning permission reference DC/15/2813. This drainage strategy seeks to discharge Condition 7 of the planning permission, the wording of which is set out below:

1.3 The Reserved matters application is pursuant to outline planning permission ref. DC/15/2813. Conditions 25 and 27, which this drainage strategy seeks to discharge are set out below:

Condition 25

At the Reserved Matters stage for any phase or part phase (excluding Phase 1) a drainage strategy detailing any on and/or off-site foul drainage works for that phase or part phase, shall be submitted to and approved in writing by the Local Planning Authority in consultation with the sewerage undertaker. No discharge of foul water from the site shall be accepted into the public system until the drainage works referred to in the strategy have been completed. The development shall be carried out in accordance with the approved details.

Condition 27

"At the Reserved Matters stage for any phase or part phase excluding Phase 1, a surface water drainage strategy for that phase or part phase based on sustainable drainage principles and an assessment of the hydrological and hydro geological context of the whole development, should be submitted to and approved in writing by the Local Planning Authority.

The strategy shall also include:

- *Details of how the sustainable drainage management train will be incorporated including several water treatment stages*
- *Details of how the drainage from the phase or part phase will discharge into the watercourse as proposed in section 15.3 of the approved Flood Risk Assessment (FRA) dated July 2010 (SLR Ref: 403-00404-00027).*
- *Consideration of pollution prevention measures to protect watercourses and groundwater*
- *Confirmation that there will be no discharge to ground in areas affected by contamination*
- *Demonstration that the scheme complies with Advice Note 6 'Potential Bird Hazards from Sustainable Urban Drainage Schemes (SUDS)'.*
- *Demonstration that flows through railway culverts will be restricted to pre-development rates or less.*

The development shall be carried out in accordance with the details and any timings of the approved scheme. Any subsequent amendments shall be agreed in writing with the Local Planning Authority.

Reason: To prevent the increased risk of flooding and ensure a management train is incorporated as agreed to improve and protect water quality, improve habitat and amenity, and ensure future maintenance of the drainage system. This planning condition is necessary to ensure the development complies with the principles of the NPPF and Policy 38 of the Horsham District Planning Framework (2015).

1.4 This briefing note constitutes an addendum to the Flood Risk Assessment produced by Global Environmental Solutions (report ref: 403.00404.00027 dated July 2010). The following sections outline the existing site characteristics, flood risk environment, proposed surface water drainage strategy and the intended Sustainable Drainage System (SuDS) management and maintenance regime.

1.5 This briefing note is to be read in conjunction with Ardent Consulting Engineers' drawing 2300200-003 entitled *Preliminary Drainage Strategy* which can be found in **Appendix A**.

2.0 EXISTING SITE

2.1 This development is the 'Neighbourhood Centre' phase within the wider Kilnwood Vale Masterplan. The land parcel was originally kept free of residential development in order to be utilised for site access to the prior phases of construction towards the South. The site is now ready for construction due to impending completion of prior phases.

2.2 The wider development incorporates multiple land usages; greenfield, former inert landfill and an active construction waste recycling facility.

2.3 In terms of the site's topography, the parcel has been subject to material deposition and storage during adjacent phase construction, thus meaning current levels differ from levels prior to construction. The parcel itself is split into 3 separated further parcels, the northern parcel showing the biggest variance in existing levels; existing levels fall from approximately 85.75mAOD at the parcel's eastern boundary to 79.5mAOD in the parcel's north west. The central parcel within the site exhibits shallower variances in elevations due to its smaller size, peaking with an elevation of 86.00mAOD in it's east to a low point of 84.75mAOD in its north-west. The final, south-eastern parcel also contains shallow variations in elevations, peaking at 86.00mAOD in its northwest to 84.64mAOD in it's east.

2.4 The site is shown on British Geological mapping to be underlain by bedrock of the Weald Clay Formation – mudstone. A Land Contamination Assessment was undertaken by ST Environmental in November 2017 (ref: J13115) for the entire site which confirmed that the soil has poor drainage characteristics and therefore infiltration would not be viable due to the clay geology.

2.5 Prior to the Kilnwood Vale masterplan, there were no existing drainage networks at the site. However, construction of Kilnwood Vale phases adjacent to the proposed site has amassed drainage infrastructure within the parcel's proximity. Subsequently, it is proposed that the parcel will discharge captured surface runoff at unrestricted run-off rates into the surrounding drainage network.

3.0 PROPOSED DEVELOPMENT

3.1 The proposed Neighbourhood development phase is to consist of 111 residential units, with associated access roads, retail units, a public house and a community centre. The site is 2.75ha. A plan of the proposed development is shown in **Figure 3-1** and included in **Appendix B**.



Figure 3-1: Proposed Site Layout

4.0 SURFACE WATER DRAINAGE STRATEGY

4.1 Based on the principles set out in the approved Flood Risk Assessment (FRA) aforementioned, Ardent have prepared an on-site surface water drainage strategy which follows the SuDS Management Train philosophy. The Indicative Drainage Strategy incorporates 2,177 m^2 of permeable pavement.

4.2 The flow from the Neighbourhood Development Phase will be split with the northern and central parcel being conveyed via adjacent phases (Northern to Phase 3C and Central to main infrastructure drainage) to strategic 'Pond S3' and

the southern parcel (Phase 2F) to strategic 'Pond S1', as detailed in Campbell Reith's Overall Drainage Constraints Plan.

4.3 The system will be unrestricted in line with the approved FRA and there will be no requirement for offline storage to deal with the 1 in 100-year plus 40% climate change event; the network will be conveying a flow from all designed storm events to Pond S1 and S3. The surface water drainage calculations can be found within **Appendix C**.

Urbanisation

4.4 The proposed impermeable areas within each catchment have incorporated a 10% uplift to account for 'urban creep' over the lifetime of the development.

Water Quality

4.5 Permeable pavement has been incorporated within the Neighbourhood Centre Drainage Strategy. As identified in "SuDS for Roads" - Scotland, permeable paving provides two stages of treatment, firstly within the grit layer and geotextile which the blocks are bedded on, and secondly, the underlying gravel media comprising washed, no-fines material of adequate depth, i.e. 0.5m from the surface to base of the system.

4.6 Shown below are three tables which form part of the CIRIA C753 Simple Index Treatment Method and highlight the improvement in water quality the designed SuDS methods deliver. The benchmark classification data for the development is shown in **Table 2** which is then compared to the SuDS mitigation indices displayed in **Table 3.**

4.7 As seen within the comparison in **Table 4**, the quality of water discharging from the site has been improved by the use of the proposed SuDS methods.

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	**Low**	**0.5**	**0.4**	**0.4**
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways	High	0.8	0.8	0.9

Table 2: Pollution hazard indices for different land use classifications (land use in bold applicable for the development).

	Mitigation indices		
Type of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Filter strip	0.4	0.4	0.5
Filter drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bio retention system	0.8	0.8	0.8
Permeable pavement	**0.7**	**0.6**	**0.7**
Detention basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Table 3: Indicative SuDS mitigation indices for discharges to surface waters
(bold text is applicable to this development)

For surface water discharge from Residential Parking Areas and Low Traffic Roads <300 traffic movements/day			
	Required mitigation indices		
Source	**TSS**	**Metals**	**Hydrocarbons**
Medium	**0.5**	**0.4**	**0.4**
Type of SuDS component provided			
Permeable Pavement	0.7	0.6	0.7
Check	**+0.2**	**+0.2**	**+0.3**

Table 4: SuDS mitigation indices provided

4.8 Tanked/lined permeable pavement is to be used to protect watercourses and groundwater receptors from pollution. In addition, no infiltration SuDS techniques will be used in areas affected by contamination to reduce the risk of mobilising contaminants.

SuDS Management and Maintenance

4.9 The maintenance of all SuDS components will be in accordance with best practice and the CIRIA C753 publication "The SuDS Manual". The recommended operation and maintenance requirements for the proposed permeable paving are provided in

4.10 Table 5 below.

4.11 A private management company will be appointed to maintain the unadopted elements of the surface water drainage network, including the permeable paving, tank and flow control.

Maintenance Issues	Failure of components, blockage from debris	
Maintenance Period	**Maintenance Task**	**Frequency**
Regular	Inspect and identify any elements that are not operating correctly.	Monthly for three months, then six monthly
	Brush surface and remove sweepings from all hard surfaces	Monthly or as required
	Remove weeds from surface of permeable paving	As necessary, inspect regularly
	Remove sediment/debris from catchpits/gullies and control structures.	Annually, after severe storms or as required
Occasional Tasks	Sweep and suction brush surface in autumn after leaf fall	Annually or as required
	Brush and vacuum surface to prevent silt blockage and enhance design life	Annually
	Remove sediment/debris from catchpits/gullies and control structures.	Annually, after severe storms or as required
	Remove covers of inspection chambers and control chamber and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt	Annually
Remedial Work	Repair inlets, outlets, vents, overflows and control structures.	As required
	Repair physical damage if necessary	As required
Monitoring	Inspect all inlets, outlets, vents, overflows and control structures to ensure they are in good condition and operating as designed.	Annually or after severe Storms

Table 5: SuDS Operation and Maintenance requirements

5.0 FOUL WATER DRAINAGE

5.1 Foul flows from the 111 no. residential units, the retail units, public house and community centre are to discharge to the pre-constructed foul network within the adjacent phases: Northern Parcel to Phase 3C, central parcel to the main infrastructure drainage and southern parcel to Phase 2F.

5.2 The proposed foul water design can be found on ACE's *Preliminary Foul & Surface Water Drainage Arrangement* (2300200-003) which can be found in **Appendix A**.

6.0 CONCLUSIONS

6.1 Surface water runoff from the Neighbourhood Centre Phase will be conveyed unrestricted to Pond S1 and S3 via a piped sewer network. The network will discharge freely into the ponds during all return events up to and including the 1 in 100 year plus 40% climate change event in line with the approved FRA aforementioned.

6.2 Tanked/lined permeable pavement is included within the Neighbourhood Centre Phase surface water strategy, providing two levels of treatment to protect watercourses and groundwater receptors from pollution.

6.3 Foul flows from the 111 no. residential units, the retail units, public house and community centre will be conveyed to adjacent phases.

Appendix A

Preliminary Surface & Foul Water Drainage Strategy

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION, INC. RISK ASSESSMENTS AND ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
2. DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
3. ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES UNLESS OTHERWISE STATED.

DRAINAGE LEGEND

- PROPOSED FOUL WATER SEWER & MANHOLE (WITH MANHOLE REF. No.)
- PROPOSED SURFACE WATER SEWER & MANHOLE (WITH MANHOLE REF. No.)
- MANHOLE REFERENCE / COVER LEVEL / INVERT LEVEL (TEXT COLOUR INDICATES PROPOSED NETWORK TYPE) — S9 / CL: 78.413 / IL: 75.634
- PERMEABLE PAVING
- SITE WIDE SURFACE WATER DRAINAGE
- SITE WIDE FOUL WATER DRAINAGE
- EXCEEDENCE FLOW ROUTE

PRELIMINARY

Rev	Description	Drn	Chk	App	Date
C	REVISED TO SHOW UPDATED SITE PLAN	MSL	MSL	JEC	11.09.24
B	REVISED TO SHOW UPDATED SITE PLAN	MSL	MSL	JEC	28.08.24
A	REVISED TO SHOW UPDATED SITE PLAN	MSL	MSL	JEC	22.05.24

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Client: CREST NICHOLSON SOUTH

Project Title: KILNWOOD VALE NEIGHBORHOOD CENTRE - PLANNING

Drawing Title: PRELIMINARY DRAINAGE STRATEGY

A1 Scale	Date	Designed by
1:500	06.09.23	MSL
Drawn by	**Checked by**	**Approved by**
MSL	MSL	JEC

Drawing Number: 2300200-003 — Rev C

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Appendix B

Proposed Site Layout

N
W
E
S
0
10
50m

PUB PATIO
SERVICE YARD
CARE HOME (66 UNITS)
Drop Off Point
AP1 2
12-28
AP1 1
1-9
10-11
AP1 3
29-48
AP1 4
49-80
AP1 5
81-100
MARLBOROUGH
WINKFIELD
ROMSEY
HEXHAM

KEY:

- APPLICATION BOUNDARY
- EMPLOYMENT LAND
- BLOCK 1 - 3 STOREY/ 11x APARTMENTS
- BLOCK 2 - 3 STOREY/ 17x APARTMENTS
- BLOCK 3 - 3 STOREY/ 20x APARTMENTS
- BLOCK 4 - 3 STOREY/ 29x APARTMENTS/ 5x RETAIL
- BLOCK 5 - 3/4 STOREY/ 23x APARTMENTS/ 3x RETAIL/ 1x CONVENIENCE STORE
- CARE HOME - 3 STOREY/ 66x CAPACITY
- COMMUNITY BUILDING (700SQM INTERNAL)
- 'FOOD BASED' PUB (525SQM INTERNAL)

KILNWOOD VALE

Accommodation Schedule

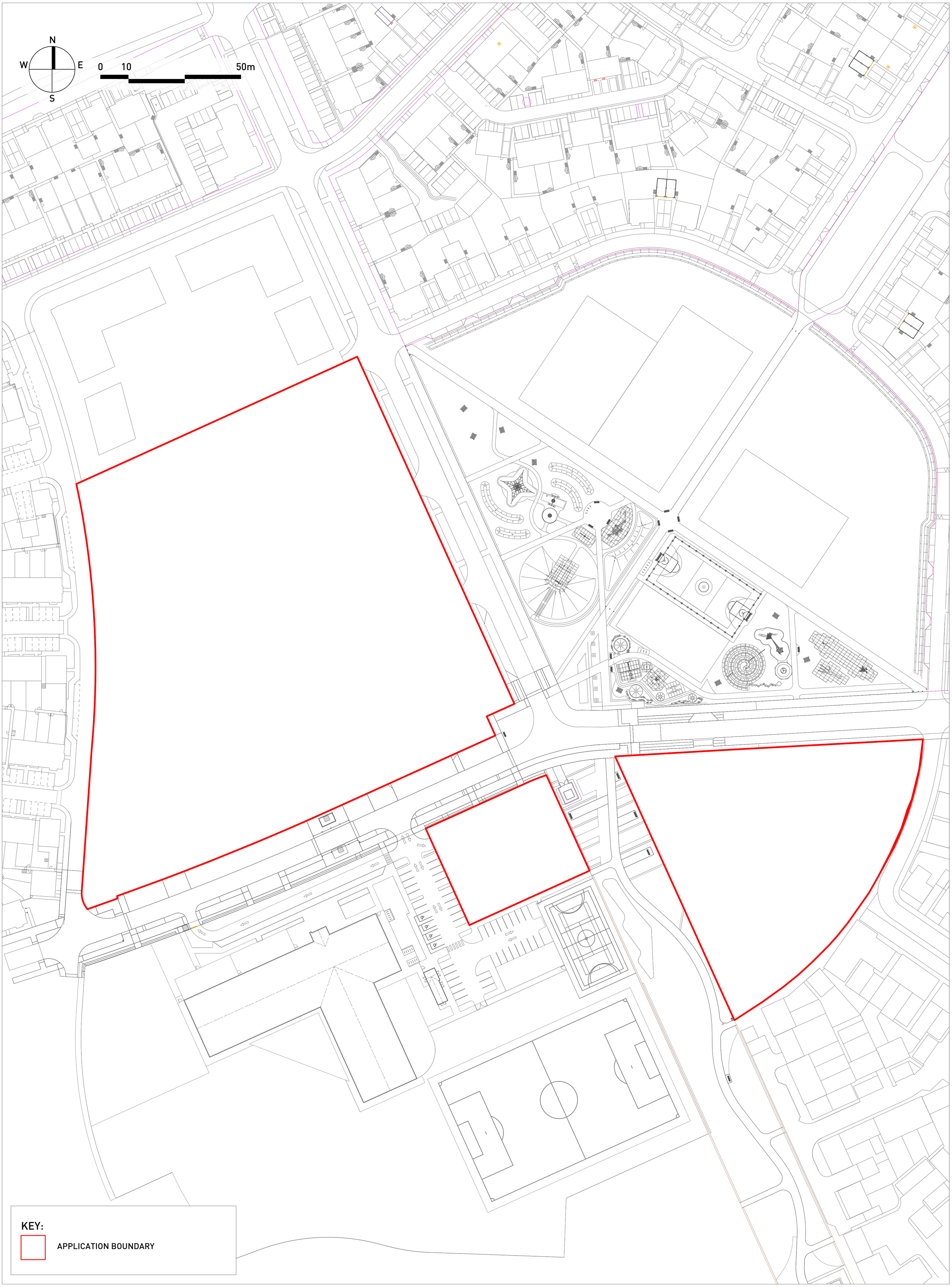
	Housetype	Sq.ft	Sq.m	St.	Beds	Pers	NDSS	R-Pers	No's	Total Sqft	Total Sqm
	OPEN MARKET HOUSING										
FLATS	APARTMENT A	539	50.1	3	1	2	YES	1B2P	14	7,546	701
FLATS	APARTMENT B	581	54.0	3	1	2	YES	1B2P	2	1,162	108
FLATS	APARTMENT C	760	70.6	3	2	4	YES	2B4P	5	3,800	353
FLATS	APARTMENT D	753	70.0	3	2	4	YES	2B4P	9	6,777	630
FLATS	APARTMENT E	786	73.0	3	2	4	YES	2B4P	4	3,144	292
FLATS	APARTMENT F	753	70.0	3	2	4	YES	2B4P	6	4,518	420
FLATS	APARTMENT G	753	70.0	3	2	4	YES	2B4P	6	4,518	420
FLATS	APARTMENT H	640	59.5	3	1	2	YES	1B2P	3	1,920	178
FLATS	APARTMENT J	753	70.0	3	2	4	YES	2B4P	9	6,777	630
FLATS	APARTMENT Q	786	73.0	3	2	4	YES	2B4P	2	1,572	146
FLATS	APARTMENT R	834	77.5	3	2	4	YES	2B4P	6	5,004	465
FLATS	APARTMENT S	791	73.5	3	2	4	YES	2B4P	2	1,582	147
FLATS	APARTMENT T	738	68.6	3	2	4	YES	2B3P	2	1,476	137
FLATS	APARTMENT U	665	61.8	3	2	4	YES	2B3P	2	1,330	124
4B	ROMSEY	1,176	109.3	3	4	7	NO	4B7P	1	1,176	109
4B	MARLBOROUGH	1,327	123.3	3	4	8	NO	4B8P	1	1,327	123
4B	WINKFIELD	1,371	127.4	3	4	8	NO	4B8P	1	1,371	127
4B	HEXHAM	1,356	126.0	3	4	7	NO	4B8P	8	10,848	1,008
	sub total (Open Market)								83	65,848	6,117
	AFFORDABLE HOUSING										
	AFFORDABLE RENT										
F	APARTMENT K	753	70.0	3	2	3	YES	2B4P	6	4,518	420
F	APARTMENT L	753	70.0	3	2	4	YES	2B4P	3	2,259	210
F	APARTMENT P	763	70.9	3	2	4	YES	2B4P	2	1,526	142
									11		
	SHARED OWNERSHIP										
F	APARTMENT D	753	70.0	3	2	4	YES	2B4P	6	4,518	420
F	APARTMENT J	753	70.0	3	2	4	YES	2B4P	3	2,259	210
F	APARTMENT M	759	70.5	3	2	4	YES	2B4P	3	2,277	212
F	APARTMENT N	753	70.0	3	1	2	YES	2B4P	3	2,259	210
F	APARTMENT O	766	71.2	3	1	2	YES	2B4P	2	1,532	142
									17		
	sub total (Affordable)								28	21,148	1,965
	TOTAL								111	86,996	8,082

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KILNWOOD VALE, NEIGHBOURHOOD CENTRE – SITE LAYOUT

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KILNWOOD VALE, NEIGHBOURHOOD CENTRE - SITE LOCATION PLAN

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Appendix C

MicroDrainage Surface Water Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 523702 135177 TQ 23702 35177
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	58.583	2.106	27.8	0.054	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	23.556	0.399	59.0	0.101	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	32.477	1.624	20.0	0.094	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	27.111	0.573	47.3	0.047	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.51	81.800	0.054	0.0	0.0	0.0	1.92	33.9	7.3
2.000	50.00	5.23	81.900	0.101	0.0	0.0	0.0	1.71	67.8	13.7
2.001	50.00	5.41	81.501	0.196	0.0	0.0	0.0	2.94	116.9	26.5
3.000	50.00	5.31	80.500	0.047	0.0	0.0	0.0	1.47	25.9	6.3

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
2.002	35.002	0.233	150.2	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	32.843	1.314	25.0	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	5.113	0.087	58.5	0.065	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	29.947	0.564	53.1	0.056	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	40.402	1.397	28.9	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	28.217	1.261	22.4	0.113	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.002	5.295	0.091	58.2	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.003	47.524	1.433	33.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	32.210	1.735	18.6	0.195	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.004	16.560	0.283	58.5	0.058	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.000	24.575	0.460	53.4	0.131	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.002	50.00	5.87	79.777	0.305	0.0	0.0	0.0	1.28	90.5	41.3
1.001	50.00	6.04	79.544	0.414	0.0	0.0	0.0	3.16	223.2	56.1
1.002	50.00	6.08	78.230	0.480	0.0	0.0	0.0	2.06	145.6	64.9
4.000	50.00	5.36	83.500	0.056	0.0	0.0	0.0	1.38	24.5	7.6
4.001	50.00	5.64	82.861	0.109	0.0	0.0	0.0	2.44	97.1	14.8
5.000	50.00	5.17	82.800	0.113	0.0	0.0	0.0	2.78	110.5	15.3
4.002	50.00	5.68	81.389	0.253	0.0	0.0	0.0	2.07	146.0	34.2
4.003	50.00	5.97	81.298	0.253	0.0	0.0	0.0	2.74	193.6	34.2
6.000	50.00	5.18	81.750	0.195	0.0	0.0	0.0	3.05	121.3	26.5
4.004	50.00	6.10	79.865	0.506	0.0	0.0	0.0	2.06	145.6	68.6
7.000	50.00	5.23	83.650	0.131	0.0	0.0	0.0	1.79	71.3	17.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
8.000	26.375	0.660	40.0	0.066	5.00	0.0	0.600	o	150	Pipe/Conduit	
7.001	35.075	0.294	119.4	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.002	4.277	0.294	14.5	0.101	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.000	50.00	5.28	83.900	0.066	0.0	0.0	0.0	1.60	28.2	8.9
7.001	50.00	5.76	83.165	0.219	0.0	0.0	0.0	1.20	47.5	29.7
7.002	50.00	5.78	82.796	0.320	0.0	0.0	0.0	4.14	292.9	43.3

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Manhole Schedules for Storm

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)
1	83.500	1.700	Open Manhole	1350	1.000	81.800	150				
2	83.600	1.700	Open Manhole	1350	2.000	81.900	225				
2	83.000	1.499	Open Manhole	1350	2.001	81.501	225	2.000	81.501	225	
3	82.250	1.750	Open Manhole	1200	3.000	80.500	150				
3	81.700	1.923	Open Manhole	1350	2.002	79.777	300	2.001	79.877	225	25
								3.000	79.927	150	
2	81.500	1.956	Open Manhole	1200	1.001	79.544	300	1.000	79.694	150	
								2.002	79.544	300	
3	80.000	1.770	Open Manhole	1200	1.002	78.230	300	1.001	78.230	300	
	80.000	1.857	Open Manhole	0		OUTFALL		1.002	78.143	300	
6	85.300	1.800	Open Manhole	1350	4.000	83.500	150				
7	84.250	1.389	Open Manhole	1200	4.001	82.861	225	4.000	82.936	150	
8	84.600	1.800	Open Manhole	1200	5.000	82.800	225				
8	83.250	1.861	Open Manhole	1200	4.002	81.389	300	4.001	81.464	225	
								5.000	81.539	225	75
9	83.250	1.952	Open Manhole	1200	4.003	81.298	300	4.002	81.298	300	
10	83.350	1.600	Open Manhole	1200	6.000	81.750	225				
10	82.000	2.135	Open Manhole	1200	4.004	79.865	300	4.003	79.865	300	
								6.000	80.015	225	75
	81.750	2.168	Open Manhole	0		OUTFALL		4.004	79.582	300	
14	85.350	1.700	Open Manhole	1200	7.000	83.650	225				
15	85.550	1.650	Open Manhole	1200	8.000	83.900	150				
15	85.110	1.945	Open Manhole	1200	7.001	83.165	225	7.000	83.190	225	25
								8.000	83.240	150	
18	84.500	1.704	Open Manhole	1200	7.002	82.796	300	7.001	82.871	225	
	84.500	1.998	Open Manhole	0		OUTFALL		7.002	82.502	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	523502.793	135190.696	523502.793	135190.696	Required	

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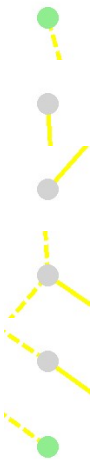
Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
2	523502.477	135126.488	523502.477	135126.488	Required	
2	523493.344	135148.202	523493.344	135148.202	Required	
3	523474.986	135109.974	523474.986	135109.974	Required	
3	523463.817	135134.678	523463.817	135134.678	Required	
2	523449.406	135166.575	523449.406	135166.575	Required	
3	523419.476	135153.053	523419.476	135153.053	Required	
	523415.307	135156.015			No Entry	
6	523543.910	135107.663	523543.910	135107.663	Required	
7	523516.709	135095.137	523516.709	135095.137	Required	
8	523491.828	135052.486	523491.828	135052.486	Required	
8	523480.061	135078.132	523480.061	135078.132	Required	
9	523475.258	135075.904	523475.258	135075.904	Required	
10	523435.203	135040.797	523435.203	135040.797	Required	
10	523427.881	135072.164	523427.881	135072.164	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
	523423.381	135088.101			No Entry	
14	523655.581	135047.457	523655.581	135047.457	Required	
15	523639.686	135003.034	523639.686	135003.034	Required	
15	523657.008	135022.923	523657.008	135022.923	Required	
18	523686.048	135003.252	523686.048	135003.252	Required	
	523689.499	135000.728			No Entry	



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PIPELINE SCHEDULES for Storm

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)
1.000	o	150	1	83.500	81.800	1.550	Open Manhole	1350
2.000	o	225	2	83.600	81.900	1.475	Open Manhole	1350
2.001	o	225	2	83.000	81.501	1.274	Open Manhole	1350
3.000	o	150	3	82.250	80.500	1.600	Open Manhole	1200
2.002	o	300	3	81.700	79.777	1.623	Open Manhole	1350
1.001	o	300	2	81.500	79.544	1.656	Open Manhole	1200
1.002	o	300	3	80.000	78.230	1.470	Open Manhole	1200
4.000	o	150	6	85.300	83.500	1.650	Open Manhole	1350
4.001	o	225	7	84.250	82.861	1.164	Open Manhole	1200
5.000	o	225	8	84.600	82.800	1.575	Open Manhole	1200
4.002	o	300	8	83.250	81.389	1.561	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)
1.000	58.583	27.8	2	81.500	79.694	1.656	Open Manhole	1200
2.000	23.556	59.0	2	83.000	81.501	1.274	Open Manhole	1350
2.001	32.477	20.0	3	81.700	79.877	1.598	Open Manhole	1350
3.000	27.111	47.3	3	81.700	79.927	1.623	Open Manhole	1350
2.002	35.002	150.2	2	81.500	79.544	1.656	Open Manhole	1200
1.001	32.843	25.0	3	80.000	78.230	1.470	Open Manhole	1200
1.002	5.113	58.5		80.000	78.143	1.557	Open Manhole	0
4.000	29.947	53.1	7	84.250	82.936	1.164	Open Manhole	1200
4.001	40.402	28.9	8	83.250	81.464	1.561	Open Manhole	1200
5.000	28.217	22.4	8	83.250	81.539	1.486	Open Manhole	1200
4.002	5.295	58.2	9	83.250	81.298	1.652	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

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)
4.003	o	300	9	83.250	81.298	1.652	Open Manhole	1200
6.000	o	225	10	83.350	81.750	1.375	Open Manhole	1200
4.004	o	300	10	82.000	79.865	1.835	Open Manhole	1200
7.000	o	225	14	85.350	83.650	1.475	Open Manhole	1200
8.000	o	150	15	85.550	83.900	1.500	Open Manhole	1200
7.001	o	225	15	85.110	83.165	1.720	Open Manhole	1200
7.002	o	300	18	84.500	82.796	1.404	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)
4.003	47.524	33.2	10	82.000	79.865	1.835	Open Manhole	1200
6.000	32.210	18.6	10	82.000	80.015	1.760	Open Manhole	1200
4.004	16.560	58.5		81.750	79.582	1.868	Open Manhole	0
7.000	24.575	53.4	15	85.110	83.190	1.695	Open Manhole	1200
8.000	26.375	40.0	15	85.110	83.240	1.720	Open Manhole	1200
7.001	35.075	119.4	18	84.500	82.871	1.404	Open Manhole	1200
7.002	4.277	14.5		84.500	82.502	1.698	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002		80.000	78.143	0.000	0	0

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Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
4.004		81.750	79.582	0.000	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
7.002		84.500	82.502	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 8 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)	20.000	Storm Duration (mins)	30
Ratio R	0.350		

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Storage Structures for Storm

Porous Car Park Manhole: 2, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	24.0
Max Percolation (l/s)	66.7	Slope (1:X)	45.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	83.150	Cap Volume Depth (m)	0.250

Porous Car Park Manhole: 2, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	17.0
Max Percolation (l/s)	47.2	Slope (1:X)	37.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	82.500	Cap Volume Depth (m)	0.250

Porous Car Park Manhole: 3, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	25.0
Max Percolation (l/s)	69.4	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	81.750	Cap Volume Depth (m)	0.250

Porous Car Park Manhole: 7, DS/PN: 4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	19.0
Max Percolation (l/s)	52.8	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	83.750	Cap Volume Depth (m)	0.250

Porous Car Park Manhole: 10, DS/PN: 6.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	55.6	Slope (1:X)	40.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	82.850	Cap Volume Depth (m)	0.250

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Porous Car Park Manhole: 14, DS/PN: 7.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	32.0
Max Percolation (l/s)	88.9	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	84.850	Cap Volume Depth (m)	0.250

Porous Car Park Manhole: 15, DS/PN: 8.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	55.6	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	85.050	Cap Volume Depth (m)	0.250

Porous Car Park Manhole: 15, DS/PN: 7.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	19.4	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	84.600	Cap Volume Depth (m)	0.250

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523702 135177 TQ 23702 35177
Data Type	Point
Cv (Summer)	1.000
Cv (Winter)	1.000

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

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.	Water Level (m)
1.000	1	15 Summer	2	+0%	100/15 Summer				81.860
2.000	2	15 Summer	2	+0%	100/15 Summer				81.990
2.001	2	15 Summer	2	+0%	100/15 Summer				81.592
3.000	3	15 Summer	2	+0%	30/15 Summer				80.565
2.002	3	15 Summer	2	+0%	30/15 Summer	100/15 Summer			79.963
1.001	2	15 Summer	2	+0%	30/15 Summer				79.673
1.002	3	15 Summer	2	+0%	2/15 Summer				78.556
4.000	6	15 Summer	2	+0%	30/15 Summer				83.575
4.001	7	15 Summer	2	+0%	100/15 Summer				82.934
5.000	8	15 Summer	2	+0%	100/15 Summer				82.873
4.002	8	15 Summer	2	+0%	30/15 Summer	100/15 Summer			81.568
4.003	9	15 Summer	2	+0%	100/15 Summer				81.405
6.000	10	15 Summer	2	+0%	100/15 Summer				81.843
4.004	10	15 Summer	2	+0%	30/15 Summer				80.072

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.090	0.000	0.33			11.1	OK	
2.000	2	-0.135	0.000	0.34		6	21.0	OK	
2.001	2	-0.134	0.000	0.34		7	37.4	OK	
3.000	3	-0.085	0.000	0.39		5	9.6	OK	
2.002	3	-0.114	0.000	0.69			57.5	OK	3
1.001	2	-0.171	0.000	0.38			78.2	OK	
1.002	3	0.026	0.000	1.20			89.0	SURCHARGED	
4.000	6	-0.075	0.000	0.49			11.6	OK	
4.001	7	-0.152	0.000	0.22		7	20.6	OK	
5.000	8	-0.152	0.000	0.23			23.4	OK	
4.002	8	-0.121	0.000	0.65			49.0	OK	1
4.003	9	-0.193	0.000	0.27			49.4	OK	
6.000	10	-0.132	0.000	0.36		6	40.5	OK	
4.004	10	-0.094	0.000	0.80			99.1	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
7.000	14	15 Summer	2	+0%	30/15 Summer				83.751
8.000	15	15 Summer	2	+0%	30/15 Summer				83.976
7.001	15	15 Summer	2	+0%	30/15 Summer				83.348
7.002	18	15 Summer	2	+0%	100/15 Summer				82.938

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
7.000	14	-0.124	0.000	0.41		5	27.2	OK	
8.000	15	-0.074	0.000	0.50		5	13.5	OK	
7.001	15	-0.042	0.000	0.99		4	44.2	OK	
7.002	18	-0.158	0.000	0.45			61.2	OK	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523702 135177 TQ 23702 35177
Data Type	Point
Cv (Summer)	1.000
Cv (Winter)	1.000

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

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.	Water Level (m)
1.000	1	15 Summer	30	+0%	100/15 Summer				81.898
2.000	2	15 Summer	30	+0%	100/15 Summer				82.046
2.001	2	15 Summer	30	+0%	100/15 Summer				81.699
3.000	3	15 Summer	30	+0%	30/15 Summer				80.985
2.002	3	15 Summer	30	+0%	30/15 Summer	100/15 Summer			80.646
1.001	2	15 Summer	30	+0%	30/15 Summer				80.082
1.002	3	15 Summer	30	+0%	2/15 Summer				79.086
4.000	6	15 Summer	30	+0%	30/15 Summer				83.723
4.001	7	15 Summer	30	+0%	100/15 Summer				82.982
5.000	8	15 Summer	30	+0%	100/15 Summer				82.914
4.002	8	15 Summer	30	+0%	30/15 Summer	100/15 Summer			81.810
4.003	9	15 Summer	30	+0%	100/15 Summer				81.475
6.000	10	15 Summer	30	+0%	100/15 Summer				81.916
4.004	10	15 Summer	30	+0%	30/15 Summer				80.866

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.052	0.000	0.73			24.3	OK	
2.000	2	-0.079	0.000	0.75		5	46.4	OK	
2.001	2	-0.027	0.000	0.85		3	93.0	OK	
3.000	3	0.335	0.000	0.82		3	20.2	SURCHARGED	
2.002	3	0.569	0.000	1.61			134.4	SURCHARGED	3
1.001	2	0.238	0.000	0.86			175.5	SURCHARGED	
1.002	3	0.556	0.000	2.68			198.4	SURCHARGED	
4.000	6	0.073	0.000	1.06			24.9	SURCHARGED	
4.001	7	-0.104	0.000	0.55		5	50.7	OK	
5.000	8	-0.111	0.000	0.50			51.8	OK	
4.002	8	0.121	0.000	1.55			116.9	SURCHARGED	1
4.003	9	-0.123	0.000	0.64			116.8	OK	
6.000	10	-0.059	0.000	0.79		5	89.3	OK	
4.004	10	0.701	0.000	1.87			231.2	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
7.000	14	15 Summer	30	+0%	30/15 Summer				84.592
8.000	15	15 Summer	30	+0%	30/15 Summer				84.874
7.001	15	15 Summer	30	+0%	30/15 Summer				84.256
7.002	18	15 Summer	30	+0%	100/15 Summer				83.033

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
7.000	14	0.717	0.000	0.85		3	55.6	SURCHARGED	
8.000	15	0.824	0.000	0.97		3	26.0	SURCHARGED	
7.001	15	0.866	0.000	1.96		4	87.9	SURCHARGED	
7.002	18	-0.064	0.000	0.95			128.4	OK	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523702 135177 TQ 23702 35177
Data Type	Point
Cv (Summer)	1.000
Cv (Winter)	1.000

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

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.	Water Level (m)
1.000	1	15 Summer	100	+40%	100/15 Summer				83.358
2.000	2	15 Summer	100	+40%	100/15 Summer				83.316
2.001	2	15 Summer	100	+40%	100/15 Summer				82.927
3.000	3	15 Summer	100	+40%	30/15 Summer				81.992
2.002	3	15 Summer	100	+40%	30/15 Summer	100/15 Summer			81.702
1.001	2	15 Summer	100	+40%	30/15 Summer				81.119
1.002	3	15 Summer	100	+40%	2/15 Summer				79.638
4.000	6	15 Summer	100	+40%	30/15 Summer				85.264
4.001	7	15 Summer	100	+40%	100/15 Summer				83.854
5.000	8	15 Summer	100	+40%	100/15 Summer				84.110
4.002	8	15 Summer	100	+40%	30/15 Summer	100/15 Summer			83.250
4.003	9	15 Summer	100	+40%	100/15 Summer				82.819
6.000	10	15 Summer	100	+40%	100/15 Summer				83.249
4.004	10	15 Summer	100	+40%	30/15 Summer				81.664

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	1.408	0.000	1.07			35.4	FLOOD RISK	
2.000	2	1.191	0.000	1.09		3	67.9	FLOOD RISK	
2.001	2	1.201	0.000	1.00		4	109.7	FLOOD RISK	
3.000	3	1.342	0.000	1.26		5	31.2	FLOOD RISK	
2.002	3	1.625	1.991	1.92			159.7	FLOOD	3
1.001	2	1.275	0.000	1.05			215.2	SURCHARGED	
1.002	3	1.108	0.000	3.65			270.3	SURCHARGED	
4.000	6	1.614	0.000	1.57			36.7	FLOOD RISK	
4.001	7	0.768	0.000	0.74		3	67.9	SURCHARGED	
5.000	8	1.085	0.000	0.80			82.4	SURCHARGED	
4.002	8	1.561	0.009	2.18			164.7	FLOOD	1
4.003	9	1.221	0.000	0.91			164.6	SURCHARGED	
6.000	10	1.274	0.000	1.01		3	114.3	FLOOD RISK	
4.004	10	1.498	0.000	2.47			306.1	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
7.000	14	15 Summer	100	+40%	30/15 Summer				85.128
8.000	15	15 Summer	100	+40%	30/15 Summer				85.300
7.001	15	15 Summer	100	+40%	30/15 Summer				84.696
7.002	18	15 Summer	100	+40%	100/15 Summer				83.345

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
7.000	14	1.253	0.000	1.04		5	68.4	FLOOD RISK	
8.000	15	1.250	0.000	1.33		5	35.9	FLOOD RISK	
7.001	15	1.306	0.000	2.30		8	103.2	SURCHARGED	
7.002	18	0.249	0.000	1.37			185.8	SURCHARGED	

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Appendix D

SW Drainage Calcs

NOTES

1 DO NOT SCALE THIS DRAWING ON PRINT OR ELECTRONICALLY. WORK FROM FIGURED DIMENSIONS ONLY.

2 No deviation from the details shown on this drawing is allowed without CampbellReith's prior permission in writing.

3 Read this drawing with all Architects, Service Engineers and CampbellReith's relevant details and drawings. **NB.** Setting-out dimensions as per the Architect's drawings take precedence.

4 All work is to be in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory requirements and the Contract Documents.

5 DRAWING STATUS

P : **PRELIMINARY** - Evolving drawings for approvals,Tenders, Billings, etc.

C : **CONSTRUCTION** - Fully developed drawings issued under instruction for construction.

ONLY STATUS C DRAWINGS TO BE USED FOR CONSTRUCTION.

6 SUITABILITY CODE

WORK IN PROGRESS:

S0 - Work in progress

SHARED (NON-CONTRACTUAL):

S1 - For coordination, **S2** - For information, **S3** - For internal review and comment, **S4** - For construction approval.

DOCUMENTATION (FOR CONTRACTOR PURPOSES):

D1 - For costing, **D2** - For Tender, **D3** - For contractor design, **D4** - For manufacture / procurement.

CONSTRUCTION:

A - For construction, **B** - For construction but with comments (i.e. areas in abeyance) **C** - Comprehensive revisions required.

7 X – Denotes Section Number. Y – Denotes Drawing Number

8. For further details for individual land parcels refer to drawings 11950-3D2G1-CD100, 11950-3E-CD100, 11950-3F3G2-CD100, 11950-3D1-CD100 and 11950-3G3-CD100.

Legend

- Land Parcel Development Boundary
- Planning Boundary
- Surface Water Drainage to be constructed by Crest South
- Surface Water Highway Drainage to be constructed by Crest South
- Foul Water Drainage to be constructed by Crest South
- Foul Water Rising Main to be constructed by Crest South
- Indicative Surface Water Drainage to be constructed by Phase 3DEFG developer/s
- Indicative Foul Water Drainage to be constructed by Phase 3DEFG developer/s
- Existing Surface Water Drainage
- Existing Foul Water Drainage
- Existing Foul Water Rising Main
- 85.000 Contour Label (Bulk Earthworks)

Phase 3D2/3G1

Phase 3G3

Phase 3F/3G2

Phase 3D1

Phase 3E

P1	ISSUED FOR INFORMATION	16.11.21	CL
Status/Rev.	Description	Date	By

CampbellReith consulting engineers

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Job Title: KILNWOOD VALE, CRAWLEY

Client: CREST NICHOLSON

PHASE 3DEFG OVERALL DRAINAGE CONSTRAINTS PLAN

drawn	date	scale @ A0	C1 checked	CR Project No.
CL	15.11.21	1:1000	-	11950

Drg No.	Suitability	Status/Revision
11950-3DEFG-CD100	S2	P1

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