



**BILLY PUB
117 ELM GROVE
HAYLING ISLAND
HAMPSHIRE
PO119ED**

DRAINAGE STRATEGY REPORT

FOR

McCarthy and Stone

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CALCINOTTO PROJECT REFERENCE:

JB-3216

PROJECT TITLE

Elm Grove, Hayling Island

REPORT TITLE:

Drainage Strategy Report

NOTES:

Issue No:	1	2	3
Prepared By: Sign & Print	Matthew Roe BSc (Hons) AMICE <i>Senior Engineer</i>	Matthew Roe BSc (Hons) AMICE <i>Senior Engineer</i>	Matthew Roe BSc (Hons) AMICE <i>Senior Engineer</i>
Date:	January 2016	May 2016	May 2016
Checked By: Sign & Print	Matthew Roe BSc (Hons) AMICE <i>Senior Engineer</i>	Matthew Roe BSc (Hons) AMICE <i>Senior Engineer</i>	Matthew Roe BSc (Hons) AMICE <i>Senior Engineer</i>
Date:	April 2016	May 2016	May 2016
Issue Status	Information	Information	Information

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1 Introduction

- 1.1 Calcinotto Ltd have been appointed to provide Preliminary design advice for the above the site in respect of drainage for the proposed development.
- 1.2 Calcinotto Ltd have been provided with, Southern Water Record Drawing (Plan Only), Topographic Survey and Concept Architectural Plans. Full Sewer records have now been obtained and are included in Appendix A.
- 1.3 The site is currently occupied by a Public House with large areas of parking hardstanding which discharges to various gullies within the car park.
- 1.4 The site is bounded on its Western side by St Mary's Road & its Eastern Side by Elm Grove, with residential properties and public surface car park.
- 1.5 The site benefits from vehicular access to both roads as the Car Park is severed by a line of bollards.
- 1.6 The total site area for the development is 3200m² and is a mixture of roof, hard paving and soft landscaping. The existing building and hard paved area is approximately 2430m², the proposed development consists of a total impermeable area of approximately 1937m² (Roof Area 1425m² & Car Parking 512m²).

2 Proposed Development.

The architects plan shown in Appendix A is for the construction of 15no 1 bedroom apartments and 18 2 bedroom apartments for Retirement Living. The development is spread over 3 floors set within mature established planting.

3 Existing Drainage Systems

- 3.1 From the Southern Water records and discussions with Havant Building Control it has been understood that there are no combined sewers serving Hayling Island and that all Surface Water is either disposed of to Soakaway or Public Surface Water System. A CCTV survey was commissioned in April 2016 of the existing on site main lines and connections into the public system(s). The existing pipework on site is 'pitchfibre' and was commonly used in the 1980's, unfortunately this material has been found to deform over time. The site has been found to have existing connections for the surface water and foul drainage for the site into the Public Sewers in Elm Grove.
- 3.2 The surface water system has been found to have two existing connections from the site, one is into an existing 150mm diameter pipe in St Mary's Road within the footway, and this is likely to a Highway Drain as it isn't shown on the Southern Water Sewer Records. The second Connection is into Elm Grove, Southern Water were contacted for a capacity check and they have advised that there is

capacity within the Surface Water Sewers in Elm Grove for this development site and the discharge rate is 21l/s, as identified in Southern Waters letter in Appendix C. This section of pipe was surveyed into the sewer and has started to deform.

- 3.3 The site has one connection into the foul sewer in Elm Grove towards the Northern Boundary of the site. This section of pipe is badly deformed and the survey wasn't able to be completed into the main. A capacity check has been undertaken for the development and the foul sewers have capacity for this development.
- 3.4 We have produced a plan using the topographic survey, utility detection survey & Southern Water records and we have superimposed the preliminary findings of the CCTV survey. This can be found in Appendix A. This has identified that existing pipework on site and connecting to the public sewer is pitchfibre and that these offsite connections are starting to deform.
- 3.5 From a review of the Topographic Survey and Radar detection survey the site is predominately level with an average level of 7.0m AOD with localised low spots for gullies. There are no sewers identified crossing the site.
- 3.6 A Flood Risk Statement has been produced and is covered under a separate report by Calcinotto Ltd. The site is located within Flood Zone 1.
- 3.7 We have had preliminary discussions with the Local Authority Building Control Surveyor who have suggested that soakaways do work in the area but they are not very effective and that new ones should be constructed from modular/cellular soakaway systems. This is due to the probable presence of a high water table, which is not unusual in the area due to the commonly encountered raised beach features.

4 Proposed Drainage

- 4.1 The drainage for the site has been designed with assumed connections for the RWP's and FWO's and will need to be finalised as part of the detailed design.

Foul Drainage – There are foul sewers located in St Mary's Road and Elm Grove the CCTV survey has identified the existing connection off site into Elm Grove. As this connection is pitch fibre and showing deformation this would have been required to be repaired or replaced as part of the development. Southern Water will require a manhole connection onto the public sewer(s) for this development. The new foul connection has been shown in Elm Grove to the East of the site. The drainage runs shown on the proposed drainage plan try to avoid the identified Root Protection Areas (RPA's) however some excavation will be required at the edges / close to the RPA's, these will need to be undertaken under the supervision of the project Arboriculturalist.

- 4.2 Surface Water – The surface water has been designed to accommodate the 1:100yr+30% climate change with no flooding above ground. The development has been checked for the 1:100yr+40% climate change and only minor flooding occurs in the car park. The surface water has been designed for a restricted discharge of 21l/s as advised by Southern Water and attenuation will be required.

Due to the restricted discharge rate attenuation will be required this is proposed to be provided using modular crate system, approximately 19cum will be required.

The flow control will be provided using a pump return system with twin pumps (Ex Type – Explosion proof due to the possible presence of hydrocarbons from the parking areas). One of the existing surface water connections appears to outfall into a 150mm diameter Highway Drain this has been ignored as part of the preliminary design. The site has been given a higher discharge flow rate into a larger sewer (675mm dia) within Elm Grove, the benefit of this higher discharge rate is that the attenuation tank has been reduced in size.

Both these connections (Foul & Surface Water) have been located within close proximity of each other to enable both the manholes to be constructed within Elm Grove utilising the same Traffic Management, and minimising disruption to the road users.

A copy of the Preliminary Drainage scheme for the site to serve the new development is included in Appendix B.

- 4.3 This attenuation required could be constructed using modular crate attenuation systems, tubosider or using GRP Tanks. Modular crate attenuation tanks have been identified so as to reduce the depth of excavation. However during the detailed design the final method of attenuation could differ.
- 4.4 An Site Investigation has not been undertaken at the moment so the use of soakaways has been discounted based on a review of the BGS website and the preliminary discussions with the local Building Control and the presence of a positive surface water drainage system for the site.
- 4.5 The use of permeable parking construction could be considered to reduce the amount of attenuation required, however the benefit of this to assess without additional information (Infiltration Rates).
- 4.6 In Appendix B we have enclosed some typical construction details for attenuation tanks, soakaways, drainage and external works construction details that are likely to be required.

5 Additional Investigations Required

- 5.1 An Intrusive Site Investigation and Interpretative Report to include infiltration testing to BRE365 undertaken by a Site Investigation Contractor.

6 Conclusions

- 6.1 If the pub is demolished prior to discussions being undertaken with Southern Water it is essential that the points of connection from the site are maintained so that the right to connect to the public system isn't lost. Southern Water have confirmed a discharge rate of 21l/s should be used for the design of the surface water system into the public sewer in Elm Grove.
- 6.2 To reduce the size of the attenuation tank consideration could be given to using permeable paving either infiltrating or tanked, if infiltration is proved to practical then permeable paving would also reduce the size of the main infiltration structure(s).
- 6.3 The foul drainage from the site can be accommodated within the public foul sewer network.
- 6.4 An intrusive site investigation should be commissioned to determine if infiltration is viable so as to reduce the offsite discharge into the public surface water sewer.
- 6.5 When the layout of the SVP's & RWP's is finalised the layout of the drainage can be finalised and the location and numbers of manholes around the development can be agreed.
- 6.6 The principle of rehabilitating the existing pipes by reshaping and relining the pitch fibre pipes has been discounted as to reshape the pipes access is required to both ends to pull the 'bullet' through to reshape. It would also be required by the Water Company that the new development has new manholes constructed at the point of connection.
- 6.7 Any crane bases required for the construction of the development will require co-ordination with the drainage design.

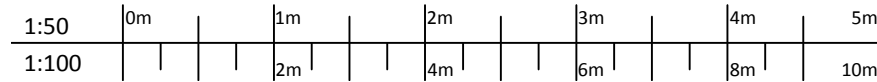
From the information contained in the report there is no reason why Planning should be refused on the basis of drainage reasons to serve the site.

Appendix A

Existing Drainage
Southern Water Records
Architects Site Plan



- Existing Services Legend**
- Existing Surface Water Sewer (& Manhole)
 - Existing Foul Water Sewer (& Manhole)
 - Pipeline to be Removed / Abandoned
 - Existing CCTV Ducts
 - Existing HV Electric
 - Existing LV Electric
 - Existing Gas (From Records)
 - Existing BT Ducts
 - Existing Watermain



COORDINATE SCHEDULE				
STATION	EASTING	NORTHING	LEVEL	DESCRIPTION
STN100	472211.633	99863.378	6.819	HLTI NAIL IN TARMAC
STN101	472203.649	99771.003	7.076	HLTI NAIL IN TARMAC
STN102	472202.090	99754.636	7.041	HLTI NAIL IN TARMAC
STN103	472199.362	99723.104	6.912	HLTI NAIL IN TARMAC
STN104	472169.807	99746.593	6.771	HLTI NAIL IN TARMAC
STN105	472144.044	99763.579	6.845	HLTI NAIL IN TARMAC
STN106	472128.220	99776.117	6.755	HLTI NAIL IN TARMAC

P1	26.04.16	Drawn	MJR
Rev.	Date	Description	Issued By

Information

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Client.	McCarthy & Stone
Project Title.	Hayling Island
Drawing Title.	Existing Drainage

Drawn by	MJR	Project No.	JB-3216	Drwg No. [Rev]	002 P1
Scale	1:200				
Date	Apr' 16				

SEWER RECORDS PAGE 1 OF 2

99899



99611

O.S. REF.
SZ7299NW
Title: 204610_Hayling Billy Pub, 117

Drawn by:	kumaria
Scale:	1:1250
Date:	26/10/2015

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.
WARNING: BAC pipes are constructed of Bonded Asbestos Cement
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement
Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved
Licence No. WU 298530.



N



472401



A	040216	LANDSCAPE UPDATE	CK	CK
REVISIONS				

NOTES:

FOR GREENFILE

0 2 4 6 8 10 12 14 16 18 20m

North arrow pointing up.

CLIENT

McCarthy & Stone

Scale @ A1: 1/200

Date: JANUARY 2016

Drawn by: CK

Checked by: GG

TITLE

ELM GROVE, HAYLING ISLAND
PROPOSED SITE PLAN

Drawing No: SO_2267_02_AC_010

Revision: A

HGP ARCHITECTS

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HGP Architects Ltd.
Copyright Reserved.
Check dims. on site.

Appendix B

Proposed Schematic Drainage JB-3216-001_P2
Typical Construction Details

Notes:

1. This drawing is to be read in conjunction with all relevant architects, engineers and specialist sub-contractors drawings and the specification.
2. All setting out to be in accordance with the schedules, any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Dimensions must not be scaled.
3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2002 Edition).
4. All adoptable drainage is to be in accordance with 'Sewers for Adoption 7th Edition' - a design and construction guide for developers and the local highway authority requirements where appropriate.
5. Where drainage pipework is to be flexibly jointed extra strength vitrified clay it should be to BS EN 295-1, Hepworth 'Supersieve' or equivalent.
6. Where drainage pipework is plastic i.e. PVC-U it shall be to BS EN 1401-1 Osma or equivalent. Private pipework to be type SN4 and all adoptable pipework to be type SN8.
7. Where drainage pipework is cast iron it shall be to BS EN 877 and for ductile iron it shall be to BS EN 598.
8. All concrete pipework, shall be to BS EN 1916 and BS 5911-1. Manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.
9. All materials for adoptable drainage are to be Kitemarked as appropriate.
10. All adoptable manhole covers are to be badged as appropriate i.e. 'FW' or 'SW'.
11. The position of the rising main should be a minimum distance of 1.0m from kerb face to the outside of the pipe nearest the kerb. Laid with a minimum of 1.2m of cover in the road and 0.9m of cover in the footpath.
13. Where drains pass through foundations or connect to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure and within a further 600mm to form a rocker pipe.
14. Where pipes pass through screen walls, footings or retaining walls, lintels are to be provided.
15. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 454 angle line taken from the bottom corner of the nearest foundation.
16. Where depth to invert does not exceed 600mm and the pipe size does not exceed 100mm diameter, 300mm dia. polypropylene access chambers may be used. Elsewhere, proprietary polypropylene or precast concrete manholes are to be used.
17. Where connections are to be made to existing manholes / sewers, invert levels, pipe sizes and orientation should be checked prior to the commencement of the works and any variance reported to the engineer immediately. Where connections are to be made on or off site the contractor is to check the line and level of any services / mains, to ensure that no clashes exist prior to works commencing.
18. Where pipelines cross, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centred on the crossing point. Length of surround to be extended as necessary to within 150mm of the next nearest flexible joints.
19. For adoptable drainage, a reinforced concrete cover slab is to be provided where the effective cover to the crown of the adopted pipe(s) is less than 0.9m in verges or 1.2m in carriageways and / or footpaths. Where effective cover is 1.0m or less in carriageways and / or footpaths, pipework will need to be ductile iron (ie. Stanton Pam St. Gobain type 'Integral').
20. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas.
21. 'Effective cover' is the minimum depth of cover over the pipe crown at any time during the construction process.
22. All adopted foul drainage to be located a minimum of 1.2m finished depth to soffit. Unless specifically identified as otherwise with relevant protective measures.
23. The contractor is to ensure that protective measures are taken to ensure that drainage pipework and fittings are not damaged by site traffic prior to oversite filling operations being completed around buildings.
24. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40, the head of each run is to be vented to atmosphere in accordance with approved document H.
25. All surface water drainage to be min 100mm dia, laid at a gradient no slacker than 1:80. And all foul water drainage to be min 100mm dia, unless stated otherwise.
26. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Where necessary 3/4 bends are to be used on oblique connections inside the manhole benching where sufficient room exists or the pipelines on oblique connections are arranged outside the chamber to be able to divert flows down the main channel. Connections brought in perpendicular to the main channel are not acceptable. Where possible the main channel flow shall be from any connections with WC's to ensure a flush through the main channel is achieved.
27. The contractor is to ensure that when preformed polypropylene manhole bases are used that they are orientated such that the main flow is through the main channel of the base, this should be achieved by incorporating long radius bends outside of the manhole.
28. Any connection into a public sewer is to be inspected by the local water authority and carried out fully in accordance with their requirements. The contractor is to allow for obtaining the appropriate 'connection to a public sewer' forms and paying all necessary fees.
29. The contractor is to allow for obtaining the appropriate road opening licences from the local highway authority and paying all necessary fees for any works associated with off-site sewer connections. All reinstatement works within the public highway are to be carried out in accordance with the requirements of the local highway authority.
30. The contractors attention is drawn to the need to ensure that any trenches excavated through previously compacted filled areas, in particular under the building footprint and immediately around the outside, are re-compacted to ensure localised differential settlement does not occur.
31. Package pumping station(s) to be 'specify manufacturer and reference' or equivalent. For installation guidance refer to manufacturer's specification. Any vent pipe to be taken to a position agreed with the architect. A three phase electricity supply is required to provide power to the control panel of the pumping station. The control panel, if external, is to be located inside a kiosk within close proximity of the pumping station. If internally located within a building, the control panel may be positioned on a wall. Localised re-grading of the ground around the pumping station may be required to accommodate new levels. An informative notice plaque should be located on or near the control panel stating 'in the event of the alarm sounding or warning light flashing please contact the number below 'insert contact telephone number'.
32. Drainage channel(s) to be 'ACO MD100' or equivalent. For installation guidance refer to the manufacturer's specification. Refer to landscape architects details for surfacing treatments around units where applicable. Where channels are indicated as in-built falls the relevant units are to be incorporated to provide the necessary length of channel gradient from the head of the run to the sump unit.
33. Modular crate attenuation tank system(s) to be 'Wavin Aquacell' or equivalent.

P2	09.05.16	St Mary's Rd Connection Omitted	MJR
P1	28.04.16	Drawn	MJR
Rev.	Date	Description	Issued By

Preliminary

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Client.	McCarthy & Stone
Project Title.	Elm Grove, Hayling Island
Drawing Title.	

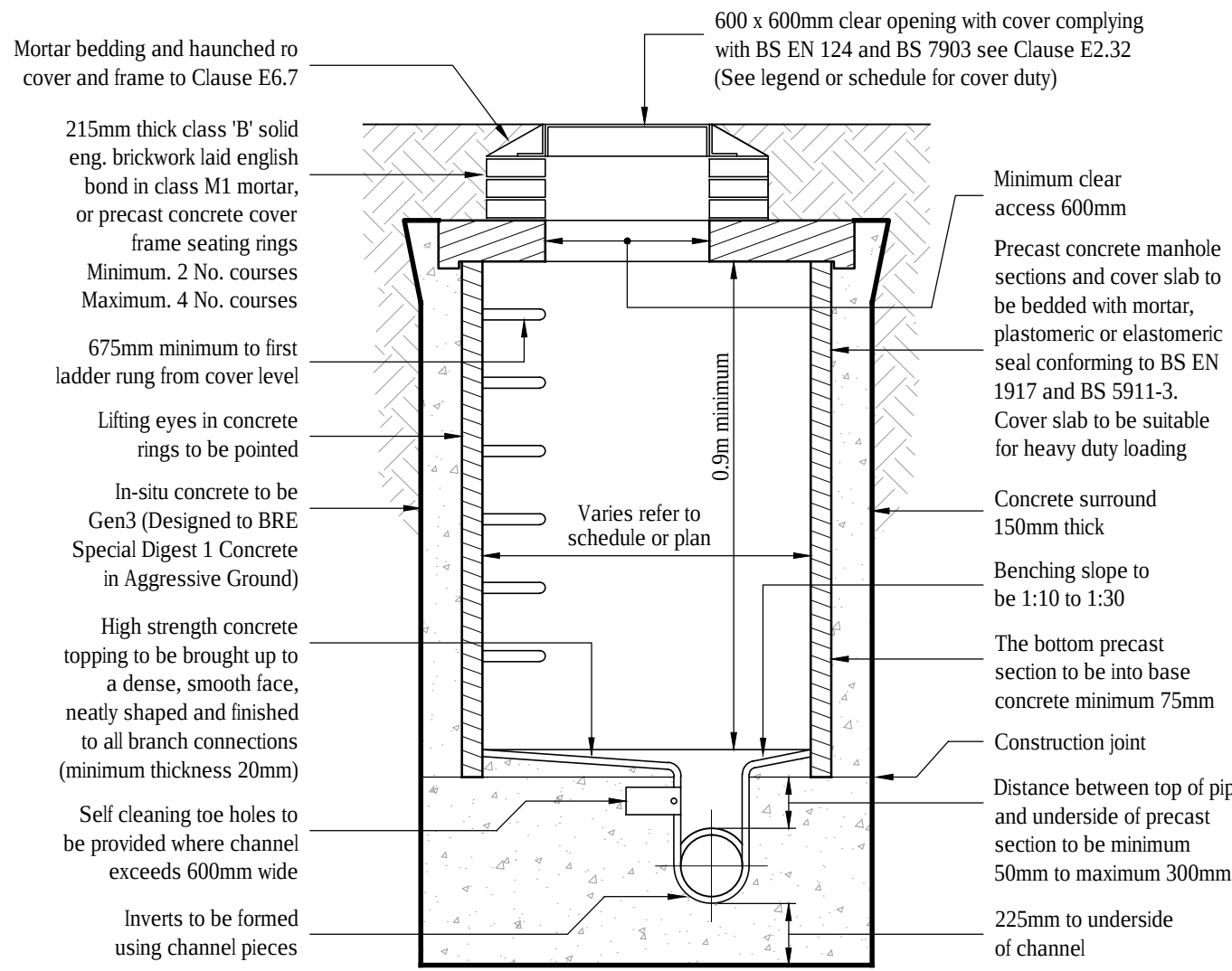
Proposed Drainage Plan

Drawn by	MJR	Project No.		Drwg No. [Rev]	
Scale	1:200				
Date	Apr' 16				

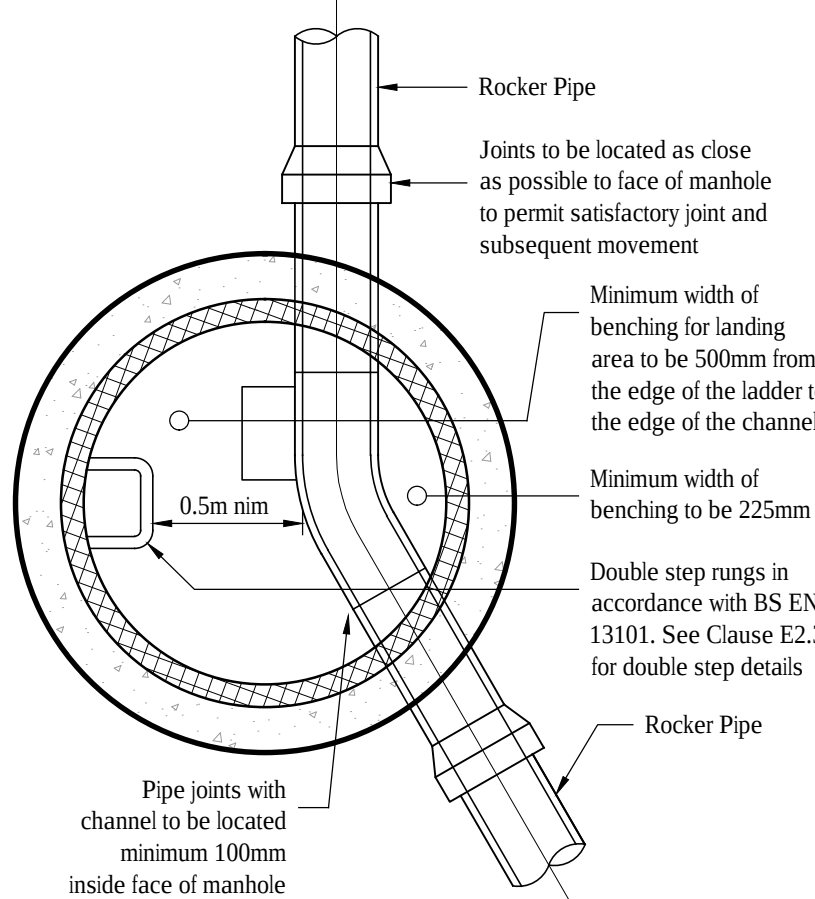
JB-3216

001 P2

The Preliminary layout is based on assumed outlet positions will be subject to detailed design when exact outlet positions are confirmed and final Approval by and Legal Agreement with Southern Water for a Section 106 Agreement of the proposed connections into the public Sewer



Type 2 Manhole - Section Detail

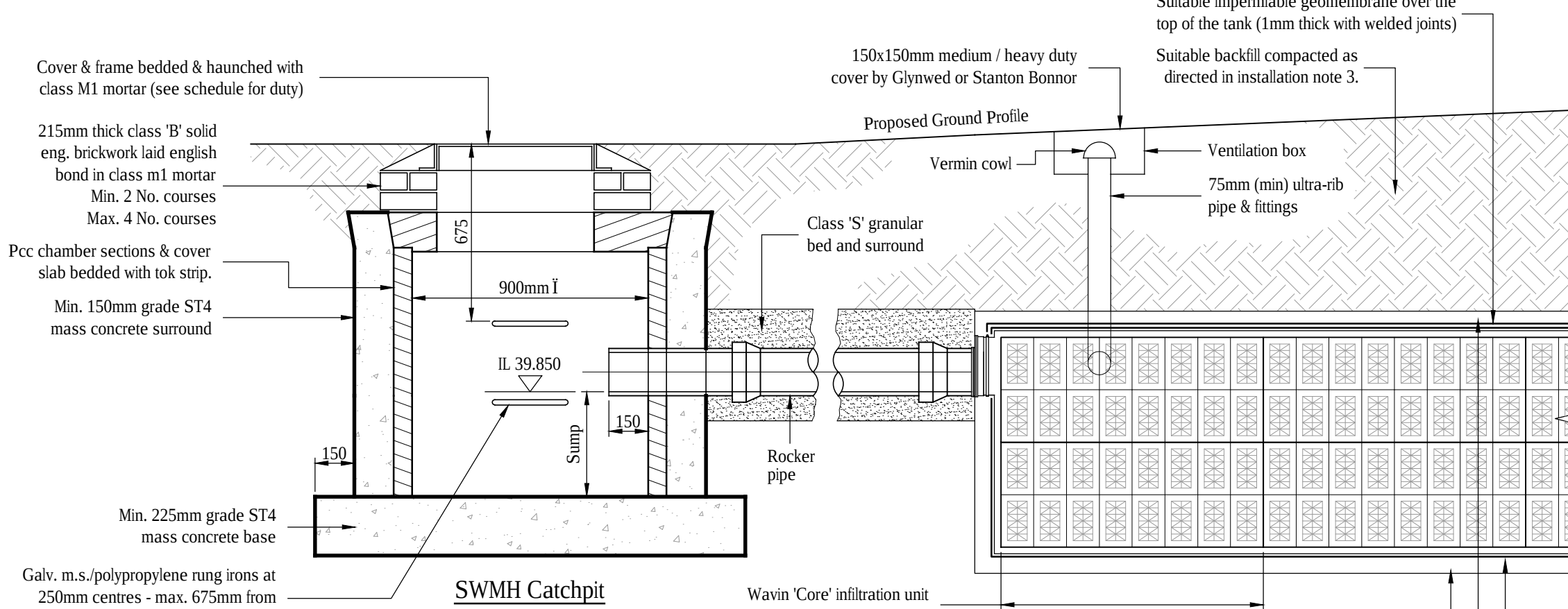


Type 2 Manhole - Plan Detail

Type 2 - P.C.C Ring Manhole Construction Detail (Depth to Soffit = 3.0m Max)

SCALE = 1:25

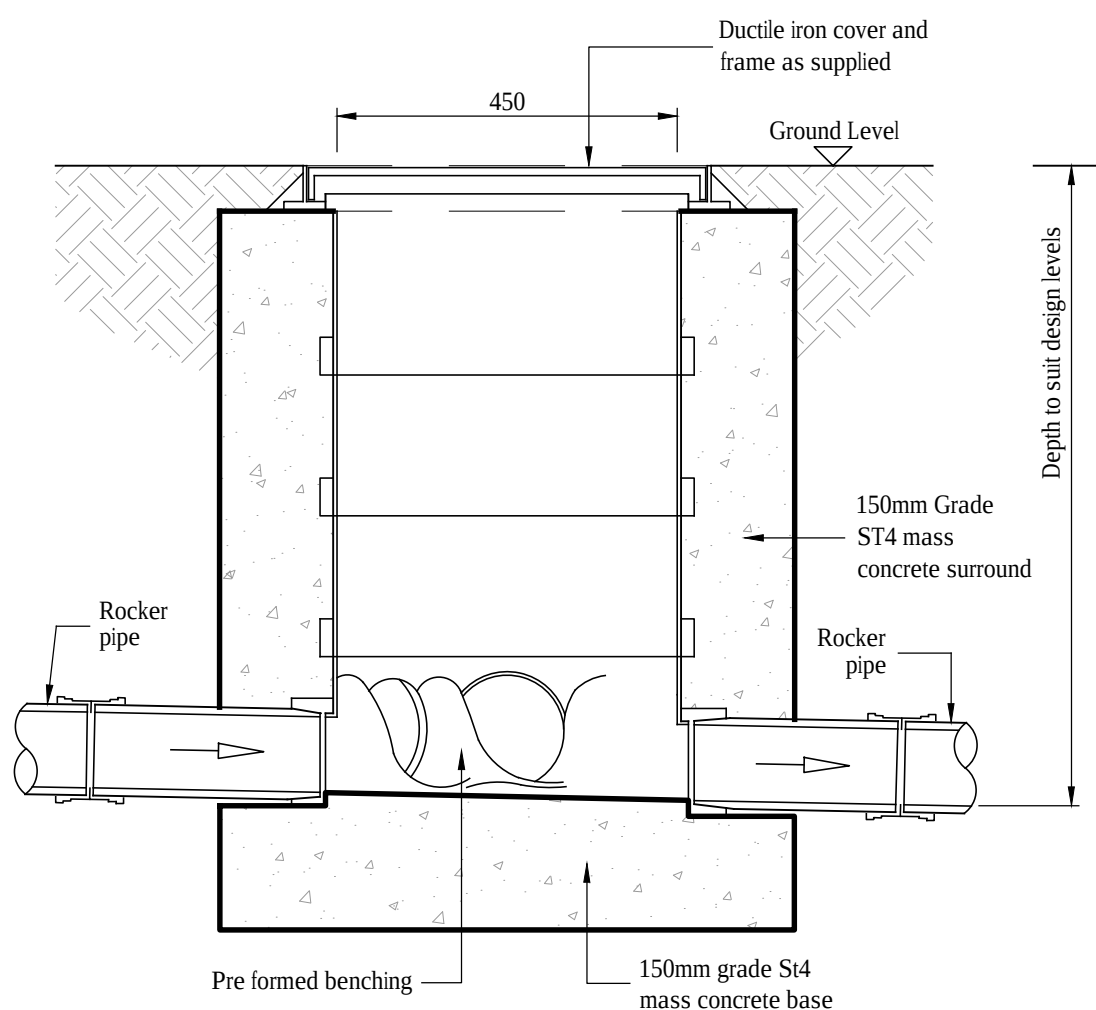
- Notes:
1. This detail is noted in accordance with Sewers for Adoption 7th Edition, please refer to this document for further information on manhole requirements and details of Clauses.
 2. Manhole opening to be located centrally over a 900mm shaft and offset approximately 200mm for a 1200mm diameter shaft with ladder.



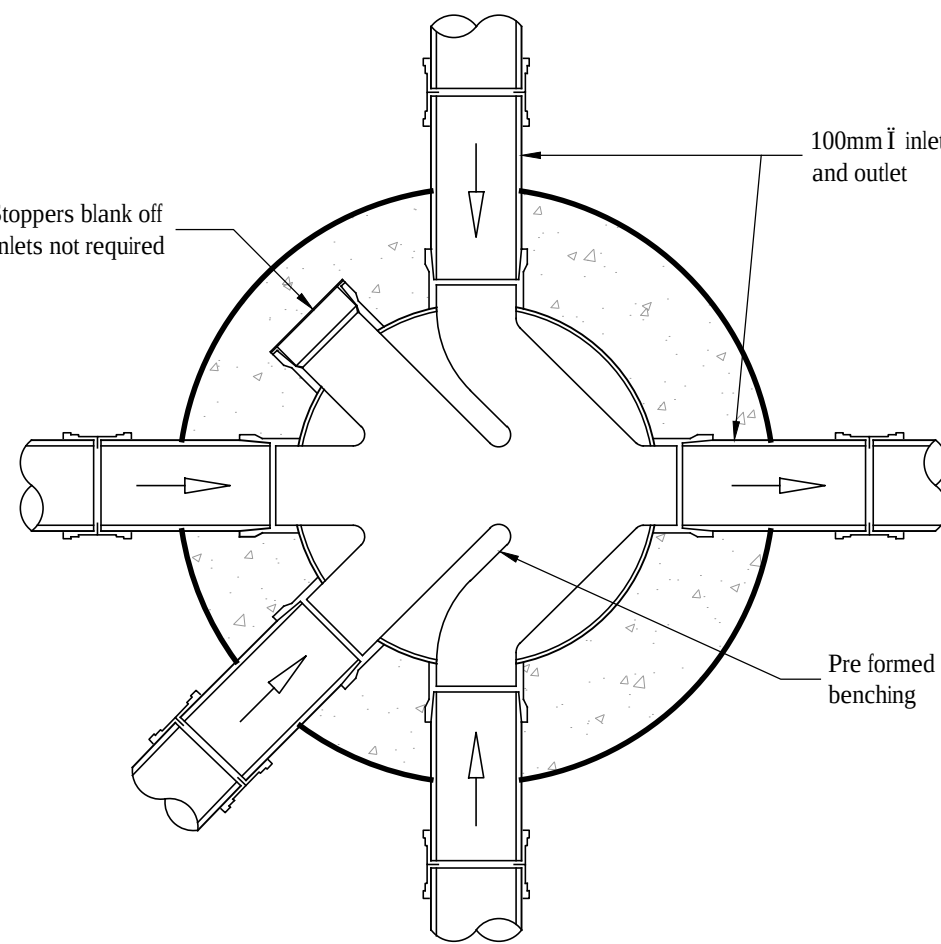
Wavin Aquacell 'Core' Soakaway

SCALE = 1:20

Note:
This detail is for arrangement use only and does not reflect the actual on site levels.



Plastic I.C Section Detail

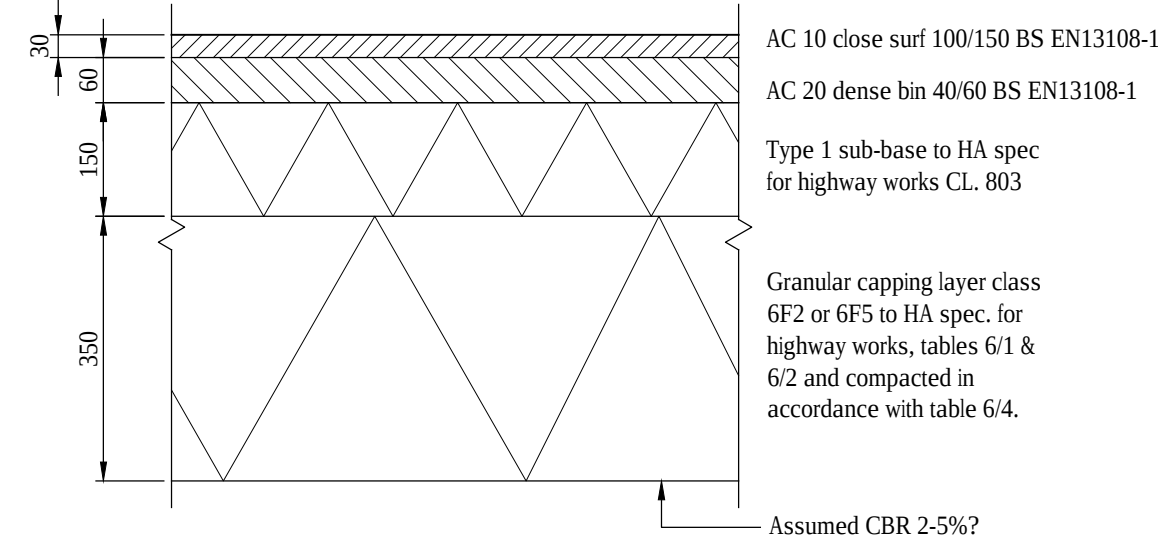


Plastic I.C Base Detail

Private Drainage Plastic I.C Construction Detail

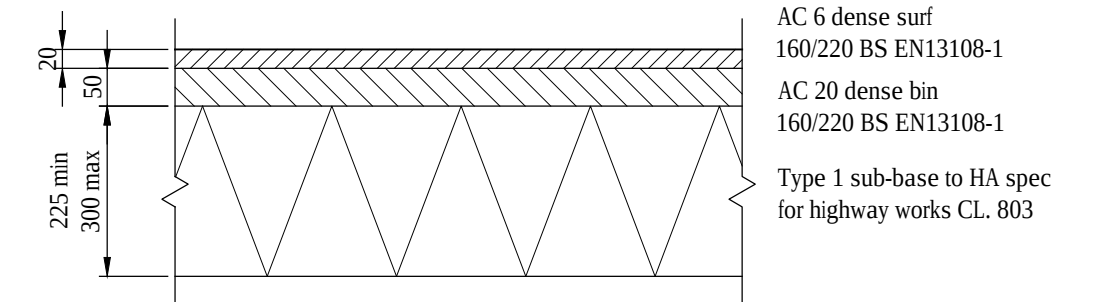
SCALE = 1:10

Note:
This detail is to be used in pedestrianised areas only



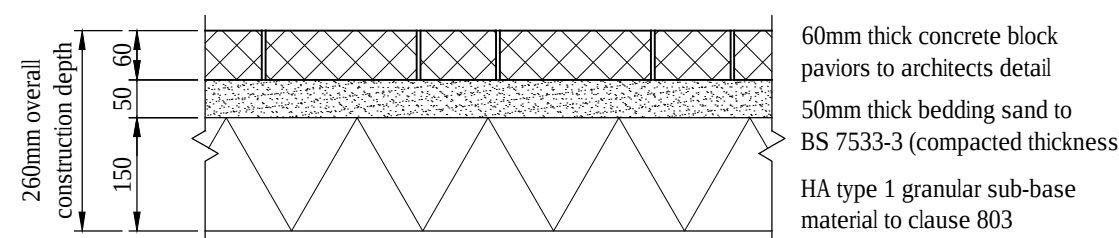
Macadam Parking Bays Construction Detail

SCALE = 1:10



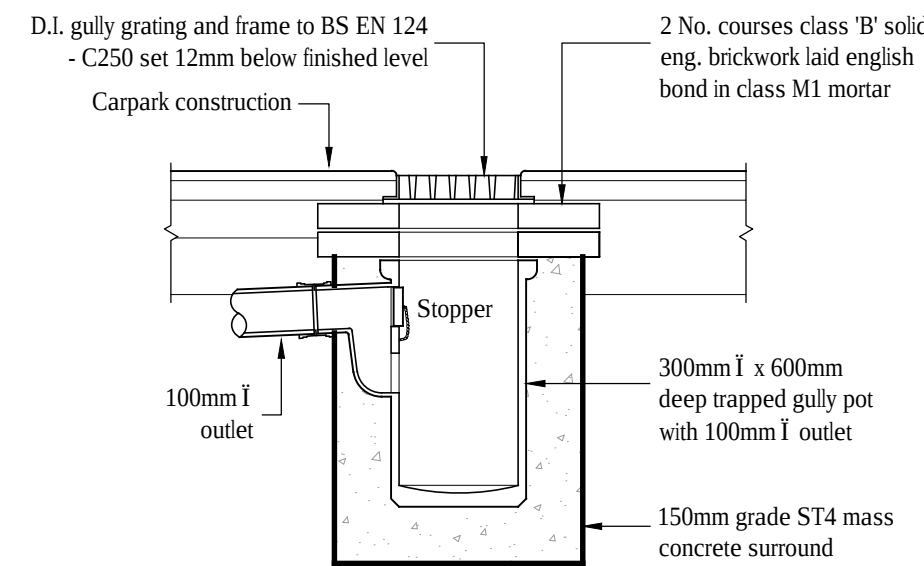
Macadam Footpath Construction Detail

SCALE = 1:10



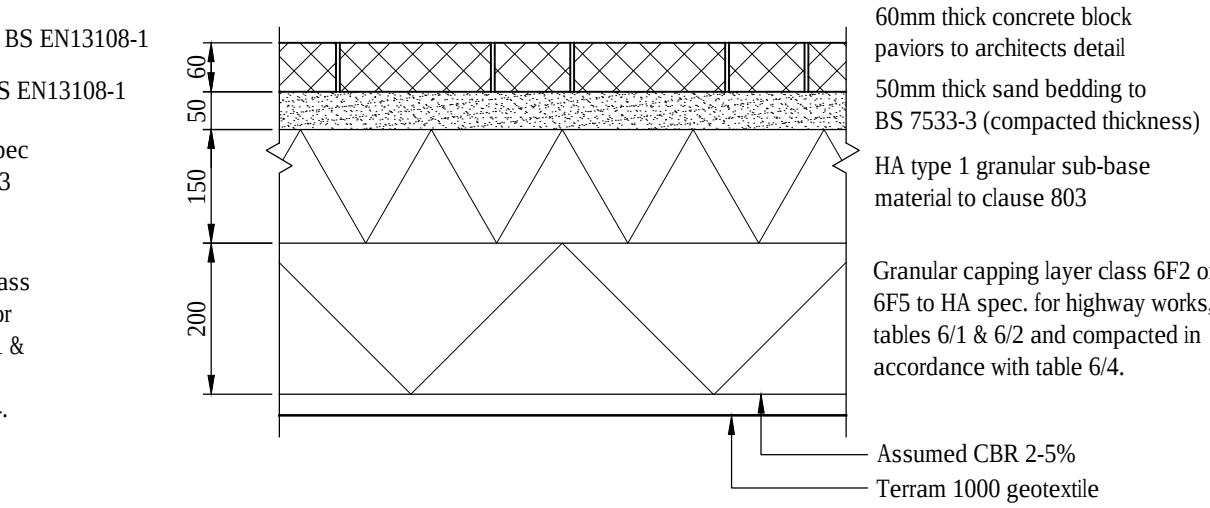
Block Paved Footpaths Construction Detail

SCALE = 1:10



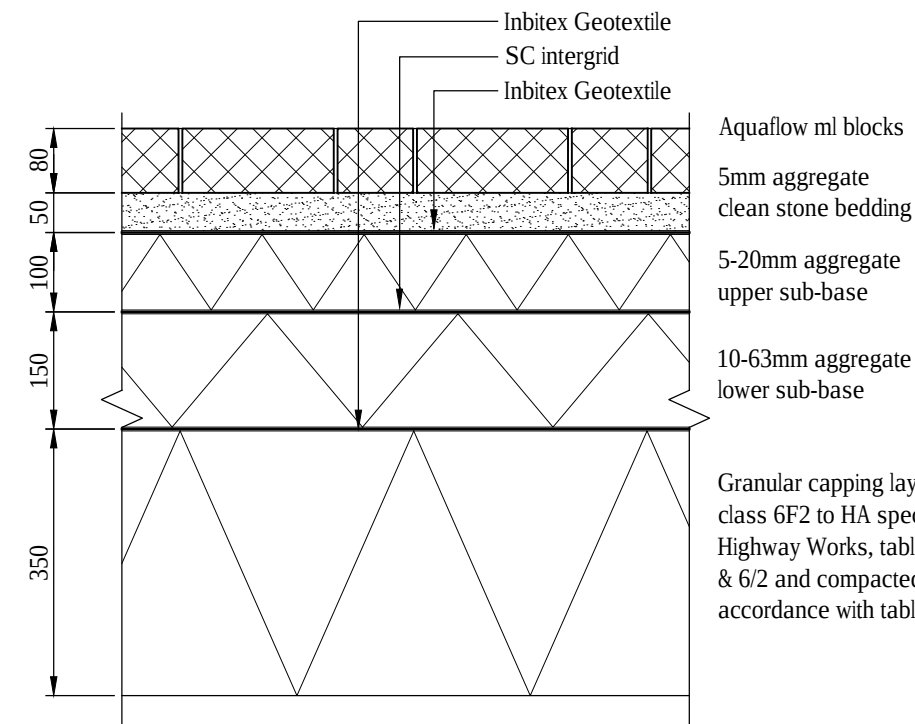
TYPICAL (VIT CLAY) YARD GULLY DETAIL

SCALE = 1:20



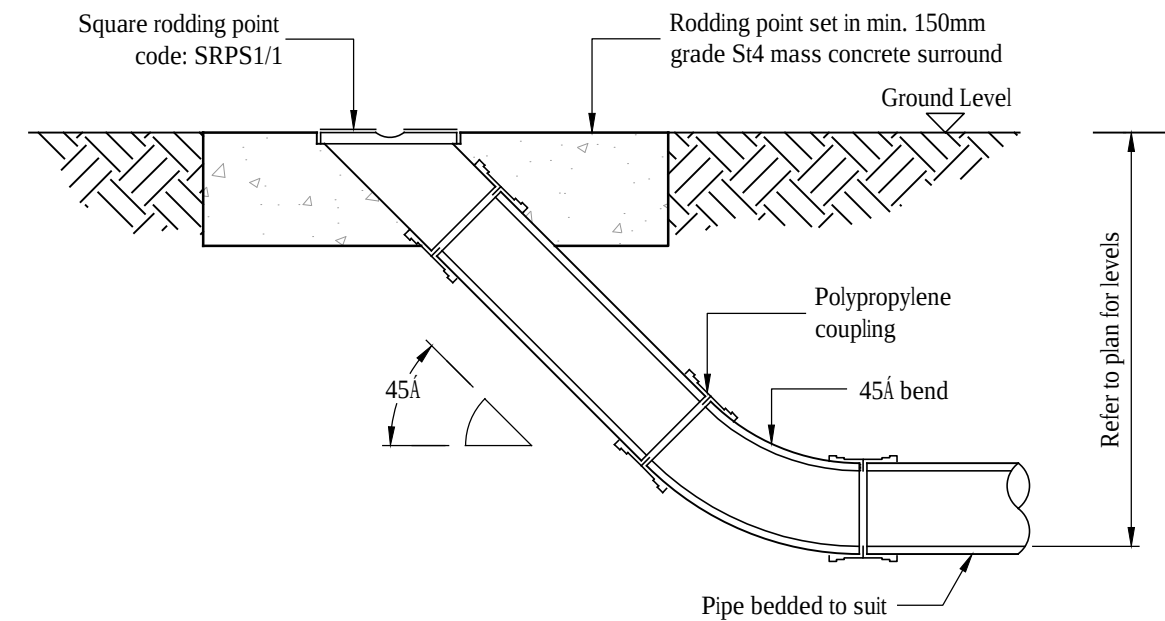
Block Paved Parking Bays / Aisles (Car Traffic Only) Construction Detail

SCALE = 1:10



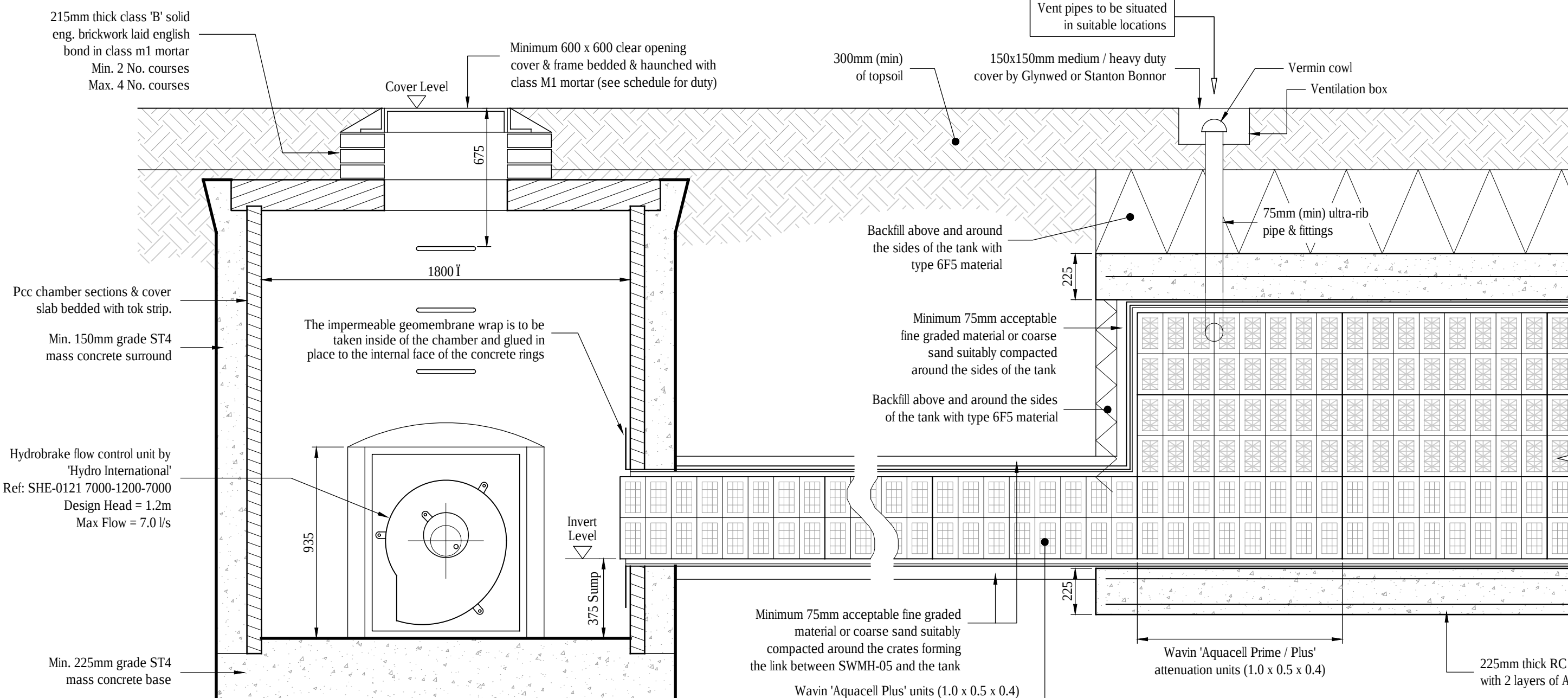
Light Duty Formpave Construction Detail (Car Parks, Drives and Moderatley Trafficked Areas)

SCALE = 1:10

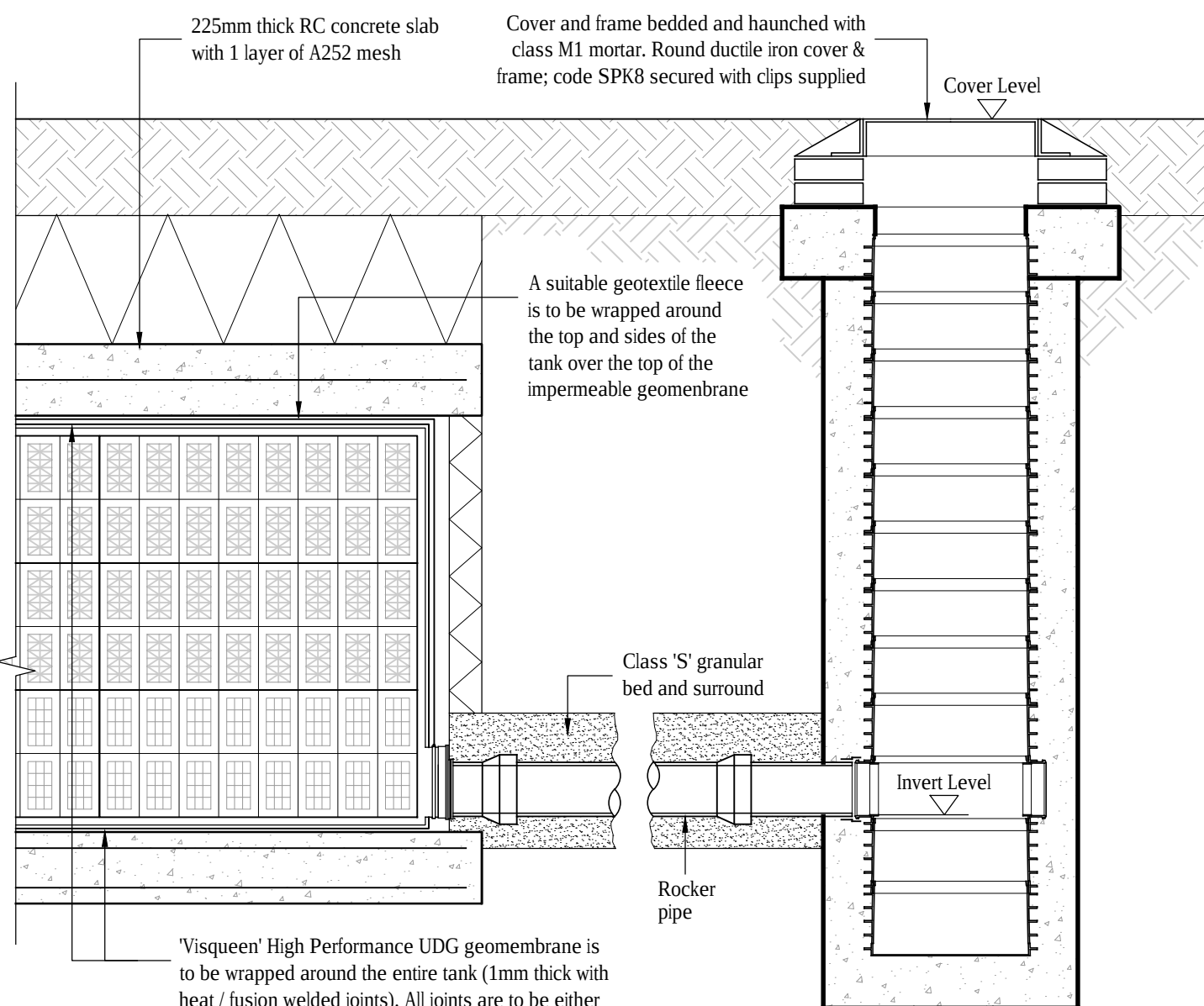


Rodding Point Installation Detail

SCALE = 1:10



Hydrobrake Chamber



SWIC Catchpit

Wavin Aquacell 'Prime' / 'Plus' Attenuation Tank

SCALE = 1:20

- Note:
1. This detail is for arrangement use only and does not reflect the actual on site levels.
 2. Refer to drainage plans for pipe arrangements, tank sizes and levels.

P1	15.01.16	Drawn	MJR
Rev.	Date	Description	Issued By

Information Only

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Client. **McCarthy & Stone**

Project Title. **Hayling Billy Site**

Drawing Title.

Typical Construction Details

Drawn by	MJR	Project No.	Drwg No. [Rev]
Scale	As Shown	3216	050 P1
Date	Jan'16		

Appendix C

Capacity Check Application
Capacity Check Response

Date: 20th January 2016

Ref: JB-3216/MJR

Southern Water
Developer Services
Sparrowgrove House
Otterbourne
Hampshire
SO21 2SW

Dear Sirs,

Re: Hayling Billy Pub

McCarthy & Stone are considering re-developing the above site we are therefore applying for a Level 1 Capacity Check.

The development is located at:-

E472177

N099756

Nearest Post Code PO11 9ED

If you have any questions please contact myself.

Yours Sincerely



Matthew Roe
Senior Civils Engineer
for Calcinotto Limited.

Enc.

Cheque £510, Capacity Check Application Form, Area Map & Site Layout

WEB : www.calcinotto.co.uk
EMAIL : admin@calcinotto.co.uk
E-FAX : +44 (0) 1202 740 650

TEL : +44 (0) 207 183 4493 +44 (0) 1202 237 237 +44 (0) 1764 752 002

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Calcinotto (Northern)
21 Comrie Street
Crieff
Perthshire
PH7 4AX



Application for Water and Wastewater Capacity Check



A. Type of capacity check required:

Please indicate the type of capacity check required (refer to guidance notes for explanations)

- ☒ **Level 1**
Preliminary capacity check
- ☐ **Level 2**
Indicative Hydraulic Assessment

B. Applicant details:

Name: MCCARTHY & STONE Contact name: MATTHEW ROE
(company name if appropriate) (if different)

Address: C/O CALCINOTTO LTD, JONSEN HOUSE
43 COMMERCIAL ROAD, POOLE Postcode: BM14 0HU

Contact details:

Daytime 'phone number: 01202 237237 Mobile: _____

Fax no: _____ Email: M.roe@calcinotto.co.uk

C. Site details:

Site/project name: FORMER MAYLING BILLY PUB

Site address: 117 ELM GROVE

MAYLING ISLAND Postcode: PO11 9ED

Please indicate type of development: ☒ Residential ☐ Commercial ☐ Industrial

Has planning permission been applied for? ☐ Yes ☒ No

Please state local planning authority: _____ Planning application no: _____

D. Development details:

Are **foul** flows to be connected to a public sewer? ☒ Yes ☐ No

Flow to be pumped? ☐ Yes ☐ No

Residential: number of properties to be connected 33

Commercial: estimated population to be connected 0

Industrial: estimated maximum trade flow (l/s) 0

Calculated foul sewer design flow (l/s): 0.196
(As per Sewers for Adoption (6th edition))

Are **surface water** flows to be connected to a public sewer?

☒ Yes ☐ No

If YES, please state the type of sewer:

☐ Combined sewer ☒ Surface water sewer

Total site area (ha) 0.327

Estimate of impermeable area to contribute surface water flows (ha)

0.147

Estimate of peak surface water run-off in two-year event (l/s)

(As per Sewers for Adoption (6th edition))

21 l/s

Datum at Lowest point on site (mAoD) ± 6.8

Do you require a water supply? ☐ Yes ☒ No

Anticipated peak flow rate _____

Anticipated continuous flow rate _____

Details of preferred point of connection: _____

BETWEEN 0701 - 1801 Foul
2750 SURFACE

If needing a non-standard connection (eg school, hotel, nursing home) please provide information on proposed fitting

Do you require a fire supply? ☐ Yes ☒ No

What type of equipment will be installed?

☐ Hydrant ☐ Sprinkler ☐ Hose reel

Required flow rate for this supply _____

E. Existing land use:

Does the site drain to an existing sewer?

Foul: ☒ Yes ☐ No

Surface water: ☐ Yes ☐ No

Does the site have an existing connection to the water mains? ☒ Yes ☐ No

What is the present impermeable area? (ha) 0.290

Please provide brief description of existing land use Public House & Car Parking

F. Proposed land use:

Please provide brief description of the development proposal (e.g. new build, conversion, number of properties)

36 NO RETIREMENT LIVING APARTMENTS

G. Attachments

All applications should include the following:

National Grid reference of site

☒ Area Map

☒ Detailed site layout

* Site boundary clearly shown

* Preferred point of connection to public water system clearly shown

H. Charges (all charges are inclusive of VAT)

Level one preliminary capacity check

Water supply or wastewater flow:

No of units	Cost (£) including 20% VAT
0 to 50	169.00
51 - 250	510.00
251 - 500	680.00

Notes:

1. Under conditions where it is deemed necessary to carry out a full pumping station survey it is advised that discussions be held with Southern Water prior to submission of the form.

Surface water capacity check:

2-year flow (l/s)	Cost (£) including 20% VAT
0 to 50	341.00
50 - 250	1,019.00
250 - 500	1,360.00

Notes:

For flows in excess of 500l/s it is advised that discussions be held with Southern Water prior to submission of this form.

Level two indicative hydraulic assessment

Water supply or wastewater flow:

No of units	Cost (£) including 20% VAT
0 to 50	256.00
51 - 250	766.00
251 - 500	1,020.00
> 500	1,276.00

Surface Water capacity check:

2-year flow (l/s)	Cost (£) including 20% VAT
0 to 50	510.00
51 - 250	1,529.00
251 - 500	2,040.00
> 500	2,550.00

For Reference:

No of units	General Housing Equivalent L/S
0 to 50	≤ 2.3
51 - 250	≤ 11.6
251 - 500	≤ 23.2
> 500	> 23.2

Terms and conditions

Failure to include any of the requested information will be deemed as an incomplete application and may result in this application being delayed/returned. This application DOES NOT mean approval has been granted. No work should commence until written approval has been given by Southern Water. In some cases the capacity check cannot be completed due to incomplete or insufficient records. In this instance, we may ask the applicant to provide surveys of drainage in the area. These would be conducted at the applicant's expense.

Checklist and declaration

☐ Drawings ☐ Correct fee

Wastewater £ 169-00

Water supply £ N/A

Surface water £ 341-00

Please make cheques payable to Southern Water Services Ltd

Total fee enclosed £ 510-00

Do you require a VAT receipt? ☒ Yes ☐ No

I confirm that to the best of my knowledge the information I have supplied is complete and correct.

Signature: 

Full name: M. J. ROE

(BLOCK CAPITALS)

Date: 19/11/2016

Position: SENIOR CIVIL ENGINEER

Please forward your complete submission to:
Developer Services, Southern Water, Sparrowgrove House, Sparrowgrove, Otterbourne, Hampshire, SO21 2SW
Phone: 0330 303 0119 Fax: 01962 716228



FOR GREEN FILE



McCarthy & Stone

ELM GROVE, HAYLING ISLAND
PROPOSED BLOCK PLAN

HGP
ARCHITECTS
PORTSMOUTH FISH MARKET ROAD
PORTSMOUTH, HAMPSHIRE, PO1 1JH
T 01705 333 333
F 01705 337 334
E HAYLING@HGPARCHITECTS.CO.UK
W HAYLING@HGPARCHITECTS.CO.UK

Scale: 1:500
Date: NOVEMBER 2015

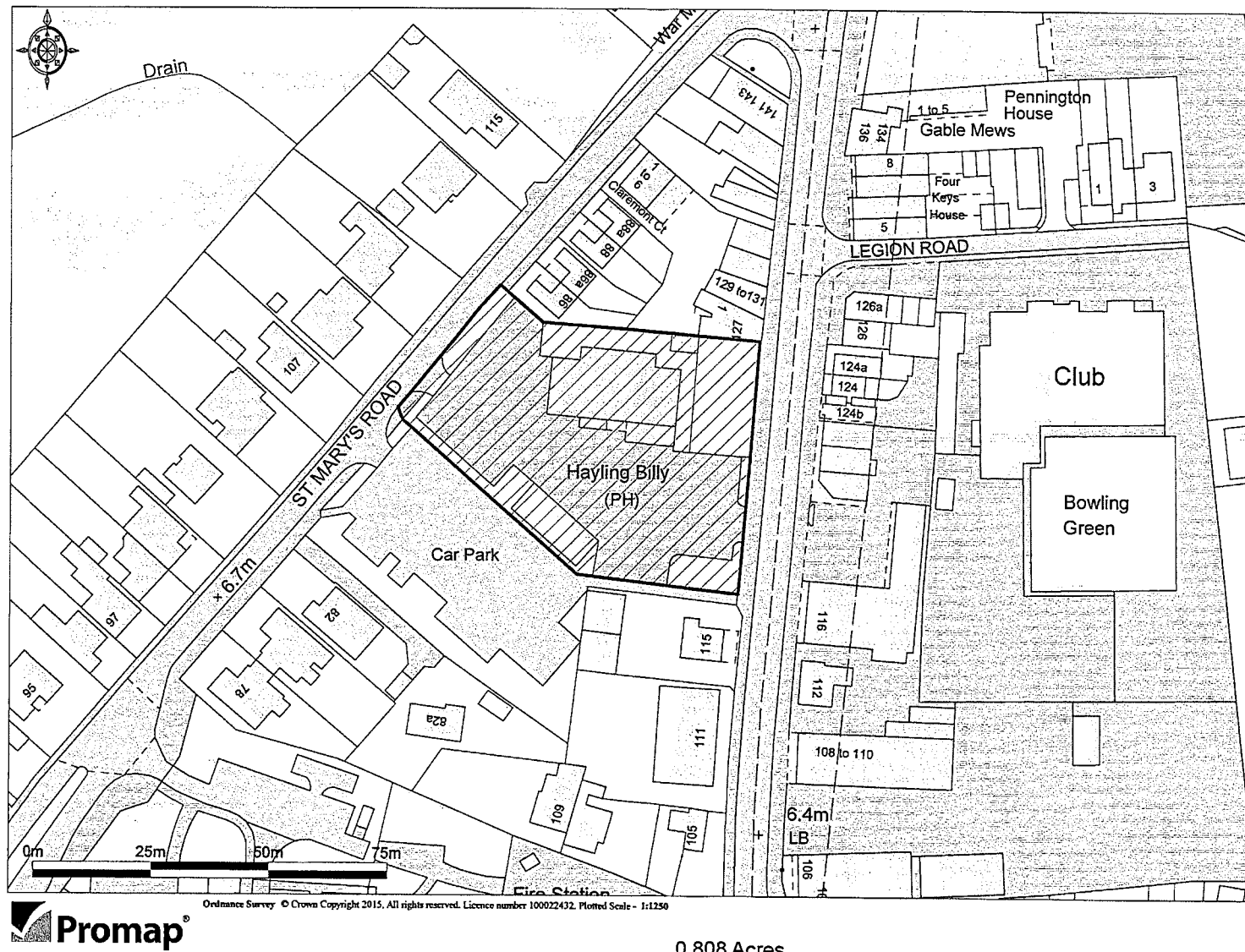
Drawn: 24

Project: SW_2267_02_AC_011

Check: 25

HGP Architects Ltd.
Company Registered
Check Status on 10/10/15

Hayling Billy Pub, 117 Elm Grove, Hayling Island, Hampshire, PO11 9ED.



AERIAL: Hayling Billy Pub, 117 Elm Grove, Hayling Island, Hampshire, PO11 9ED.



Promap

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Getmapping plc 2015. Plotted Scale - 1:1250

0.808 Acres

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Jonsen House 43 Commercial Road Poole BH14 0HU	Preliminary Assessment Hayling Billy Site Capacity Check	
Date Jan 16	Designed by MJR	
File PRELIMINARY ASSESSMENT.MDX	Checked by	
XP Solutions	Network 2015.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.800
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	150
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	30.000	0.300	100.0	0.073	5.00	0.0	0.600	o	150	
1.001	30.000	0.300	100.0	0.073	0.00	0.0	0.600	o	225	
1.002	10.000	0.059	169.5	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.50	6.310	0.073	0.0	0.0	0.0	1.00	17.8	9.9
1.001	50.00	5.88	5.935	0.146	0.0	0.0	0.0	1.31	52.0	19.8
1.002	50.00	6.05	5.635	0.146	0.0	0.0	0.0	1.00	39.8	19.8

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.073	0.073	0.073
1.001	-	-	100	0.073	0.073	0.073
1.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.146	0.146	0.146

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

1.002		6.700	5.576	0.000	0	0
-------	--	-------	-------	-------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	0	Number of Storage Structures	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

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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 Coefficient 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 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 10, 30

PN	US/MH		Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow Overflow	Overflow Act.	Water	Surcharged	Flooded
	Name	Storm							Level (m)	Depth (m)	Volume (m ³)
1.000	1	15 Winter	1	+0%	30/15 Summer	100/15 Summer			6.389	-0.071	0.000
1.001	2	15 Winter	1	+0%	100/15 Summer				6.027	-0.133	0.000
1.002	3	15 Winter	1	+0%	30/15 Summer				5.748	-0.112	0.000

PN	US/MH Name	Pipe		Flow (l/s)	Status	Level Exceeded
		Flow / Cap.	Overflow (l/s)			
1.000	1	0.53	9.1	OK		4
1.001	2	0.35	16.8	OK		
1.002	3	0.50	16.6	OK		

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 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 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 0, 10, 30

PN	US/MH		Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded
	Name	Storm							Level (m)	Depth (m)	Volume (m³)
1.000	1	15 Winter	2	+0%	30/15 Summer	100/15 Summer			6.403	-0.057	0.000
1.001	2	15 Winter	2	+0%	100/15 Summer				6.041	-0.119	0.000
1.002	3	15 Winter	2	+0%	30/15 Summer				5.768	-0.092	0.000

PN	US/MH Name	Pipe		Flow Status	Level Exceeded
		Flow / Cap.	Overflow (l/s)		
1.000	1	0.69	11.7	OK	4
1.001	2	0.45	21.6	OK	
1.002	3	0.65	21.4	OK	

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Jonsen House 43 Commercial Road Poole BH14 0HU	Preliminary Assessment Hayling Billy Site Capacity Check	
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XP Solutions	Network 2015.1	

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 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 10, 30

PN	US/MH		Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded
	Name	Storm							Level (m)	Depth (m)	Volume (m³)
1.000	1	15 Winter	30	+10%	30/15 Summer	100/15 Summer			6.640	0.180	0.000
1.001	2	15 Winter	30	+10%	100/15 Summer				6.144	-0.016	0.000
1.002	3	15 Winter	30	+10%	30/15 Summer				5.894	0.034	0.000

PN	US/MH Name	Pipe Flow / Overflow		Flow (l/s)	Status	Level Exceeded
		Cap.	(l/s)			
1.000	1	1.26		21.4	FLOOD RISK	4
1.001	2	0.91		44.0	OK	
1.002	3	1.32		43.7	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 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 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 10, 30

PN	US/MH		Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded
	Name	Storm							Level (m)	Depth (m)	Volume (m³)
1.000	1	15 Winter	100	+30%	30/15 Summer	100/15 Summer			6.912	0.452	1.831
1.001	2	15 Winter	100	+30%	100/15 Summer				6.394	0.234	0.000
1.002	3	15 Winter	100	+30%	30/15 Summer				5.968	0.108	0.000

PN	US/MH		Flow / Overflow		Pipe		Level Exceeded
	Name	Cap.	(l/s)	(l/s)	Status		
1.000	1	1.58		27.0	FLOOD		4
1.001	2	1.19		57.7	SURCHARGED		
1.002	3	1.73		57.3	SURCHARGED		



Calcinotto Limited
Jonsen House
43 Commercial Road
Poole
Dorset
BH14 0HU

CALCINOTTO & ASSOCIATES LTD	
09 FEB 2016	
FILE	
REC'D	SR
ACTION	
INFO	
COPY TO	

Developer Services
Southern Water
Sparrowgrove House
Sparrowgrove
Otterbourne
Hampshire
SO21 2SW

Tel: **0330 303 0119**
Email: **developerservices@southernwater.co.uk**

Your Ref:
JB-3216/MJR

Our Ref:
CC/002903

Date:
08 February 2016

F.A.O: Mr. Matthew Roe,

Site: Former Hayling Billy Pub, 117 Elm Grove, Hayling Island, Hampshire, PO11 9ED.

Dear Sirs,

I am now in receipt of the results of the capacity check you requested for the above development site.

FOUL WATER

Following initial investigations, there is currently adequate capacity in the local sewerage network to accommodate a foul flow of 0.8 l/s at/downstream of manhole references SZ72990701 or SZ72991801. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system.

SURFACE WATER

Following initial investigations, there is currently adequate capacity in the local sewerage network to accommodate a surface water flow of 21 l/s at manhole reference SZ72992750. Any excess surface water flows should be disposed of by an alternative means i.e. Soakaways, or any local drainage watercourses, subject to all interested parties approval.

Please note that if the excess surface water flows are to be attenuated on site, it could have a significant effect on any proposed Section 104 Agreements. Any attenuation proposals should be agreed before any works are implemented on site.

Where capacity is limited/restricted, agreement should be sought if you are to include any highway drainage within your proposals as Southern Water is not obligated to accept highway flows.

Before any connection/s are made, an application form needs to be completed and approved by Southern Water Services.

Please let me know if we can be of any further assistance in this matter.

Yours faithfully,



J. Sylvester

Developer services

Please note: -

The information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

GABLE HEAD



Appendix D

Preliminary Calculations

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Jonsen House 43 Commercial Road Poole BH14 0HU	Hayling island JB-3216	
Date April 16	Designed by MJR	
File JB-3216 Design Prelim 211-s.MDX	Checked by	
XP Solutions		Network 2015.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.500
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	0.500
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.158	4-8	0.036

Total Area Contributing (ha) = 0.194

Total Pipe Volume (m³) = 2.852

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN	Invert Level (m)	Diameter (mm)	Pipes In PN	Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	7.000	0.600	Open Manhole		1.000	6.400	100				
2	7.000	0.720	Junction		1.001	6.280	100	1.000	6.280	100	
3	7.000	0.861	Junction	0	1.002	6.139	100	1.001	6.139	100	
4	7.000	0.963	Open Manhole		1.003	6.037	100	1.002	6.037	100	
5	7.000	1.161	Junction	0	1.004	5.839	100	1.003	5.839	100	
6	7.000	1.287	Open Manhole	450	1.005	5.713	100	1.004	5.713	100	
7	7.000	0.600	Open Manhole		2.000	6.400	100				
9	7.000	0.687	Junction	0	2.001	6.313	100	2.000	6.313	100	
7	7.000	1.406	Open Manhole	450	1.006	5.594	150	1.005	5.644	100	
								2.001	6.287	100	643
8	7.000	0.600	Open Manhole		3.000	6.400	100				
9	7.000	0.632	Junction		3.001	6.368	100	3.000	6.368	100	
10	7.000	0.701	Junction	0	3.002	6.299	100	3.001	6.299	100	
11	7.000	0.600	Open Manhole	450	4.000	6.400	100				
8	7.000	1.796	Open Manhole	450	1.007	5.204	150	1.006	5.204	150	
								3.002	6.278	100	1023
								4.000	6.330	100	1075
15	7.000	0.600	Open Manhole	300	5.000	6.400	100				
16	7.000	0.919	Open Manhole		5.001	6.081	100	5.000	6.081	100	
17	7.000	1.087	Junction	0	5.002	5.913	100	5.001	5.913	100	
18	7.000	1.198	Open Manhole		5.003	5.802	150	5.002	5.852	100	
19	7.000	1.282	Junction	0	5.004	5.718	150	5.003	5.718	150	
20	7.000	1.367	Open Manhole	450	5.005	5.633	150	5.004	5.633	150	
21	7.000	1.489	Open Manhole	450	5.006	5.511	150	5.005	5.511	150	
22	7.000	1.602	Open Manhole	450	5.007	5.398	150	5.006	5.398	150	
23	6.800	1.529	Open Manhole	1200	5.008	5.271	150	5.007	5.271	150	
9	6.800	1.794	Open Manhole	1200	1.008	5.006	225	1.007	5.081	150	
								5.008	5.081	150	
10	7.000	2.048	Open Manhole	1200	1.009	4.952	225	1.008	4.952	225	
	7.000	2.070	Open Manhole	0		OUTFALL		1.009	4.930	225	

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Jonsen House 43 Commercial Road Poole BH14 0HU	Hayling island JB-3216	
Date April 16	Designed by MJR	
File JB-3216 Design Prelim 211-s.MDX	Checked by	
XP Solutions	Network 2015.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	100	1	7.000	6.400	0.500	Open Manhole	300
1.001	o	100	2	7.000	6.280	0.620	Junction	
1.002	o	100	3	7.000	6.139	0.761	Junction	
1.003	o	100	4	7.000	6.037	0.863	Open Manhole	450
1.004	o	100	5	7.000	5.839	1.061	Junction	
1.005	o	100	6	7.000	5.713	1.187	Open Manhole	450
2.000	o	100	7	7.000	6.400	0.500	Open Manhole	300
2.001	o	100	9	7.000	6.313	0.587	Junction	
1.006	o	150	7	7.000	5.594	1.256	Open Manhole	450
3.000	o	100	8	7.000	6.400	0.500	Open Manhole	300
3.001	o	100	9	7.000	6.368	0.532	Junction	
3.002	o	100	10	7.000	6.299	0.601	Junction	
4.000	o	100	11	7.000	6.400	0.500	Open Manhole	450
1.007	o	150	8	7.000	5.204	1.646	Open Manhole	450
5.000	o	100	15	7.000	6.400	0.500	Open Manhole	300
5.001	o	100	16	7.000	6.081	0.819	Open Manhole	450
5.002	o	100	17	7.000	5.913	0.987	Junction	
5.003	o	150	18	7.000	5.802	1.048	Open Manhole	450
5.004	o	150	19	7.000	5.718	1.132	Junction	
5.005	o	150	20	7.000	5.633	1.217	Open Manhole	450

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	7.012	58.5	2	7.000	6.280	0.620	Junction	
1.001	8.268	58.5	3	7.000	6.139	0.761	Junction	
1.002	5.961	58.5	4	7.000	6.037	0.863	Open Manhole	450
1.003	11.584	58.5	5	7.000	5.839	1.061	Junction	
1.004	7.361	58.5	6	7.000	5.713	1.187	Open Manhole	450
1.005	4.036	58.5	7	7.000	5.644	1.256	Open Manhole	450
2.000	5.072	58.5	9	7.000	6.313	0.587	Junction	
2.001	1.566	58.5	7	7.000	6.287	0.613	Open Manhole	450
1.006	22.780	58.5	8	7.000	5.204	1.646	Open Manhole	450
3.000	1.895	58.5	9	7.000	6.368	0.532	Junction	
3.001	4.032	58.5	10	7.000	6.299	0.601	Junction	
3.002	1.234	58.5	8	7.000	6.278	0.622	Open Manhole	450
4.000	4.112	58.5	8	7.000	6.330	0.570	Open Manhole	450
1.007	12.268	99.2	9	6.800	5.081	1.569	Open Manhole	1200
5.000	18.634	58.5	16	7.000	6.081	0.819	Open Manhole	450
5.001	9.868	58.5	17	7.000	5.913	0.987	Junction	
5.002	3.530	58.5	18	7.000	5.852	1.048	Open Manhole	450
5.003	4.927	58.5	19	7.000	5.718	1.132	Junction	
5.004	8.460	99.7	20	7.000	5.633	1.217	Open Manhole	450
5.005	12.144	99.7	21	7.000	5.511	1.339	Open Manhole	450

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.006	o	150	21	7.000	5.511	1.339	Open Manhole	450
5.007	o	150	22	7.000	5.398	1.452	Open Manhole	450
5.008	o	150	23	6.800	5.271	1.379	Open Manhole	1200
1.008	o	225	9	6.800	5.006	1.569	Open Manhole	1200
1.009	o	225	10	7.000	4.952	1.823	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.006	11.347	99.7	22	7.000	5.398	1.452	Open Manhole	450
5.007	12.647	99.7	23	6.800	5.271	1.379	Open Manhole	1200
5.008	6.320	33.2	9	6.800	5.081	1.569	Open Manhole	1200
1.008	9.043	168.2	10	7.000	4.952	1.823	Open Manhole	1200
1.009	3.686	168.2		7.000	4.930	1.845	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.003	0.003	0.003
	User	-	100	0.001	0.001	0.004
1.001	User	-	100	0.004	0.004	0.004
	User	-	100	0.009	0.009	0.012
1.002	User	-	100	0.004	0.004	0.004
1.003	User	-	100	0.002	0.002	0.002
1.004	User	-	100	0.004	0.004	0.004
	User	-	100	0.006	0.006	0.010
	User	-	100	0.003	0.003	0.013
1.005	User	-	100	0.004	0.004	0.004
2.000	User	-	100	0.003	0.003	0.003
	User	-	100	0.002	0.002	0.005
2.001	User	-	100	0.004	0.004	0.004
	User	-	100	0.001	0.001	0.006
1.006	-	-	100	0.000	0.000	0.000
3.000	User	-	100	0.006	0.006	0.006
3.001	User	-	100	0.006	0.006	0.006
	User	-	100	0.002	0.002	0.009
3.002	User	-	100	0.002	0.002	0.002
4.000	User	-	100	0.007	0.007	0.007
	User	-	100	0.009	0.009	0.016
1.007	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.006	0.006	0.006
5.001	User	-	100	0.004	0.004	0.004
	User	-	100	0.000	0.000	0.004
5.002	User	-	100	0.008	0.008	0.008
	User	-	100	0.001	0.001	0.010
	User	-	100	0.004	0.004	0.014
5.003	User	-	100	0.005	0.005	0.005
	User	-	100	0.005	0.005	0.010
5.004	User	-	100	0.004	0.004	0.004
	User	-	100	0.004	0.004	0.007
5.005	User	-	100	0.008	0.008	0.008
	User	-	100	0.004	0.004	0.012
5.006	User	-	100	0.004	0.004	0.004
5.007	User	-	100	0.003	0.003	0.003
	User	-	100	0.002	0.002	0.004
5.008	User	-	100	0.040	0.040	0.040
1.008	User	-	100	0.011	0.011	0.011
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.194	0.194	0.194

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009		7.000	4.930	0.000	0	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Storage Structures	1
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Pump Manhole: 10, DS/PN: 1.009, Volume (m³): 2.6

Invert Level (m) 4.952

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)
0.200	5.0000	1.400	21.0000	2.600	21.0000	3.800	21.0000	5.000	21.0000
0.400	10.0000	1.600	21.0000	2.800	21.0000	4.000	21.0000	5.200	21.0000
0.600	21.0000	1.800	21.0000	3.000	21.0000	4.200	21.0000	5.400	21.0000
0.800	21.0000	2.000	21.0000	3.200	21.0000	4.400	21.0000	5.600	21.0000
1.000	21.0000	2.200	21.0000	3.400	21.0000	4.600	21.0000	5.800	21.0000
1.200	21.0000	2.400	21.0000	3.600	21.0000	4.800	21.0000	6.000	21.0000

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Storage Structures for Storm

Cellular Storage Manhole: 10, DS/PN: 1.009

Invert Level (m) 4.952 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	25.0	0.0	1.800	0.0	0.0	3.600	0.0	0.0
0.200	25.0	0.0	2.000	0.0	0.0	3.800	0.0	0.0
0.400	25.0	0.0	2.200	0.0	0.0	4.000	0.0	0.0
0.600	25.0	0.0	2.400	0.0	0.0	4.200	0.0	0.0
0.800	25.0	0.0	2.600	0.0	0.0	4.400	0.0	0.0
1.000	0.0	0.0	2.800	0.0	0.0	4.600	0.0	0.0
1.200	0.0	0.0	3.000	0.0	0.0	4.800	0.0	0.0
1.400	0.0	0.0	3.200	0.0	0.0	5.000	0.0	0.0
1.600	0.0	0.0	3.400	0.0	0.0			

Volume Summary (Static)

Length Calculations based on Centre-Centre

Storage			
Pipe	USMH	Structure	Total
Number	Name	Volume (m³)	Volume (m³)
1.000	1	0.000	0.000
1.001	2	0.000	0.000
1.002	3	0.000	0.000
1.003	4	0.000	0.000
1.004	5	0.000	0.000
1.005	6	0.000	0.000
2.000	7	0.000	0.000
2.001	9	0.000	0.000
1.006	7	0.000	0.000
3.000	8	0.000	0.000
3.001	9	0.000	0.000
3.002	10	0.000	0.000
4.000	11	0.000	0.000
1.007	8	0.000	0.000
5.000	15	0.000	0.000
5.001	16	0.000	0.000
5.002	17	0.000	0.000
5.003	18	0.000	0.000
5.004	19	0.000	0.000
5.005	20	0.000	0.000
5.006	21	0.000	0.000
5.007	22	0.000	0.000
5.008	23	0.000	0.000
1.008	9	0.000	0.000
1.009	10	20.583	20.583
Total		20.583	20.583

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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 Coefficient 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 1 Number of Storage Structures 1 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 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 20, 30

PN	US/MH		Event	US/CL (m)	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Pipe Flow (l/s)
	Name				Level (m)	Depth (m)	Volume (m³)				
1.000	1	15 minute	1 year Winter I+0%	7.000	6.418	-0.082	0.000	0.08		0.001	0.5
1.001	2	15 minute	1 year Winter I+0%	7.000	6.313	-0.067	0.000	0.24		0.034	1.9
1.002	3	15 minute	1 year Winter I+0%	7.000	6.175	-0.064	0.000	0.28		0.039	2.3
1.003	4	15 minute	1 year Winter I+0%	7.000	6.076	-0.061	0.000	0.33		0.013	2.4
1.004	5	15 minute	1 year Winter I+0%	7.000	5.888	-0.051	0.000	0.48		0.054	3.8
1.005	6	15 minute	1 year Winter I+0%	7.000	5.771	-0.042	0.000	0.63		0.020	4.2
2.000	7	15 minute	1 year Winter I+0%	7.000	6.422	-0.078	0.000	0.10		0.001	0.7
2.001	9	15 minute	1 year Winter I+0%	7.000	6.350	-0.063	0.000	0.29		0.039	1.3
1.006	7	15 minute	1 year Winter I+0%	7.000	5.645	-0.099	0.000	0.25		0.009	5.5
3.000	8	15 minute	1 year Winter I+0%	7.000	6.426	-0.074	0.000	0.15		0.001	0.8
3.001	9	15 minute	1 year Winter I+0%	7.000	6.400	-0.067	0.000	0.23		0.031	1.7
3.002	10	15 minute	1 year Winter I+0%	7.000	6.347	-0.051	0.000	0.47		0.053	1.9
4.000	11	15 minute	1 year Summer I+0%	7.000	6.438	-0.062	0.000	0.32		0.005	2.1
1.007	8	15 minute	1 year Winter I+0%	7.000	5.287	-0.067	0.000	0.58		0.037	9.4
5.000	15	15 minute	1 year Winter I+0%	7.000	6.421	-0.079	0.000	0.10		0.001	0.8
5.001	16	15 minute	1 year Winter I+0%	7.000	6.108	-0.073	0.000	0.16		0.008	1.2
5.002	17	15 minute	1 year Winter I+0%	7.000	5.957	-0.056	0.000	0.39		0.048	2.7
5.003	18	15 minute	1 year Winter I+0%	7.000	5.849	-0.104	0.000	0.20		0.008	3.7
5.004	19	15 minute	1 year Winter I+0%	7.000	5.769	-0.099	0.000	0.25		0.060	4.5
5.005	20	15 minute	1 year Winter I+0%	7.000	5.695	-0.088	0.000	0.36		0.039	5.8
5.006	21	15 minute	1 year Winter I+0%	7.000	5.576	-0.085	0.000	0.39		0.041	6.2
5.007	22	15 minute	1 year Winter I+0%	7.000	5.464	-0.083	0.000	0.41		0.042	6.6
5.008	23	15 minute	1 year Winter I+0%	6.800	5.338	-0.083	0.000	0.41		0.102	10.8
1.008	9	30 minute	1 year Winter I+0%	6.800	5.270	0.039	0.000	0.52		0.493	17.0
1.009	10	30 minute	1 year Winter I+0%	7.000	5.260	0.083	0.000	0.29		7.977	7.7

US/MH		
PN	Name	Status
1.000	1	OK
1.001	2	OK*
1.002	3	OK*
1.003	4	OK

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

US/MH		
PN	Name	Status
1.004	5	OK*
1.005	6	OK
2.000	7	OK
2.001	9	OK*
1.006	7	OK
3.000	8	OK
3.001	9	OK*
3.002	10	OK*
4.000	11	OK
1.007	8	OK
5.000	15	OK
5.001	16	OK
5.002	17	OK*
5.003	18	OK
5.004	19	OK*
5.005	20	OK
5.006	21	OK
5.007	22	OK
5.008	23	OK
1.008	9	SURCHARGED
1.009	10	SURCHARGED

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 1 Number of Storage Structures 1 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 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 20, 30

US/MH		Water Surcharged Flooded							Pipe	
PN	Name	Event	US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Flow (l/s)
1.000	1 15 minute	30 year Winter I+20%	7.000	6.458	-0.042	0.000	0.22		0.004	1.6
1.001	2 15 minute	30 year Winter I+20%	7.000	6.380	0.000	0.000	0.77		0.209	6.1
1.002	3 30 minute	30 year Winter I+20%	7.000	6.239	0.000	0.000	0.71		0.236	5.6
1.003	4 15 minute	30 year Winter I+20%	7.000	6.380	0.243	0.000	0.81		0.099	6.1
1.004	5 30 minute	30 year Winter I+20%	7.000	5.939	0.000	0.000	1.02		0.462	8.1
1.005	6 15 minute	30 year Winter I+20%	7.000	6.159	0.346	0.000	1.44		0.126	9.7
2.000	7 15 minute	30 year Winter I+20%	7.000	6.438	-0.062	0.000	0.31		0.002	2.1
2.001	9 15 minute	30 year Summer I+20%	7.000	6.391	-0.022	0.000	0.96		0.089	4.4
1.006	7 15 minute	30 year Winter I+20%	7.000	6.028	0.284	0.000	0.60		0.096	13.2
3.000	8 15 minute	30 year Winter I+20%	7.000	6.470	-0.030	0.000	0.44		0.005	2.2
3.001	9 15 minute	30 year Winter I+20%	7.000	6.464	-0.003	0.000	0.74		0.103	5.4
3.002	10 30 minute	30 year Winter I+20%	7.000	6.399	0.000	0.000	1.22		0.122	4.9
4.000	11 15 minute	30 year Winter I+20%	7.000	6.476	-0.024	0.000	0.93		0.011	6.3
1.007	8 30 minute	30 year Winter I+20%	7.000	5.908	0.554	0.000	1.30		0.506	21.0
5.000	15 15 minute	30 year Winter I+20%	7.000	6.437	-0.063	0.000	0.30		0.002	2.3
5.001	16 15 minute	30 year Winter I+20%	7.000	6.227	0.046	0.000	0.51		0.063	3.8
5.002	17 30 minute	30 year Winter I+20%	7.000	6.013	0.000	0.000	1.00		0.286	6.8
5.003	18 15 minute	30 year Winter I+20%	7.000	6.164	0.212	0.000	0.62		0.083	11.3
5.004	19 30 minute	30 year Winter I+20%	7.000	5.868	0.000	0.000	0.60		0.449	10.7
5.005	20 15 minute	30 year Winter I+20%	7.000	6.119	0.336	0.000	0.93		0.222	15.0
5.006	21 15 minute	30 year Winter I+20%	7.000	6.035	0.374	0.000	0.91		0.289	14.6
5.007	22 30 minute	30 year Winter I+20%	7.000	5.948	0.400	0.000	0.83		0.279	13.4
5.008	23 30 minute	30 year Winter I+20%	6.800	5.875	0.454	0.000	0.88		0.887	22.8
1.008	9 30 minute	30 year Winter I+20%	6.800	5.825	0.594	0.000	1.39		1.214	45.4
1.009	10 30 minute	30 year Winter I+20%	7.000	5.798	0.621	0.000	0.78		21.122	21.0

US/MH		
PN	Name	Status
1.000	1	OK
1.001	2	SURCHARGED*
1.002	3	SURCHARGED*
1.003	4	SURCHARGED

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

US/MH		
PN	Name	Status
1.004	5	SURCHARGED*
1.005	6	SURCHARGED
2.000	7	OK
2.001	9	OK*
1.006	7	SURCHARGED
3.000	8	OK
3.001	9	OK*
3.002	10	SURCHARGED*
4.000	11	OK
1.007	8	SURCHARGED
5.000	15	OK
5.001	16	SURCHARGED
5.002	17	SURCHARGED*
5.003	18	SURCHARGED
5.004	19	SURCHARGED*
5.005	20	SURCHARGED
5.006	21	SURCHARGED
5.007	22	SURCHARGED
5.008	23	SURCHARGED
1.008	9	SURCHARGED
1.009	10	SURCHARGED

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 1

Number of Storage Structures 1

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

DVD Status OFF

Analysis Timestep

Fine Inertia Status OFF

DTS Status ON

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 20, 30

US/MH						Water Surcharged Flooded				Pipe	
PN	Name	Event	US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Flow (l/s)	
1.000	1	30 minute 100 year Winter I+30%	7.000	6.924	0.424	0.000	0.23		0.037	1.6	
1.001	2	30 minute 100 year Winter I+30%	7.000	6.380	0.000	0.000	0.74		0.690	5.9	
1.002	3	120 minute 100 year Winter I+30%	7.000	6.239	0.000	0.000	0.45		0.281	3.6	
1.003	4	30 minute 100 year Winter I+30%	7.000	6.897	0.761	0.000	0.78		0.181	5.8	
1.004	5	120 minute 100 year Winter I+30%	7.000	5.939	0.000	0.000	0.72		0.578	5.7	
1.005	6	30 minute 100 year Winter I+30%	7.000	6.852	1.039	0.000	1.32		0.236	8.9	
2.000	7	30 minute 100 year Winter I+30%	7.000	6.832	0.332	0.000	0.33		0.030	2.3	
2.001	9	30 minute 100 year Winter I+30%	7.000	6.413	0.000	0.000	1.00		0.550	4.6	
1.006	7	30 minute 100 year Winter I+30%	7.000	6.827	1.084	0.000	0.58		0.234	12.7	
3.000	8	30 minute 100 year Winter I+30%	7.000	6.810	0.310	0.000	0.48		0.029	2.4	
3.001	9	30 minute 100 year Winter I+30%	7.000	6.468	0.000	0.000	0.82		0.450	6.0	
3.002	10	30 minute 100 year Winter I+30%	7.000	6.399	0.000	0.000	1.68		0.531	6.8	
4.000	11	30 minute 100 year Winter I+30%	7.000	6.809	0.309	0.000	0.99		0.064	6.7	
1.007	8	30 minute 100 year Winter I+30%	7.000	6.801	1.447	0.000	1.60		0.684	25.8	
5.000	15	30 minute 100 year Winter I+30%	7.000	6.940	0.440	0.000	0.32		0.038	2.4	
5.001	16	30 minute 100 year Winter I+30%	7.000	6.932	0.750	0.000	0.47		0.278	3.5	
5.002	17	120 minute 100 year Winter I+30%	7.000	6.013	0.000	0.000	0.62		0.507	4.2	
5.003	18	30 minute 100 year Winter I+30%	7.000	6.911	0.958	0.000	0.54		0.201	9.8	
5.004	19	120 minute 100 year Winter I+30%	7.000	5.868	0.000	0.000	0.36		0.694	6.5	
5.005	20	30 minute 100 year Winter I+30%	7.000	6.887	1.104	0.000	0.86		0.344	13.8	
5.006	21	30 minute 100 year Winter I+30%	7.000	6.860	1.199	0.000	0.93		0.420	14.9	
5.007	22	30 minute 100 year Winter I+30%	7.000	6.832	1.285	0.000	1.00		0.420	16.2	
5.008	23	30 minute 100 year Winter I+30%	6.800	6.800	1.379	0.157	1.13		2.088	29.3	
1.008	9	30 minute 100 year Winter I+30%	6.800	6.766	1.535	0.000	1.77		2.278	57.7	
1.009	10	30 minute 100 year Winter I+30%	7.000	6.740	1.563	0.000	0.78		22.912	21.0	

US/MH		
PN	Name	Status
1.000	1	FLOOD RISK
1.001	2	SURCHARGED*
1.002	3	SURCHARGED*
1.003	4	FLOOD RISK

Calcinotto		Page 14
Jonsen House 43 Commercial Road Poole BH14 0HU	Hayling island JB-3216	
Date April 16	Designed by MJR	
File JB-3216 Design Prelim 211-s.MDX	Checked by	
XP Solutions	Network 2015.1	

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

US/MH		
PN	Name	Status
1.004	5	SURCHARGED*
1.005	6	FLOOD RISK
2.000	7	FLOOD RISK
2.001	9	SURCHARGED*
1.006	7	FLOOD RISK
3.000	8	FLOOD RISK
3.001	9	SURCHARGED*
3.002	10	SURCHARGED*
4.000	11	FLOOD RISK
1.007	8	FLOOD RISK
5.000	15	FLOOD RISK
5.001	16	FLOOD RISK
5.002	17	SURCHARGED*
5.003	18	FLOOD RISK
5.004	19	SURCHARGED*
5.005	20	FLOOD RISK
5.006	21	FLOOD RISK
5.007	22	FLOOD RISK
5.008	23	FLOOD
1.008	9	FLOOD RISK
1.009	10	FLOOD RISK