

24 Beacon Square

Drainage Strategy Report

Ref: G24150 - 001

Date: June 2019



THOMASONS

Contents

1. Introduction.....	2
2. Site Details	2
3. Surface Water and Foul Drainage Strategies.....	3
4. Summary	5

Appendices

Appendix A – Site Location Plan
Appendix B – Development Layout & Elevations
Appendix C – Environment Agency Flood Map for Planning
Appendix D – Southern Water Asset Map
Appendix E – Layout of the Proposed Drainage Strategy
Appendix F – MicroDrainage Calculations
Appendix G – MicroDrainage Exceedance Event Calculations

Revision	Date	Written by	Checked by
-	22 nd May 2019	PA	MR

1. Introduction

1.1 This drainage strategy report has been produced by Thomasons on behalf of Mr & Mrs Nicholls (hereafter referred to as 'the client'). It supports the planning application for the proposed new property at 24 Beacon Square, Emsworth, Hampshire.

1.2 The report follows the guidance set out in:

- National Planning Policy Framework (NPPF) 2018
- Technical Guidance to the National Planning Policy Framework
- CIRIA SuDS Manual 2015 (C753)
- Defra's Non-Statutory Technical Standards for Sustainable Drainage Systems
- Sewers for Adoption 7th Edition
- Building Regulations 2010: Approved Documents H – Drainage and Waste Disposal
- BS EN 752:2017 - Drain and Sewer Systems Outside Buildings - Sewer System Management.

2. Site Details

Site Setting

2.1 Beacon Square is in Emsworth, a village in Hampshire that straddles the A259 between Chichester and Havant. Beacon Square is a secluded residential street in the south of the village and number 24 fronts onto the tidal estuary between Thorney Island and Hayling Island.

2.2 See Appendix A for location maps of the site.

The Proposed Development

2.3 The existing property at 24 Beacon Square is to be demolished. A new, four-bedroom residential property is to be constructed in its place.

2.4 See Appendix B for layouts and elevations of the proposed development.

Topography

2.5 A detailed topographic survey of the site is not available at the time of writing this report.

2.6 The topographic information that is available shows that the site of the property is at approximately 3.9 maOD. This level falls away in the rear garden towards the property boundary and the tidal defences that front onto the estuary.

Geology and Groundwater

2.7 British Geological Survey (BGS) mapping indicates the solid geology underlying the site is of nodular chalk formation. The superficial deposits are undifferentiated river terrace deposits, which are made up of sand, silt and clay.

2.8 During ground investigation works groundwater was encountered below depths of 5.00 to 6.00 metres below ground level and then recorded to rise to levels of approximately 2.50 metres below ground level after a 20 minute monitoring period.

Surface Water Features

2.9 There are no surface water features on the site. As mentioned above, the property faces the tidal estuary between Hayling Island and Thorney Island, which leads out to the East Solent and the English Channel.

Source Protection Zone

- 2.10 Defra's Magic Map¹ shows that the site is outside of any groundwater Source Protection Zones (SPZ's).

Infiltration Testing

- 2.11 The infiltration potential of the soils through a BRE365 soakage test has not been carried out. Infiltration as a form of surface water disposal has been discounted due to high groundwater levels and the proximity to the tidal estuary.

Flood Risk Zone

- 2.12 Appendix C contains the Environment Agency's Flood Map for Planning in the vicinity of 24 Beacon Square. It indicates that the site is within Flood Zone 1. Therefore, the risk of flooding from rivers or the sea can be considered to be very low.

3. Surface Water and Foul Drainage Strategies

Existing Surface Water Discharge

- 3.1 The existing property at 24 Beacon Square drains to a surface water sewer, which discharges to the estuary. There is an access point to the sewer in the rear garden of the property.

Existing Foul Water Discharge

- 3.2 The sewage service provider for foul water in the area is Southern Water (Portsmouth Water supply drinking water). There is existing foul sewerage infrastructure on site, belonging to Southern Water, which the existing property connects to. See Appendix D for a map of Southern Water's sewers.

Proposed Surface Water Drainage Strategy

- 3.3 The NPPF states that the opportunities to reduce overall flood risk should be sought. This can be achieved, for instance, through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems (SuDS). SuDS are designed to control surface water runoff close to where it falls and mimic natural drainage as closely as possible. They provide opportunities to:

- reduce the causes and impacts of flooding;
- remove pollutants from urban run-off at source;
- combine water management with green space with benefits for amenity, recreation and ecology.

- 3.4 In order to deliver SuDS benefits and ensure that a development reduces overall flood risk, there is an established hierarchy of surface water drainage methods that should be considered. The most preferable and sustainable are at the top and the least preferable and least sustainable at the bottom. This hierarchy is as follows:

1. Into the ground (infiltration);
2. To a surface water body;
3. To a surface water sewer, highway drain, or another drainage system;
4. To a combined sewer.

- 3.5 Generally, the aim should be to discharge surface water runoff as high up the hierarchy of drainage options as reasonably practicable. Local Planning Authorities (LPA's), Lead Local Flood Authorities

¹ <http://magic.defra.gov.uk/MagicMap.aspx>

(LLFA's) and Water Authorities may enforce the surface water drainage hierarchy and demand that the highest practicable tier of the hierarchy is used.

- 3.6 The first tier of the drainage hierarchy (infiltration) ensures that surface water is discharged within the site boundary and does not increase flood risk to others. This is always the most preferable method of surface water management. The next three tiers of the hierarchy provide regional control, but with decreasing levels of pollution removal and reduced potential for amenity and habitat creation.
- 3.7 As mentioned in paragraph 2.11 infiltration as a means of surface water discharge has been discounted due to due to high groundwater levels and the proximity to the tidal estuary.
- 3.8 In accordance with the second tier of the drainage hierarchy it is proposed to discharge surface water to a surface water body. It is proposed to discharge surface water from the development to the existing surface water sewer that crosses the site, which in turn discharges into the estuary. See Appendix E for a plan of the proposed surface water strategy.
- 3.9 Paragraph S1 of Defra's Non-Statutory Technical Standards for Sustainable Drainage Systems states that where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary), peak flow control standards and volume control technical standards do not apply. Therefore, there is no requirement to attenuate surface water from the development and discharge it a controlled rate.
- 3.10 The proposed surface water strategy has been designed in MicroDrainage. The surface water drainage strategy has been tested in the 1 in 100-year plus 40% for climate change rainfall event without flooding. See Appendix F for the MicroDrainage results

Proposed Foul Water Drainage Strategy

- 3.11 The proposed foul water drainage strategy is to connect back into Southern Water's foul sewer network, as seen in Appendix D. This is subject to gaining an agreement to do so with Southern Water via a Section 106 agreement.
- 3.12 The layout of the proposed foul water strategy can be seen in Appendix E.

Surface Water Runoff Quality

- 3.13 The NPPF (Section 110) states that the development should not have a detrimental impact on the environment, including the water environment. The technical guidance to the NPPF provides further advice on the benefits of ensuring runoff quality is to an appropriate standard.
- 3.14 The CIRIA SuDS Manual (C753) provides guidance on the treatment of surface water runoff. Table 4.3 rates the pollution hazard from roof water runoff as 'very low'. The CIRIA SuDS Manual states that the only requirement for roof water runoff is the removal of gross solids and sediments.
- 3.15 The proposed surface water strategy includes a catchpit prior to it joining the existing surface water sewer. Catchpits allow for the collection of gross solids but also collect variable amounts of finer sediments. As such, catchpits are a mechanism through which particulate material can be trapped prior to entering a surface water system and the receiving environment.
- 3.16 The surface water strategy satisfies the requirements of the CIRIA SuDS Manual and no further pollution mitigation measures are required.

Exceedance Events

- 3.17 Exceedance events are those in excess of the design rainfall event (i.e. greater than the 1 in 100-year return period rainfall event + 40% climate change).
- 3.18 The surface water system has been designed to accommodate flows from the design rainfall event. If a rainfall greater than the design event occurs, then needs to be surety that the system will not surcharge and cause flooding to the property or neighbours.
- 3.19 The proposed surface water strategy has been tested for a 1 in 1000 year storm plus an additional 40% for climate change. In this scenario the surface water strategy does not flood, as is shown in the MicroDrainage results in Appendix G.
- 3.20 Therefore, the surface water strategy can be deemed able to cope with exceedance events.

Flood Risk Mitigation Measures

- 3.21 In acknowledgement of the proposed property's proximity to a tidal flood risk area, the property's finished floor levels will have 450mm of freeboard (above ground levels) to account for any possible wind/wave action.

Residual Risks

- 3.22 Whilst the on-site drainage will be constructed to current standards and in line with Sewers For Adoption, there always remains a small residual risk of flooding due to blockage or failure of on-site private drains. It is assumed that appropriate and regular maintenance to the drainage infrastructure will be undertaken. Operational and maintenance schedules will be determined during detailed design stage.
- 3.23 There are also further residual risks related to the maintenance of off-site drainage assets by third parties. It is the responsibility of the Council and the sewerage service provider to maintain their respective infrastructure to reduce the risk of flooding to or from the site.

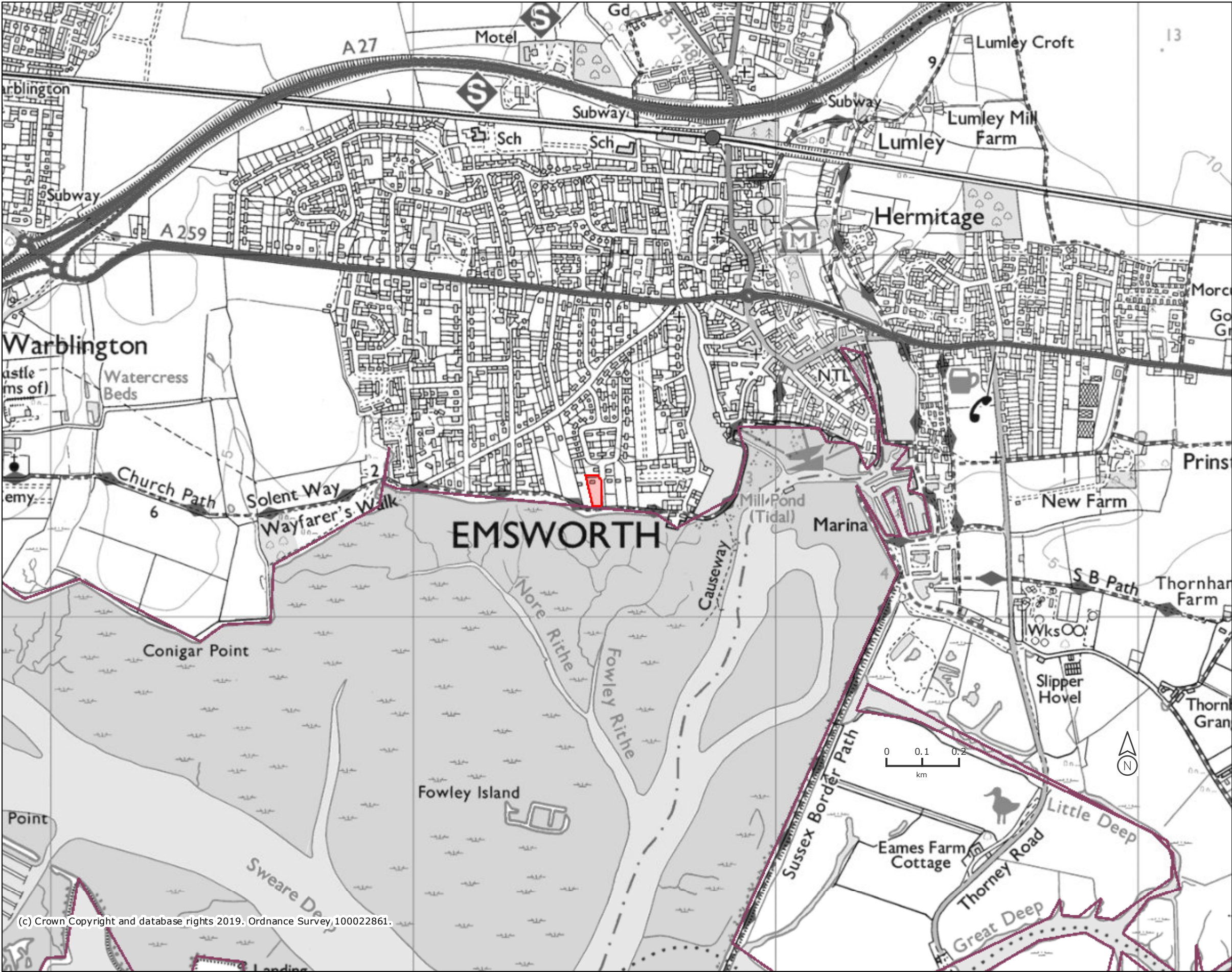
4. Summary

- 4.1 The surface water run-off from the proposed development will be discharged via the existing surface water outfall to the estuary. In accordance with the recommendations of paragraph S1 of Defra's Non-Statutory Technical Standards for Sustainable Drainage Systems there is no requirement for on-site attenuation when discharging to an estuary.
- 4.2 In accordance with Table 4.3 of the CIRIA SuDS Manual (C753) sufficient pollution mitigation for roof water has been provided in the form of a catchpit, which will intercept any gross solids and sediment prior to it joining the main surface water system. No further pollution mitigation is required.
- 4.3 This report shows that the proposed development will not be at risk of flooding and the proposed surface water strategy adequately drains the development during the design rainfall event. Moreover, the proposed surface water strategy can withstand the drainage requirements in a 1 in 1000-year plus 40% for climate change rainfall event, so exceedance events have also be taken into account.
- 4.4 The proposed surface water system should not be a cause for constraint with the planning application.
- 4.5 This report is the property of and is confidential to the client designated in the report. Whilst it may be shown to his professional advisors, the contents are not to be disclosed to, or made use of, by any third party, without our express written consent. Without such consent we can accept no responsibility to any third party.

- 4.6 Thomasons certify that they have carried out the works contained herein with due care and diligence to their best belief and knowledge based on the time and information available.
- 4.7 This report is made on behalf of Thomasons. By receiving it and acting on it, the client – or any third party relying on it – accepts that no individual is personally liable in contract, tort or breach of statutory duty (including negligence).

Appendix A

Site Location Plan



(c) Crown Copyright and database rights 2019. Ordnance Survey 100022861.

Projection = OSGB36
xmin = 471900
ymin = 104000
xmax = 477200
ymax = 106700

Map produced by MAGIC on 22 May, 2019.
Copyright resides with the data suppliers and the map must not be reproduced without their permission. Some information in MAGIC is a snapshot of the information that is being maintained or continually updated by the originating organisation. Please refer to the metadata for details as information may be illustrative or representative rather than definitive at this stage.

Appendix B

Development Layout & Elevations

24 Beacon Square

PROPOSED

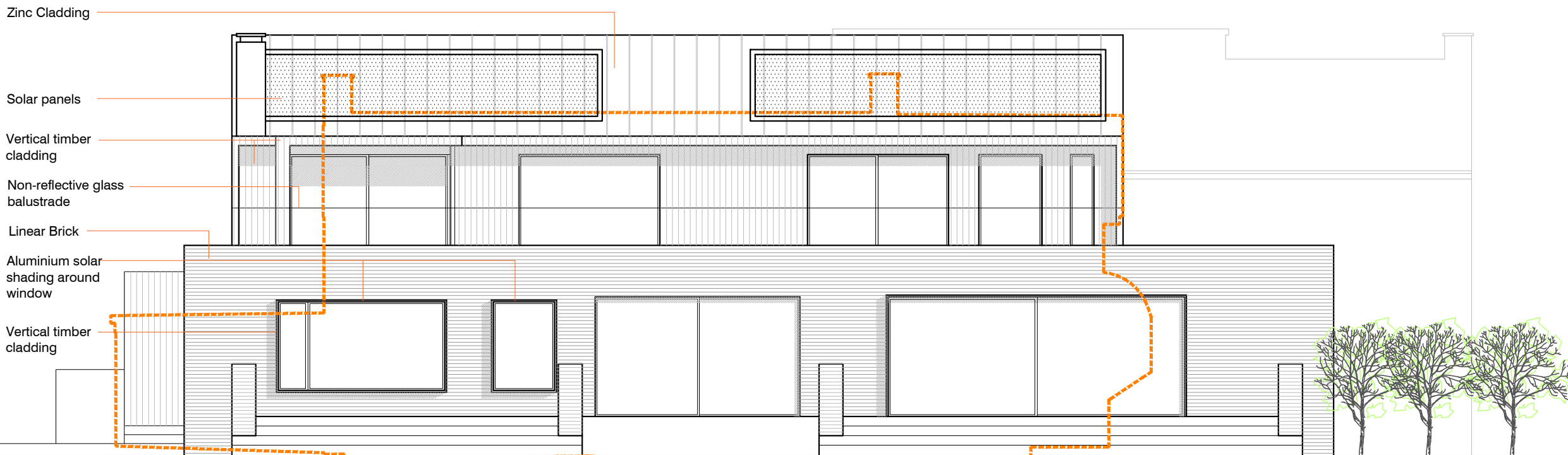
Dimensions to be checked on site before commencing work.
Any discrepancies shall be reported to the architect
immediately.

Do not scale from these drawings except for planning purposes.

Use figured dimensions only.

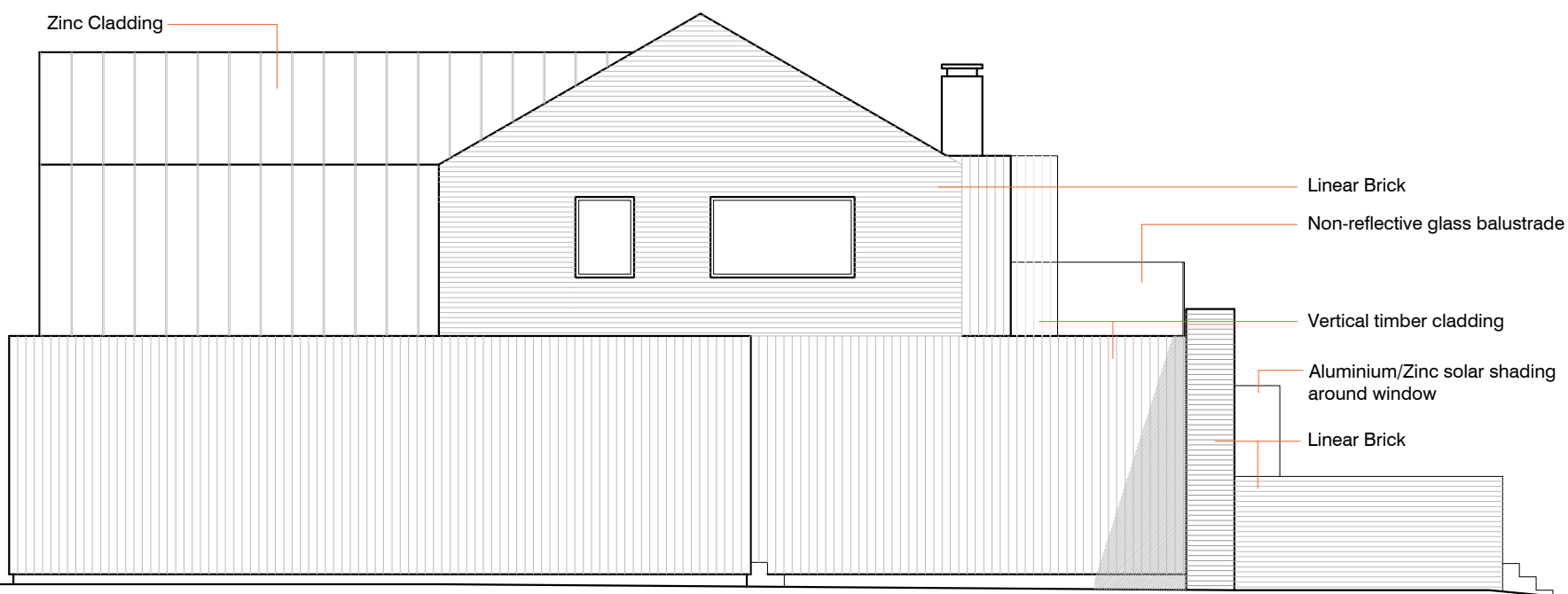
Where applicable this drawing is to be read in conjunction with other consultants' drawings.

All drawings to be read in conjunction with specification and all other drawings including structural engineer and mechanical and electrical drawings / specification



SOUTH ELEVATION

1:100



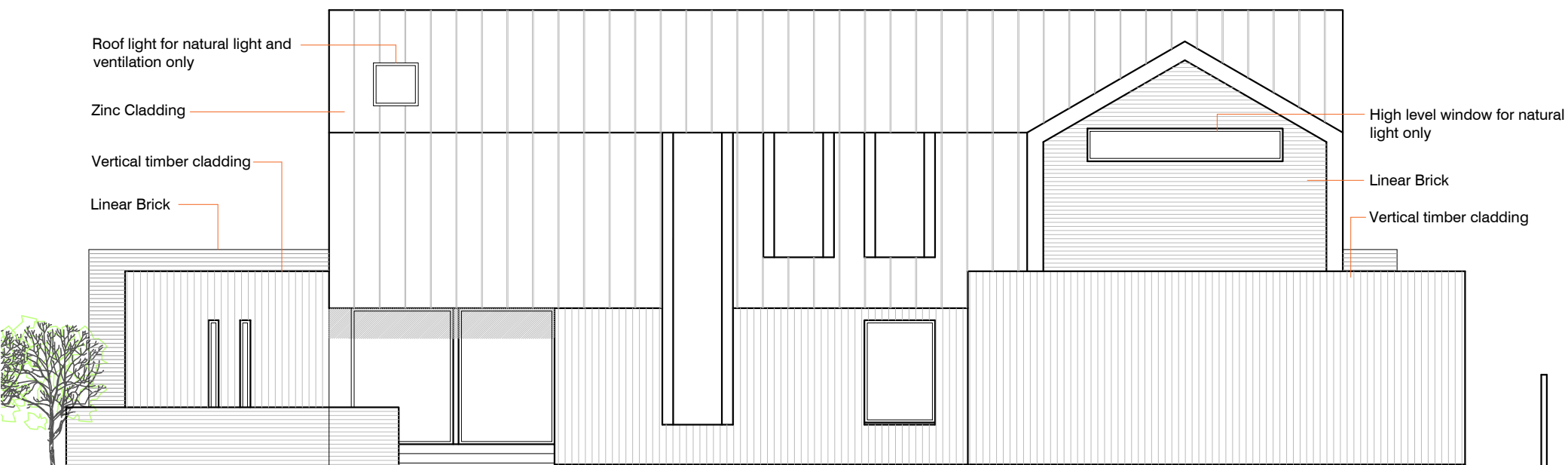
WEST ELEVATION

1:100



EAST ELEVATION

1:100



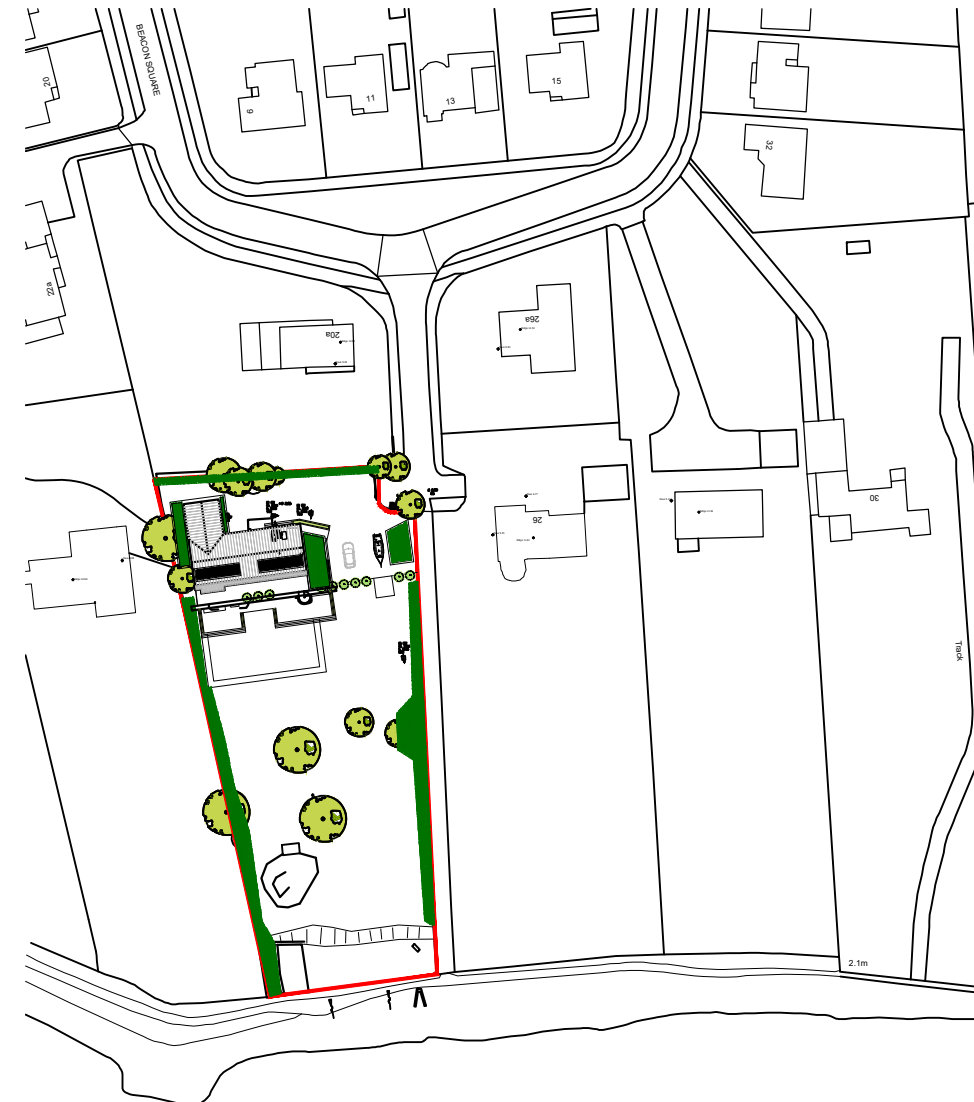
NORTH ELEVATION

1:100



PROPOSED BLOCK PLAN

1:500



PROPOSED LOCATION PLAN

1:1250

Ordnance Survey (c) Crown Copyright 2018. All rights reserved

Licence number 100022432



REV	DATE	AMENDMENT	DRAWN



Helyer Davies Architects Ltd
1 The Old Flour Mill,
Emsworth, PO10 7BT
01243 370 715

www.hdarchitects.co.uk mail@hdarchitects.co.uk

PROJECT

24 Beacon Square
Emsworth

DRAWING

Proposed Elevation and Materials
Proposed Block & Location Plans

SCALE

as noted @A1

DATE	March 2018	DRAWN	NW
DRAWING NUMBER		REVISION	
17193-03		*	

Appendix C
Environment Agency Flood Map for Planning

Flood map for planning

Your reference
Beacon Square

Location (easting/northing)
474494/105376

Created
22 May 2019 1:51

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

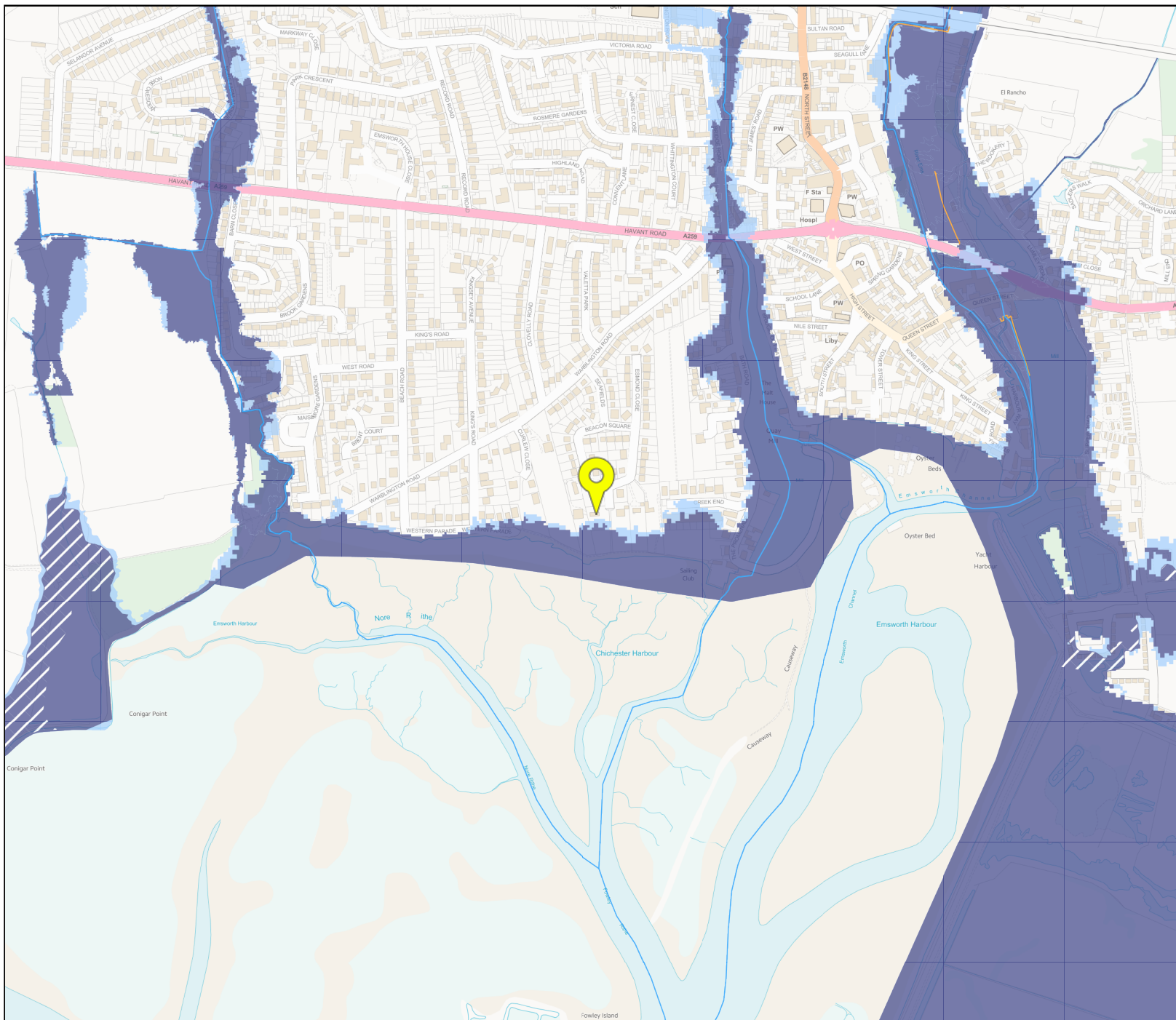
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Flood map for planning

Your reference
Beacon Square

Location (easting/northing)
474494/105376

Scale
1:10000

Created
22 May 2019 1:51

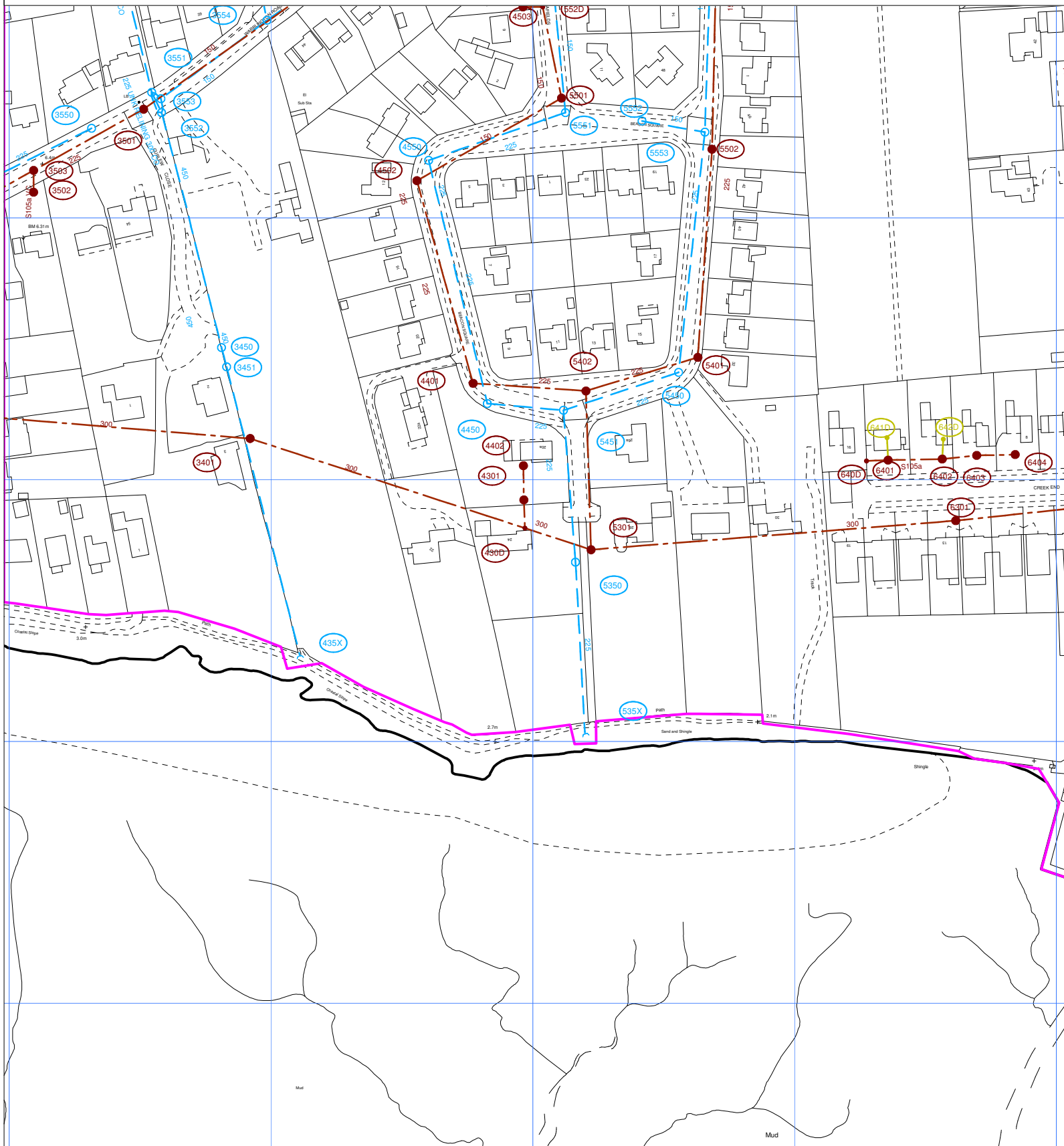
-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area


0 100 200 300m

Appendix D

Southern Water Asset Map

SOUTHERN WATER



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530

O.S. REF: SU7405SE

Scale: 1:1931

Screen Print

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement



Printed By: kishoku

Date: 21-9-2018

Southern Water MapGuide Browser

Requested By:

N

Appendix E
Proposed Drainage Strategy Plan

Project: BEACON SQUARE

Description: DRAINAGE LAYOUT

Status: FOR COMMENT

Scale: N/A

Rev: A.

Originator: PA

Checked: N/A

Passed: N/A.

Project/Sk no: G24150/SK003

Date: 22/05/19

NOTES:

Dimensions to be checked on site before commencing work. Any discrepancies shall be reported to the architect immediately.

Do not scale from these drawings except for planning purposes.

Use figured dimensions only.

Where applicable this drawing is to be read in conjunction with other consultants' drawings.

All drawings to be read in conjunction with specification and all other drawings including structural engineer and mechanical and electrical drawings / specification

ALL FOUL & SURFACE WATER DRAINAGE DETAILS SHOWN ON HELYER DAVIES ARCHITECTS DRAWINGS ARE TO BE READ AS INDICATIVE ONLY AND ARE NOT FOR CONSTRUCTIONAL USE. FULL DRAINAGE PLAN AND DETAILS TO BE PRODUCED BY THOMASONS STRUCTURAL/CIVIL ENGINEER.

Max. 12m between any new inspection chambers.

Contractor is to establish the exact location existing service pipes on site by tracing their location from known connection points. Care is to be taken when excavating in this area as to avoid disruption to existing services. All areas to be made good prior to completion.



Internal Wall Construction B: 12.5mm plasterboard and skim coat fixed to 25x38mm timber batten layer for service zone either side of 140mm timber stud. 50mm Isover APR 1200 acoustic insulation fitted within timber studwork.

Please refer to the appointed Bathroom & Utility manufacturers details and notes for a full bathroom/ En-Suite/ WC/ Utility layout and specification. Details depicted on Helyer Davies Architects drawings have been produced for illustrative purposes only.

All structural details shown on Helyer Davies Architects drawings are to be interpreted as indicative only and should be read in conjunction with the project structural engineers drawings and calculations.

Proposed ground floor construction: Excavate to reduce levels allowing for beam and block flooring system installed above foundations (TBC by structural engineer). 6mm zone above screed for floor finish installed in full accordance with specialist manufacturers details and requirements (Exact floor finish dimensions TBC). 75mm Fibre/Mesh Reinforced Floor Screed on 500g polythene membrane, 110mm PIR insulation on top of 1200g polythene vapour control layer membrane, on a beam and block floor system designed by others and installed in full accordance with specialist designers details. All to structural engineer's design and requirements. Completed construction to achieve a 'U' value of 0.11W/m²/K or as near as possible. (Foundation type and connections TBC)

Wall Construction B: 95mm external skin of facing linear brickwork in 50mm coursing. 50mm cavity, breather membrane to be installed back to 18mm timber sheathing board fixed to 140mm timber stud infill between steel frame, with an added 63mm internal timber stud to hide protruding steel work. All internal studs to be fully filled with Celotex XR4140 insulation board with a vapour control layer fixed to the inside face of studs. 25mm service zone formed from 25x38mm timber battening, finished with 12.5mm plasterboard and skim coat. Completed construction to achieve a 'U' value of 0.11W/m²/K or as near as possible.

Wall Construction C: 95mm external skin of facing linear brickwork in 50mm coursing, tied into 100mm structural blockwork with 10mm gap between. 240mm ventilated cavity with breather membrane to be installed back to 18mm timber sheathing board fixed to 140mm timber stud infill between steel frame, with an added 63mm internal timber stud to hide protruding steel work. All internal studs to be fully filled with Celotex XR4140 insulation board with a vapour control layer fixed to the inside face of studs. 25mm service zone formed from 25x38mm timber battening, finished with 12.5mm plasterboard and skim coat. Completed construction to achieve a 'U' value of 0.11W/m²/K or as near as possible.

Wall Construction A: Vertical timber cladding panels fixed through 25x38mm horizontal timber battens to 100mm ventilated timber studs. Breather membrane is to be installed back to 18mm timber sheathing board fixed to 140mm timber stud infill between steel frame, with an added 63mm internal timber stud to hide protruding steel work. All internal studs to be fully filled with Celotex XR4140 insulation board with a vapour control layer installed back to the inside face of studs. 25mm service zone formed from 25x38mm timber battening, finished with 12.5mm plasterboard and skim coat. Completed construction to achieve a 'U' value of 0.11W/m²/K or as near as possible.

Wall Construction E: 95mm external skin of facing linear brickwork in 50mm coursing, tied into 100mm structural blockwork with 10mm gap between. 303mm ventilated cavity with 200mm Celotex XR4140 insulation board fixed to outside of the internal leaf. 100mm structural blockwork tied to 95mm internal skin of facing linear brickwork in 50mm coursing with 10mm between. (All blockwork to structural engineers specification). Completed construction to achieve a 'U' value of 0.11W/m²/K or as near as possible.

Proposed powder coated double sliding doors. To be installed in full accordance with specialist manufacturers details and requirements.

CATCHPT.

doors to be built from 95mm wide linear brickwork in 50mm

PRELIMINARY ISSUE
NOT FOR CONSTRUCTIONAL USE

GENERAL NOTES:

STRUCTURES:

Helyer Davies Architects drawings and documentation are to be read as indicative only in regards to structural make up. Any details relating to structure on Helyer Davies Architects drawings and notes are for information only and not for detailing purposes. For full structural design please contact the appointed project Structural Engineer.

FOUL DRAINAGE:

Foul drainage is to discharge into the existing foul drainage management system via new connections made in the existing run. Additional inspection chambers are to be installed at turns in foul drainage runs and at a maximum of 12 meter intervals between chambers in full accordance with Approved Document H.

Proposed powder coated aluminium windows. To be installed in full accordance with specialist manufacturers details and requirements.

24 Beacon Square,
Emsworth, PO10 7HU

17193_101

hd
architects

mail@hdarchitects.co.uk
www.hdarchitects.co.uk
1 The Old Flour Mill, Emsworth, PO10 7BT
01243 370 715

EXISTING

Appendix F
MicroDrainage Calculations

1 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	2.000
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	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer)	0.750	
Region	England and Wales	Ratio R	0.350	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
									(m)	(m)	(m³)
S1.000	S1	15 Winter	1	+0%					3.277	-0.073	0.000
S1.001	S2	15 Winter	1	+0%					3.113	-0.113	0.000
S1.002	S3	15 Winter	1	+0%	100/15 Summer				2.928	-0.107	0.000
S1.003	S4	15 Winter	1	+0%	100/15 Summer				2.716	-0.104	0.000
S2.000	S5	15 Winter	1	+0%					3.310	-0.090	0.000
S1.004	S5	15 Winter	1	+0%	100/15 Summer				2.608	-0.097	0.000

PN	US/MH Name	Pipe Flow / Overflow			Level Exceeded
		Cap.	(l/s)	(l/s)	
S1.000	S1	0.16		1.1	OK
S1.001	S2	0.13		2.5	OK
S1.002	S3	0.18		3.3	OK
S1.003	S4	0.21		3.6	OK
S2.000	S5	0.02		0.2	OK
S1.004	S5	0.27		4.7	OK

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	2.000
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	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer)	0.750	
Region	England and Wales	Ratio R	0.350	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
									(m)	(m)	(m³)
S1.000	S1	15 Winter	30	+0%					3.293	-0.057	0.000
S1.001	S2	15 Winter	30	+0%					3.140	-0.086	0.000
S1.002	S3	15 Winter	30	+0%	100/15 Summer				2.961	-0.073	0.000
S1.003	S4	15 Winter	30	+0%	100/15 Summer				2.753	-0.066	0.000
S2.000	S5	15 Winter	30	+0%					3.315	-0.085	0.000
S1.004	S5	15 Winter	30	+0%	100/15 Summer				2.656	-0.050	0.000

PN	US/MH Name	Flow Cap.	Pipe Flow (l/s)	Overflow Flow (l/s)	Pipe Status	Level
						Exceeded
S1.000	S1	0.39		2.7	OK	
S1.001	S2	0.38		6.9	OK	
S1.002	S3	0.51		9.5	OK	
S1.003	S4	0.59		10.4	OK	
S2.000	S5	0.06		0.4	OK	
S1.004	S5	0.77		13.4	OK	

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 2.000

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 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

FSR M5-60 (mm) 19.000

Cv (Summer) 0.750

Region England and Wales

Ratio R 0.350

Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)

300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

OFF

DVD Status

ON

Inertia Status

ON

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years)

1, 30, 100

Climate Change (%)

0, 0, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
	Name	Storm							(m)	(m)	(m³)
S1.000	S1	15 Winter	100	+40%					3.312	-0.038	0.000
S1.001	S2	15 Winter	100	+40%					3.167	-0.059	0.000
S1.002	S3	15 Winter	100	+40%	100/15 Summer				3.056	0.021	0.000
S1.003	S4	15 Winter	100	+40%	100/15 Summer				2.887	0.067	0.000
S2.000	S5	15 Winter	100	+40%					3.321	-0.079	0.000
S1.004	S5	15 Winter	100	+40%	100/15 Summer				2.774	0.069	0.000

PN	US/MH		Flow / Cap.	Overflow (l/s)	Pipe Flow		Status	Level Exceeded
	Name				(l/s)			
S1.000	S1		0.70		5.0		OK	
S1.001	S2		0.68		12.5		OK	
S1.002	S3		0.87		16.2		SURCHARGED	
S1.003	S4		1.00		17.6		SURCHARGED	
S2.000	S5		0.10		0.7		OK	
S1.004	S5		1.30		22.5		SURCHARGED	

Appendix G

MicroDrainage Exceedance Event Calculations

Summary Wizard of 15 minute 1000 year Winter I+40% 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	2.000
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	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer)	0.750	
Region	England and Wales	Ratio R	0.350	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100, 1000
Climate Change (%)	0, 0, 40, 40

			Water	Surcharged	Flooded			Pipe	
	US/MH	Storm	Level	Depth	Volume	Flow /	Overflow	Flow	
PN	Name	Rank	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)	Status
S1.000	S1	1	3.876	0.476	0.000	0.39		7.8	FLOOD RISK
S1.001	S2	1	3.846	0.570	0.000	0.97		17.8	FLOOD RISK
S1.002	S3	1	3.684	0.599	0.000	1.30		24.0	FLOOD RISK
S1.003	S4	1	3.312	0.443	0.000	1.50		26.2	SURCHARGED
S2.000	S5	1	3.327	-0.073	0.000	0.17		1.2	OK
S1.004	S5	1	3.057	0.302	0.000	1.95		33.9	SURCHARGED

Thomasons Limited

86 Epsom Road, Guildford, Surrey GU1 2BX

T: 01483 565 886

E: guildford@thomasons.co.uk

W: www.thomasons.co.uk



THOMASONS