

May 2013

FLOOD RISK ASSESSMENT

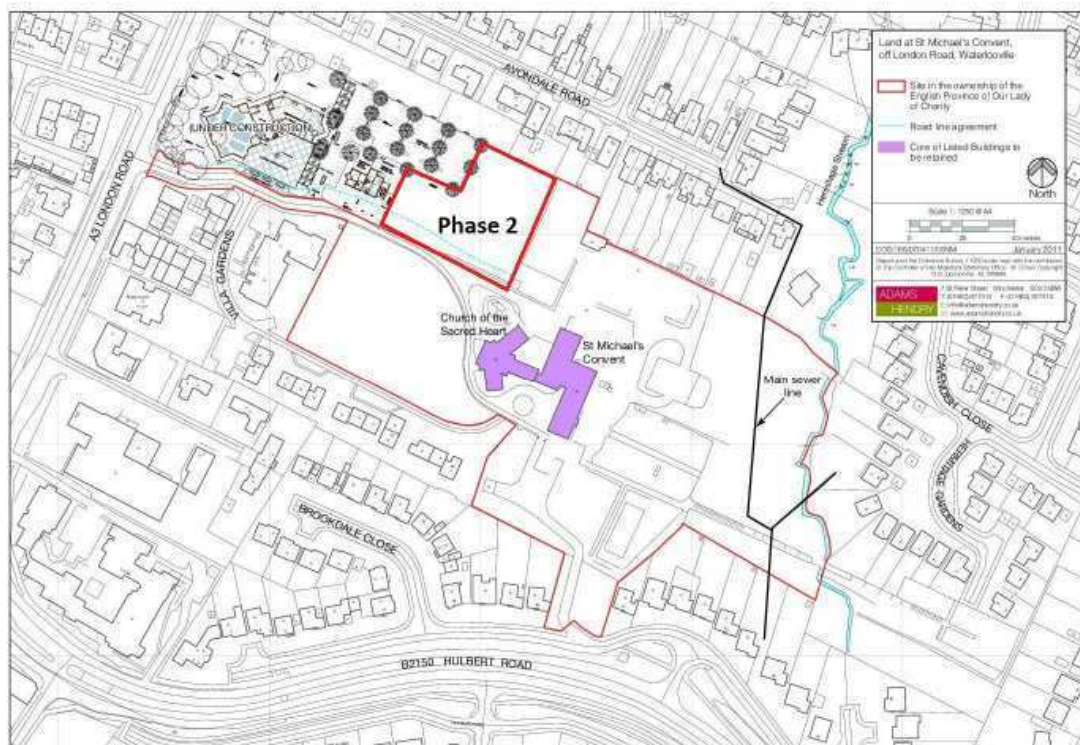
PROPOSED DEVELOPMENT, PHASE 2, ST.MICHAEL'S CONVENT, LONDON ROAD, WATERLOOVILLE, HAMPSHIRE

1. INTRODUCTION

In May 2013, AMA Ltd were commissioned by Linden Homes Southern Ltd to undertake a Flood Risk Assessment to meet the requirements of National Planning Policy Framework and the Code for Sustainable Homes for a development of 10 houses at St.Michael's Convent, London Road, Waterlooville, Hampshire (Figure 1).

This development forms Phase 2 of an area currently being developed and for which a Flood Risk Assessment Report dated February 2012 has already been prepared. The previous Flood Risk Assessment Report had already taken into account the Phase 2 development which shares the same drainage system, but a detailed Drainage Design had not been prepared at that time. This report is therefore an update of the previous report, with specific references to Phase 2 and incorporating the detailed drainage details and calculations.

Figure 1: Site Location Plan



1.1 Background

Planning permission will be sought for Phase 2 of the development for 10 residential units. Phase 1 already has planning consent and is under construction. The site was previously occupied by the

existing convent building and church, with associated outbuildings, roads and areas of hard standing. As a statutory consultee the Environment Agency will comment on the proposals.

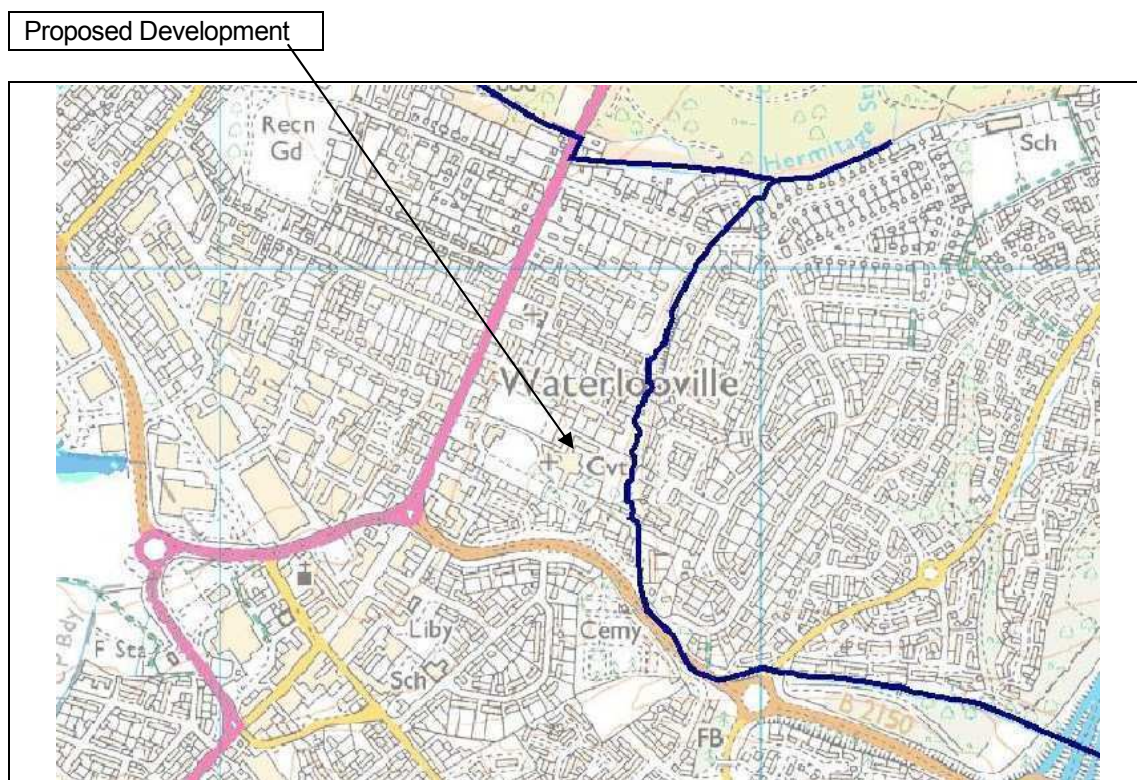
1.1.1 Ground Conditions

A Site Investigation has been carried out confirming that the site has a mantle of made ground, overlying soft to stiff clay and gravelly clay, logged as Head Deposits, overlying stiff to very stiff clay, logged as London Clay. Silty sand, logged as Bognor Sand, was encountered beneath the London Clay in the lower ground in the north-eastern portion of the site, adjacent to the Hermitage Stream.

1.1.2 Flood History

The flood risk map indicates that the site is not located within an Environment Agency fluvial/tidal flood risk zone (Figure 2).

Figure 2: Environment Agency Flood Map



Map Courtesy of Environment Agency

The site is located 300m to the East of the Waterlooville town centre, and immediately west of the Hermitage Stream, which is classified as Main River by the Environment Agency.

Although the site is located immediately adjacent to the Hermitage Stream, there are no records of fluvial type flooding at the site location. This is because the stream passes through a steep sided valley, with bank heights more than 2.0m above normal water levels and with the adjacent land 50m either side, sloping steeply towards the stream at a gradient of more approximately 1in7. However, the likelihood of this has been investigated and is discussed in this report. In addition to this, issues of local site scale flooding and site runoff volumes have been addressed. This document is designed to fulfil these requirements in line with the National Planning Policy Framework.

1.1.3 Correspondence and Discussions

During the preparation of this document the Environment Agency has been contacted in order to

obtain information. The report has been based on the information provided by the Environment Agency, the client and observations from site visits.

1.1.4 Objectives

The principle aims of the FRA are:

1. To assess the risk associated with all potential flood sources;
2. To investigate the interaction between potential flood sources and the redevelopment proposals;
3. To discuss management of storm water runoff related to the potential development.

2. SITE DESCRIPTION

2.1 Location

The site is located 300m to the East of the Waterloo town centre, and immediately west of the Hermitage Stream (Figure 1). The A3(M) is located approximately 1km east of the site and the A3 London Road is located 100m west of the site. The main access road leading into the site is served from London Road. Phase 2 of the development is located in the north west corner of the site.

2.2 Site Appearance

The site covers an area of approximately 3.13 hectares, although only 2.43 hectares is being developed for residential use, with the existing green and area adjacent to the Hermitage Stream being retained as Open Space. The area of Phase 2 is 0.27 hectares and has been included in the net developable area of 2.43 hectares.

Appendix 1 shows the existing site survey. The site can be accessed via existing access roads from London Road to the West and Hulbert Road to the South. It is currently occupied by the existing convent building and Sacred Heart Church, together with associated outbuildings, roads and areas of hardstanding. The existing impermeable area is 0.83 hectares.

The Hermitage Stream forms the eastern boundary of the site and flows from North to South. A tributary watercourse to the Hermitage Stream flows from west to east and joins the Hermitage Stream in the South Eastern corner of the site. This watercourse is open for approximately 60m upstream of where it meets the Hermitage Stream, a brick built headwall has been constructed at the head of the watercourse for the outfall of existing storm water drains.

The maximum site level is approximately 48.00m AOD at the Western end of the site adjacent to the existing Church Hall and gently falls south eastwards for approximately 200 metres at a gradient of 1in25. The site then steepens to an average gradient of 1in7 for approximately 50 metres down towards the Hermitage Stream at the eastern end of the site. The minimum site level is approximately 30.00m AOD in the south eastern corner of the site adjacent to the Hermitage Stream.

Most of the area surrounding the site has already been developed, mostly for residential use. To the west, a new church, church hall and car park have recently been constructed on the north side of the Access Road leading from London Road into the site.

2.2.1 Site Drainage

There are existing surface and foul water sewers/drains that run through the site serving the existing developments around the site and which will have to be retained. These have been indicated on the Drainage Strategy (Appendix 3) and are as follows:

- 1). An existing 225mm diameter public foul sewer running from North to South through the eastern part of the site near the Hermitage Stream.
- 2). An existing 150mm diameter public foul sewer running from West to East across the access road from Hulbert Road.
- 3). An existing 100mm diameter foul drain and 150mm diameter storm drain, running along the northern site boundary serving the new church and church hall. The foul drain connects to the

sewer mentioned in Item 1, the storm drain connects to the Hermitage Stream via a concrete bag headwall.

4). An existing 150mm diameter foul drain and 300mm storm drain, running along the southern site boundary of the site serving the existing properties in Villa Gardens and the existing access road from London Road. The foul drain connects to the sewer mentioned in Item 2, the storm drain connects to the brick built headwall at the head of the tributary watercourse to the Hermitage Stream.

It should be noted that there are no soakaways on the site suggesting that ground conditions are such that infiltration methods for the disposal of surface water run-off are not viable. This has been confirmed by falling head permeability tests undertaken on the London Clay as part of the Site Investigation. These tests did not return sufficient fall in water level for a permeability to be calculated. Typical permeability for clay such as encountered is 1.0×10^{-8} m/s or lower. Surface water run-off from the existing buildings, roads and areas of hardstanding, discharges to the Hermitage Stream via an existing 6inch diameter piped drainage system. However, this system has a limit capacity and has fallen into disrepair, so much of the surface water run-off now discharges to the Hermitage Stream via the overland route particularly in exceptional storm events.

From the net development area of 2.43ha (ie. Gross Area less Open Space areas) and taking into account the existing impermeable area and the site soil characteristics, the Mean Annual Flood Rate (Qbar) can be calculated using the IH124 method of calculation, together with the peak rate of discharge for varying storm events (Figure 3).

Figure 3: Existing Discharge Rates.

Andrew Malcolm Associates Ltd		Page 1	
15 Wild Rose Crescent	Qbar		
Southampton	St.Michaels Convent		
SO31 6TG	Waterlooville		
Date 19-01-12	Designed By AJM		
File	Checked By		
Micro Drainage	Source Control W.11.2		
IH 124 Mean Annual Flood			
Input			
Return Period (years)	100	Soil	0.450
Area (Ha)	2.430	Urban	0.330
SAAR (mm)	800,000	Region Number	7
Results		1/s	
QBAR Rural		17.4	
QBAR Urban		27.9	
Q 100 years		70.4	
Q 1 year		23.7	
Q 2 years		26.3	
Q 5 years		36.5	
Q 10 years		44.2	
Q 20 years		51.6	
Q 25 years		54.0	
Q 30 years		55.6	
Q 50 years		60.6	
Q 100 years		70.4	
Q 200 years		79.5	
Q 250 years		82.4	
Q 1000 years		102.1	

2.2.2 Geology

GESL undertook an intrusive site investigation during December 2011. Table 1 shows the generalised ground profile encountered during this investigation.

Table 1. Generalised Ground Profile

Depth (mbgl)	Encountered Material
0 – 0.3	Top Soil/Made Ground.
0.3 – 2.00	HEAD DEPOSITS: Firm to stiff sandy silty CLAY with occasional fine to coarse flint gravel
2.00 – 4.00+	LONDON CLAY: Stiff to very stiff brown silty CLAY

2.3 Surrounding Area

The site is located 300m to the East of the Waterloo town centre, and immediately west of the Hermitage Stream. The A3(M) is located approximately 1km east of the site and the A3 London Road is located 100m west of the site. The main access road leading into the site is served from London Road.

Most of the area surrounding the site has already been developed, mostly for residential use. To the west, a new church, church hall and car park have recently been constructed on the north side of the Access Road leading from London Road into the site.

The surrounding area is generally on sloping ground, falling from the London Road towards the Hermitage Stream. The areas surrounding the site have no specific conservation classification.

2.3.1 Local Drainage Network

The existing storm and foul sewers systems within the site have been indicated on the Drainage strategy (Appendix 3). The existing residential developments adjacent to the proposed site, have both storm and foul sewers systems as indicated on Southern Water's drainage records (Figure 4). It can be seen from these details that these storm sewers within the vicinity of the site and on the east side of the London Road, all eventually discharge to the Hermitage Stream. It should be noted that approximately 50 metres south of the site, the Hermitage Stream has been culverted with a 1.0 metre diameter pipe for a length of approximately 300m before it becomes an open stream again.

Figure 4: Southern Water Drainage Records



2.4 Description Of Redevelopment

The residential development under construction consists of 65 new houses/apartments, the refurbishment of the existing convent building for 17 apartments, the retention of the Sacred Heart Church, together with associated roads and POS areas, as indicated on the proposed site layout (Appendix 2) . It is proposed to build a further 10 new houses on Phase 2 of the development. The

impermeable area will increase from 0.83ha to 1.24ha, an increase from 33% to 51%. Proposed ground levels will remain broadly in line with existing levels.

3. EXTERNAL FLOOD SOURCES

Current guidance recommends that a FRA must investigate all potential sources of flood risk that may affect each particular site. A number of site-specific mechanisms exist: however, many of these are not relevant to this site. Table 2 summarises the range of potential flood sources, pathways and the possibility of relevance to the site itself and immediately surrounding area.

Table 2: Summary of potential flood sources

Flood Type	Source	Pathway	Consider Further
Fluvial	Hermitage Stream	None	No - large level difference.
Tidal	None	None	No
Overland Flow	A3 London Road	Surface Water Run-off in exceptional storm events.	Yes
Drainage	Public Sewer	Blockage/overwhelmed capacity	Yes
Groundwater	Clay Sub-Strata	Rising Water Table	Yes

3.1 Overland Flow

The areas to the west of the site up to and including London Road are at a higher level than the site itself. Therefore in the event of an exceptional storm event, the natural overland flow route for surface water run-off is through the site. Therefore it will be necessary to maintain a flood route through the site to the Hermitage Stream.

3.2 Drainage

Southern Water maintains a database that records reported incidents of sewer flooding. There have been no recorded instances of flooding the site as a result of their sewers being overwhelmed.

3.3 Groundwater

As part of the intrusive investigation undertaken by GESL, groundwater data was available. This confirmed that no groundwater was encountered up to a depth of at least 4.0m. This is because of the impervious nature of the site's subgrade and as such groundwater is unlikely to represent a risk.

4. FLOOD MITIGATION AND MANAGEMENT

The assessment undertaken in Section 3 identified overland flow, off-site drainage and groundwater as a potential source of flood risk to the proposed development. However, it was demonstrated that only overland flow pathways are a potential source of flooding.

4.1 Overland Flow Pathways

As already mentioned, it has been identified that a flood route through the site to the Hermitage Stream needs to be maintained. This has been achieved by ensuring that the existing access road into the site is continued through the proposed development and leads to the Hermitage Stream, as indicate on the drainage layout (Appendix 3).

5. SITE GENERATED FLOOD RISK

5.1 Storm Water Strategy

5.1.1 Background

As the site prior to development discharged to the Hermitage Stream via the local drainage system, and overland in exceptional storm events, the discharge from the proposed development should not exceed the Mean Annual Maximum Flood Rate (Qbar) for the existing site. This has been calculated as 27.9 litres/sec (Figure 3).

5.1.2 Run-off Calculations

The maximum rate of discharge for the development post development should not exceed Qbar. For the purposes of comparison however, the maximum run-off for design storms of 1in1 year, 1in30 year, 1in100 year and 1in100year+30% allowance for climate change, have been calculated prior to and after the site is developed, in accordance with the National Planning Policy Framework and the Code for Sustainable Homes (Table 3).

Table 3: Outline run-off calculations based on relevant design storm

Development Status	1in1year Design Storm	Qbar – Mean Annual Max. Flood Rate	1in30year Design Storm	1in100year Design Storm	1in100year+30% Design Storm
Existing	23.7 l/sec	27.9 l/sec	55.6 l/sec	70.4 l/sec	91.5 l/sec
Proposed	23.7 l/sec	27.9 l/sec	27.9 l/sec	27.9 l/sec	27.9 l/sec

5.2 Options for Disposal

5.2.1 Unattenuated Discharge

The existing site drains to the Hermitage Stream on the eastern boundary of the site. Given the increase in impermeable area of the development and the decrease in time of concentration associated with a new piped drainage system, an unattenuated discharge may overwhelm the culverted section of the Hermitage Stream downstream of the site with an increase in the risk of fluvial flooding. Therefore this method of discharge is not an option.

In accordance with PPS25, the volume of run-off from the impermeable areas prior to and after development have been calculated for a 1in100 yr storm +30%CC of 6 hours duration in Table 4. It should be noted that for this site these figures are irrelevant, because of the issues with overland flows from the existing site.

Table 4: Volume of run-off from Impermeable Areas (1in100 yr storm +30%CC of 6 hours duration).

Conditions	Impermeable Area	Volume
Existing	0.83 hectares	566m ³
Proposed	1.24 hectares	846m ³

2.2.2 Attenuated Discharge

Attenuation of storm water will be required if the permitted maximum rate of discharge is limited to 27.9 litres/sec (ie the mean annual maximum flood rate). The storage requirements will have to accord with the requirements of the Code for Sustainable Homes and cater for a 1in100year storm with a 30% allowance in rainfall intensities for climate change.

In accordance with current guidelines, the storage of storm water should be provided where possible in ponds, swales, porous paving and similar Suds features. A drainage scheme using swales and porous paving, with some underground storage has been prepared to meet the aforementioned requirements.

This scheme indicates two outfalls to the Hermitage Stream, one direct connection where the discharge has been limited to 22.9 litres/sec and one connection to the tributary of the Hermitage Stream where the discharge has been limited to 5.0 litres/sec. It should be noted that this strategy has been submitted to the Environment Agency who have approved the scheme subject to the provision of detailed calculations (Appendix 4).

The surface water discharge from Phase 2 is to be limited to 5 litres/sec, with underground storage being provided. This system connects to the existing on-site drainage system that directly discharges to the Hermitage Stream.

In support of this scheme Drainage Calculations have been prepared (Appendix 5), with calculations relating to Phase 2 being provided separately.

2.2.3 Infiltration

As already discussed, it has been shown that the Clay sub-grade (Head Deposits overlying London Clay) will provide a suitable drainage medium. Infiltration devices will therefore not be an option for the disposal of storm water.

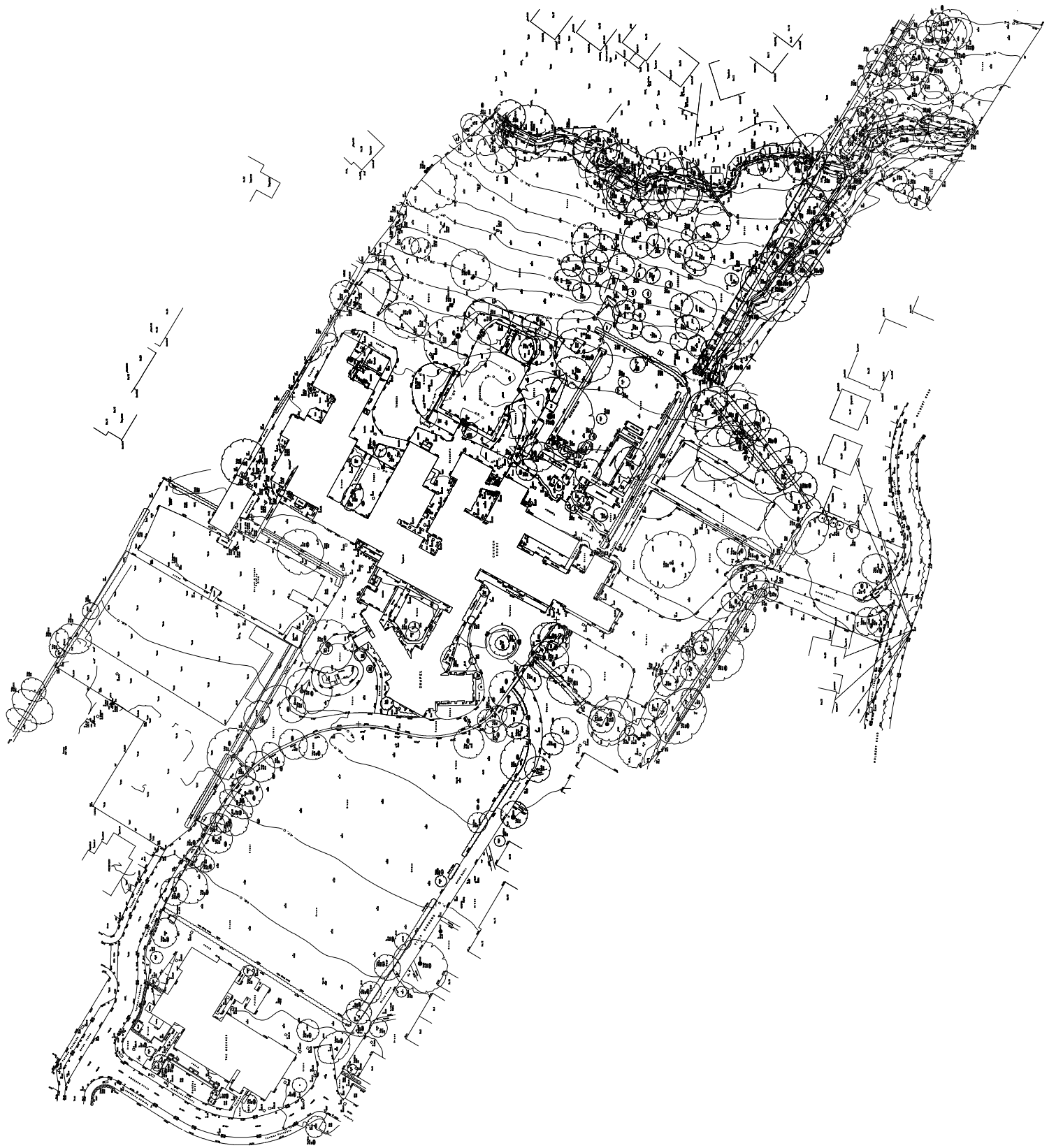
6. CONCLUSIONS AND RECOMMENDATIONS.

The following conclusions and recommendations can be made:

- The site is not located within an area considered to be at risk from fluvial flooding.
- Overland flow from London Road through the site was identified as a flood risk to the proposed development. As such a flood route through the site should be maintained.
- Because of the non-porous nature of the clay sub-grade, groundwater will not be a potential flood risk.
- It is proposed that storm water generated on-site will be discharged to the Hermitage Stream at a maximum rate of 27.9 litres/sec (Q_{bar}), with the storm water discharge generated by Phase 2 and connected to the existing on-site drainage system being limited to 5.0 litres/sec.
- Detailed calculations of storage requirements should be undertaken.

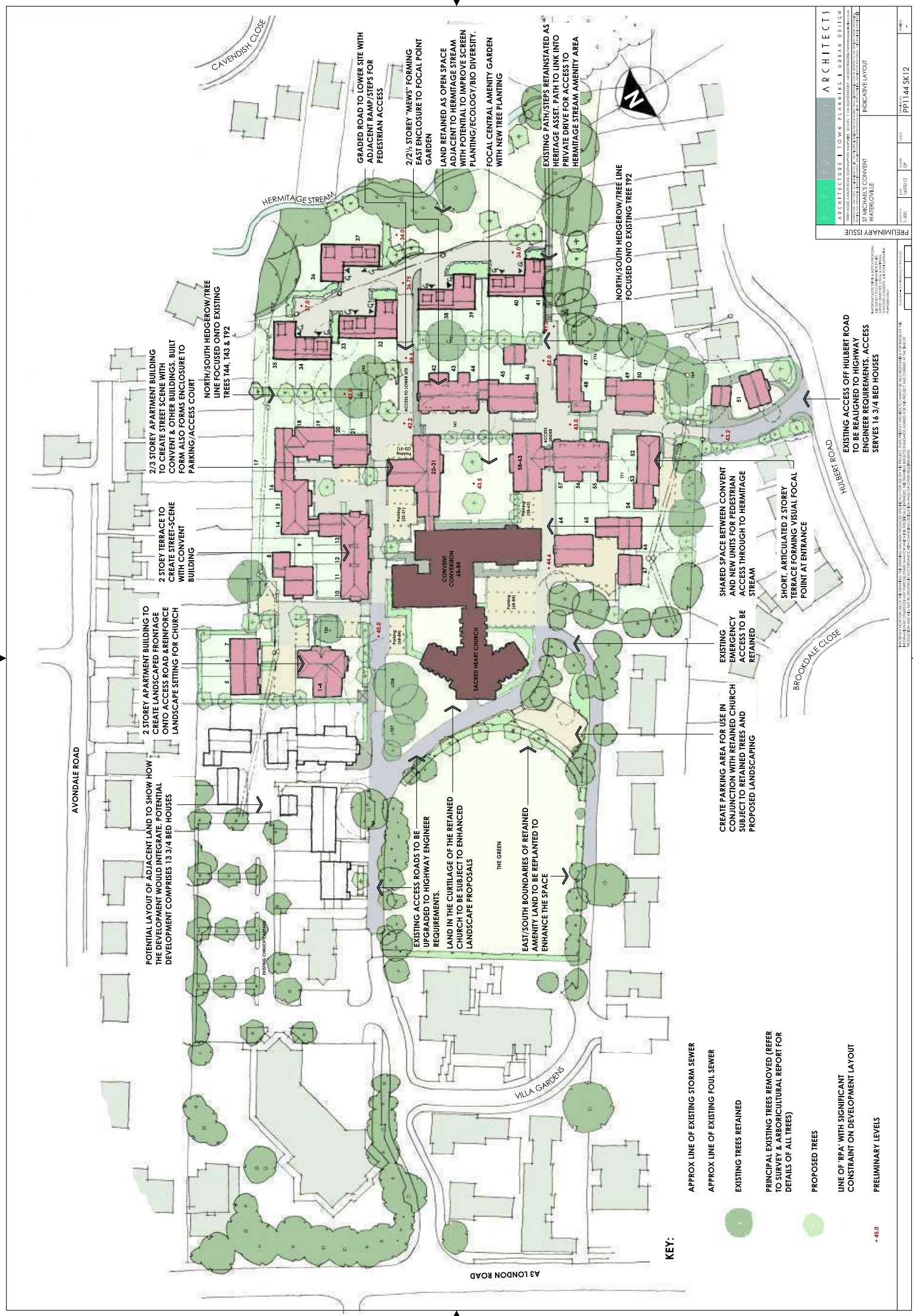
Appendix 1

SITE SURVEY



Appendix 2

SITE LAYOUT



KEY:

- APPROX LINE OF EXISTING STORM SEWER
- APPROX LINE OF EXISTING FOUL SEWER
- EXISTING TREES RETAINED
- PRINCIPAL EXISTING TREES REMOVED (REFER TO SURVEY & ARBOCULTURAL REPORT FOR DETAILS OF ALL TREES)
- PROPOSED TREES
- LINE OF 'RPA' WITH SIGNIFICANT CONSTRAINT ON DEVELOPMENT LAYOUT
- PRELIMINARY LEVELS

ARCHITECTS
ARCHITECTURE | TOWN PLANNING | URBAN DESIGN
100-100 CAVENDISH CLOSE, WATERLOO, ONTARIO N2L 2B7
TEL: 613-593-9333
WWW.ARC-ATD.COM

PROJECT
ST MICHAEL'S CONVENT
WATERLOO, ONTARIO

INDICATIVE LAYOUT

PRELIMINARY ISSUE

DATE: 16/02/22
DRAWN: DP
CHECKED: PPI144 SK/2

+45.0

Appendix 3

DRAINAGE LAYOUT

Hydrobrake Manhole S11
Maximum rate of
discharge for surface
water = 5.0 litres/sec.

NEW POSITIONS FOR MANHOLES S10&F7
S10 - 572.450E 408.211N, CL 46.240, IL 44.178
F7 - 570.501E 407.659N, CL 46.290, IL 43.755

SACRED HEART CHURCH
DETAILS TO BE CONFIRMED

DRAINAGE NOTES

- [illegible]

LEGEND

SEWERS & DRAINS

- Foul Sewer
Storm Sewer
Foul Drain (100mm diam. unless shown)

INSPECTION CHAMBERS

- Type 4 - 450mm diam, preformed (depth to soffit less than 3.0m)
Type 5 - 450mm diam, preformed (depth to soffit less than 1.0m)
Type 6 - 225mm diam, shallow access (depth to soffit less than 1.0m)

Road Qu

1000-0000/01/0000-0000\$05.00/0

ACO 01511

RETAINING WALLS - INDEPENDENT OF

STREET LIGHTING

-  **New Lamp Column**
URBIS 5m Post Top Lamp Column, finished in black.
ZXU1 Lantern with 50 Watt SON-T lamp and integral control gear, suitable for post top mounting.
Small plain column, 5m nominal height in galvanneal

LOW LEVEL SOLUBLE DYEING

SW MANHOLE SCHEDULE

Particle	Center of mass	Linear momentum	Linear Energy	Center of mass velocity	Chamber Temperature	Particle Type
S100	4.1600	1.5767	93.938362704	0.378711151	1000	Special
S102	4.1607	1.5807	93.938362704	0.378711151	1000	Special
S104	4.2366	2.0605	102.02435352	0.484262225	1000	Special
S106	4.3519	2.4825	108.02628	0.572221221	1000	Special
S108	4.4180	2.6716	109.740	0.592221221	1000	Special
S110	4.4739	2.8190	110.589	0.592221221	1000	Special
S112	4.5279	2.9315	111.503	0.592221221	1000	Special
Special	8.1600	5.0850	90.703	0.022122122	Special	Special
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S80	48.3370	1.780	4.1490	0.022122122	1000	Special
S81	48.3370	1.780	4.1490	0.022122122	1000	Special
S82	48.3370	1.780	4.1490	0.022122122	1000	Special
S83	48.3370	1.780	4.1490	0.022122122	1000	Special
S84	48.3370	1.780	4.1490	0.022122122	1000	Special
S85	48.3370	1.780	4.1490	0.022122122	1000	Special
S86	48.3370	1.780	4.1490	0.022122122	1000	Special
S87	48.3370	1.780	4.1490	0.022122122	1000	Special
S88	48.3370	1.780	4.1490	0.022122122	1000	Special
S89	48.3370	1.780	4.1490	0.022122122	1000	Special
S90	48.3370	1.780	4.1490	0.022122122	1000	Special
S91	48.3370	1.780	4.1490	0.022122122	1000	Special
S92	48.3370	1.780	4.1490	0.022122122	1000	Special
S93	48.3370	1.780	4.1490	0.022122122	1000	Special
S94	48.3370	1.780	4.1490	0.022122122	1000	Special
S95	48.3370	1.780	4.1490	0.022122122	1000	Special
S96	48.3370	1.780	4.1490	0.022122122	1000	Special
S97	48.3370	1.780	4.1490	0.022122122	1000	Special
S98	48.3370	1.780	4.1490	0.022122122	1000	Special
S99	48.3370	1.780	4.1490	0.022122122	1000	Special
S100	48.3370	1.780	4.1490	0.022122122	1000	Special

FW MANHOLE SCHEDULE

Item No.	Case	Material	Unit/Length	Order Qty	Chamber Size	Material Type
F1	35,000	1,032	35,100/36,200	120/100	3000x675	Type C
F2	39,020	2,614	38,600	100/100		Type B
F3	42,340	2,654	39,675	100/100		Type B
F4	43,000	2,190	40,700	100/100		Type B
F5	43,560	2,226	41,274	100/100		Type B
F6	45,090	2,262	42,838	100/100		Type B
F7	46,570	2,298	43,362	100/100		Type B
F8	46,560	2,332	42,209	100/100		Type B
F9	47,120	2,100	41,320	100/100		Type B
F10	47,120	1,843	41,067	100/100		Type B
F12	42,640	2,170	40,075	100/100		Type B
F13	42,260	2,689	39,562	100/100		Type B
F15	44,010	1,924	42,098	100/100		Type B

Note: For details of 'Special Manholes', Headwalls and SW Storage Tanks see dwg.no.LIND34-007

FOR FULL DETAILS OF AC
ON HULBERT ROAD - SEE
DWG. NO. LIND34-S278-02

- F. Street lighting added. Cycles store to plots 22-31 amended. Levels at rear of properties amended to indicate level thresholds. 04-05-13
- G. Car barn details for plot 49 added. 07-02-13
- D. Granite Self Rumble Strip added at Hubert Ross junction to accord with S278 details. Embankments in gardens of plots 53,54,52,683 amended to accommodate revised paving. 02-01-13
- C. FFL's of plots 40-45, 62683 amended to suit timber frame construction, external levels amended accordingly. 17-12-12
- B. Layout updated to accord with Architects landscape houseplans. Access from London Road amended between carriage 0,000 and 60,000. 29-11-12
- A. Layout updated to accord with Architects landscape details. 29-09-12

Project LINDEN HOMES RESIDENTIAL DEVELOPMENT St.Michaels Convent WATERLOOVILLE		
Title ENGINEERING LAYOUT		
Date aug 12	Scale 1:250@A0	Drawn ajm
Drawing Number LIND34-001		Rev J

Appendix 4

ENVIRONMENT AGENCY CORRESPONDENCE

Andrew Malcolm

From: "Waite, Rob" <robert.waite@environment-agency.gov.uk>
Date: 20 February 2012 10:20
To: "Andrew Malcolm" <amassoc@ntlworld.com>
Subject: RE: Environment Agency Response ref.HA/2011/112395/02-L01, St.Michaels Convent, Waterloooville

Dear Mr Malcolm,

Thank you for confirming the drainage arrangement at MH SW1. I can confirm that in principle the drainage scheme proposed is acceptable subject to the provision of detailed calculations.

Regards

Rob Waite

Development and Flood Risk Officer

Environment Agency
 Solent and South Downs Area
 Colvedene Court
 Wessex Way
 Colden Common
 Winchester
 Hampshire
 SO21 1WP

Tel: 01962 764897

e-mail: robert.waite@environment-agency.gov.uk

We would be really grateful if you could spare five minutes to help us improve our service. Please click on the link below and fill in our survey - we use every piece of feedback we receive.

<http://goo.gl/mHxkR>

-----Original Message-----

From: Andrew Malcolm [mailto:amassoc@ntlworld.com]

Sent: 13 February 2012 08:56

To: Waite, Rob

Cc: Michael.Obrien@lindenhomes.co.uk

Subject: Environment Agency Response ref.HA/2011/112395/02-L01, St.Michaels Convent, Waterloooville

Dear Mr.Waite,

Thank you for your attached letter dated the 10th February.

I note that you have no objections to the drainage proposals for the above site, but require confirmation regarding the connection upstream of MH SW1.

The 300dia. storm sewer shown on the drawing is an existing sewer serving the properties in Villa Gardens. No connections are made to this sewer from the proposed development, other than via MH SW1. All the surface water run-off from the proposed development will therefore be stored/attenuated before discharging to the existing sewer.

I trust this clarifies the proposed arrangement for you, so that you are able to confirm your approval. If you should have any further queries however, please do not hesitate to contact me.

Regards
Andrew Malcolm
AMA Ltd
tel.01489 605526

From: <planning.southdowns@environment-agency.gov.uk>

Sent: Friday, February 10, 2012 4:58 PM

To: <amassoc@ntlworld.com>

Subject: Environment Agency Response to:

- > The proposal has been reviewed and I enclose the Environment Agency's
- > comments on:
- > St. Michael's Convent
- > London Road
- > Waterlooville
- > Hampshire
- >
- > LPA ref:
- >
- >
- > Information in this message may be confidential and may be legally
- > privileged. If you have received this message by mistake, please notify
- > the sender immediately, delete it and do not copy it to anyone else.
- >
- > We have checked this email and its attachments for viruses. But you should
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- > We may have to make this message and any reply to it public if asked to
- > under the Freedom of Information Act, Data Protection Act or for
- > litigation. Email messages and attachments sent to or from any
- > Environment Agency address may also be accessed by someone other than the
- > sender or recipient, for business purposes.
- >
- > If we have sent you information and you wish to use it please read our
- > terms and conditions which you can get by calling us on 08708 506 506.

Mr Andrew Malcolm
Andrew Malcolm Associates Ltd.
15 Wild Rose Crescent
Locks Heath
Southampton
SO31 6TG

Our ref: HA/2011/112395/02-L01

Your ref:

Date: 10 February 2012

Dear Mr Malcolm,

**PROPOSED RESIDENTIAL DEVELOPMENT AT ST MICHAEL'S CONVENT,
LONDON ROAD, WATERLOOVILLE - REVISED DRAINAGE STRATEGY TO
INCLUDE EXTRA BUILDINGS AND THE INCLUSION OF PERMEABLE PAVING
AND SWALE.
ST. MICHAEL'S CONVENT, LONDON ROAD, WATERLOOVILLE, HAMPSHIRE**

Thank you for submitting the revised drainage information for the St Michaels Convent development site.

The inclusion of a swale and porous paving within the drainage system is welcomed and in principle the proposed drainage strategy is acceptable. My previous comments with regards to the provision of drainage calculations to confirm the rate and long term storage requirements still apply.

One further issue that requires confirmation is the discharge arrangement at the SW1 hydrobrake. This feature in the drainage drawing appears to be sited upstream of another drainage route (300 storm sewer) and therefore potentially this source would be unattenuated before entering the existing headwall and being discharged to the Hermitage Stream. Can you please confirm the final arrangement for this discharge point please.

Please note that the view expressed in this letter by the Environment Agency is a response to a pre application enquiry only and does not represent our final view in relation to any future planning application made in relation to this site. We reserve the right to change our position in relation to any such application.

Should you require any further assistance please do not hesitate to contact me on the number shown below.

Environment Agency
Wessex Business Park (Colvedene Court) Wessex Way, Colden Common, Winchester, SO21 1WP.
Customer services line: 03708 506 506
www.environment-agency.gov.uk

Cont/d..

Yours sincerely

Rob Waite
Development & Flood Risk Officer

Direct dial: 01962 764897

Direct e-mail: robert.waite@environment-agency.gov.uk

On behalf of Planning Liaison

End

Appendix 5

DRAINAGE CALCULATIONS

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 89 minutes

Storm Duration (mins)	Maximum Control (l/s)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	3.9	0.0	3.9	45.0103	0.7863	26.9	0 K
30 Summer	4.4	0.0	4.4	45.1963	0.9723	33.3	0 K
60 Summer	4.6	0.0	4.6	45.3038	1.0798	36.9	0 K
120 Summer	4.6	0.0	4.6	45.3138	1.0898	37.3	0 K
180 Summer	4.5	0.0	4.5	45.2743	1.0503	35.9	0 K
240 Summer	4.4	0.0	4.4	45.2213	0.9973	34.1	0 K
360 Summer	4.2	0.0	4.2	45.1198	0.8958	30.6	0 K
480 Summer	4.0	0.0	4.0	45.0278	0.8038	27.5	0 K
600 Summer	3.8	0.0	3.8	44.9448	0.7208	24.6	0 K
720 Summer	3.6	0.0	3.6	44.8683	0.6443	22.0	0 K
960 Summer	3.5	0.0	3.5	44.7302	0.5062	17.3	0 K
1440 Summer	3.5	0.0	3.5	44.4943	0.2702	9.2	0 K
2160 Summer	3.0	0.0	3.0	44.3723	0.1483	5.1	0 K
2880 Summer	2.6	0.0	2.6	44.3253	0.1013	3.5	0 K
4320 Summer	1.9	0.0	1.9	44.2973	0.0733	2.5	0 K
5760 Summer	1.5	0.0	1.5	44.2823	0.0583	2.0	0 K
7200 Summer	1.2	0.0	1.2	44.2723	0.0482	1.7	0 K
8640 Summer	1.1	0.0	1.1	44.2658	0.0417	1.4	0 K
10080 Summer	0.9	0.0	0.9	44.2608	0.0367	1.3	0 K
15 Winter	4.2	0.0	4.2	45.1113	0.8873	30.3	0 K
30 Winter	4.7	0.0	4.7	45.3288	1.1048	37.8	0 K
60 Winter	5.0	0.0	5.0	45.4818	1.2578	42.4	0 K
120 Winter	5.0	0.0	5.0	45.5078	1.2837	42.7	0 K
180 Winter	4.8	0.0	4.8	45.4183	1.1943	40.8	0 K
240 Winter	4.7	0.0	4.7	45.3418	1.1178	38.2	0 K
360 Winter	4.4	0.0	4.4	45.1918	0.9678	33.1	0 K
480 Winter	4.1	0.0	4.1	45.0588	0.8348	28.5	0 K
600 Winter	3.8	0.0	3.8	44.9393	0.7153	24.5	0 K
720 Winter	3.5	0.0	3.5	44.8303	0.6063	20.7	0 K
960 Winter	3.5	0.0	3.5	44.6177	0.3937	13.5	0 K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	128.29	18
30 Summer	84.23	32
60 Summer	52.66	60
120 Summer	31.80	90
180 Summer	23.35	124
240 Summer	18.64	158
360 Summer	13.54	228
480 Summer	10.79	296
600 Summer	9.04	362
720 Summer	7.82	426
960 Summer	6.22	556
1440 Summer	4.49	780
2160 Summer	3.24	1116
2880 Summer	2.57	1468
4320 Summer	1.85	2200
5760 Summer	1.46	2920
7200 Summer	1.22	3672
8640 Summer	1.05	4384
10080 Summer	0.92	5016
15 Winter	128.29	18
30 Winter	84.23	31
60 Winter	52.66	58
120 Winter	31.80	94
180 Winter	23.35	134
240 Winter	18.64	172
360 Winter	13.54	246
480 Winter	10.79	316
600 Winter	9.04	386
720 Winter	7.82	454
960 Winter	6.22	580

Summary of Results for 100 year Return Period (+30%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
1440 Winter	3.1	0.0	3.1	44.3868	0.1628	5.6	0 K
2160 Winter	2.4	0.0	2.4	44.3168	0.0928	3.2	0 K
2880 Winter	1.9	0.0	1.9	44.2978	0.0738	2.5	0 K
4320 Winter	1.4	0.0	1.4	44.2773	0.0532	1.8	0 K
5760 Winter	1.1	0.0	1.1	44.2663	0.0422	1.4	0 K
7200 Winter	0.9	0.0	0.9	44.2593	0.0352	1.2	0 K
8640 Winter	0.8	0.0	0.8	44.2543	0.0302	1.0	0 K
10080 Winter	0.7	0.0	0.7	44.2508	0.0267	0.9	0 K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
1440 Winter	4.49	766
2160 Winter	3.24	1100
2880 Winter	2.57	1468
4320 Winter	1.85	2180
5760 Winter	1.46	2904
7200 Winter	1.22	3584
8640 Winter	1.05	4376
10080 Winter	0.92	5136

Andrew Malcolm Associates Ltd		Page 3
15 Wild Rose Crescent Southampton SO31 6TG	Phase 2 St.Micaels Convent Waterlooville	
Date 20-05-13 File PHASE 2.src	Designed By ajm Checked By	
Micro Drainage	Source Control W.11.2	

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	100	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	20.000	Shortest Storm (mins)	15	Climate Change %	+30
Ratio-R	0.400	Longest Storm (mins)	10080		

Time / Area Diagram

Total Area (ha) = 0.124

Time (mins)		Area
from:	to:	(ha)
0	4	0.124

Cellular Storage Details

Infil Coef - Base (m/hr)	0.000000	Porosity	0.95
Infil Coef - Sides (m/hr)	0.000000	Invert Level (m)	44.224
Safety Factor	2.0	Ground Level (m)	46.240

Depth (m)	Area (m²)	Infil. Area (m²)	Depth (m)	Area (m²)	Infil. Area (m²)	Depth (m)	Area (m²)	Infil. Area (m²)	Depth (m)	Area (m²)	Infil. Area (m²)
0.00	36.0	36.0	0.70	36.0	71.7	1.40	0.0	97.2	2.10	0.0	97.2
0.10	36.0	41.1	0.80	36.0	76.8	1.50	0.0	97.2	2.20	0.0	97.2
0.20	36.0	46.2	0.90	36.0	81.9	1.60	0.0	97.2	2.30	0.0	97.2
0.30	36.0	51.3	1.00	36.0	87.0	1.70	0.0	97.2	2.40	0.0	97.2
0.40	36.0	56.4	1.10	36.0	92.1	1.80	0.0	97.2	2.50	0.0	97.2
0.50	36.0	61.5	1.20	36.0	97.2	1.90	0.0	97.2			
0.60	36.0	66.6	1.30	0.0	97.2	2.00	0.0	97.2			

Hydro-Brake Outflow Control

Design Head (m)	1.300	Hydro-Brake Type	MD6	Invert Level (m)	44.224
Design Flow (l/s)	5.0	Diameter (mm)	88		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.10	2.5	0.60	3.5	1.60	5.6	2.60	7.2	5.00	9.9	7.50	12.1
0.20	3.5	0.80	4.0	1.80	6.0	3.00	7.7	5.50	10.4	8.00	12.5
0.30	3.3	1.00	4.4	2.00	6.3	3.50	8.3	6.00	10.9	8.50	12.9
0.40	3.2	1.20	4.9	2.20	6.6	4.00	8.9	6.50	11.3	9.00	13.3
0.50	3.3	1.40	5.2	2.40	6.9	4.50	9.4	7.00	11.7	9.50	13.7

Global Variables

Region	FSR - England & Wales
Return Period (yrs)	100
M5-60 (mm)	20.000
Ratio R	0.400
Volumetric Runoff Coef	0.840
Profile Type	Winter
PIMP (%)	100
Areal Reduction Factor	1.000
Storm Duration (mins)	30
Hot Start (mins)	0
Hot Start Level (mm)	0
Manhole Headloss Coefficient	0.500
MADD Factor * 10m³/ha Storage	2.000
Foul Sewage/Hectare (l/s)	0.00
Additional Flow - % of Total Flow	30
Number of Input Hydrographs	0
Number of Time/Area Diagrams	21
Number of Bifurcations	0
Number of Overflows	0
Number of Off-Line Controls	0
Number of On-Line Controls	6

Starting Storm file name

\\HP2\USERS\PUBLIC\DOCUMENTS\PROJECTS\LINDEN\WATERLOOVILLE\WINDES\FINAL SCHEME\OUTFALL 1\STORM2.SWS

Time/Area Diagram at Pipe Number 2.000

Time	(mins)	Area
From:	To:	(ha)
0	4	0.120
Total Area (ha) 0.120		

Time/Area Diagram at Pipe Number 1.001

Time	(mins)	Area
From:	To:	(ha)
0	4	0.043
Total Area (ha) 0.043		

Time/Area Diagram at Pipe Number 3.000

Time	(mins)	Area
From:	To:	(ha)
0	4	0.103
Total Area (ha) 0.103		

Time/Area Diagram at Pipe Number 1.002

Time	(mins)	Area
From:	To:	(ha)
0	4	0.074

Time/Area Diagram at Pipe Number 1.002

Total Area (ha) 0.074

Time/Area Diagram at Pipe Number 4.000

Time (mins)	Area (ha)
From: To:	
0 4	0.045

Total Area (ha) 0.045

Time/Area Diagram at Pipe Number 1.003

Time (mins)	Area (ha)
From: To:	
0 4	0.022

Total Area (ha) 0.022

Time/Area Diagram at Pipe Number 5.000

Time (mins)	Area (ha)
From: To:	
0 4	0.076

Total Area (ha) 0.076

Time/Area Diagram at Pipe Number 1.005

Time (mins)	Area (ha)
From: To:	
0 4	0.024

Total Area (ha) 0.024

Time/Area Diagram at Pipe Number 6.000

Time (mins)	Area (ha)
From: To:	
0 4	0.029

Total Area (ha) 0.029

Time/Area Diagram at Pipe Number 6.001

Time (mins)	Area (ha)
From: To:	
0 4	0.018

Total Area (ha) 0.018

Time/Area Diagram at Pipe Number 7.000

Time (mins) Area
From: To: (ha)

0 4 0.046

Total Area (ha) 0.046

Time/Area Diagram at Pipe Number 6.002

Time (mins) Area
From: To: (ha)

0 4 0.050

Total Area (ha) 0.050

Time/Area Diagram at Pipe Number 8.000

Time (mins) Area
From: To: (ha)

0 4 0.025

Total Area (ha) 0.025

Time/Area Diagram at Pipe Number 6.004

Time (mins) Area
From: To: (ha)

0 4 0.013

Total Area (ha) 0.013

Time/Area Diagram at Pipe Number 6.005

Time (mins) Area
From: To: (ha)

0 4 0.028

Total Area (ha) 0.028

Time/Area Diagram at Pipe Number 6.006

Time (mins) Area
From: To: (ha)

0 4 0.042

Total Area (ha) 0.042

Time/Area Diagram at Pipe Number 1.006

Time (mins) Area
From: To: (ha)

0 4 0.023

Time/Area Diagram at Pipe Number 1.006

Total Area (ha) 0.023

Time/Area Diagram at Pipe Number 1.007

Time (mins)	Area (ha)
From: To:	
0 4	0.028

Total Area (ha) 0.028

Time/Area Diagram at Pipe Number 9.000

Time (mins)	Area (ha)
From: To:	
0 4	0.032

Total Area (ha) 0.032

Time/Area Diagram at Pipe Number 1.008

Time (mins)	Area (ha)
From: To:	
0 4	0.013

Total Area (ha) 0.013

Time/Area Diagram at Pipe Number 1.009

Time (mins)	Area (ha)
From: To:	
0 4	0.032

Total Area (ha) 0.032

Freely Discharging Outfalls

Outfall Pipe Number	Outfall MH/No	C.Level (m)	I.Level (m)	D, L (mm)	B (mm)
1.010	Headwall	31.350	30.500	1200	0



Micro Drainage®

Designed By ajm
Checked By

Simulation W.11.2

US/PN	Volume (m³)	Ctrl MH Name	Invert (m)	Type	Dia (m)	D.Head (m)	D.Flow (l/s)	Headloss (m)	Flow (l/s)
2.000	48.600	S10.1	44.286	Md4	0.077	1.200	5.0	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.2 1.4 1.6 1.8 2.0 2.2	2.3 3.1 2.7 2.9 3.3 3.6 3.9 4.1 4.4 4.6 5.1 5.5 5.8 6.2 6.5 6.9
1.003	0.341	S7	41.390	Md1	0.113	1.600	18.0	0.2 0.4 0.6 0.8 1.0 1.4 1.8 2.2 2.6	8.7 9.0 11.0 12.7 14.2 16.9 19.1 21.1 23.0
5.000	102.400	S7	41.390	Md1	0.113	1.600	18.0	0.2 0.4 0.6 0.8 1.0 1.4 1.8 2.2 2.6	8.7 9.0 11.0 12.7 14.2 16.9 19.1 21.1 23.0
6.005	14.578	S5.1	40.554	Md4	0.100	1.200	8.5	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.2 1.4 1.6 1.8 2.0 2.2	3.0 6.3 5.6 5.3 5.6 6.1 6.6 7.0 7.4 7.8 8.6 9.3 9.9 10.5 11.1 11.6
1.009	0.193	S1	32.000	Md6 SW Only	0.174	1.750	22.9	0.2 0.4 0.6 0.8 1.0 1.4 1.8 2.2 2.6 3.0 3.4 3.8	14.1 19.0 18.0 17.5 18.2 20.6 23.2 25.6 27.9 29.9 31.9 33.7
10.000	70.737	S1	32.000	Md6 SW Only	0.174	1.750	22.9	0.2 0.4 0.6 0.8	14.1 19.0 18.0 17.5

On-Line Controls (Hydro-Brake®)

US/PN	Volume (m³)	Ctrl MH Name	Invert (m)	Type	Dia (m)	D.Head (m)	D.Flow (l/s)	Headloss (m)	Flow (l/s)
								1.0	18.2
								1.4	20.6
								1.8	23.2
								2.2	25.6
								2.6	27.9
								3.0	29.9
								3.4	31.9
								3.8	33.7

Network Details

PN	Length (m)	Fall (m)	Slope (1:x)	Area (ha)	T.E. (mins)	Rain Pro	k (mm)	Hyd Sect	Dia (mm)
1.000	18.98	0.911	20.8	0.000	5.00	1	0.600	o	150
2.000	30.00	0.060	500.0	0.000	5.00	1	0.600	[]	-3
2.001	9.52	0.061	156.1	0.000	0.00	1	0.600	o	225
1.001	53.06	0.964	55.0	0.000	0.00	1	0.600	o	225
3.000	34.85	0.232	150.2	0.000	5.00	1	0.600	o	225
1.002	28.80	0.958	30.1	0.000	0.00	1	0.600	o	225
4.000	10.34	0.068	152.1	0.000	5.00	1	0.600	o	150
1.003	10.68	0.913	11.7	0.000	0.00	1	0.600	o	225
5.000	11.00	0.116	94.8	0.000	5.00	1	0.600	[]	-1
1.004	11.28	0.190	59.4	0.000	0.00	1	0.600	o	225
1.005	14.12	0.740	19.1	0.000	0.00	1	0.600	o	225
6.000	15.91	0.307	51.8	0.000	5.00	1	0.600	o	225
6.001	34.88	0.886	39.4	0.000	0.00	1	0.600	o	225
7.000	15.08	0.100	150.8	0.000	5.00	1	0.600	o	150
6.002	18.72	0.612	30.6	0.000	0.00	1	0.600	o	225
8.000	10.97	0.073	150.3	0.000	5.00	1	0.600	o	150
6.003	16.91	0.169	100.1	0.000	0.00	1	0.600	o	1200
6.004	32.03	0.320	100.1	0.000	0.00	1	0.600	o	1200

PN	USMH No.	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl No.	US/MH (mm)
1.000	S11	46.940	45.211	1.579	46.320	44.300	1.870		1200
2.000	S10.2	46.200	44.346	0.654	46.300	44.286	0.814		3000
2.001	S10.1	46.300	44.286	1.789	46.320	44.225	1.870	9	3000
1.001	S10	46.320	44.225	1.870	45.060	43.261	1.574		1200
3.000	S9.1	45.050	43.493	1.332	45.060	43.261	1.574		1050
1.002	S9	45.060	43.261	1.574	44.100	42.303	1.572		1200
4.000	S8.1	43.930	42.446	1.334	44.100	42.378	1.572		1050
1.003	S8	44.100	42.303	1.572	43.570	41.390	1.955		1200
5.000	S7.1	43.790	41.506	0.684	43.570	41.390	0.580		3000
1.004	S7	43.570	41.390	1.955	43.000	41.200	1.575	9	3000
1.005	S6	43.000	41.200	1.575	42.260	40.460	1.575		1200
6.000	S5.7	46.830	43.970	2.635	45.460	43.663	1.572		1200
6.001	S5.6	45.460	43.663	1.572	44.630	42.777	1.628		1200
7.000	S5.51	44.590	42.952	1.488	44.630	42.852	1.628		1050
6.002	S5.5	44.630	42.777	1.628	43.950	42.165	1.560		1200
8.000	S5.41	43.832	42.313	1.369	43.950	42.240	1.560		1050
6.003	S5.4	43.950	41.190	1.560	44.200	41.021	1.979		1800
6.004	S5.3	44.200	41.021	1.979	42.780	40.701	0.879		1800

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 30mins OUTFALL 1 S.Michaels Convent	
Date 13-11-12	Designed By ajm	
File 1in100+30% 30mins.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

Network Details

PN	Length (m)	Fall (m)	Slope (1:x)	Area (ha)	T.E. (mins)	Rain Pro	k (mm)	Hyd Sect	Dia (mm)
6.005	14.69	0.147	99.9	0.000	0.00	1	0.600	o	1200
6.006	14.07	0.094	149.7	0.000	0.00	1	0.600	o	225
1.006	24.58	3.305	7.4	0.000	0.00	1	0.600	o	225
1.007	24.58	3.305	7.4	0.000	0.00	1	0.600	o	225
9.000	20.67	0.751	27.5	0.000	5.00	1	0.600	o	225
1.008	40.19	0.850	47.3	0.000	0.00	1	0.600	o	225
1.009	6.06	1.000	6.1	0.000	0.00	1	0.600	o	225
10.000	64.00	0.006	10666.7	0.000	5.00	1	0.600	\	-2
1.010	28.16	1.500	18.8	0.000	0.00	1	0.600	o	225
PN	USMH No.	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl No.	US/MH (mm)
6.005	S5.2	42.780	40.701	0.879	42.630	40.554	0.876		1800
6.006	S5.1	42.630	40.554	1.851	42.260	40.460	1.575	9	1800
1.006	S5	42.260	40.460	1.575	39.380	37.155	2.000		1200
1.007	S4	39.380	37.155	2.000	35.650	33.850	1.575		1200
9.000	S3.1	36.400	34.601	1.574	35.650	33.850	1.575		1200
1.008	S3	35.650	33.850	1.575	35.000	33.000	1.775		1200
1.009	S2	35.000	33.000	1.775	34.000	32.000	1.775		1200
10.000	SWALE	33.750	33.006	-0.006	34.000	33.000	0.250		
1.010	S1	34.000	32.000	1.775	31.350	30.500	0.625	9	1200

The following hydraulic sections have been used in this network

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, 0 egg.

Section numbers < 0 are taken from the file AQUA 1.SEC

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m ²)
-1	[]	8000	1600			2.667	12.800
-2	\ /	1000	750	26		1.721	1.903
-3	[]	1500	1200			1.333	1.800

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15 Wild Rose Crescent Southampton SO31 6TG	lin100+30% 30mins OUTFALL 1 S.Michaels Convent	
Date 13-11-12 File lin100+30% 30mins.SIM	Designed By ajm Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100	Analysis Time Step	Fine
Storm Duration (mins)	30	DTS Status	ON
Profile Type	Winter	DVD Status	ON
Margin for Flood Risk warning (mm)	300	Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	45.211	-0.150	0.000	0.00	0.0	0.0	0 K
2.000	45.061	-0.485	0.000	0.02	0.0	48.5	0 K
2.001	45.061	0.550	0.000	0.12	0.0	4.1	SURCH'ED
1.001	44.316	-0.134	0.000	0.34	0.0	22.9	0 K
3.000	44.385	0.667	0.000	1.12	0.0	44.6	SURCH'ED
1.002	44.132	0.646	0.000	1.02	0.0	90.6	SURCH'ED
4.000	43.276	0.680	0.000	1.49	0.0	19.1	SURCH'ED
1.003	43.178	0.650	0.000	0.88	0.0	113.4	SURCH'ED
5.000	42.928	-0.178	0.000	0.00	0.0	23.6	0 K
1.004	42.928	1.313	0.000	0.31	0.0	17.6	SURCH'ED
1.005	41.274	-0.151	0.000	0.23	0.0	24.0	0 K
6.000	44.040	-0.155	0.000	0.21	0.0	13.5	0 K
6.001	43.744	-0.144	0.000	0.28	0.0	21.7	0 K
7.000	43.255	0.153	0.000	1.59	0.0	21.2	SURCH'ED
6.002	42.928	-0.074	0.000	0.78	0.0	65.9	0 K
8.000	42.424	-0.039	0.000	0.89	0.0	11.6	0 K
6.003	42.099	-0.291	0.000	0.04	0.0	73.8	0 K
6.004	42.098	-0.123	0.000	0.02	0.0	52.9	0 K
6.005	42.096	0.195	0.000	0.01	0.0	13.5	SURCH'ED
6.006	42.096	1.317	0.000	0.26	0.0	9.7	SURCH'ED
1.006	40.535	-0.150	0.000	0.24	0.0	42.0	0 K
1.007	37.241	-0.139	0.000	0.31	0.0	54.7	0 K
9.000	34.662	-0.164	0.000	0.16	0.0	14.9	0 K
1.008	34.517	0.442	0.000	1.00	0.0	72.2	SURCH'ED
1.009	33.681	0.456	0.000	0.60	0.0	84.1	SURCH'ED
10.000	33.535	-0.221	0.000	0.00	0.0	0.0	FLD RISK
1.010	33.535	1.310	0.000	0.19	0.0	21.5	SURCH'ED

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15 Wild Rose Crescent Southampton SO31 6TG	lin100+30% 60mins OUTFALL 1 S.Michaels Convent	
Date 13-11-12 File lin100+30% 60mins.SIM	Designed By ajm Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100	Analysis Time Step	Fine
Storm Duration (mins)	60	DTS Status	ON
Profile Type	Winter	DVD Status	ON
Margin for Flood Risk warning (mm)	300	Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	45.211	-0.150	0.000	0.00	0.0	0.0	0 K
2.000	45.150	-0.396	0.000	0.02	0.0	31.9	0 K
2.001	45.149	0.638	0.000	0.13	0.0	4.3	SURCH'ED
1.001	44.300	-0.150	0.000	0.24	0.0	16.1	0 K
3.000	43.644	-0.074	0.000	0.78	0.0	31.0	0 K
1.002	43.439	-0.047	0.000	0.78	0.0	69.2	0 K
4.000	43.171	0.575	0.000	0.97	0.0	12.5	SURCH'ED
1.003	43.164	0.636	0.000	0.66	0.0	84.7	SURCH'ED
5.000	43.139	0.033	0.000	0.00	0.0	14.7	SURCH'ED
1.004	43.139	1.524	0.000	0.33	0.0	18.8	SURCH'ED
1.005	41.270	-0.155	0.000	0.21	0.0	22.0	0 K
6.000	44.025	-0.170	0.000	0.14	0.0	8.8	0 K
6.001	43.728	-0.160	0.000	0.18	0.0	14.2	0 K
7.000	43.105	0.003	0.000	1.04	0.0	13.8	SURCH'ED
6.002	42.891	-0.111	0.000	0.51	0.0	43.0	0 K
8.000	42.540	0.077	0.000	0.58	0.0	7.6	SURCH'ED
6.003	42.536	0.146	0.000	0.02	0.0	48.0	SURCH'ED
6.004	42.536	0.315	0.000	0.02	0.0	34.3	SURCH'ED
6.005	42.536	0.635	0.000	0.01	0.0	9.9	FLD RISK
6.006	42.536	1.757	0.000	0.30	0.0	11.0	FLD RISK
1.006	40.530	-0.155	0.000	0.21	0.0	36.6	0 K
1.007	37.232	-0.148	0.000	0.25	0.0	44.7	0 K
9.000	34.650	-0.176	0.000	0.11	0.0	9.7	0 K
1.008	34.114	0.039	0.000	0.79	0.0	57.0	SURCH'ED
1.009	33.683	0.458	0.000	0.46	0.0	65.3	SURCH'ED
10.000	33.662	-0.094	0.000	0.00	0.0	0.0	FLD RISK
1.010	33.662	1.437	0.000	0.20	0.0	22.3	SURCH'ED

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15 Wild Rose Crescent Southampton SO31 6TG	lin100+30% 120mins OUTFALL 1 S.Michaels Convent	
Date 13-11-12 File lin100+30% 120mins.SIM	Designed By ajm Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100	Analysis Time Step	Fine
Storm Duration (mins)	120	DTS Status	ON
Profile Type	Winter	DVD Status	ON
Margin for Flood Risk warning (mm)	300	Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	45.211	-0.150	0.000	0.00	0.0	0.0	0 K
2.000	45.157	-0.389	0.000	0.01	0.0	19.6	0 K
2.001	45.157	0.646	0.000	0.13	0.0	4.3	SURCH'ED
1.001	44.287	-0.163	0.000	0.17	0.0	11.3	0 K
3.000	43.602	-0.116	0.000	0.48	0.0	19.0	0 K
1.002	43.373	-0.113	0.000	0.49	0.0	43.9	0 K
4.000	43.196	0.600	0.000	0.62	0.0	7.9	SURCH'ED
1.003	43.188	0.660	0.000	0.42	0.0	54.0	SURCH'ED
5.000	43.163	0.057	0.000	0.00	0.0	9.2	SURCH'ED
1.004	43.164	1.549	0.000	0.33	0.0	19.0	SURCH'ED
1.005	41.268	-0.157	0.000	0.20	0.0	20.5	0 K
6.000	44.013	-0.182	0.000	0.08	0.0	5.3	0 K
6.001	43.713	-0.175	0.000	0.11	0.0	8.6	0 K
7.000	43.039	-0.063	0.000	0.64	0.0	8.5	0 K
6.002	42.863	-0.139	0.000	0.31	0.0	26.3	0 K
8.000	42.555	0.092	0.000	0.35	0.0	4.6	SURCH'ED
6.003	42.546	0.156	0.000	0.02	0.0	29.6	SURCH'ED
6.004	42.546	0.325	0.000	0.01	0.0	21.9	SURCH'ED
6.005	42.545	0.644	0.000	0.01	0.0	15.4	FLD RISK
6.006	42.544	1.765	0.000	0.30	0.0	11.0	FLD RISK
1.006	40.526	-0.159	0.000	0.19	0.0	32.8	0 K
1.007	37.225	-0.155	0.000	0.21	0.0	37.2	0 K
9.000	34.638	-0.188	0.000	0.07	0.0	5.9	0 K
1.008	33.980	-0.095	0.000	0.62	0.0	44.8	0 K
1.009	33.760	0.535	0.000	0.35	0.0	49.9	SURCH'ED
10.000	33.740	-0.016	0.000	0.00	0.0	0.0	FLD RISK
1.010	33.740	1.515	0.000	0.20	0.0	22.8	FLD RISK

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15 Wild Rose Crescent Southampton SO31 6TG	lin100+30% 180mins OUTFALL 1 S.Michaels Convent	
Date 13-11-12	Designed By ajm	
File lin100+30% 180mins.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100	Analysis Time Step	Fine
Storm Duration (mins)	180	DTS Status	ON
Profile Type	Winter	DVD Status	ON
Margin for Flood Risk warning (mm)	300	Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	45.211	-0.150	0.000	0.00	0.0	0.0	0 K
2.000	45.126	-0.420	0.000	0.01	0.0	14.7	0 K
2.001	45.125	0.614	0.000	0.12	0.0	4.2	SURCH'ED
1.001	44.280	-0.170	0.000	0.14	0.0	9.2	0 K
3.000	43.585	-0.133	0.000	0.35	0.0	14.1	0 K
1.002	43.357	-0.129	0.000	0.38	0.0	33.4	0 K
4.000	43.112	0.516	0.000	0.47	0.0	6.1	SURCH'ED
1.003	43.105	0.577	0.000	0.32	0.0	40.8	SURCH'ED
5.000	43.083	-0.023	0.000	0.00	0.0	7.1	0 K
1.004	43.082	1.467	0.000	0.32	0.0	18.5	SURCH'ED
1.005	41.266	-0.159	0.000	0.19	0.0	19.7	0 K
6.000	44.006	-0.189	0.000	0.06	0.0	4.0	0 K
6.001	43.706	-0.182	0.000	0.08	0.0	6.4	0 K
7.000	43.025	-0.077	0.000	0.47	0.0	6.3	0 K
6.002	42.850	-0.152	0.000	0.23	0.0	19.6	0 K
8.000	42.365	-0.098	0.000	0.26	0.0	3.4	0 K
6.003	42.246	-0.144	0.000	0.01	0.0	22.1	0 K
6.004	42.241	0.020	0.000	0.01	0.0	17.0	SURCH'ED
6.005	42.237	0.336	0.000	0.01	0.0	11.2	SURCH'ED
6.006	42.237	1.458	0.000	0.27	0.0	10.1	SURCH'ED
1.006	40.523	-0.162	0.000	0.18	0.0	31.1	0 K
1.007	37.222	-0.158	0.000	0.19	0.0	33.9	0 K
9.000	34.633	-0.193	0.000	0.05	0.0	4.4	0 K
1.008	33.969	-0.106	0.000	0.55	0.0	39.3	0 K
1.009	33.774	0.549	0.000	0.30	0.0	43.0	SURCH'ED
10.000	33.749	-0.007	0.000	0.00	0.0	1.7	FLD RISK
1.010	33.751	1.526	0.000	0.20	0.0	22.9	FLD RISK

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15 Wild Rose Crescent Southampton SO31 6TG	lin100+30% 240mins OUTFALL 1 S.Michaels Convent	
Date 13-11-12	Designed By ajm	
File lin100+30% 240mins.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100	Analysis Time Step	Fine
Storm Duration (mins)	240	DTS Status	ON
Profile Type	Winter	DVD Status	ON
Margin for Flood Risk warning (mm)	300	Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	45.211	-0.150	0.000	0.00	0.0	0.0	0 K
2.000	45.081	-0.465	0.000	0.01	0.0	11.9	0 K
2.001	45.080	0.569	0.000	0.12	0.0	4.1	SURCH'ED
1.001	44.276	-0.174	0.000	0.12	0.0	8.0	0 K
3.000	43.574	-0.144	0.000	0.28	0.0	11.3	0 K
1.002	43.346	-0.140	0.000	0.31	0.0	27.4	0 K
4.000	42.999	0.403	0.000	0.38	0.0	4.9	SURCH'ED
1.003	42.992	0.464	0.000	0.26	0.0	33.5	SURCH'ED
5.000	42.970	-0.136	0.000	0.00	0.0	5.9	0 K
1.004	42.970	1.355	0.000	0.31	0.0	17.9	SURCH'ED
1.005	41.265	-0.160	0.000	0.18	0.0	19.1	0 K
6.000	44.002	-0.193	0.000	0.05	0.0	3.2	0 K
6.001	43.700	-0.188	0.000	0.07	0.0	5.1	0 K
7.000	43.016	-0.086	0.000	0.38	0.0	5.0	0 K
6.002	42.842	-0.160	0.000	0.18	0.0	15.6	0 K
8.000	42.359	-0.104	0.000	0.21	0.0	2.7	0 K
6.003	42.044	-0.346	0.000	0.01	0.0	17.7	0 K
6.004	42.042	-0.179	0.000	0.01	0.0	14.2	0 K
6.005	42.007	0.106	0.000	0.01	0.0	15.2	SURCH'ED
6.006	42.034	1.255	0.000	0.25	0.0	9.3	SURCH'ED
1.006	40.522	-0.163	0.000	0.17	0.0	29.7	0 K
1.007	37.219	-0.161	0.000	0.18	0.0	31.9	0 K
9.000	34.629	-0.197	0.000	0.04	0.0	3.5	0 K
1.008	33.963	-0.112	0.000	0.50	0.0	36.0	0 K
1.009	33.772	0.547	0.000	0.28	0.0	39.0	SURCH'ED
10.000	33.748	-0.008	0.000	0.00	0.0	1.2	FLD RISK
1.010	33.749	1.524	0.000	0.20	0.0	22.9	FLD RISK

Summary of Results

Return Period (years)	100	Analysis Time Step	Fine
Storm Duration (mins)	360	DTS Status	ON
Profile Type	Winter	DVD Status	ON
Margin for Flood Risk warning (mm)	300	Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	45.211	-0.150	0.000	0.00	0.0	0.0	0 K
2.000	44.994	-0.552	0.000	0.00	0.0	8.7	0 K
2.001	44.993	0.482	0.000	0.11	0.0	3.9	SURCH'ED
1.001	44.272	-0.178	0.000	0.10	0.0	6.6	0 K
3.000	43.562	-0.156	0.000	0.21	0.0	8.2	0 K
1.002	43.334	-0.152	0.000	0.23	0.0	20.6	0 K
4.000	42.820	0.224	0.000	0.28	0.0	3.6	SURCH'ED
1.003	42.813	0.285	0.000	0.20	0.0	25.8	SURCH'ED
5.000	42.792	-0.314	0.000	0.00	0.0	4.5	0 K
1.004	42.792	1.177	0.000	0.29	0.0	16.9	SURCH'ED
1.005	41.262	-0.163	0.000	0.17	0.0	17.8	0 K
6.000	43.997	-0.198	0.000	0.04	0.0	2.3	0 K
6.001	43.694	-0.194	0.000	0.05	0.0	3.7	0 K
7.000	43.005	-0.097	0.000	0.27	0.0	3.7	0 K
6.002	42.831	-0.171	0.000	0.13	0.0	11.4	0 K
8.000	42.352	-0.111	0.000	0.15	0.0	2.0	0 K
6.003	41.821	-0.569	0.000	0.01	0.0	12.9	0 K
6.004	41.820	-0.401	0.000	0.00	0.0	11.0	0 K
6.005	41.820	-0.081	0.000	0.00	0.0	7.4	0 K
6.006	41.817	1.038	0.000	0.24	0.0	8.8	SURCH'ED
1.006	40.519	-0.166	0.000	0.16	0.0	27.6	0 K
1.007	37.216	-0.164	0.000	0.16	0.0	29.1	0 K
9.000	34.626	-0.200	0.000	0.03	0.0	2.5	0 K
1.008	33.955	-0.120	0.000	0.44	0.0	32.0	0 K
1.009	33.744	0.519	0.000	0.24	0.0	34.0	SURCH'ED
10.000	33.723	-0.033	0.000	0.00	0.0	0.3	FLD RISK
1.010	33.723	1.498	0.000	0.20	0.0	22.7	FLD RISK

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 480mins OUTFALL 1 S.Michaels Convent	
Date 13-11-12	Designed By ajm	
File 1in100+30% 480mins.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100	Analysis Time Step	Fine
Storm Duration (mins)	480	DTS Status	ON
Profile Type	Winter	DVD Status	ON
Margin for Flood Risk warning (mm)	300	Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	45.211	-0.150	0.000	0.00	0.0	0.0	0 K
2.000	44.916	-0.630	0.000	0.00	0.0	7.0	0 K
2.001	44.915	0.404	0.000	0.11	0.0	3.7	SURCH'ED
1.001	44.270	-0.180	0.000	0.09	0.0	5.8	0 K
3.000	43.554	-0.164	0.000	0.16	0.0	6.5	0 K
1.002	43.327	-0.159	0.000	0.19	0.0	17.0	0 K
4.000	42.665	0.069	0.000	0.22	0.0	2.9	SURCH'ED
1.003	42.659	0.131	0.000	0.16	0.0	21.2	SURCH'ED
5.000	42.639	-0.467	0.000	0.00	0.0	3.7	0 K
1.004	42.639	1.024	0.000	0.28	0.0	15.9	SURCH'ED
1.005	41.260	-0.165	0.000	0.16	0.0	16.7	0 K
6.000	43.995	-0.200	0.000	0.03	0.0	1.8	0 K
6.001	43.691	-0.197	0.000	0.04	0.0	3.0	0 K
7.000	42.999	-0.103	0.000	0.22	0.0	2.9	0 K
6.002	42.826	-0.176	0.000	0.11	0.0	9.1	0 K
8.000	42.348	-0.115	0.000	0.12	0.0	1.6	0 K
6.003	41.679	-0.711	0.000	0.01	0.0	10.3	0 K
6.004	41.678	-0.543	0.000	0.00	0.0	9.2	0 K
6.005	41.678	-0.223	0.000	0.00	0.0	6.9	0 K
6.006	41.677	0.898	0.000	0.22	0.0	8.3	SURCH'ED
1.006	40.517	-0.168	0.000	0.15	0.0	25.9	0 K
1.007	37.214	-0.166	0.000	0.15	0.0	27.2	0 K
9.000	34.624	-0.202	0.000	0.02	0.0	2.0	0 K
1.008	33.950	-0.125	0.000	0.41	0.0	29.4	0 K
1.009	33.685	0.460	0.000	0.22	0.0	31.0	SURCH'ED
10.000	33.665	-0.091	0.000	0.00	0.0	0.3	FLD RISK
1.010	33.665	1.440	0.000	0.20	0.0	22.3	SURCH'ED

Global Variables

Region	FSR - England & Wales
Return Period (yrs)	100
M5-60 (mm)	20.000
Ratio R	0.400
Volumetric Runoff Coef	0.840
Profile Type	Winter
PIMP (%)	100
Areal Reduction Factor	1.000
Storm Duration (mins)	30
Hot Start (mins)	0
Hot Start Level (mm)	0
Manhole Headloss Coefficient	0.500
MADD Factor * 10m³/ha Storage	2.000
Foul Sewage/Hectare (l/s)	0.00
Additional Flow - % of Total Flow	30
Number of Input Hydrographs	0
Number of Time/Area Diagrams	5
Number of Bifurcations	0
Number of Overflows	0
Number of Off-Line Controls	0
Number of On-Line Controls	1

Starting Storm file name

\\HP2\Users\Public\Documents\PROJECTS\LINDEN\WATERLOOVILLE\WINDES\FINAL SCHEME\OUTFALL 2\STORM.SWS

Time/Area Diagram at Pipe Number 1.000

Time (mins)	Area (ha)
From: To:	
0 4	0.040
Total Area (ha) 0.040	

Time/Area Diagram at Pipe Number 1.001

Time (mins)	Area (ha)
From: To:	
0 4	0.040
Total Area (ha) 0.040	

Time/Area Diagram at Pipe Number 1.002

Time (mins)	Area (ha)
From: To:	
0 4	0.045
Total Area (ha) 0.045	

Time/Area Diagram at Pipe Number 1.003

Time (mins)	Area (ha)
From: To:	
0 4	0.016

Time/Area Diagram at Pipe Number 1.003

 Total Area (ha) 0.016

Time/Area Diagram at Pipe Number 1.004

Time	(mins)	Area
From:	To:	(ha)
0	4	0.046

 Total Area (ha) 0.046

Freely Discharging Outfalls

Outfall Pipe Number	Outfall MH/No	C.Level (m)	I.Level (m)	D,L (mm)	B (mm)
1.006	Headwall	41.130	39.500	1200	0

On-Line Controls (Hydro-Brake®)

US/PN	Volume (m³)	Ctrl MH Name	Invert (m)	Type	Dia (m)	D.Head (m)	D.Flow (l/s)	Headloss (m)	Flow (l/s)
1.004	54.400	SW2	39.800	Md6 SW Only	0.088	1.300	5.0	0.1	2.5
								0.2	3.5
								0.3	3.3
								0.4	3.2
								0.5	3.3
								0.6	3.5
								0.7	3.7
								0.8	4.0
								0.9	4.2
								1.0	4.4
								1.2	4.9
								1.4	5.2
								1.6	5.6
								1.8	6.0

Network Details

PN	Length (m)	Fall (m)	Slope (1:x)	Area (ha)	T.E. (mins)	Rain Pro	k (mm)	Hyd Sect	Dia (mm)
1.000	34.58	0.231	149.7	0.000	5.00	1	0.600	o	225
1.001	19.31	0.129	149.7	0.000	0.00	1	0.600	o	225
1.002	16.77	0.112	149.7	0.000	0.00	1	0.600	o	225
1.003	6.91	0.608	11.4	0.000	0.00	1	0.600	o	225
1.004	20.00	0.220	90.9	0.000	0.00	1	0.600	[]	-1
1.005	8.52	0.057	149.5	0.000	0.00	1	0.600	o	150
1.006	1.00	0.093	10.8	0.000	0.00	1	0.600	o	300

PN	USMH No.	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl No.	US/MH (mm)
1.000	SW7	42.719	41.100	1.394	43.259	40.869	2.165		1050
1.001	SW6	43.259	40.869	2.165	43.018	40.740	2.053		1200
1.002	SW5	43.018	40.740	2.053	43.313	40.628	2.460		1200
1.003	SW4	43.313	40.628	2.460	42.946	40.020	2.701		1200
1.004	SW3	42.946	40.020	2.126	41.367	39.800	0.767		3000
1.005	SW2	41.367	39.800	1.417	41.300	39.743	1.407	9	3000
1.006	SW1	41.300	39.593	1.407	41.130	39.500	1.330		1050

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 30min OUTFALL 2 St.Michaels Convent	
Date 18-07-12	Designed By AJM	
File 1in100yr+30% 30min.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

The following hydraulic sections have been used in this network

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, 0 egg.

Section numbers < 0 are taken from the file AQUA 2.SEC

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m ²)
-1	[]	4000	800			1.333	3.200

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 30min OUTFALL 2 St.Michaels Convent	
Date 18-07-12 File 1in100yr+30% 30min.SIM	Designed By AJM Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100
Storm Duration (mins)	30
Profile Type	Winter
Margin for Flood Risk warning (mm)	300
Analysis Time Step	2.5 second increment (extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	41.236	-0.089	0.000	0.46	0.0	18.2	0 K
1.001	41.188	0.094	0.000	0.92	0.0	35.1	SURCH'ED
1.002	41.079	0.114	0.000	1.44	0.0	54.2	SURCH'ED
1.003	40.749	-0.104	0.000	0.56	0.0	61.0	0 K
1.004	40.647	-0.173	0.000	0.01	0.0	73.2	0 K
1.005	40.647	0.697	0.000	0.32	0.0	4.1	SURCH'ED
1.006	39.637	-0.256	0.000	0.05	0.0	4.1	0 K

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 60min OUTFALL 2 St.Michaels Convent	
Date 18-07-12 File 1in100yr+30% 60min.SIM	Designed By AJM Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100
Storm Duration (mins)	60
Profile Type	Winter
Margin for Flood Risk warning (mm)	300
Analysis Time Step	2.5 second increment (extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	41.185	-0.140	0.000	0.30	0.0	12.1	0 K
1.001	40.999	-0.095	0.000	0.63	0.0	24.2	0 K
1.002	40.922	-0.043	0.000	1.00	0.0	37.7	0 K
1.003	40.904	0.051	0.000	0.39	0.0	42.5	SURCH'ED
1.004	40.901	0.081	0.000	0.01	0.0	51.3	SURCH'ED
1.005	40.901	0.951	0.000	0.37	0.0	4.6	SURCH'ED
1.006	39.641	-0.252	0.000	0.06	0.0	4.6	0 K

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 120min OUTFALL 2 St.Michaels Convent	
Date 18-07-12	Designed By AJM	
File 1in100yr+30% 120min.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100
Storm Duration (mins)	120
Profile Type	Winter
Margin for Flood Risk warning (mm)	300
Analysis Time Step	2.5 second increment (extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	41.165	-0.160	0.000	0.19	0.0	7.5	0 K
1.001	41.089	-0.005	0.000	0.39	0.0	14.9	0 K
1.002	41.084	0.119	0.000	0.62	0.0	23.3	SURCH'ED
1.003	41.078	0.225	0.000	0.24	0.0	26.2	SURCH'ED
1.004	41.074	0.254	0.000	0.01	0.0	31.8	SURCH'ED
1.005	41.074	1.124	0.000	0.39	0.0	5.0	FLD RISK
1.006	39.643	-0.250	0.000	0.07	0.0	5.0	0 K

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 180min OUTFALL 2 St.Michaels Convent	
Date 18-07-12	Designed By AJM	
File 1in100yr+30% 180min.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100
Storm Duration (mins)	180
Profile Type	Winter
Margin for Flood Risk warning (mm)	300
Analysis Time Step	2.5 second increment (extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	41.155	-0.170	0.000	0.14	0.0	5.5	0 K
1.001	41.029	-0.065	0.000	0.29	0.0	11.0	0 K
1.002	41.025	0.060	0.000	0.46	0.0	17.2	SURCH'ED
1.003	41.019	0.166	0.000	0.18	0.0	19.4	SURCH'ED
1.004	41.015	0.195	0.000	0.00	0.0	23.6	SURCH'ED
1.005	41.015	1.065	0.000	0.39	0.0	4.9	SURCH'ED
1.006	39.642	-0.251	0.000	0.06	0.0	4.9	0 K

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 240min OUTFALL 2 St.Michaels Convent	
Date 18-07-12	Designed By AJM	
File 1in100yr+30% 240min.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100
Storm Duration (mins)	240
Profile Type	Winter
Margin for Flood Risk warning (mm)	300
Analysis Time Step	2.5 second increment (extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	41.149	-0.176	0.000	0.11	0.0	4.4	0 K
1.001	40.942	-0.152	0.000	0.23	0.0	8.8	0 K
1.002	40.938	-0.027	0.000	0.36	0.0	13.7	0 K
1.003	40.932	0.079	0.000	0.14	0.0	15.5	SURCH'ED
1.004	40.928	0.108	0.000	0.00	0.0	18.9	SURCH'ED
1.005	40.928	0.978	0.000	0.37	0.0	4.7	SURCH'ED
1.006	39.641	-0.252	0.000	0.06	0.0	4.7	0 K

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15 Wild Rose Crescent Southampton SO31 6TG	1in100+30% 360min OUTFALL 2 St.Michaels Convent	
Date 18-07-12	Designed By AJM	
File 1in100yr+30% 360min.SIM	Checked By	
Micro Drainage	Simulation W.11.2	

Summary of Results

Return Period (years)	100
Storm Duration (mins)	360
Profile Type	Winter
Margin for Flood Risk warning (mm)	300
Analysis Time Step	2.5 second increment (extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m³)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	41.142	-0.183	0.000	0.08	0.0	3.2	0 K
1.001	40.930	-0.164	0.000	0.17	0.0	6.4	0 K
1.002	40.818	-0.147	0.000	0.26	0.0	10.0	0 K
1.003	40.751	-0.102	0.000	0.10	0.0	11.3	0 K
1.004	40.748	-0.072	0.000	0.00	0.0	13.9	0 K
1.005	40.747	0.797	0.000	0.34	0.0	4.3	SURCH'ED
1.006	39.639	-0.254	0.000	0.06	0.0	4.3	0 K