Sandown Pathfinder

Technical Report Appendices

September 2022

from Southern Water

Appendix A – Sandown Technical Group

Southern Water have set up a technical group with prospective partnerships so that we can discuss some of the opportunities to manage surface water and rainfall better in the Sandown catchment.

- W. Jones, Environment Agency
- J. Brewer, Isle of White Council
- K. Herbert, Southern Water
- R. McTaggart, Southern Water
- P. M. Green, Southern Water
- A. Potts, Southern Water

Appendix B – How does Urban Drainage Work?

B.1 The Development of the Urban Drainage System

Victorian drainage – single pipe solution

The modern built sewerage network began to appear in the mid-19th century. Overcrowded cities had no means to control the disposal of wastewater. Rivers were overloaded and public health was under threat. Over the next 70 – 100 years thousands of kilometres of sewers were laid. These combined sewers, as we know them today not only took wastewater from homes but also rainfall runoff from paved and roofed area.

Roofs and Paved areas (Urbanisation) and the provision of artificial drainage, or sewer systems, has a twofold effect on the natural drainage process. Firstly, it reduces infiltration thereby increasing the volume of run-off. Secondly, artificial surfaces, pipes and channels convey run-off more rapidly, making drainage areas more responsive to short duration/high intensity storms. This two-fold effect significantly changes the rates of run-off, by a factor of 10 or more when compared to a natural drainage system.

In addition to the intensification of peak flow, the single pipe system mixes untreated wastewater and surface water runoff. Conveyance capacity and disposal capacity at wastewater pumping stations and treatment works has traditionally been limited such that during heavy rainfall (to protect life and property) CSOs operate to discharge a mixture of 'clean' surface runoff and screened untreated or partly treated wastewater, see Figure 1.

Early 20th Century drainage – two pipe solution

With the advent of modern sewers and cleaner streets it became feasible to separately drain the two flows, wastewater and surface water. Between the first and second World Wars the building of new combined systems declined in favour of the new separate systems. The roofs and paved area were drained by a surface water system and the wastewater was drained by a foul water system. These foul water systems, from new developments would typically connect to their older combined systems for conveyance and disposal at wastewater treatment works. Surface water systems would discharge direct to receiving waters (water courses, estuaries and coastal waters). Although separate systems removed the need to install new overflows, the rapid collection and conveyance of rainwater away from where it fell, continues to cause problems particularly in intense storms.

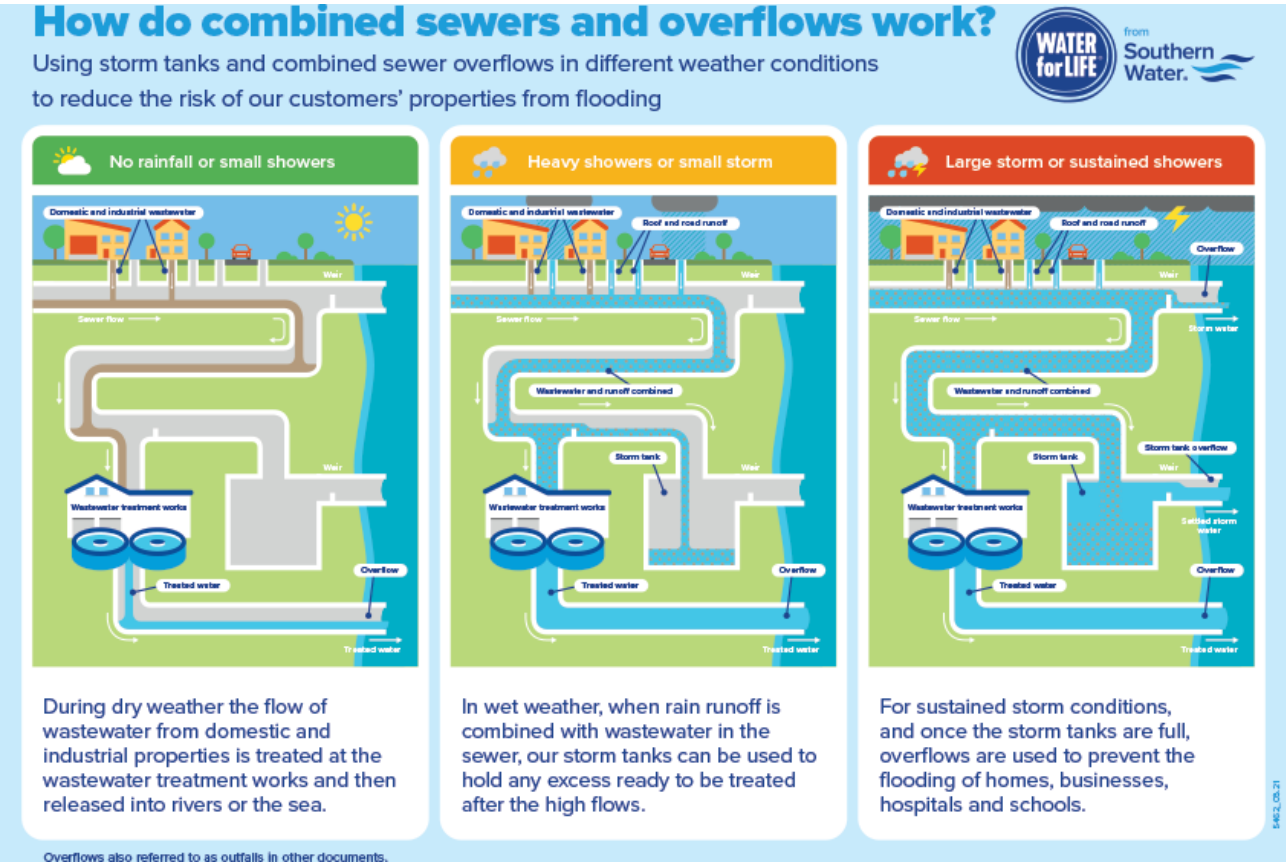


Figure 1– How do combined sewers and overflows work

Late 20th Century drainage – sustainable drainage

In the last 30 years planning regulation has changed and there is now a requirement to reduce peak runoff rate from urbanized areas. Flows from new developments are restricted to 'greenfield' runoff i.e., a rate equivalent to that of a green field and are typically built with a SuDs. These systems closely mimic a natural drainage system.

Retrofitting sustainable drainage

Homes and paved areas drained by combined sewers can be retrofitted with a range of SuDS features which either 'slow the flow' or fully disconnect the surface water flow from the combined sewer system. Both methods reduce the intensity of the peak flows to a more consistent level and mimic natural drainage systems.

By using sustainable drainage systems, they can also reduce flooding in the catchment, increase infiltration to replenish ground water systems and restore capacity in the network. They also reduce pressure and therefore increase the asset life of existing infrastructure. This also results in CSOs operating less often with more flow being treated at wastewater treatment works before discharge to the environment.

B.2 The Contribution of Legacy Housing

Legacy housing are houses that are connected to the combined system. As you can see from Figure 2, only 13% of the water that falls on a home with sustainable drainage will drain to the sewer therefore significantly reducing the contribution to, pressure on and risk to the downstream assets.

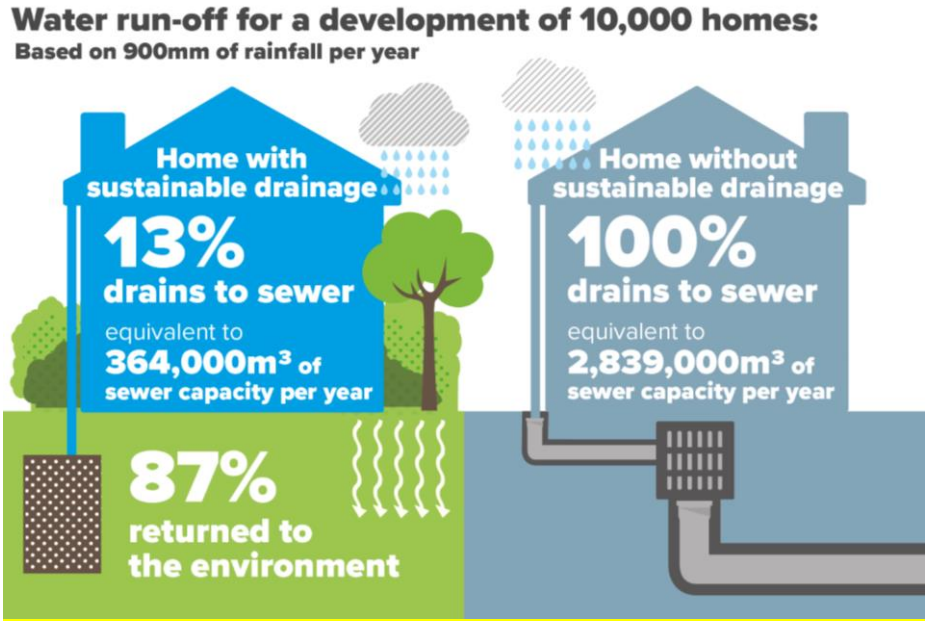


Figure 2 – The impact of legacy drainage systems

B.3 Highway Drainage System

Road or Highway drainage i.e., road gullies, also connect to surface water systems. Often this is the same surface water system that takes roof drainage into the single pipe/combined system described in Appendix B – How does Urban Drainage Work?.

When rain falls on the impermeable highway areas this can contribute to rapid increases in flow to the drainage system an overwhelm it. In particularly intense storms and/or if gullies are blocked then overland flow can occur. This overland flow can cause flooding or allow rainwater to enter combined sewers which are not always designed for these extreme flows.

B.4 Internal Drainage Board

Across England there are a number of IDBs who work in partnership with local councils, the Environment Agency and other local partners to reduce the risk of flooding to agricultural, residential and industrial land, and are overseen by the Department for the Environment, Food and Rural (DEFRA). They carry out an annual programme of maintenance works to ensure water levels are kept at an appropriate and safe level.

Appendix C – Building a Holistic View of a Drainage Catchment for Storm Water Management

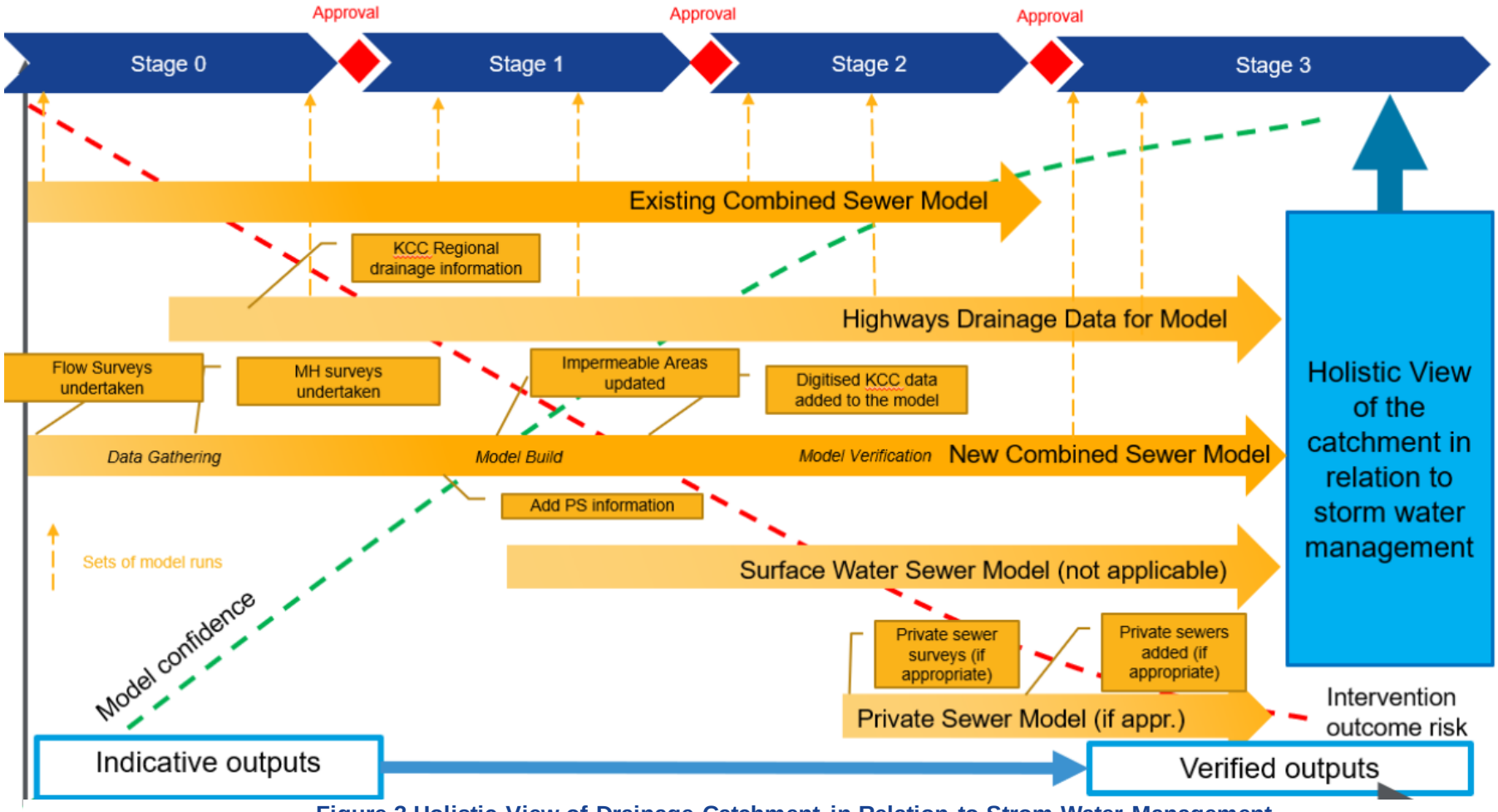
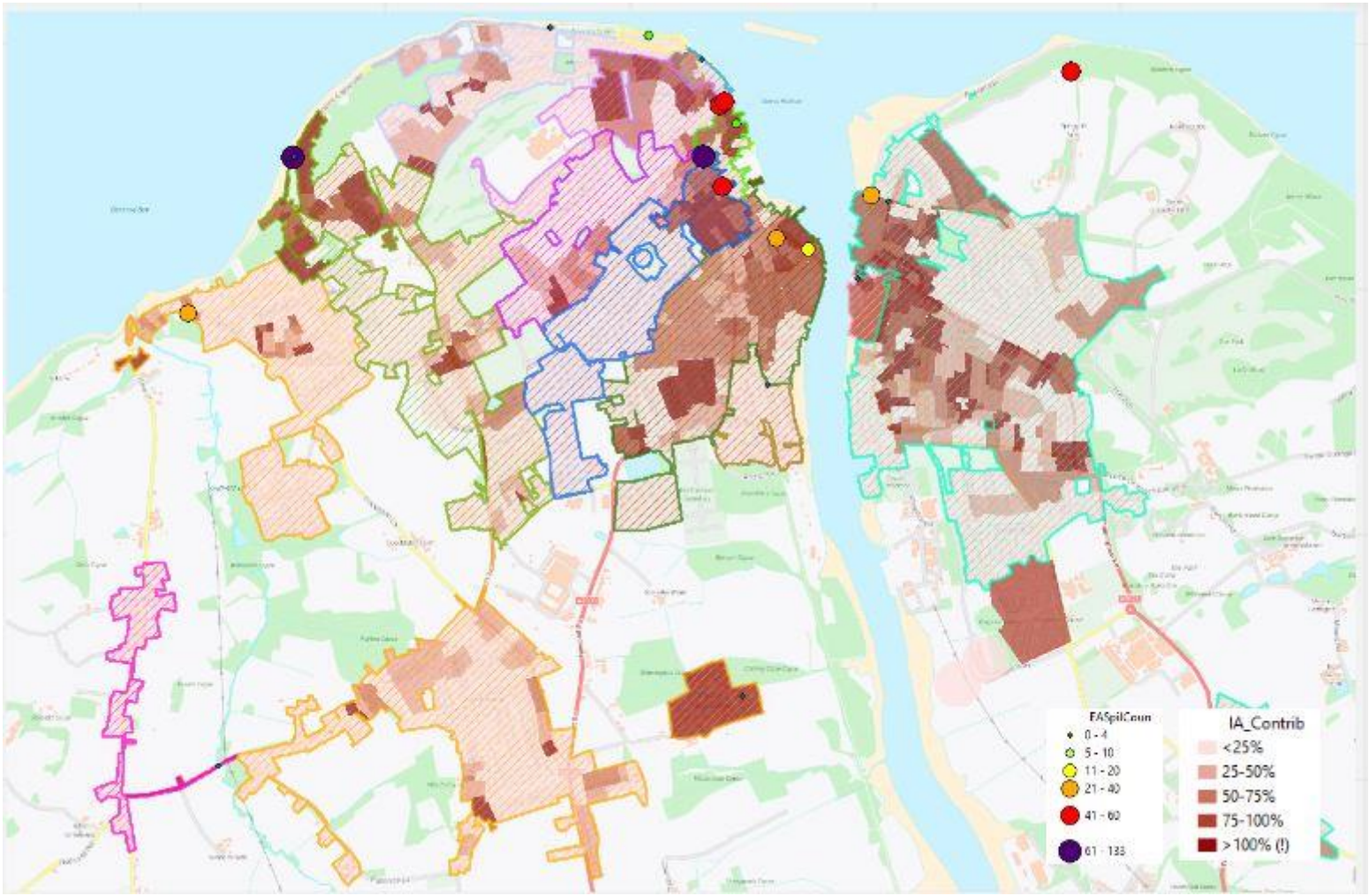


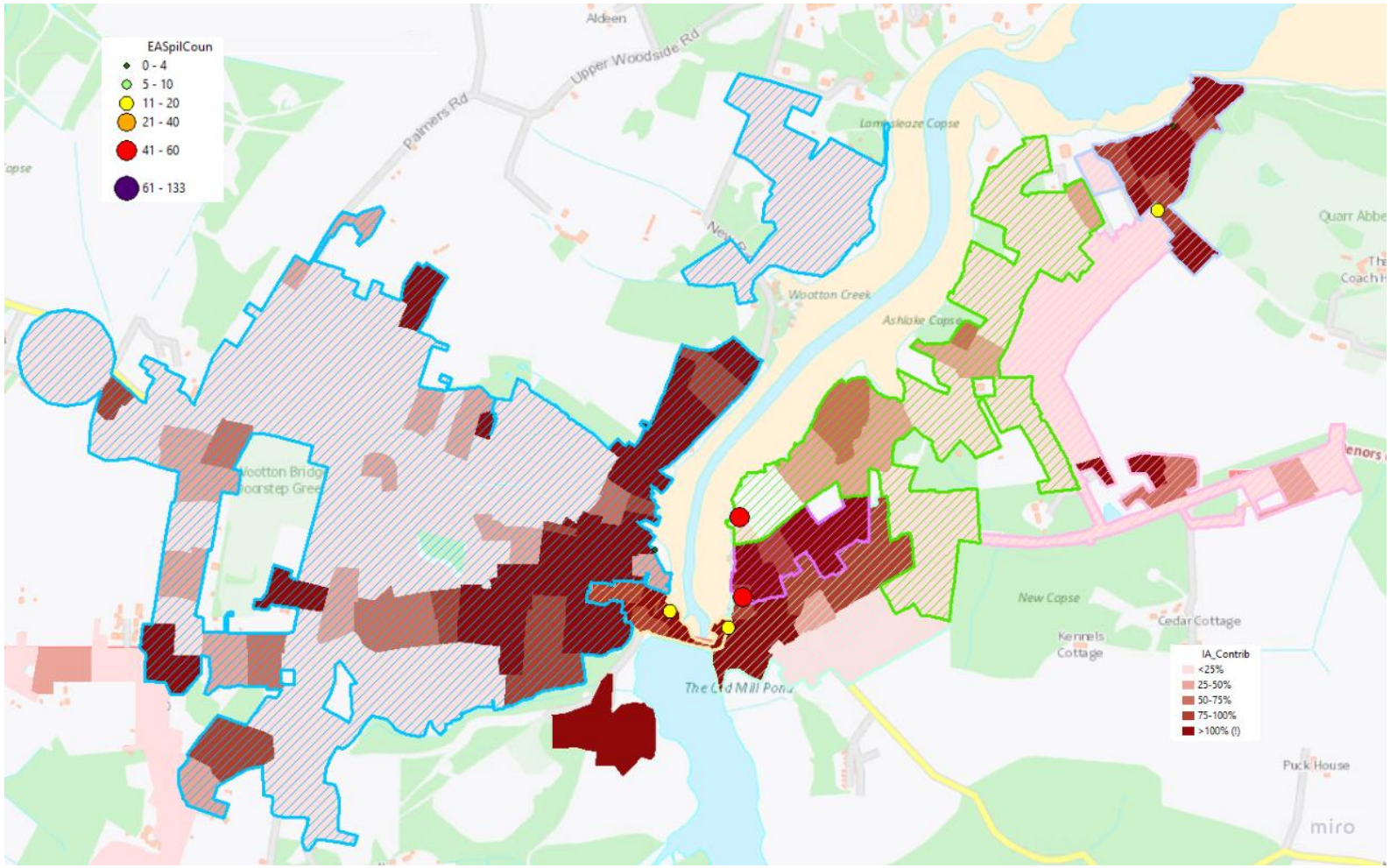
Figure 3 Holistic View of Drainage Catchment in Relation to Strom Water Management

Appendix D – Urban Area Characterisation Diagrams

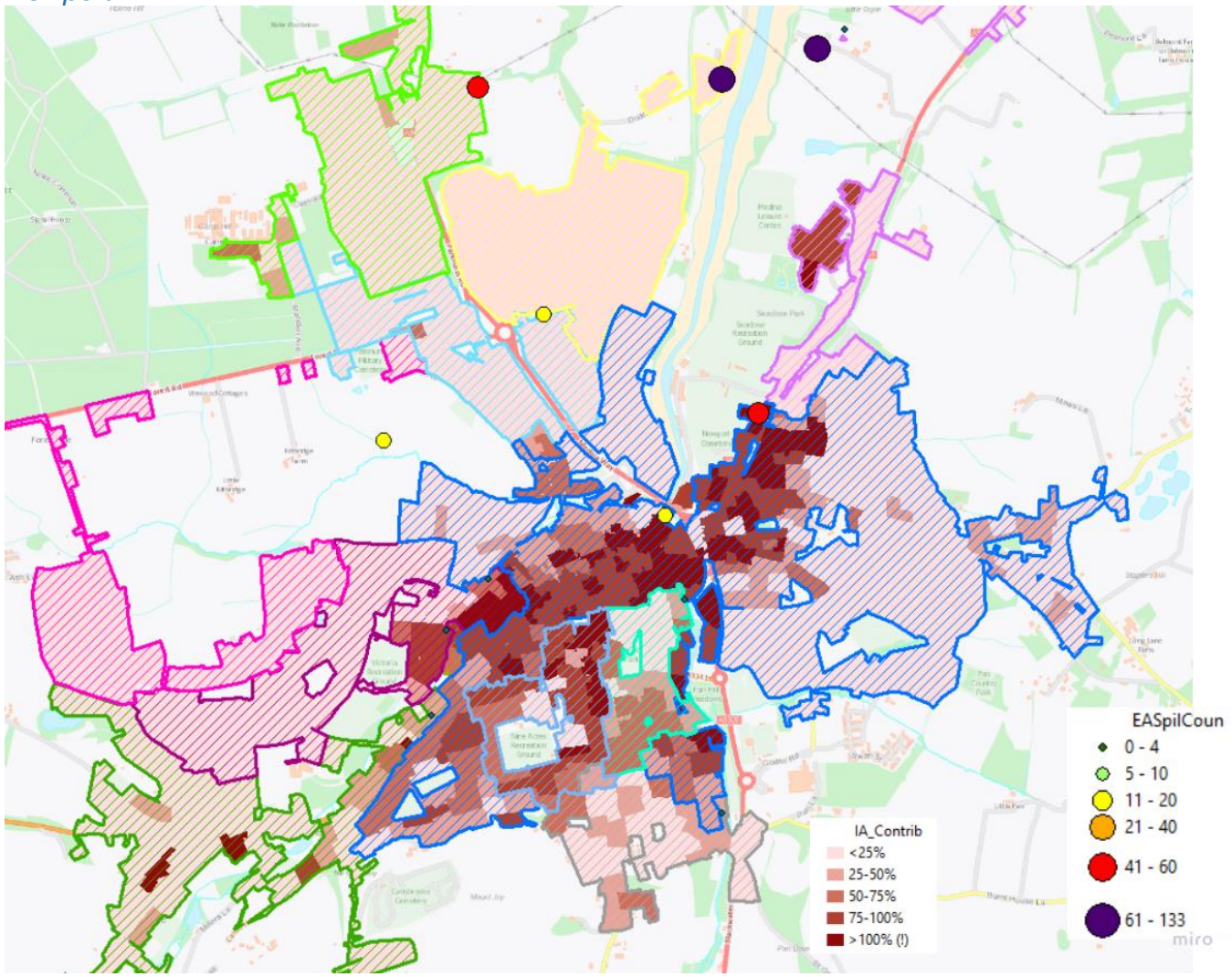
Cowes



Fishbourne


EASpilCoun
0 - 4
5 - 10
11 - 20
21 - 40
41 - 60
61 - 133
Aldeen
Upper Woodside Rd
Palmers Rd
Lamsleaze Copse
Wootton Creek
Ashlake Copse
Quarr Abbe
New Copse
Cedar Cottage
Kennels Cottage
The Old Mill Pond
Puck House
IA_Contrib
<25%
25-50%
50-75%
75-100%
>100% (!)
miro

Newport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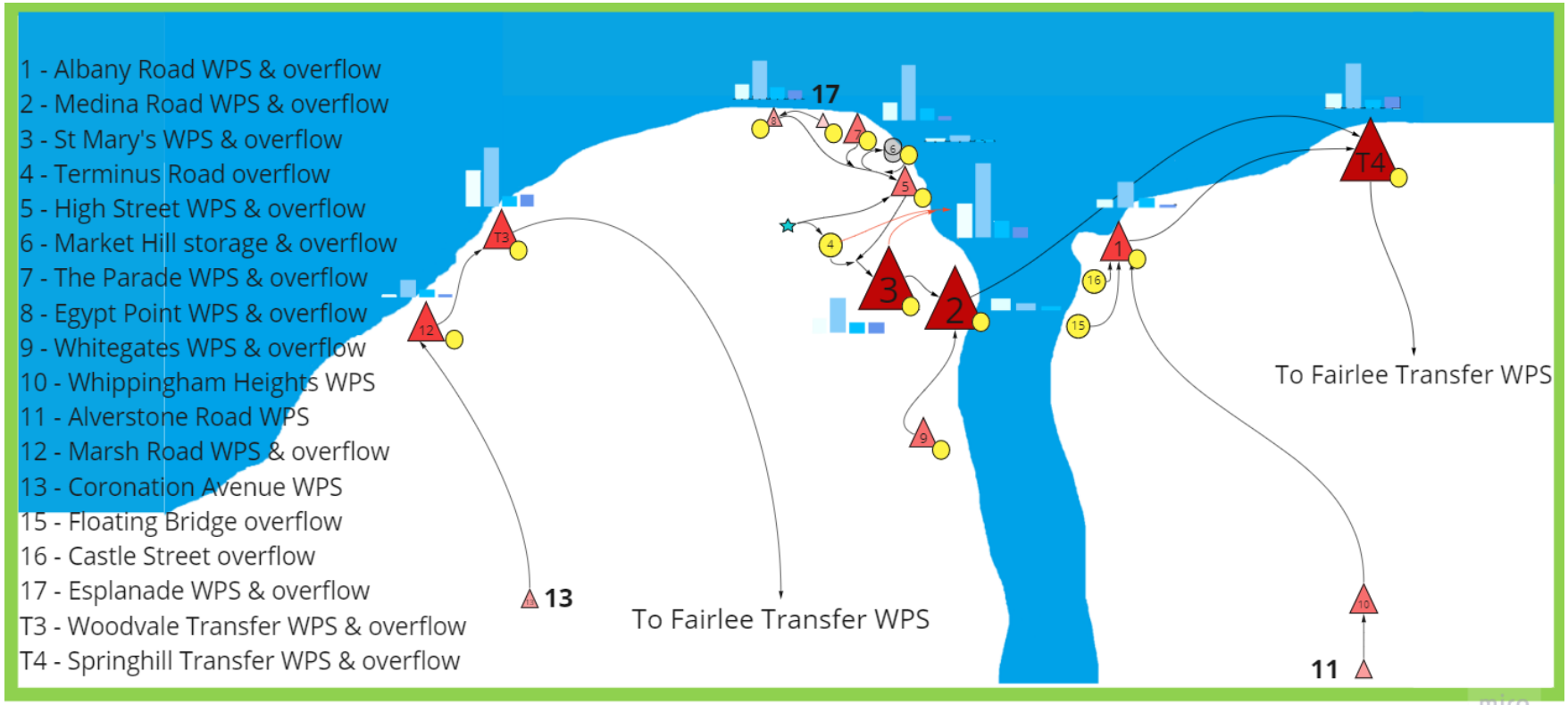
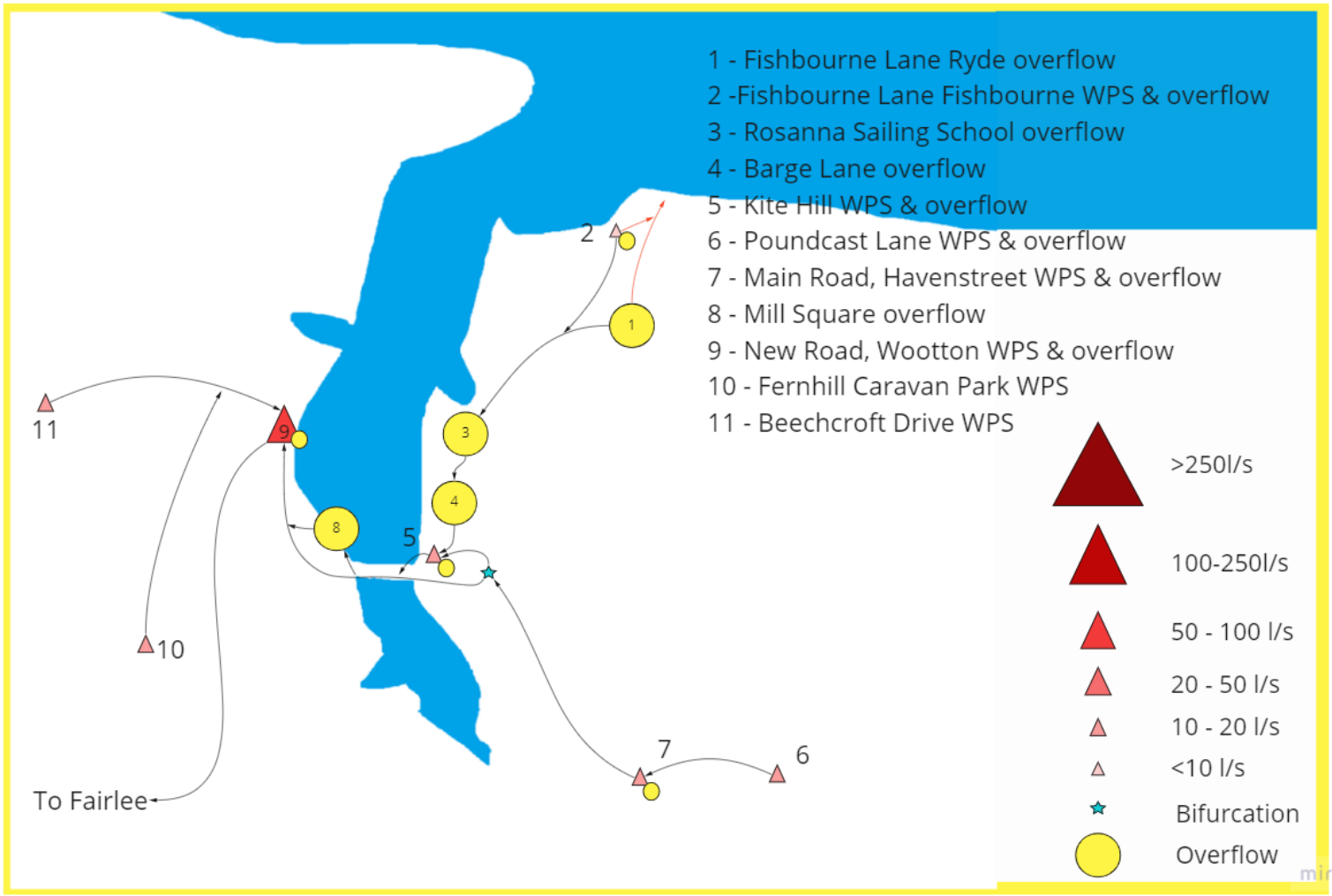
>100% (!)
EASpilCoun
0 - 4
5 - 10
11 - 20
21 - 40
41 - 60
61 - 133
miro

Appendix E – Pumping Station Schematics

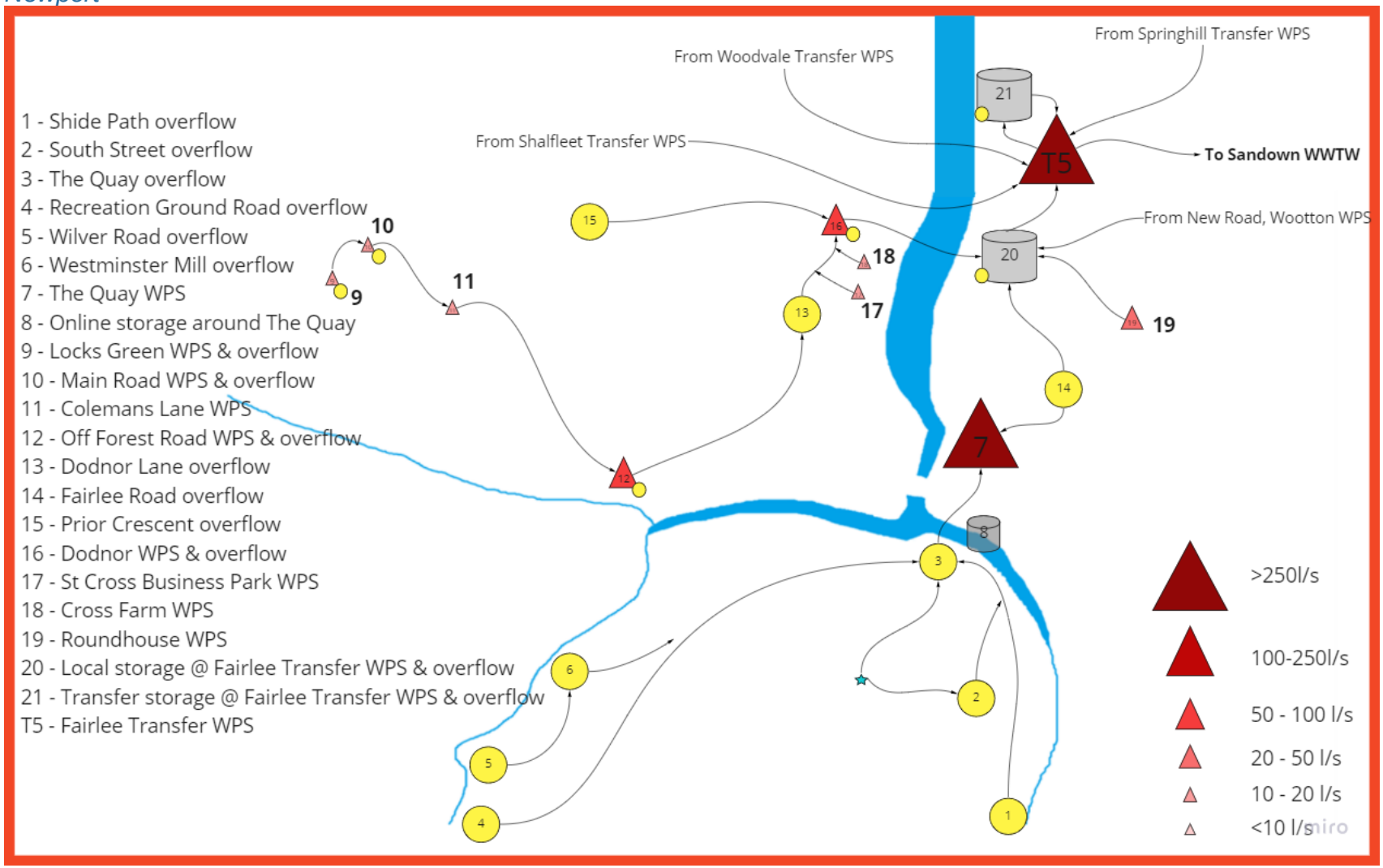
Cowes



Fishbourne


1 - Fishbourne Lane Ryde overflow
2 -Fishbourne Lane Fishbourne WPS & overflow
3 - Rosanna Sailing School overflow
4 - Barge Lane overflow
5 - Kite Hill WPS & overflow
6 - Poundcast Lane WPS & overflow
7 - Main Road, Havenstreet WPS & overflow
8 - Mill Square overflow
9 - New Road, Wootton WPS & overflow
10 - Fernhill Caravan Park WPS
11 - Beechcroft Drive WPS
>250l/s
100-250l/s
50 - 100 l/s
20 - 50 l/s
10 - 20 l/s
<10 l/s
Bifurcation
Overflow
11
9
2
1
3
4
8
5
10
7
6
To Fairlee
miro

Newport


1 - Shide Path overflow
2 - South Street overflow
3 - The Quay overflow
4 - Recreation Ground Road overflow
5 - Wilver Road overflow
6 - Westminster Mill overflow
7 - The Quay WPS
8 - Online storage around The Quay
9 - Locks Green WPS & overflow
10 - Main Road WPS & overflow
11 - Colemans Lane WPS
12 - Off Forest Road WPS & overflow
13 - Dodnor Lane overflow
14 - Fairlee Road overflow
15 - Prior Crescent overflow
16 - Dodnor WPS & overflow
17 - St Cross Business Park WPS
18 - Cross Farm WPS
19 - Roundhouse WPS
20 - Local storage @ Fairlee Transfer WPS & overflow
21 - Transfer storage @ Fairlee Transfer WPS & overflow
T5 - Fairlee Transfer WPS
From Woodvale Transfer WPS
From Springhill Transfer WPS
From Shalfleet Transfer WPS
To Sandown WWTW
From New Road, Wootton WPS
>250l/s
100-250l/s
50 - 100 l/s
20 - 50 l/s
10 - 20 l/s
<10 l/s

Appendix F – Bembridge

CSO Spills

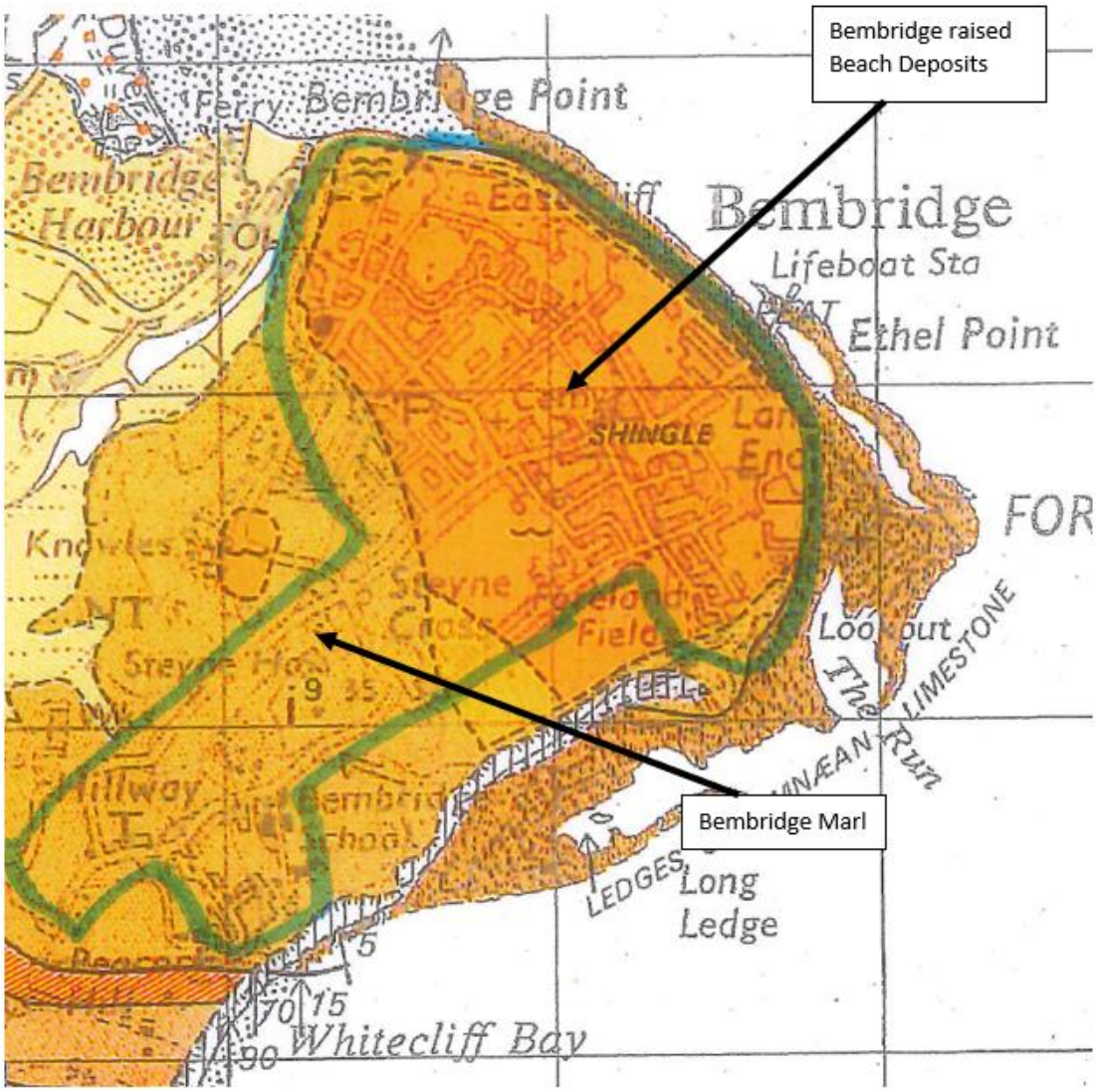
No	Mnemonic ID	Overflow Name	Urban Area	EA Spills (Count) 2020
1	HILLBEMB	HILLWAY BEMBRIDGE CEO	Bembridge	37
2	LESTBEMB	LANE END STORAGE TANKS BEMBRIDGE CEO	Bembridge	48
3	THPBENEW	THE POINT BEMBRIDGE NEW CEO	Bembridge	12

Geology

Below is a geological map of the Bembridge study area with the study area outline marked on the figure below. The area is divided geologically in half, with surface/near surface deposits comprising the Bembridge Raised Beach Deposits in the east half, and Bembridge Marl in the western half of the site.

The Bembridge Marl, in the west of the site, coloured light brown on the map, comprises -Clays and Silts with occasional thin sands, lime-mudstones and limestones. Near surface, or at least within 1-2 m depth which would be the depth of interest for soakaways/SUDS, the material would be expected to be weathered and clays to dominate. Therefore, permeability is expected to be low and therefore not expected to be suitable for soakaway drainage.

Bembridge Raised Beach Deposits, eastern half of site, coloured orange on the map is expected to comprise a sandy Gravel. These sedimentary deposits are coarse-grained, and therefore expected to be highly permeable, would drain quickly, and therefore very suitable for accepting flows from soakaways/SUDS.


Bembridge raised Beach Deposits
Bembridge Marl
Ferry
Bembridge Point
Bembridge Harbour
Bembridge
Lifeboat Sta
Ethel Point
SHINGLE
Steyne Field
Lookout
The Run
LIMESTONE
Tillway
LEDGES
Long Ledge
Whitecliff Bay
FOR

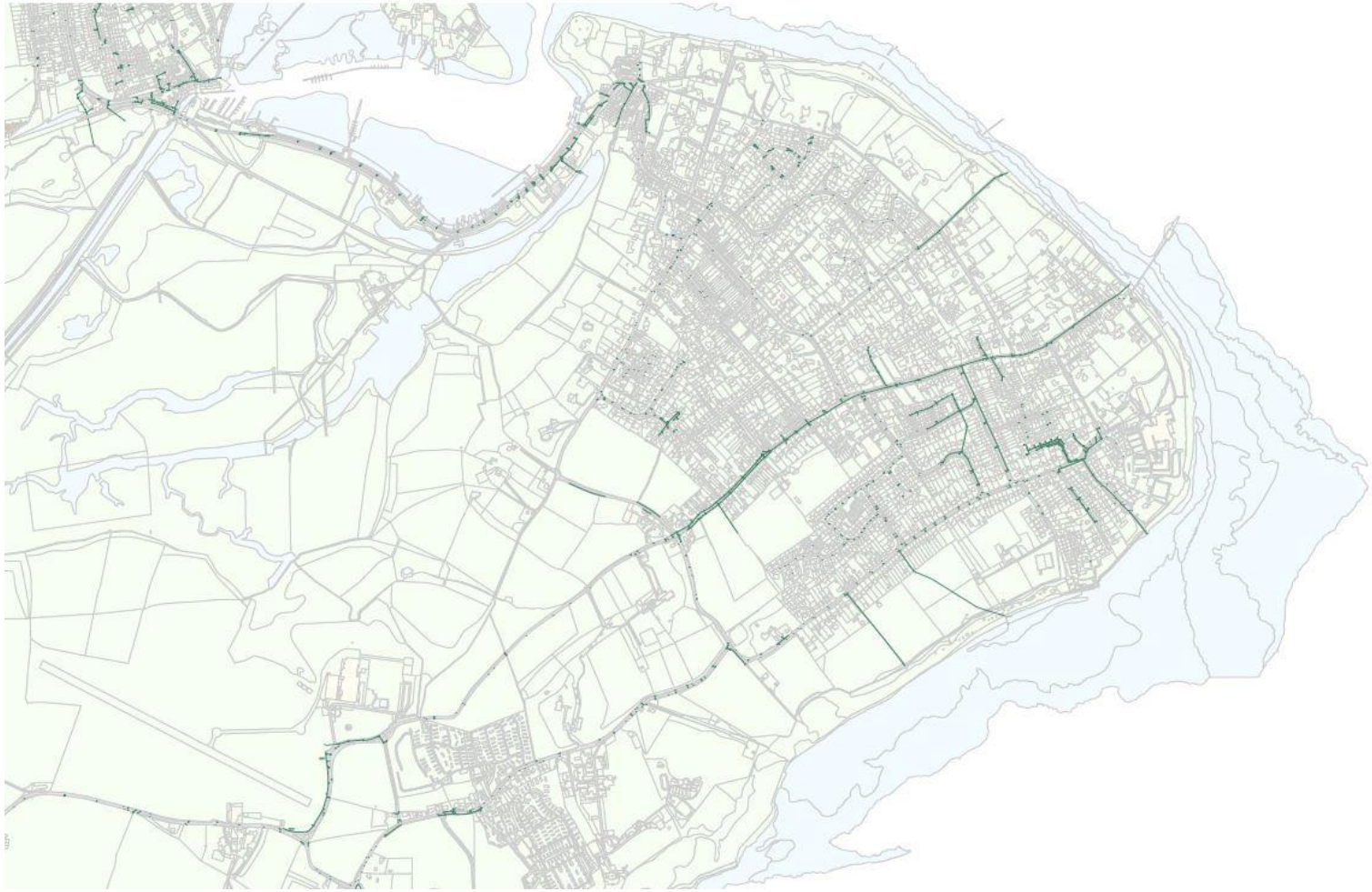
Combined / Foul Pipes[1]

[1] Southern Water Asset Miner System

Surface Water Pipes[2]

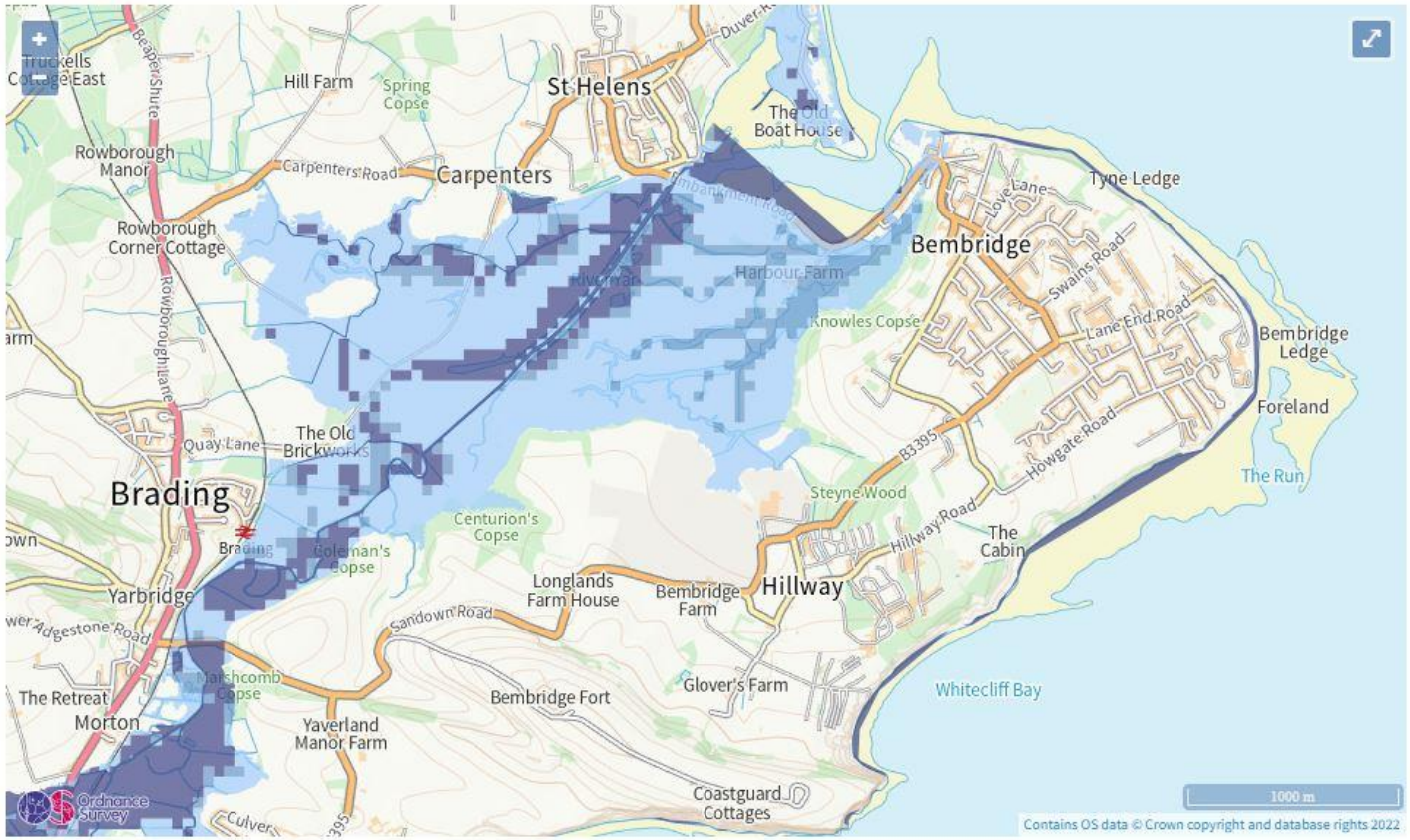
[2] Southern Water Asset Miner System

Highway Gullies[3]



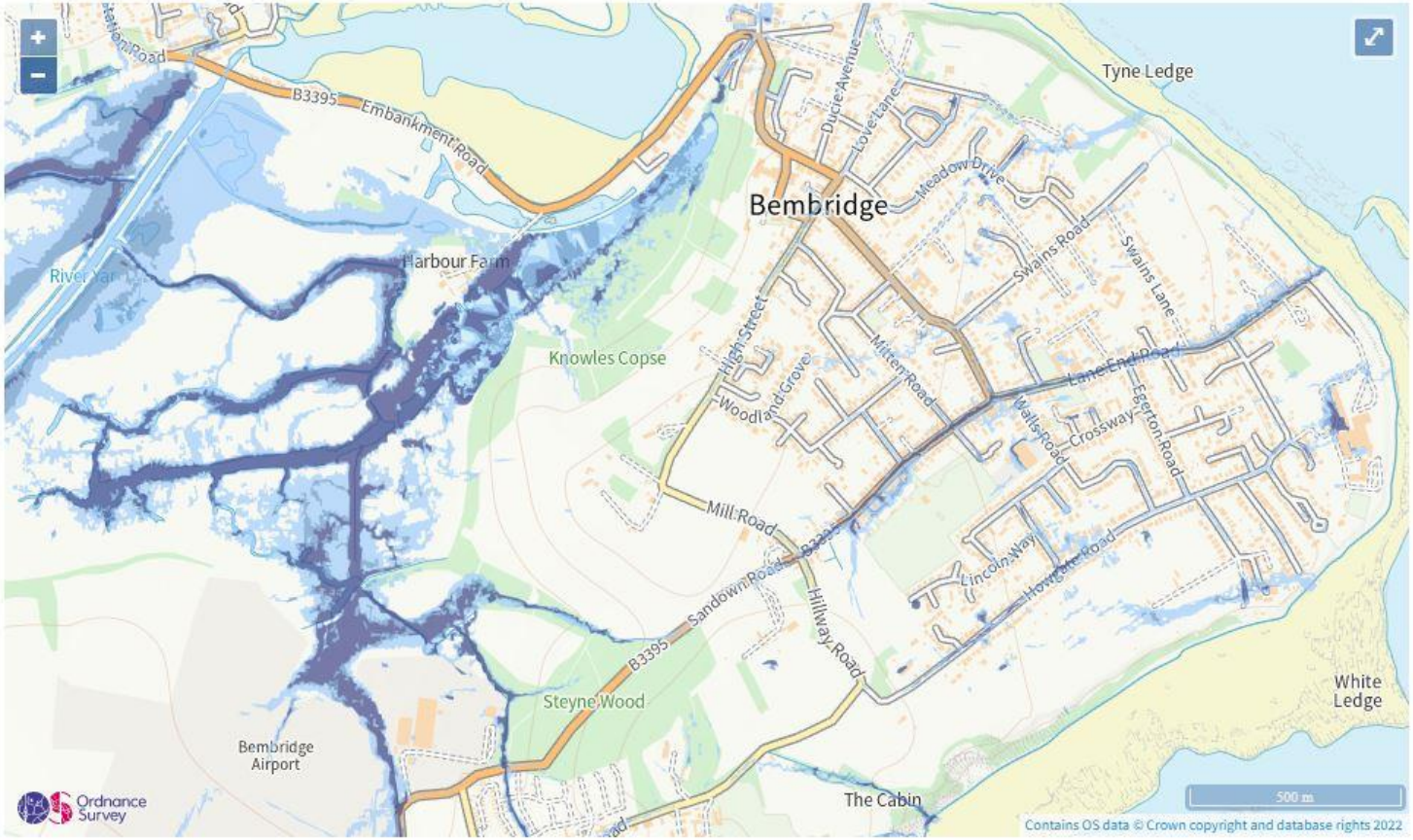
[3] Island Roads, 2022

River and Coastal Flooding[4]



[4] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Surface Water Flooding[5]



Extent of flooding from surface water

High Medium Low Very low Location you selected

[5] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Appendix G – Cowes

CSO Spills

No	Mnemonic ID	Overflow Name	Urban Area	EA Spills (Count) 2020
1	ALROECOW	ALBANY ROAD EAST COWES CEO	Cowes	28
2	ARRDCOWE	ARCTIC ROAD COWES OPPOSITE 234 CSO	Cowes	
3	ALRDECOW	CASTLE STREET COWES CEO	Cowes	
4	CASTCOWE	CASTLE STREET COWES CSO	Cowes	1
5	EGPOCOWE	EGYPT POINT COWES CEO	Cowes	3
6	EGPPCOWE	EGYPT POINT COWES PUMPED CEO	Cowes	
7	ESPLCOWE	ESPLANADE COWES CEO	Cowes	5
8	FLBRCOWE	FLOATING BRIDGE COWES CSO	Cowes	1
9	HISTCOWE	HIGH STREET COWES CEO	Cowes	7
10	MAHICOWE	MARKET HILL COWES CSO	Cowes	59
11	MAHICOWE	MARKET HILL COWES EMO	Cowes	0
12	MARDGURN	MARSH ROAD GURNARD CEO	Cowes	23
13	MEDFNORE	MEDHAM FARM NORTHWOOD EMO	Cowes	0
14	MERDCOWE	MEDINA ROAD COWES CEO	Cowes	16
15	SPRICOWE	SPRINGHILL COWES TRANSFER CEO	Cowes	49
16	STMACOWE	ST MARYS ROAD COWES CSO	Cowes	47
17	TERDCOWE	TERMINUS ROAD COWES CSO	Cowes	88
18	PARACOWE	THE PARADE COWES CEO	Cowes	0
19	WHITCOWE	WHITEGATES COWES EMO	Cowes	39
20	WHBRNWOO	WHITFORD BRIDGE NORTHWOOD CSO	Cowes	0
21	WOODTRAN	WOODVALE TRANSFER CSO	Cowes	78
22	WOODVALE	WOODVALE TRANSFER EMO	Cowes	1
23	COAVNWOV	CORONATION AVENUE (NORTHWOOD) CEO	Cowes	

Geology

Below are geological maps of the Cowes study area with the study areas (east and west) outline marked on the figure below. The ground conditions at surface, depending on location are broadly:

Superficial Deposits Plateau Gravels or

Solid Deposits Bembridge Marl or

Hampstead Beds or

Osbourne/Headon Beds.

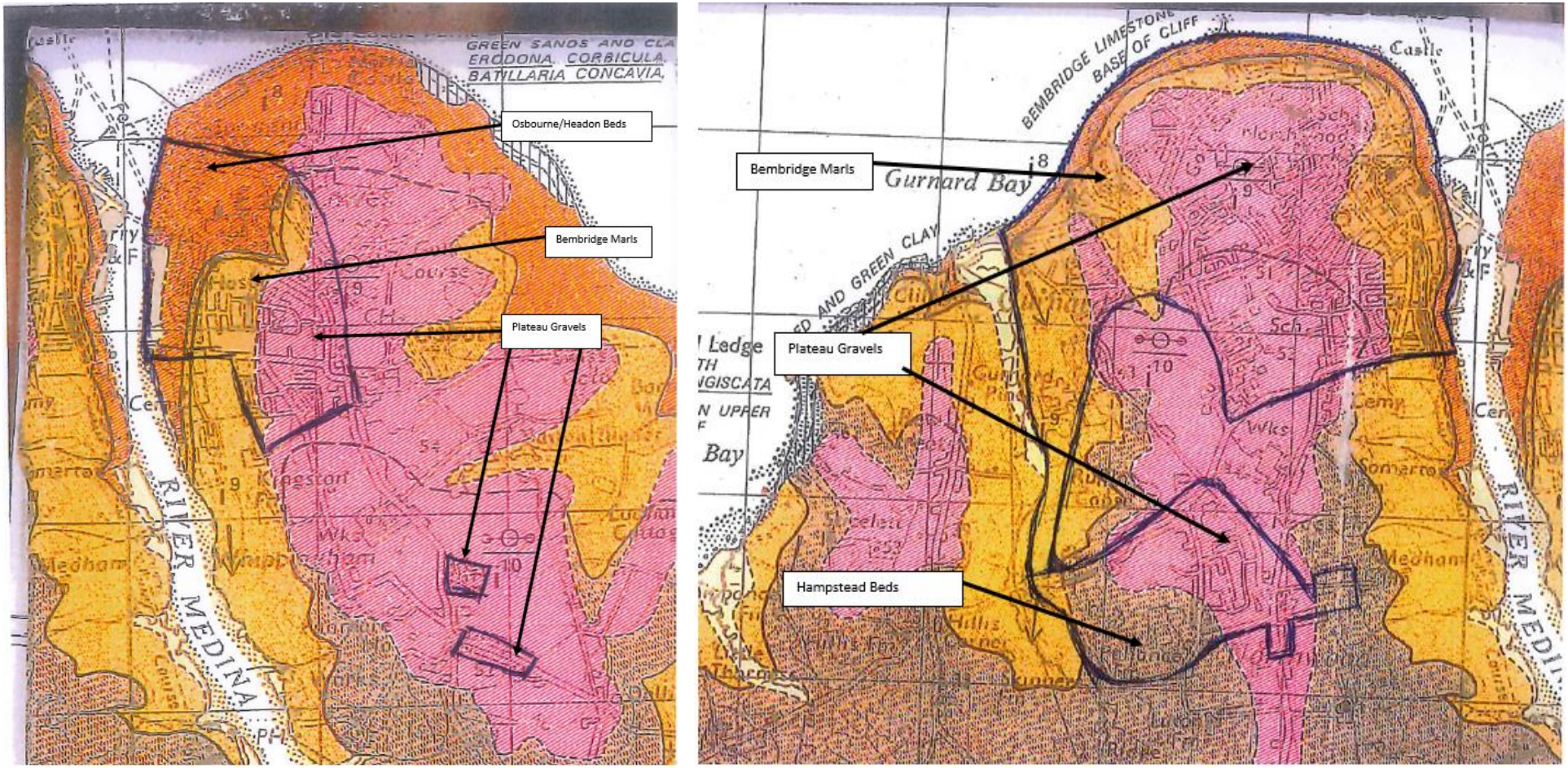
The shallow ground in which soakaways are likely to be soaking into will be any one of these depending on location. Platea Gravels cover a large part of the areas; but where these are absent soakaways will be soaking into solid geology of either Hampstead Beds or Bembridge Marls or Osbourne/Headon Beds. The attached maps show the distribution with the study areas marked on.

Plateau Gravels, red on map. Comprising mainly Sand and Gravels. Permeability expected to be high, so suitable for soakaway drainage

Hampstead Beds - Predominantly clays, silts and sands, brown coloured on the map. Soakage will be slow or indifferent but probably useable where sands are present.

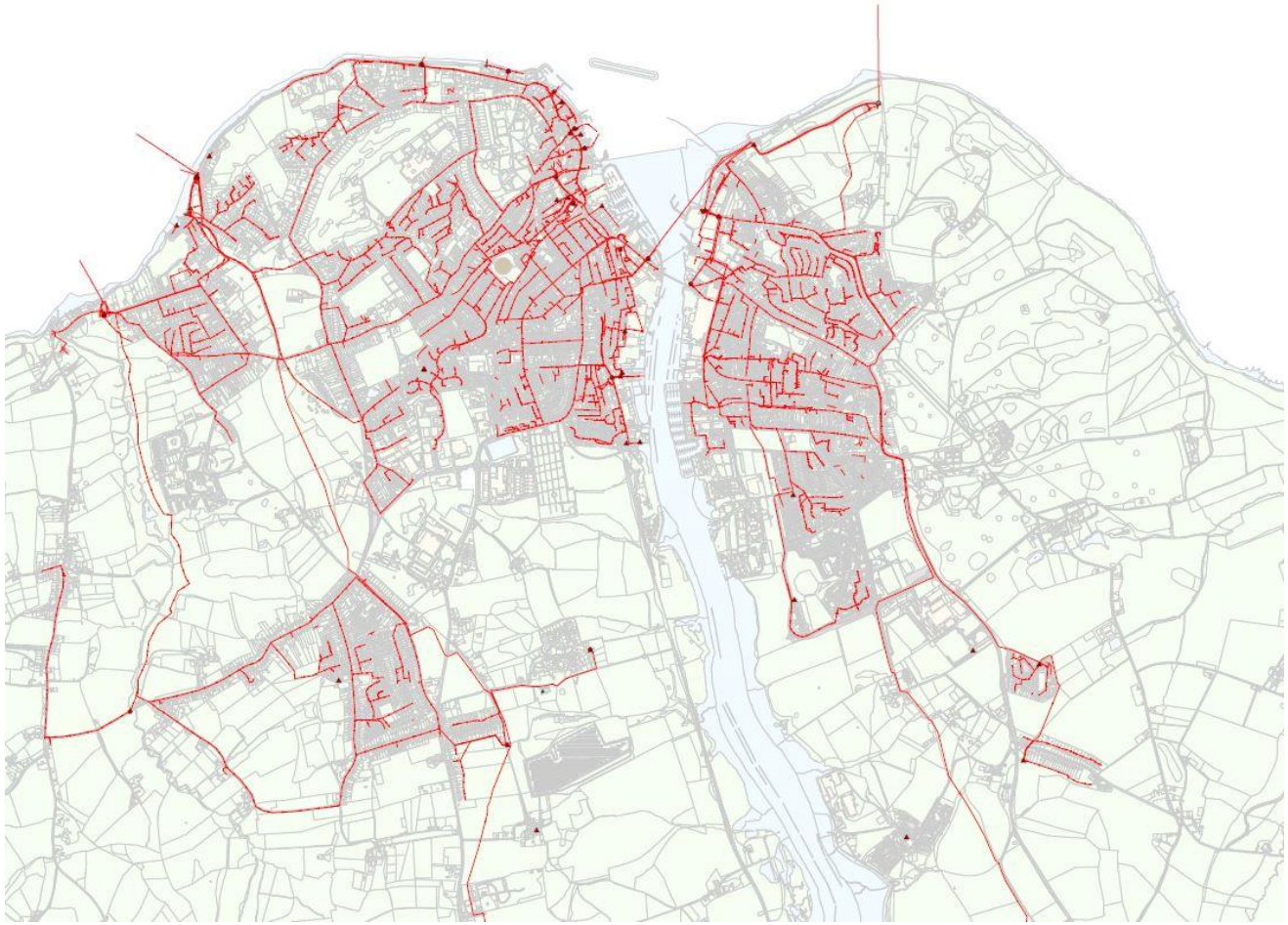
Osbourne/Headon Beds – similar to the Hampstead Beds

The Bembridge Marl, coloured light brown on the map, comprises Clays and Silts with occasional thin sands, lime-mudstones and limestones. Near surface, or at least within 1-2 m depth which would be the depth of interest for soakaways/SUDS, the material would be expected to be weathered and clays to dominate. Therefore, permeability is expected to be low and therefore not expected to be suitable for soakaway drainage.



Geology of East (on the left) and West (on the right) Cowes

Combined / Foul Pipes[6]



[6] Southern Water Asset Miner System

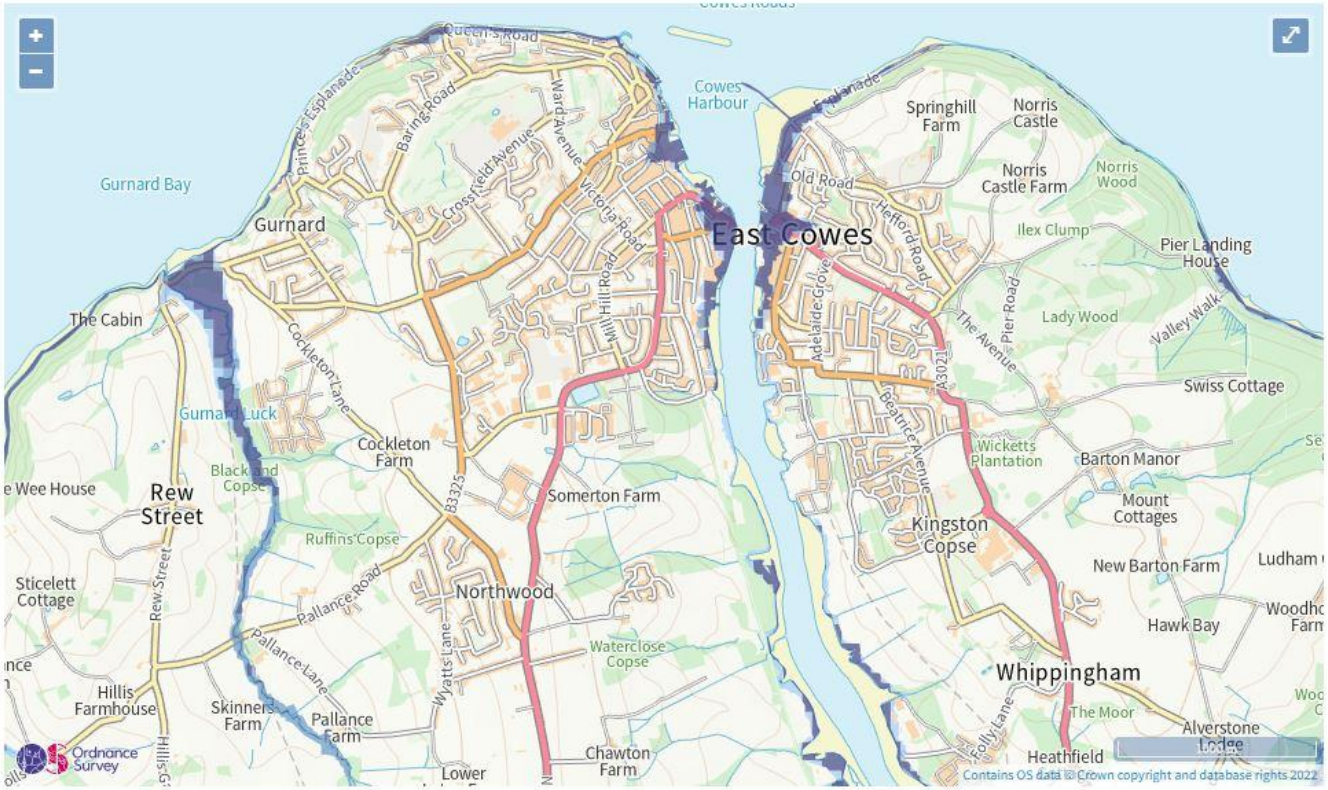
Surface Water Pipes[7]

[7] Southern Water Asset Miner System

Highway Gullies[8]

[8] Island Roads, 2022

River and Coastal Flooding[9]



Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected

[9] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Surface Water Flooding[10]

[10] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Appendix H – Fishbourne

CSO Spills

No	Mnemonic ID	Overflow Name	Urban Area	EA Spills (Count) 2020
1	BALAWOBR	BARGE LANE WOOTTON BRIDGE OUTSIDE 5 CSO	Fishbourne	50
2	FILAFISI	FISHBOURNE LANE FISHBOURNE IOW CEO	Fishbourne	0
3	FILARYDE	FISHBOURNE LANE RYDE CSO	Fishbourne	16
4	KIHIWOOT	KITE HILL WOOTTON CEO	Fishbourne	19
5	MARDHAVE	MAIN ROAD HAVENSTREET CEO	Fishbourne	17
6	MISQWOOT	MILL SQUARE WOOTTON CSO	Fishbourne	14
7	NERDWOOT	NEW ROAD WOOTTON CEO	Fishbourne	46
8	ROSAWOOT	ROSANNA SAILING SCHOOL WOOTTON CSO	Fishbourne	41

Geology

Below is a geological map of the Fishbourne study area with the study area outline marked on. The ground conditions at surface, depending on location are broadly:

Superficial Deposits; Head deposits or

Solid Deposits; Bembridge Marl or

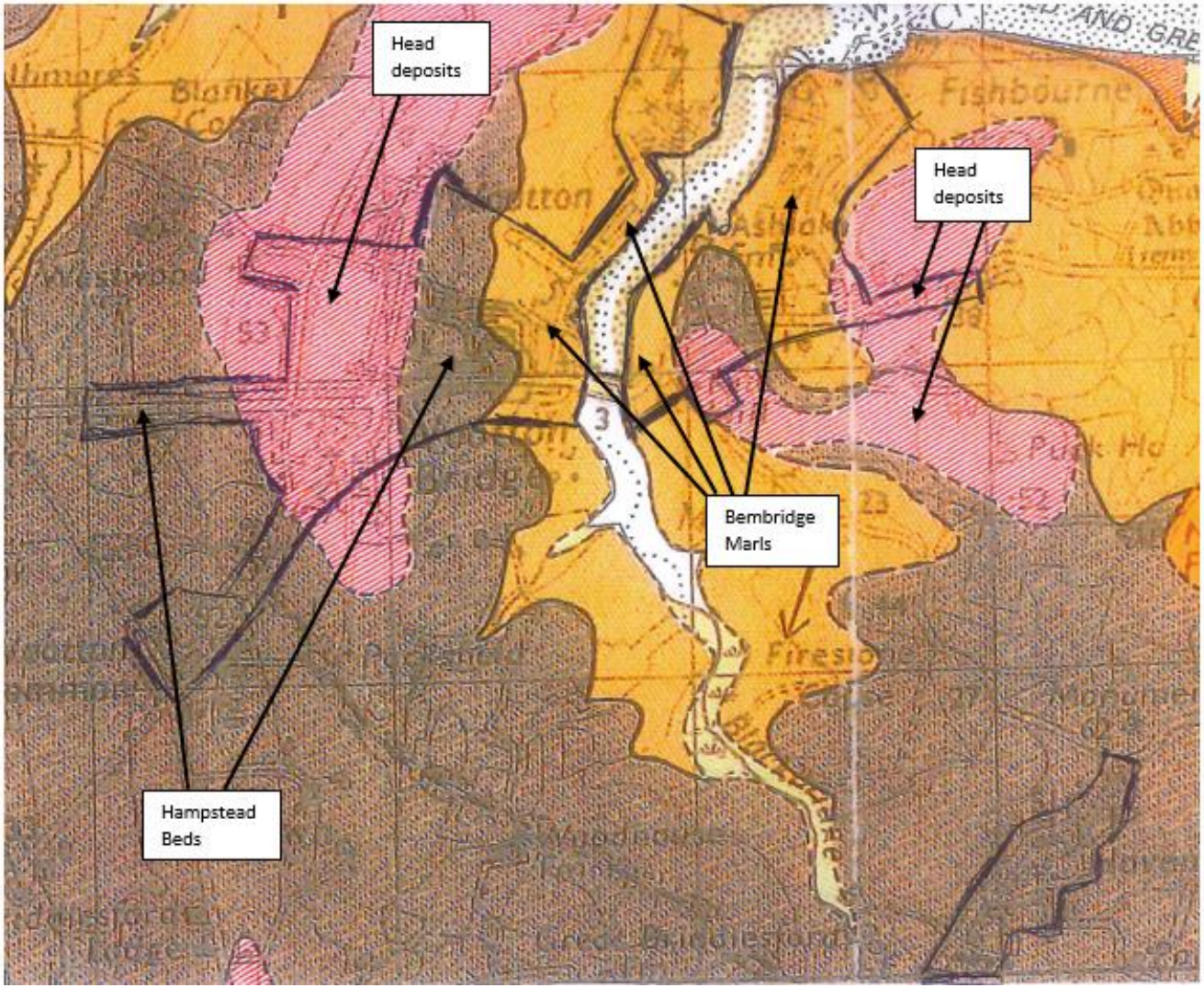
Hampstead Beds

The shallow ground in which soakaways are likely to be soaking into will be any one of these depending on location. Head deposits cover a large part of the west side of Fishbourne Creek; but elsewhere and on the eastern side these are largely absent from the study area and soakaways will be soaking into solid geology of either Hampstead Beds or Bembridge Marls. The attached map shows the distribution with the study areas marked on.

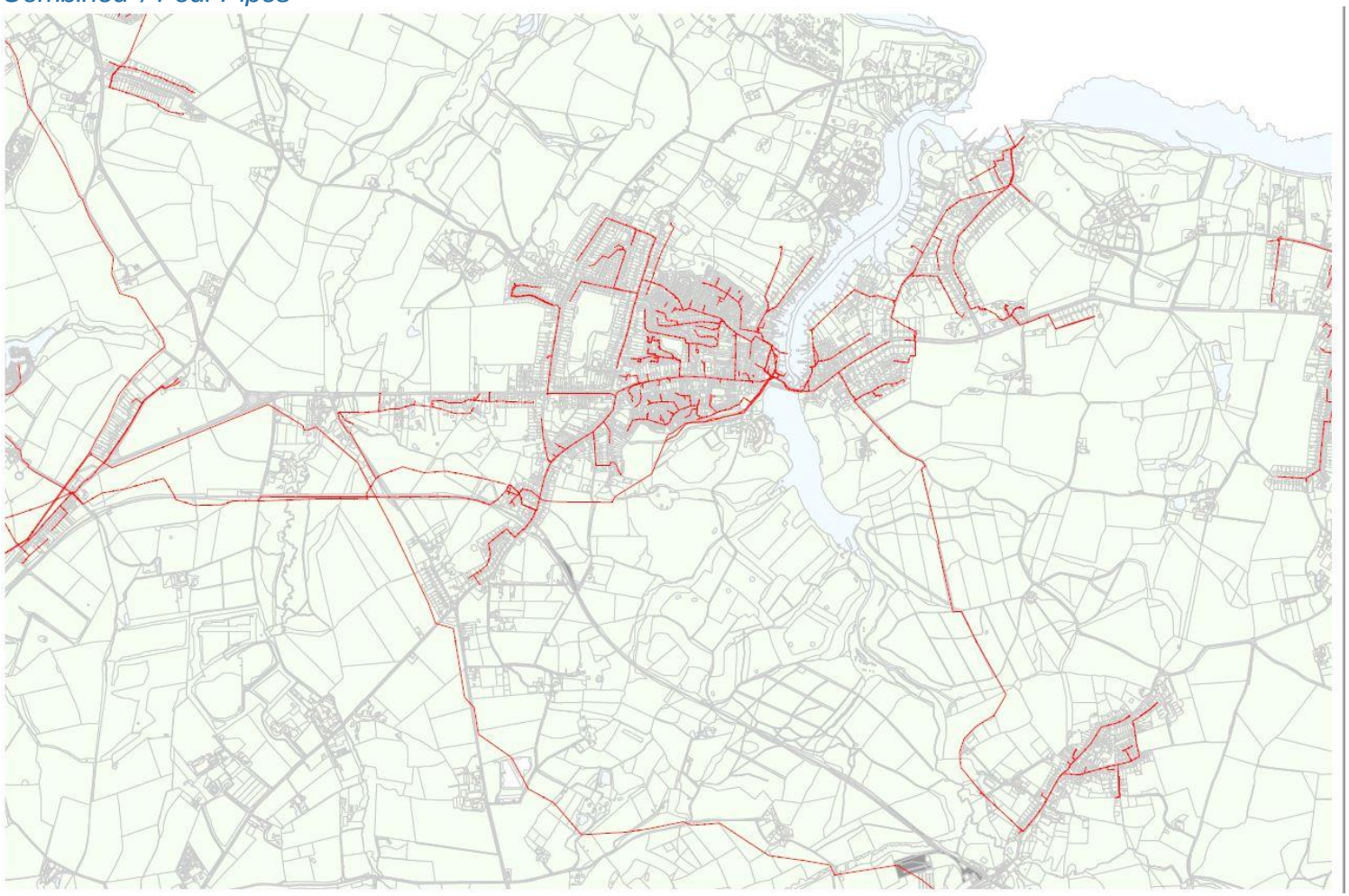
Head Deposits, red on map. Comprising mainly Clay and Silt, and in this area is expected to be derived from the Hampstead Beds and Bembridge Marls. Head is poorly sorted and poorly stratified, clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction processes. Solifluction is the slow viscous downslope flow of waterlogged soil and other unsorted and unsaturated superficial deposits as it is derived from the Hampstead Beds and Bembridge Marls, fine material is expected to dominate, meaning lower permeability than might be needed.

Hampstead Beds - Predominantly clays, silts and sands, brown coloured on the map. Soakage will be slow or indifferent but probably useable where sands are present.

The Bembridge Marl, in the west of the site, coloured light brown on the map, comprises -Clays and Silts with occasional thin sands, lime-mudstones and limestones. Near surface, or at least within 1-2 m depth which would be the depth of interest for soakaways/SUDS, the material would be expected to be weathered and clays to dominate. Therefore, permeability is expected to be low and therefore not expected to be suitable for soakaway drainage.

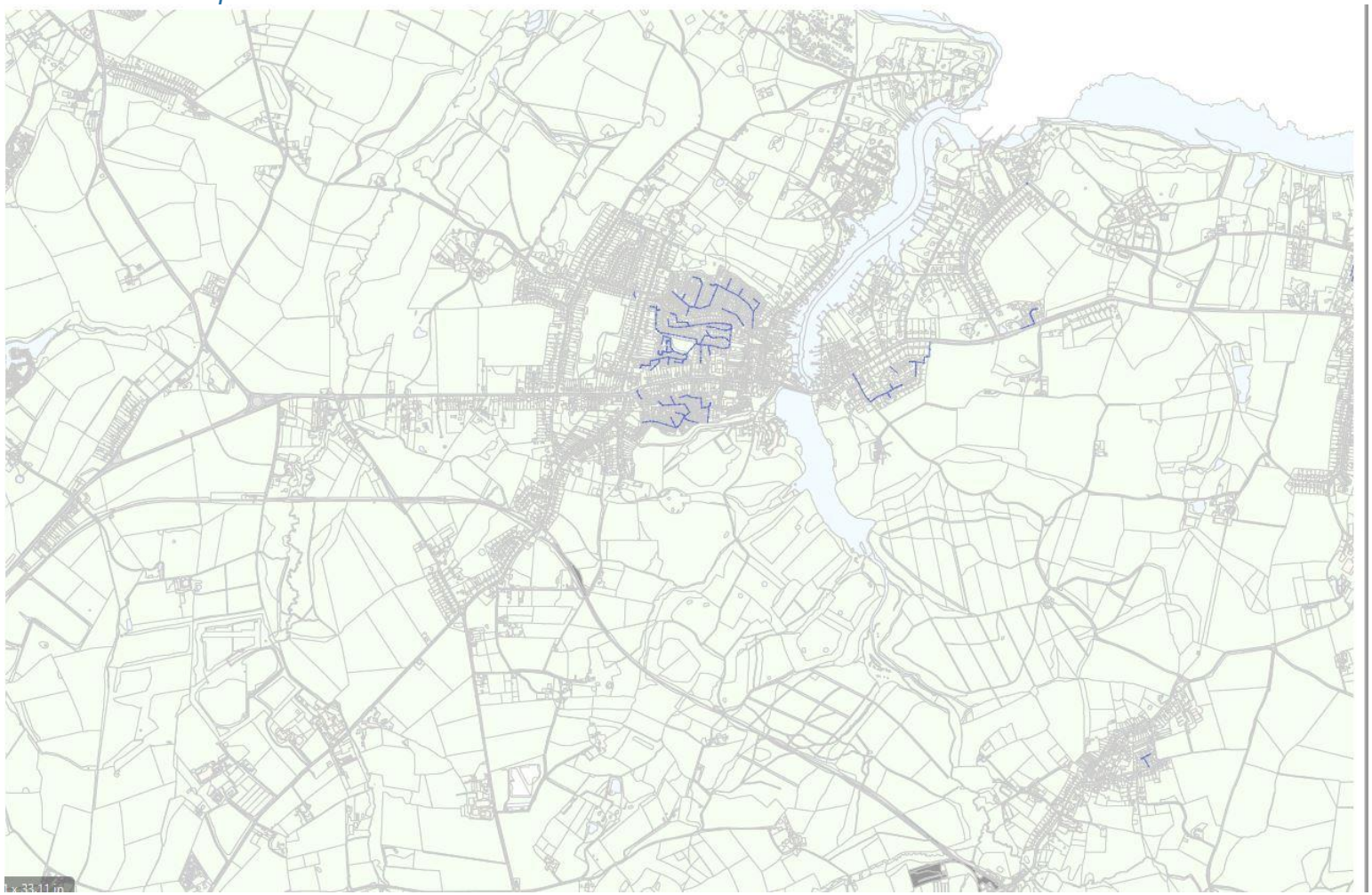

Head deposits
Head deposits
Bembridge Marls
Hampstead Beds

Combined / Foul Pipes [11]



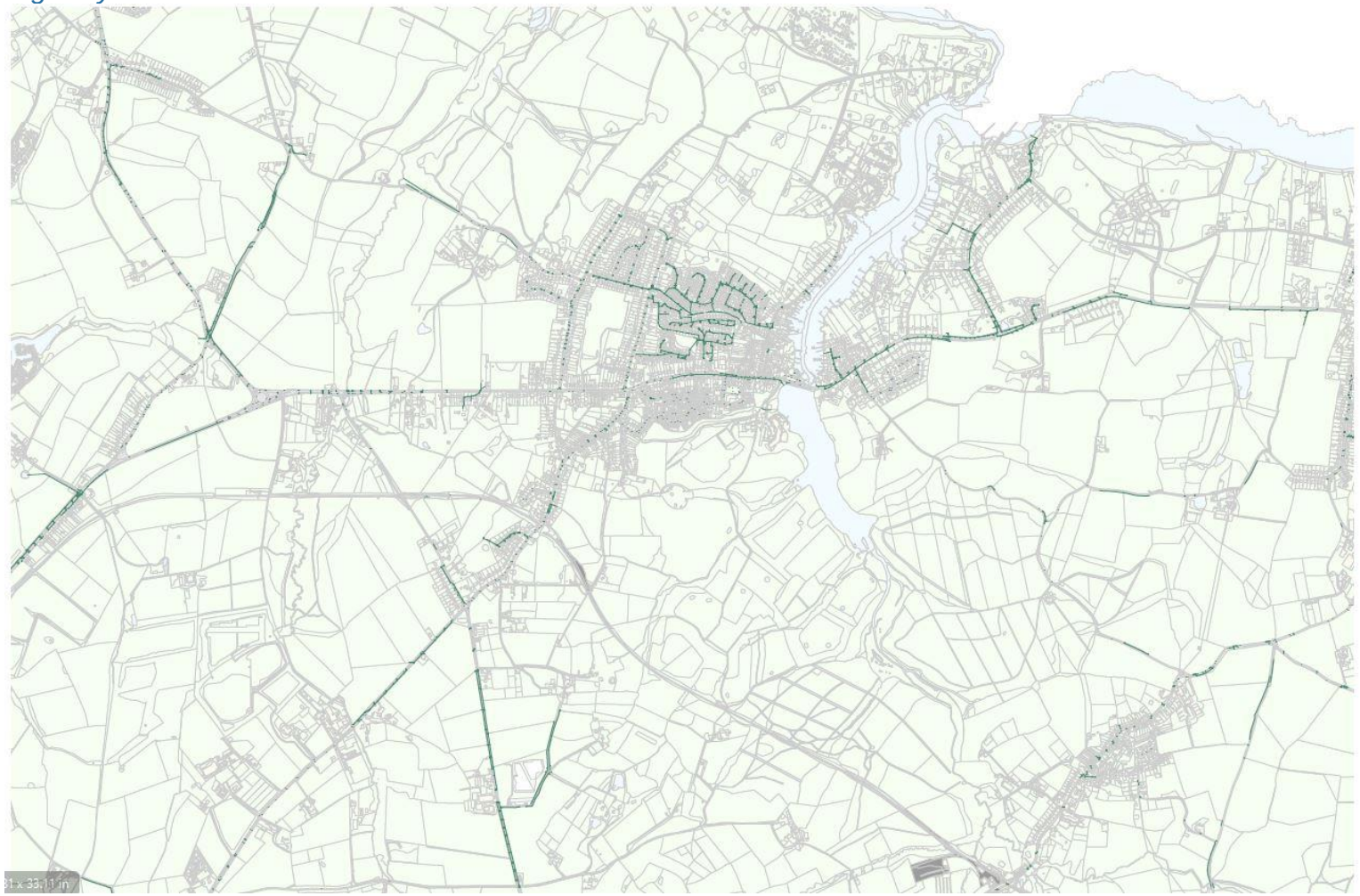
[11] Southern Water Asset Miner System

Surface Water Pipes [12]



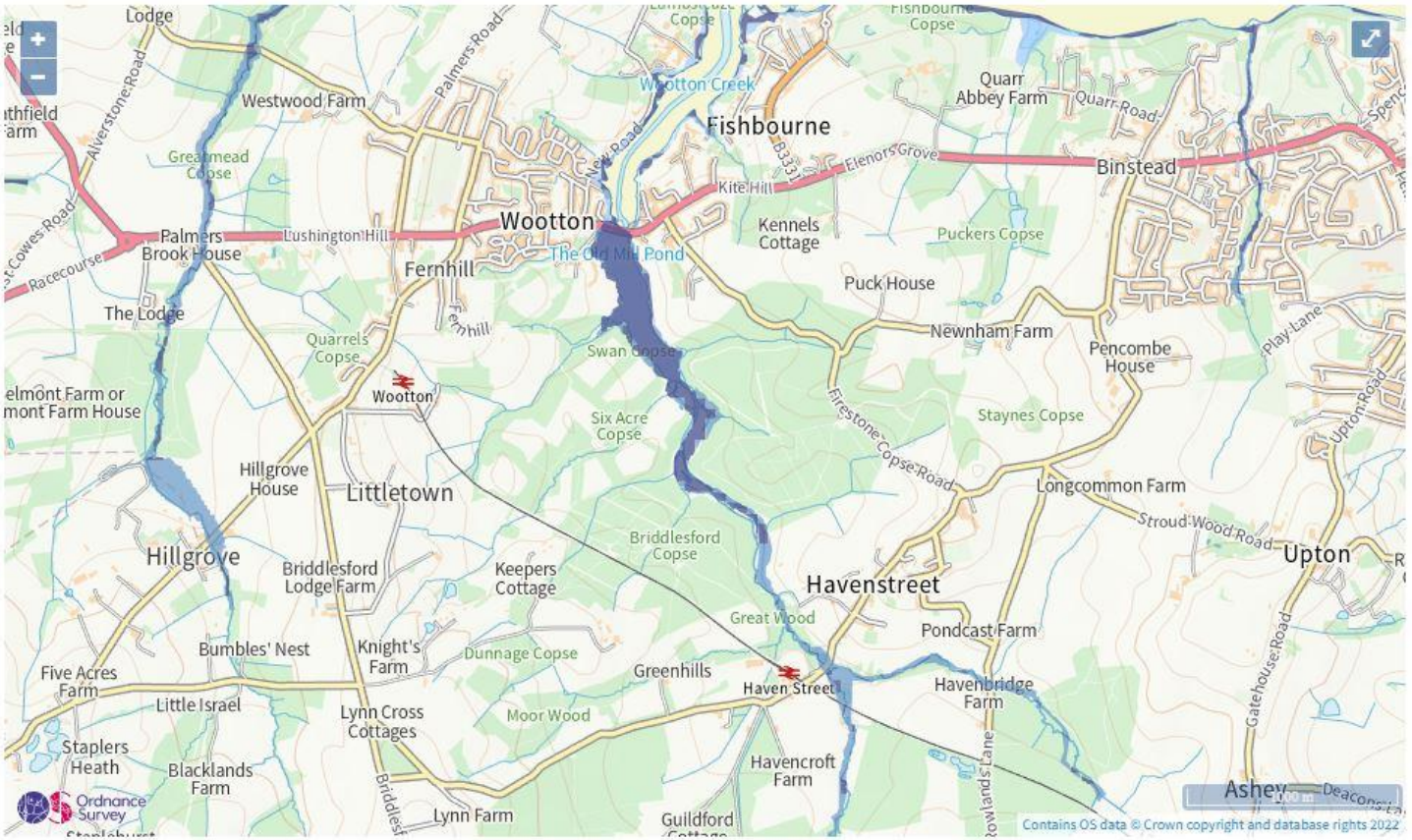
[12] Southern Water Asset Miner System

Highway Gullies [13]



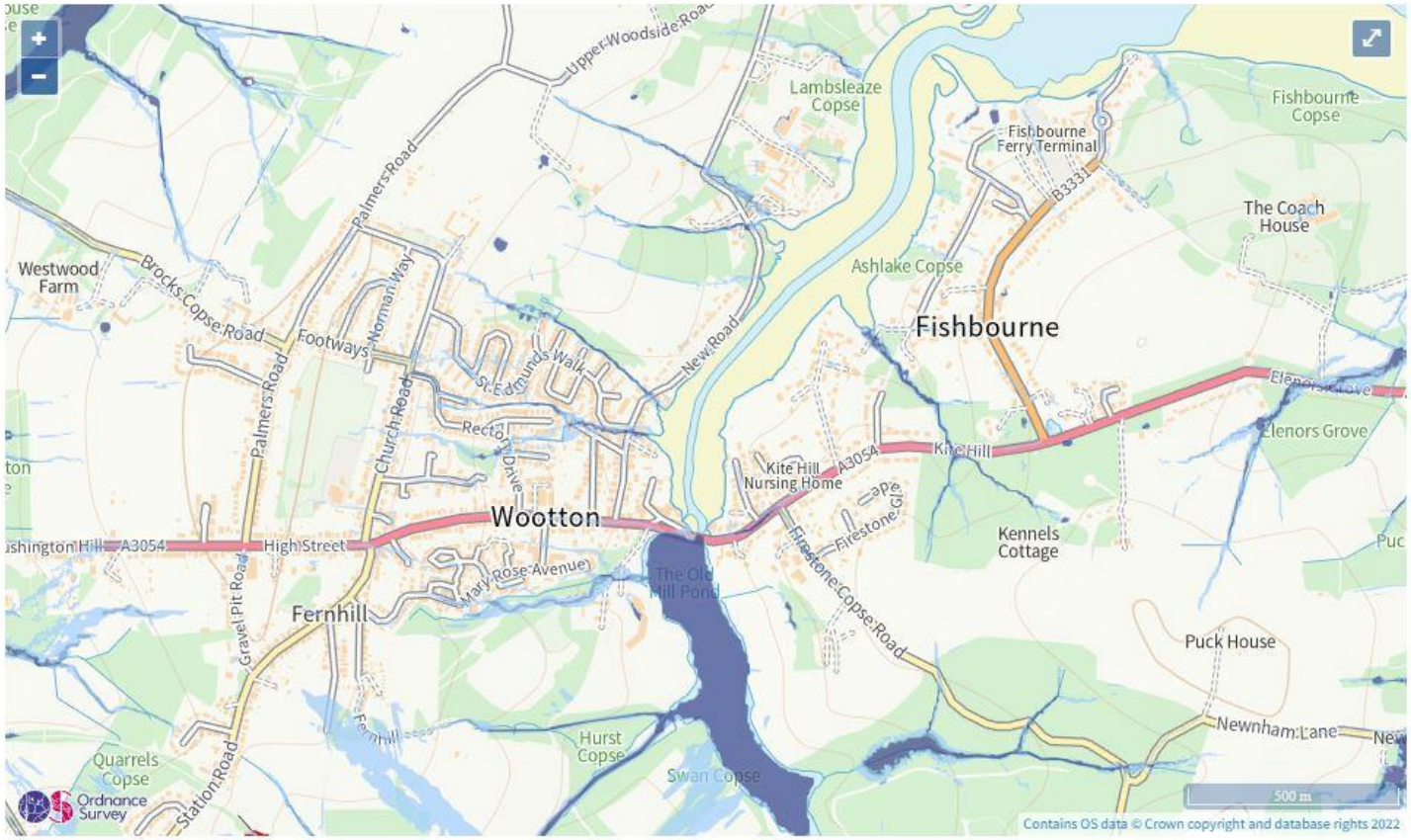
[13] Island Roads, 2022

River and Coastal Flooding[14]



[14] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Surface Water Flooding[15]



Extent of flooding from surface water

High Medium Low Very low Location you selected

[15] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Appendix I – Newport

CSO Spills

No	Mnemonic ID	Overflow Name	Urban Area	EA Spills (Count) 2020
1	DODNORXX	DODNOR CEO	Newport	93
2	DOLANEWP	DODNOR LANE NEWPORT CSO	Newport	14
3	NEWPFAIR	FAIRLEE CSO	Newport	88
4	FARDNEWP	FAIRLEE ROAD NEWPORT OUTSIDE 62 CSO	Newport	60
5	FAIRTRAN	FAIRLEE TRANSFER EMO	Newport	1
6	LOGRPORC	LOCKS GREEN PORCHFIELD CEO	Newport	0
7	MARDPORC	MAIN ROAD PORCHFIELD CEO	Newport	33
8	HERDNEWP	OFF FOREST ROAD NEWPORT CEO	Newport	14
9	HOHINEWP	PRIOR CRESCENT NEWPORT CSO	Newport	54
10	RGRDNEWP	RECREATION GROUND ROAD NEWPORT CSO	Newport	
11	SHIDEXXX	SHIDE PATH NEWPORT NO 1 CSO	Newport	0
12	SOSTNEWP	SOUTH STREET NEWPORT CSO	Newport	0
13	QUAYNEWP	THE QUAY NEWPORT CEO	Newport	11
14	WEMINEWP	WESTMINSTER MILL NEWPORT CSO	Newport	0
15	WIRDNEWP	WILVER ROAD NEWPORT CSO	Newport	

Geology

Below is a geological map of the study area. The study area is essentially the urban areas of Newport, which a visible through the coloured areas of the map.

For SUDS design, you are mainly interested in the permeability of the near surface (say the top 3m) of the local geology, that is the ground that the soakage will take place into. By reference to the geological map 'Isle of Wight Special Edition (parts of sheets 344, 345, 330, 331) and the British Geological survey (BGS) online geological mapping, the surface and near surface geology over the study area is as below.

There are three types of superficial deposits over the site; Head Deposits, Terrace Gravels (sand and gravel); and Alluvium.

Head Deposits (pink on map). - These cover a significant area and are expected to comprise mainly Clay and Silt. Head is poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction processes. Solifluction is the slow viscous downslope flow of waterlogged soil and other unsorted and unsaturated superficial deposits It comprises gravel, sand and clay depending on upslope source and distance from source. Locally with lenses of silt, clay or peat and organic material It is probably derived partly from the chalk, but also the clays of the Hampstead and Bracklesham Beds. Fine material is expected to dominate, meaning low or only moderate permeability.

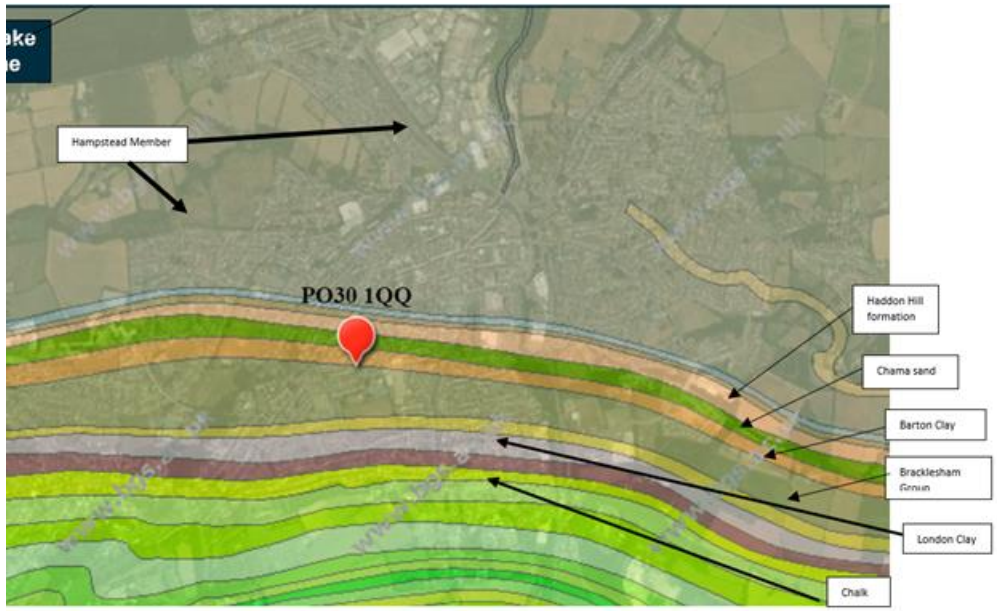
There are deposits of sand/gravel (Terrace Gravels) in the river Medina valley itself, see below geological map. These form a deposit of 100 m or so in width, east side of the river. These would be expected to be of high permeability, so well suited for soakaway drainage in that particular part of the site.

There are narrow limited strips of alluvium along all river and stream valleys. This comprises a mix of silts, clays and sands and may therefore offer some limited potential for soakaways.

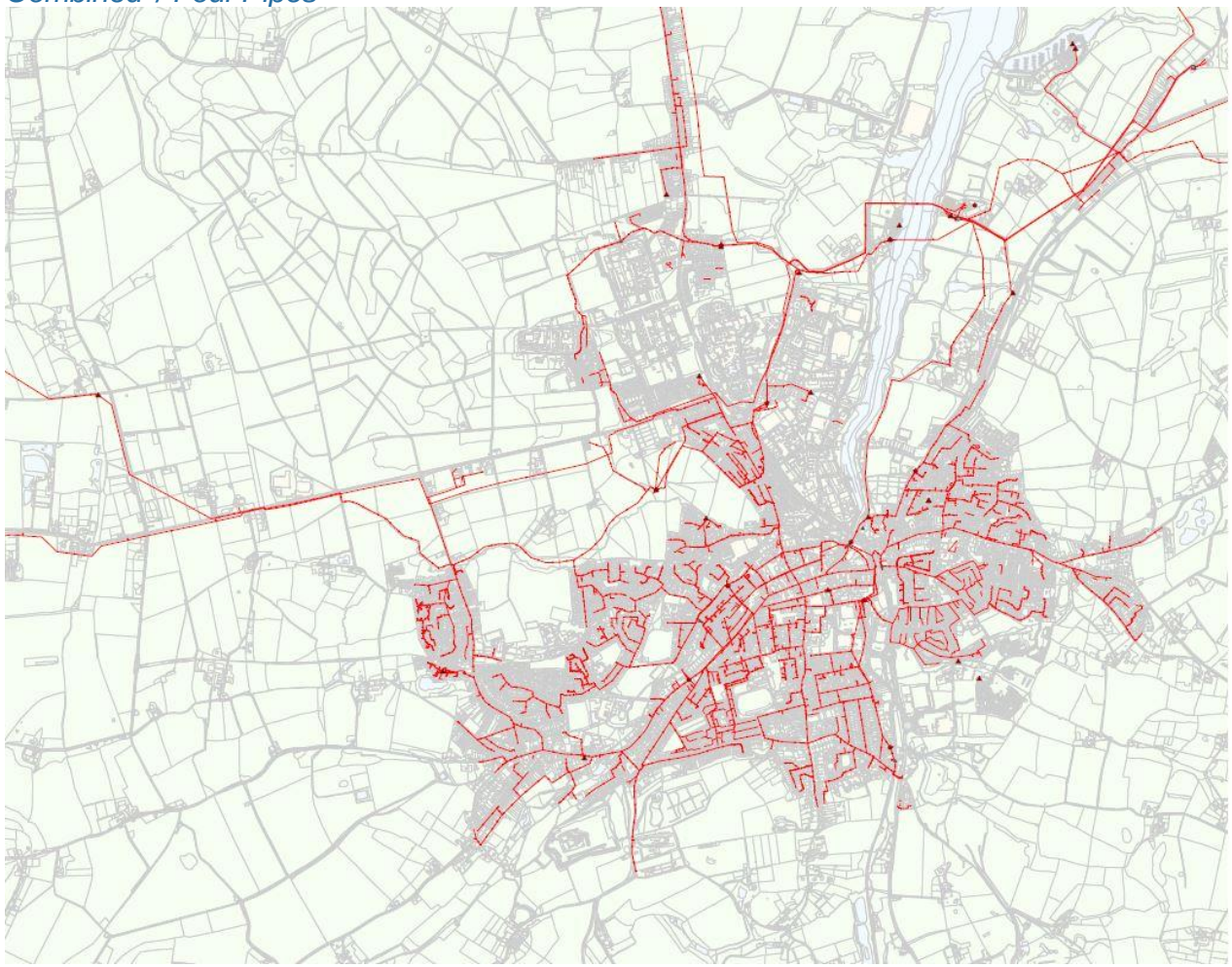
Over the majority of the remainder of the site, there are no superficial deposits, so the solid geology outcrops at surface. North side of Newport this comprises the Hampstead Beds, described by the BGS overall as 'clays, silts and sands' and are expected on site to comprise a mix of consolidated firm and stiff clays, firm silts and minor amounts of sands. Soakage rates are therefore expected to be slow or at least indifferent. The Bracklesham Beds and Barton Clay, underlying the south of Newport are described by the BGS overall as sandstones, mudstones and siltstones, weathered to 'clays, silts and sands' at outcrop and are expected on site to comprise a mix of consolidated firm and stiff clays, firm silts and dense sands. Like the Hampstead Beds, soakage rates are therefore expected to be slow or at least indifferent in these as well, although some slow soakage may be possible. In between these are thin deposits of Haddon Hill Formation, and Charma Sands but of limited extent so unlikely to be useful.

South of Newport is the Chalk and soakage into this would be expected to be high. However, the Chalk is just outside the study area, and on high ground, so above the flow direction of surface water so not likely to be of use for soakaways.


Earthquake Timeline
Alluvium
Sand and Gravel
Head deposits
PO30 1QQ
www.bgs.ac.uk

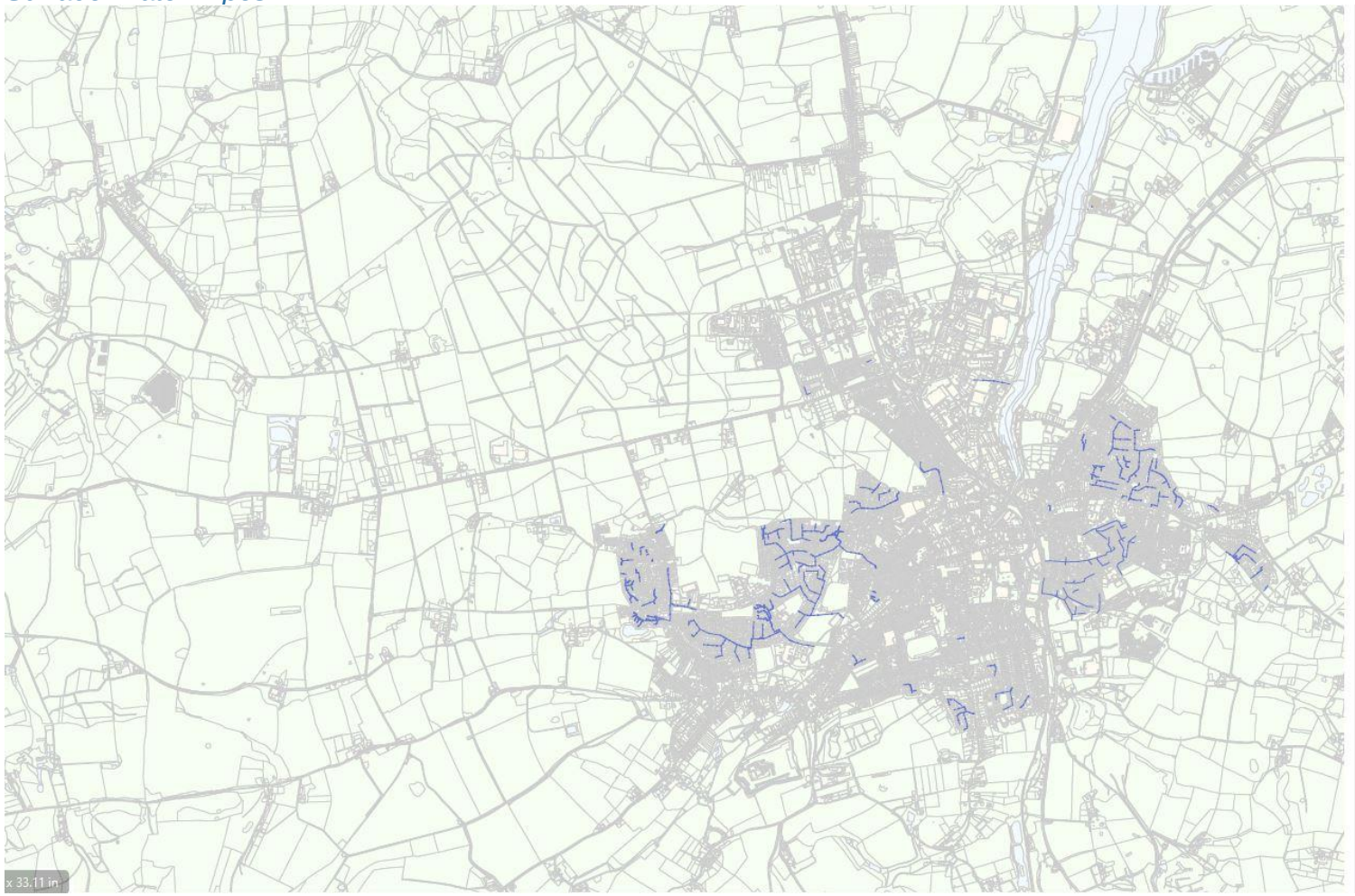

Hampstead Member
PO30 1QQ
Haddon Hill formation
Chama sand
Barton Clay
London Clay
Chalk

Combined / Foul Pipes[16]



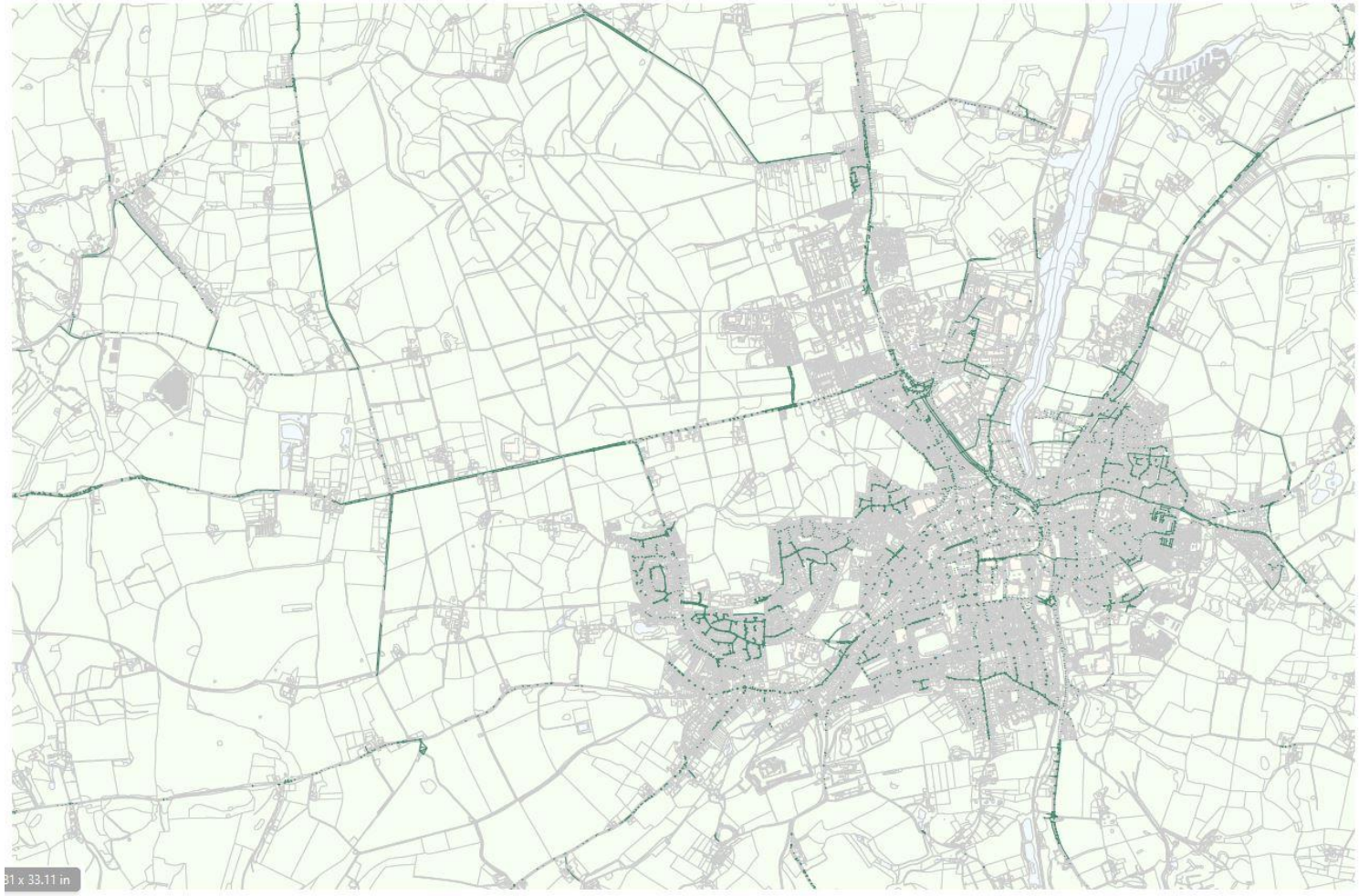
[16] Southern Water Asset Miner System

Surface Water Pipes[17]



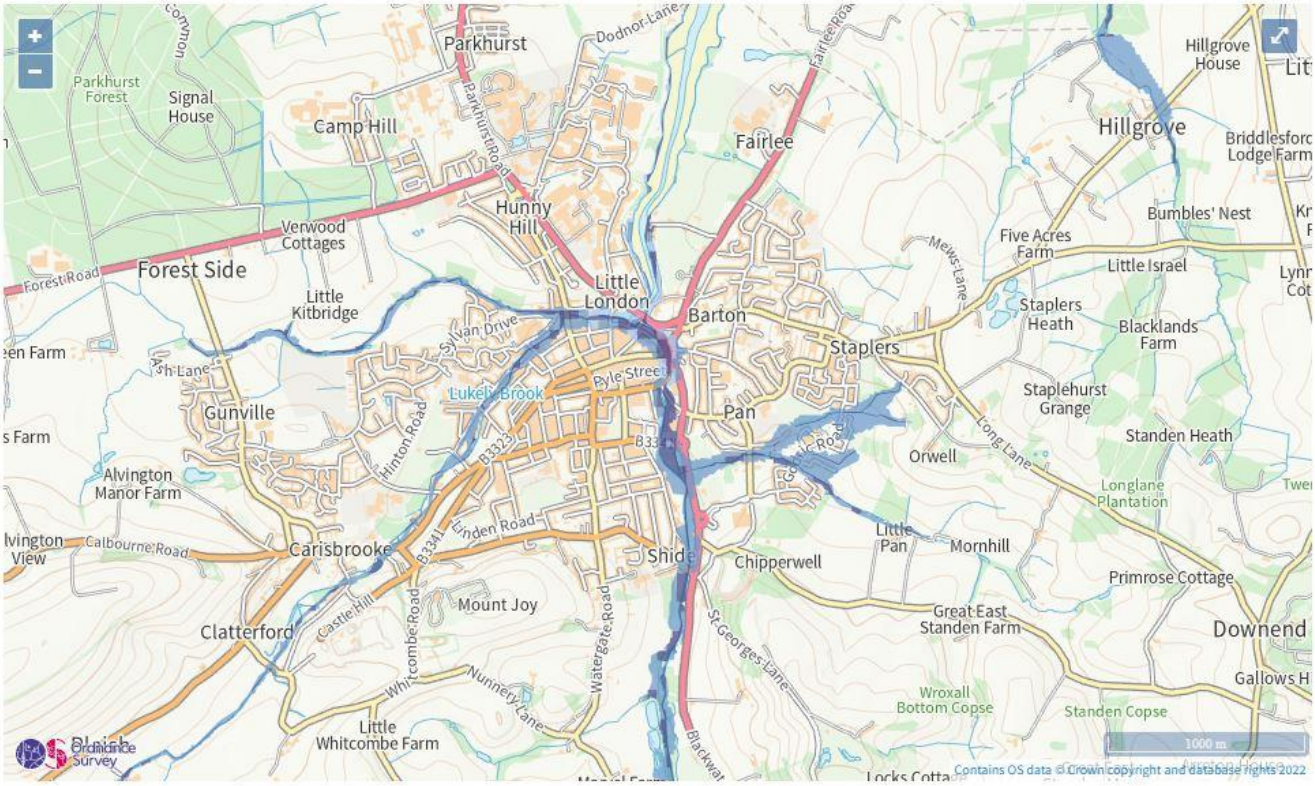
[17] Southern Water Asset Miner System

Highway Gullies [18]



[18] Island Roads, 2022

River and Coastal Flooding[19]

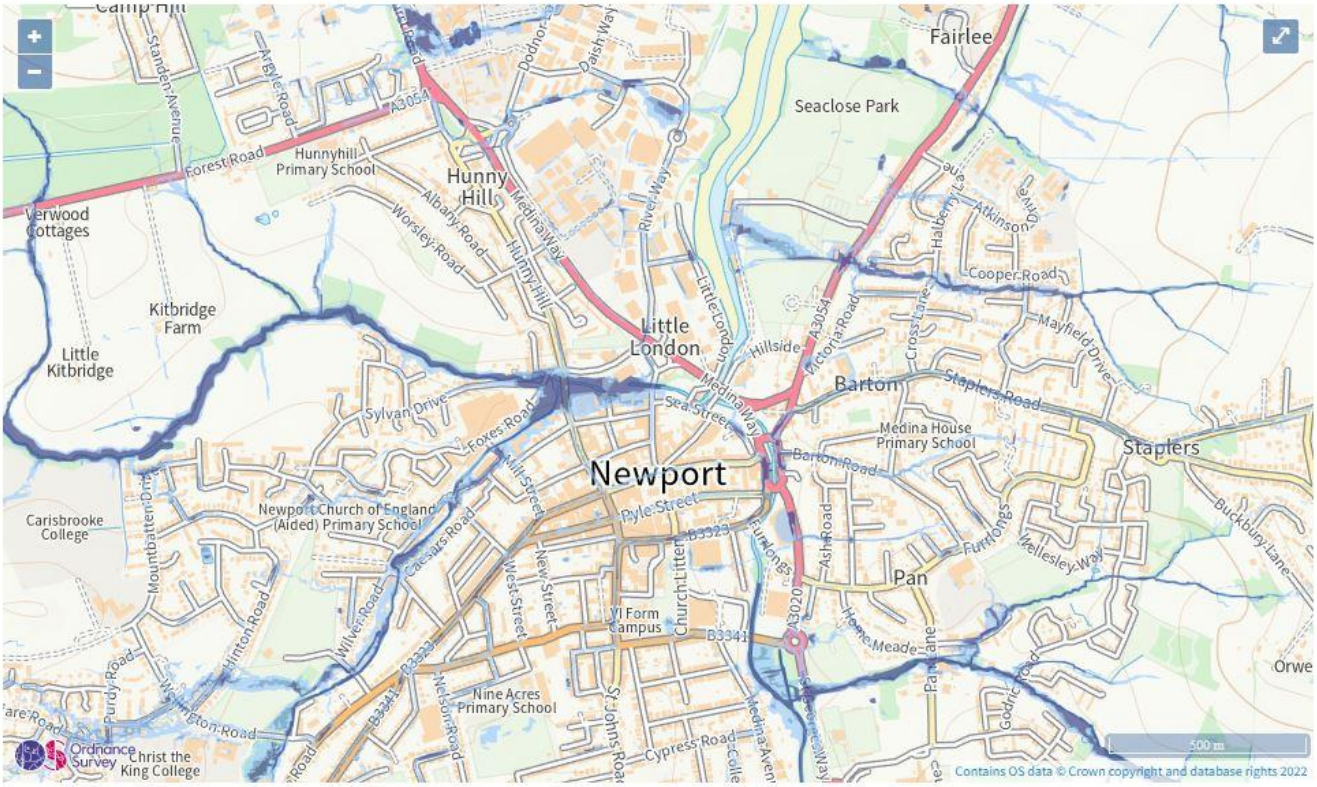


Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected

[19] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Surface Water Flooding[20]



[20] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Appendix J – Ryde

CSO Spills

No	Mnemonic ID	Overflow Name	Urban Area	EA Spills (Count) 2020
1	APPKRYDE	APPLEY PARK RYDE TRANSFER CEO	Ryde	136
2	ASRDRYDE	ASHEY ROAD RYDE CSO	Ryde	0
3	AURDRYDE	AUGUSTA ROAD RYDE CSO	Ryde	0
4	ESPLSEAV	ESPLANADE SEAVIEW CEO	Ryde	2
5	LAWABINS	LADIES WALK BINSTEAD CEO	Ryde	13
6	NIRDRYDE	NICHOLSON ROAD RYDE CSO	Ryde	15
7	PKRDRYDE	PARK ROAD RYDE CSO	Ryde	0
8	PRCORYDE	PRINCE CONSORT RYDE CEO	Ryde	32
9	ROLARYDE	ROSEMARY LANE RYDE CSO	Ryde	
10	SARDSEAV	SALTERNS ROAD SEAVIEW CEO	Ryde	5
11	SAROSEAV	SALTERNS ROAD SEAVIEW EMO	Ryde	0
12	PASANEN2	SANDOWN NEW NO.2 SSO	Ryde	76
13	SEAGBAYX	SEAGROVE BAY CEO	Ryde	0
14	SISTRYDE	SIMEON STREET RYDE CSO	Ryde	2
15	SPRDRYDE	SPENCER ROAD RYDE CSO	Ryde	0
16	SPRVALEX	SPRING VALE CEO	Ryde	3
17	SPRVALEP	SPRING VALE PUMPED CEO	Ryde	
18	SVRDRYDE	SPRINGVALE ROAD RYDE EMO	Ryde	
19	DUVESTHE	THE DUVER ST HELENS CEO	Ryde	8
20	WERDRYDE	WESTWOOD ROAD RYDE CSO	Ryde	0

Geology

Below is a geological map of the Ryde study area with the study area outline marked on. The ground conditions at surface, depending on location are broadly:

Superficial Deposits Raised Marine gravels or where these are absent -

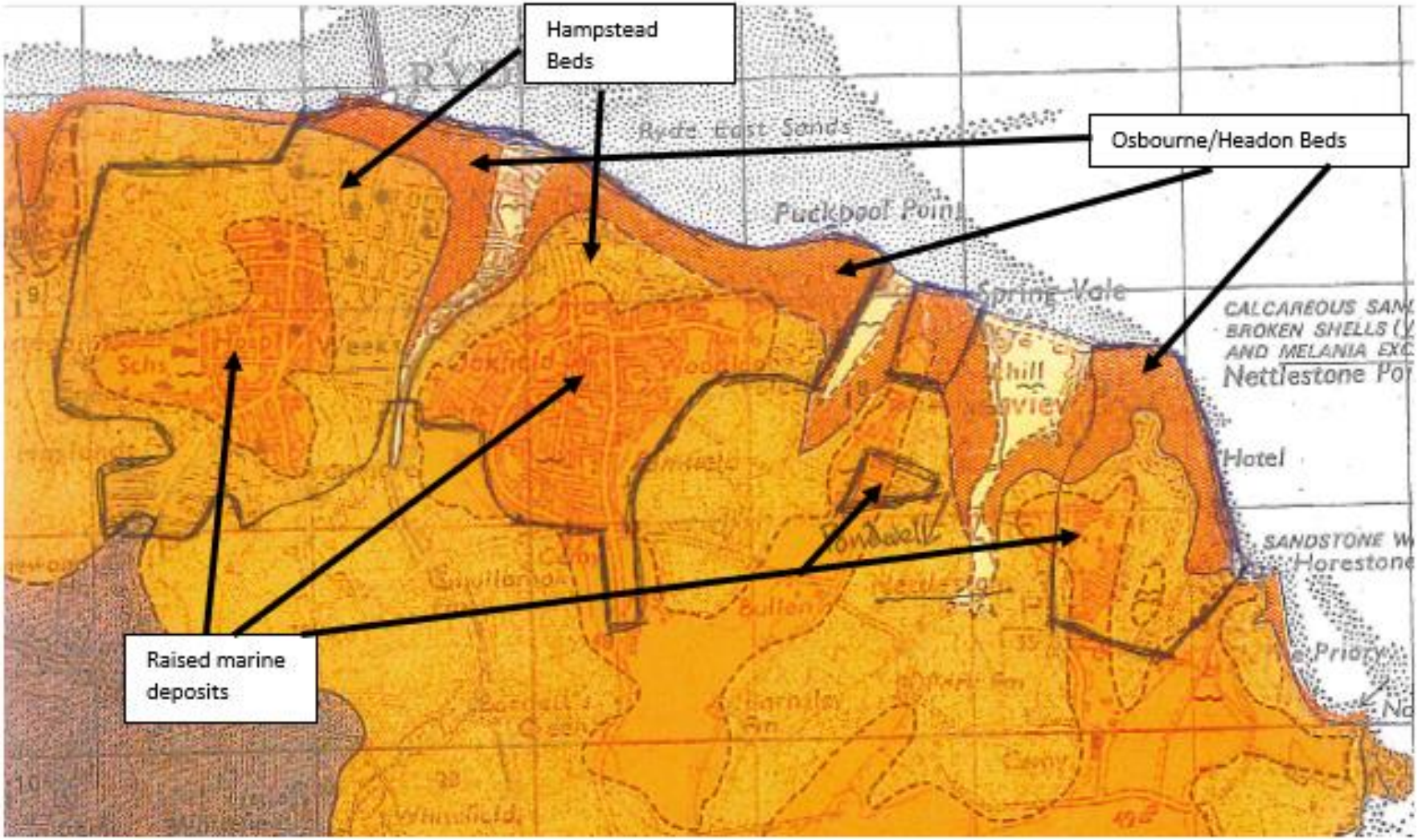
Solid Deposits Osbourne/Headon Beds or Bembridge Marl

The shallow ground in which soakaways are likely to be soaking into will be any one of these depending on location. Raised Marine gravels cover a large part of central Ryde, also Pondwell and Nettlestone. Elsewhere where these absent from the study area soakaways will be soaking into solid geology of either Osbourne/Headon Beds or Bembridge Marls. The attached map shows the distribution with the study areas marked on.

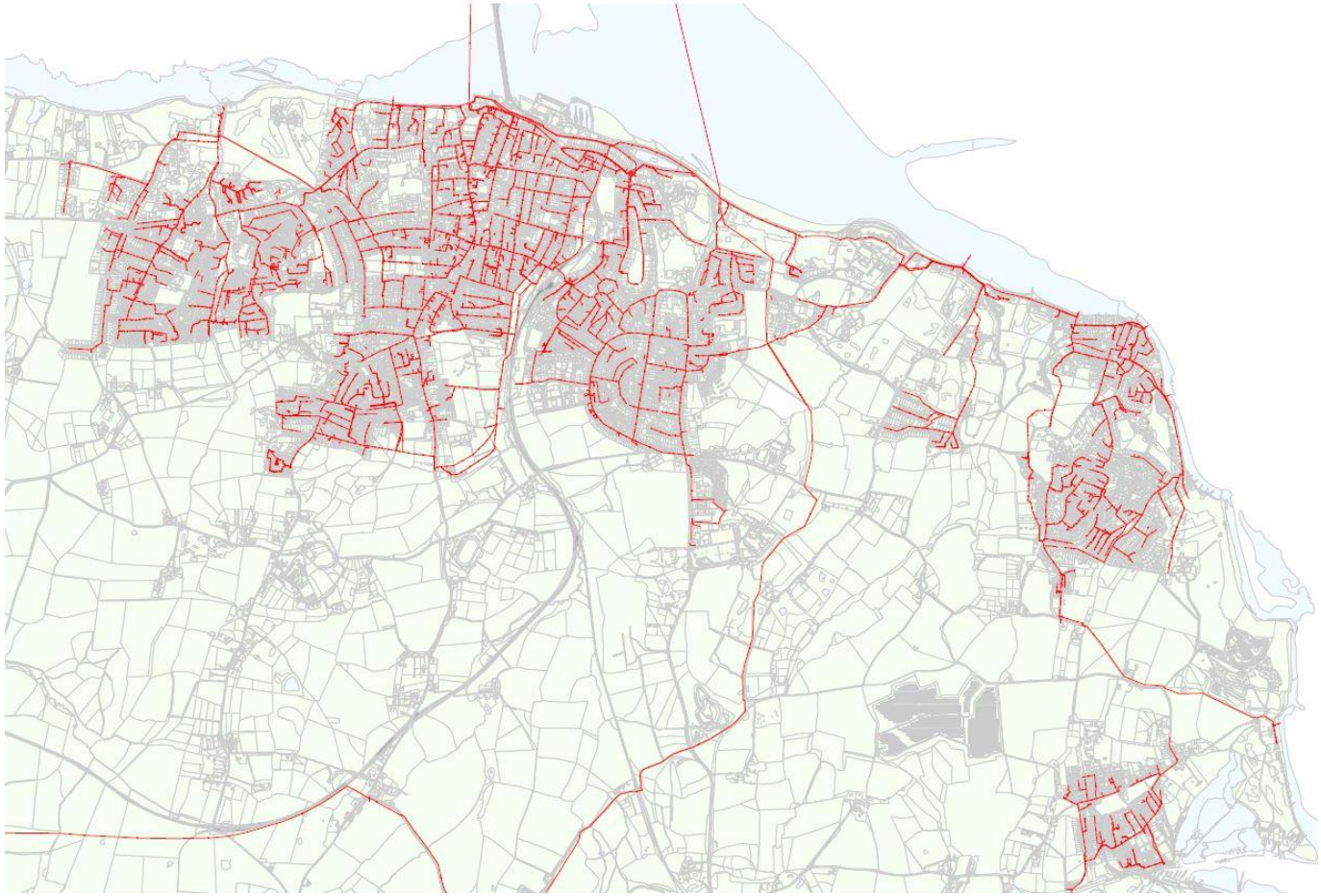
Raised marine gravel -, pale orange on map. Comprising mainly sand and gravel. Good permeability expected as these would be highly permeable. So well suited for soakaways/SUDS

Osbourne /Headon Beds – dark orange on the map. At depth an interbedded mudstone /limestone, weathered near surface to clays, silts and sands, Soakage will be slow or indifferent but probably useable where sands are present. Mostly outcropping at lower elevations along Ryde Sea front.

The Bembridge Marl, beneath a significant part of Ryde where the raised marine gravels are absent, coloured light brown on the map, comprises Clays and Silts with occasional thin sands, some limestones. Near surface, or at least within 1-2 m depth which would be the depth of interest for soakaways/SUDS, the material would be expected to be weathered and clays to dominate. Therefore, permeability is expected to be low and therefore not expected to be suitable for soakaway drainage.

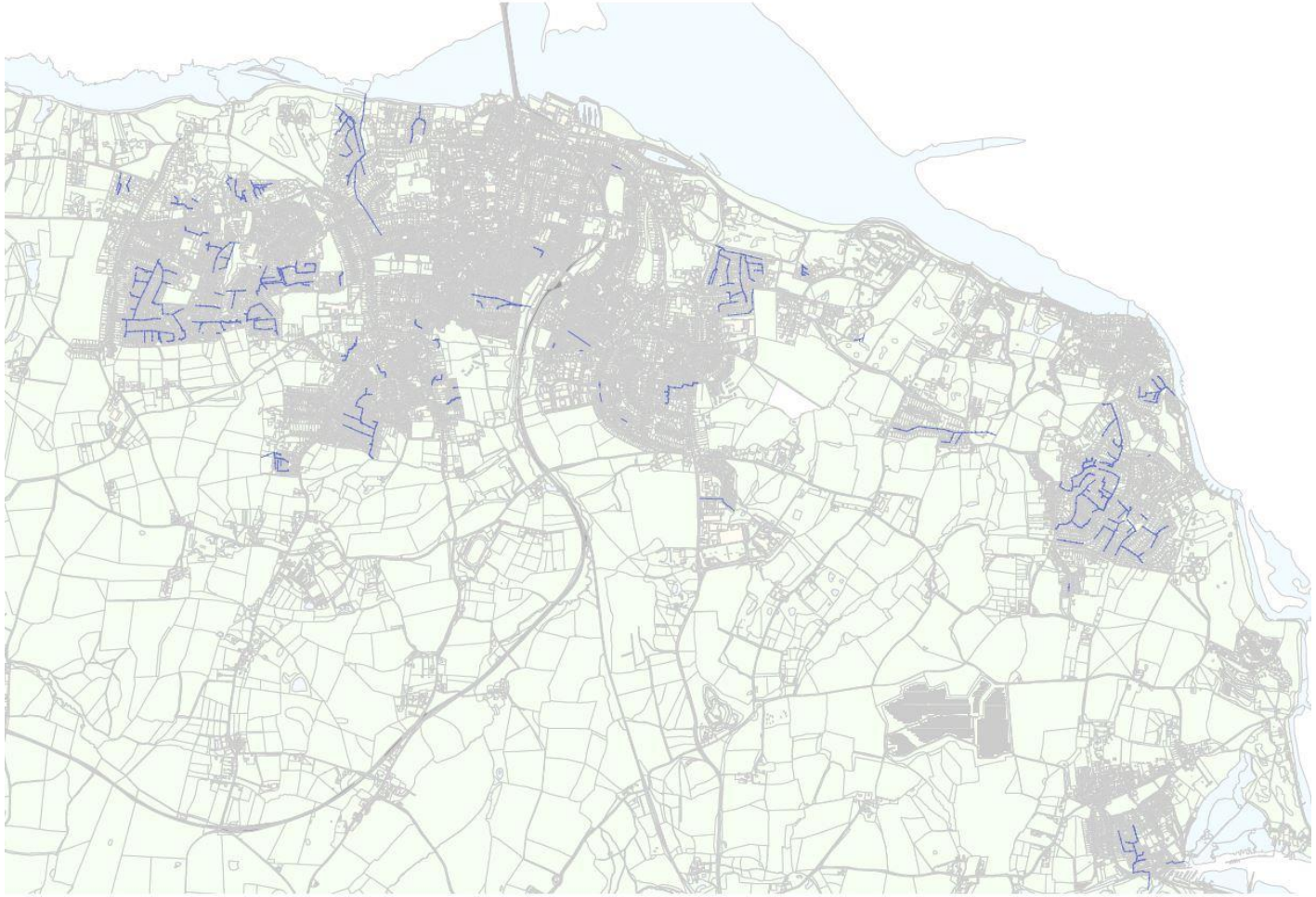

Hampstead Beds
Osbourne/Headon Beds
Raised marine deposits
Ryde East Sands
Puckpool Point
Spring Vale
CALCAREOUS SAN
BROKEN SHELLS (
AND MELANIA EXC
Nettlestone Po
Hotel
SANDSTONE W
Horestone
Priory

Combined / Foul Pipes [21]



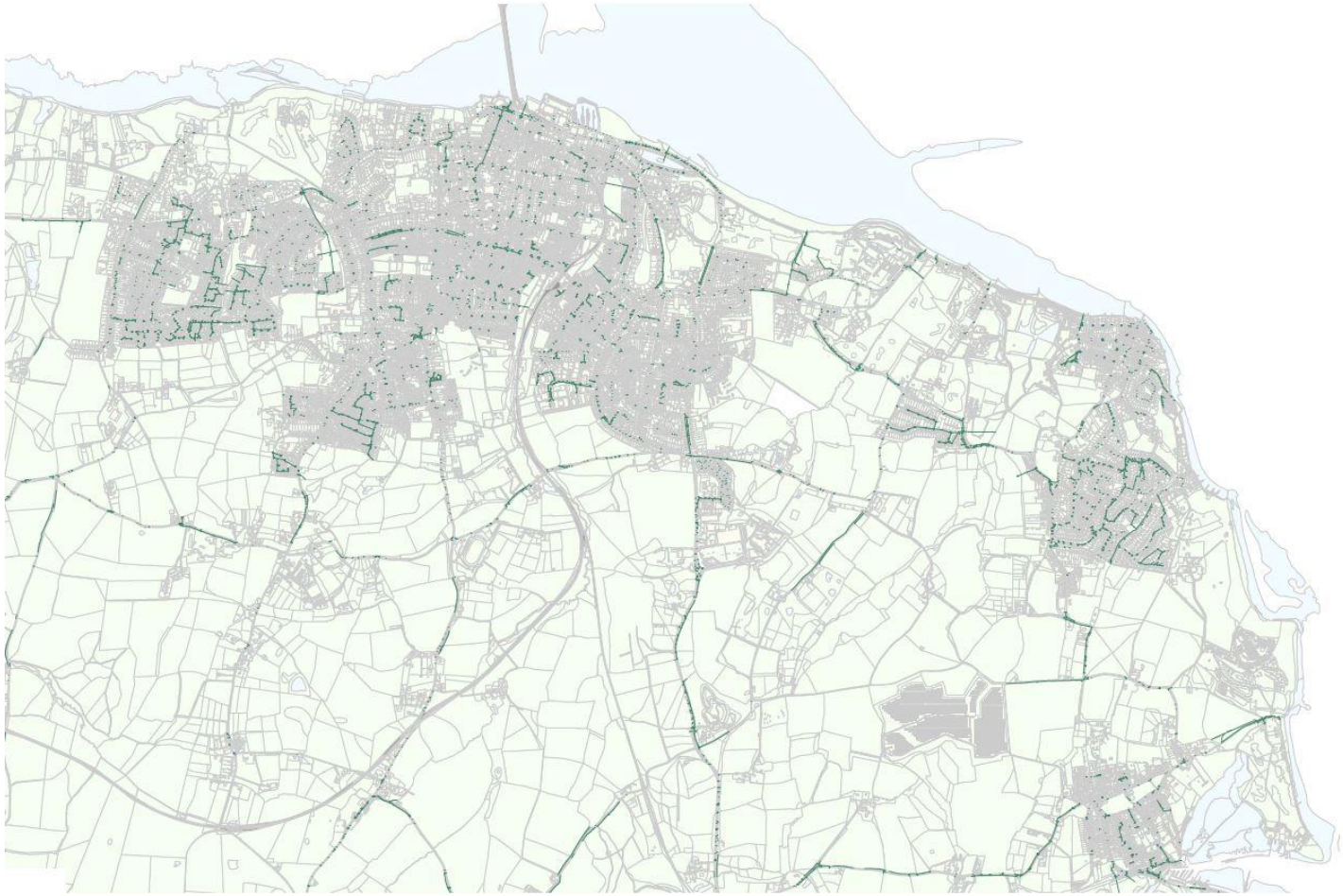
[21] Southern Water Asset Miner System

Surface Water Pipes [22]



[22] Southern Water Asset Miner System

Highway Gullies[23]



[23] Island Roads, 2022

River and Coastal Flooding[24]

[24] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Surface Water Flooding[25]

Extent of flooding from surface water

High Medium Low Very low Location you selected

[25] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Appendix K – Sandown

CSO Spills

No	Mnemonic ID	Overflow Name	Urban Area	EA Spills (Count) 2020
1	ALSHALVS	ALVERSTONE SHUTE ALVERSTONE CEO	Sandown	7
2	COCLSAND	COLLEGE CLOSE SANDOWN CEO	Sandown	0
3	EAGASAND	EASTERN GARDENS SANDOWN CEO	Sandown	1
4	EAGASAND	EASTERN GARDENS SANDOWN EMO	Sandown	
5	SOBESHAN	HOPE BEACH SHANKLIN NEW CEO	Sandown	5
6	HYDESHAN	HYDE DESTRUCTOR SHANKLIN CSO	Sandown	0
7	LAGRSAND	LAKE GREEN ROAD SANDOWN CSO	Sandown	8
8	LANGBRID	LANGBRIDGE CEO	Sandown	15
9	LUCCOMBE	LUCCOMBE CEO	Sandown	4
10	MORTCOMM	MORTON COMMON CEO	Sandown	
11	NEFMAPSE	NEWBARN FARM APSE HEATH CEO	Sandown	27
12	QULABRA2	QUAY LANE BRADING CEO	Sandown	36
13	PASANEN1	SANDOWN NEW NO.1 SSO	Sandown	114
14	SHANCHIN	SHANKLIN CHINE CSO	Sandown	8
15	WINFORDX	WINFORD CEO	Sandown	1
16	YOCOALVS	YOUNGWOODS COPSE ALVERSTONE CEO	Sandown	0

Geology

The study area is underlain in the most part (90%) by the Ferruginous Sands Formation and in the south the Sandrock Formation which both outcrop at ground level (no drift deposits present), beneath all the urban area of Sandown and Shanklin, shown as green on the map (orange for the Sandrock Formation). There are only very limited drift deposits in this area, so the Ferruginous Sands/Sandrock Formation outcrops at the surface.

They comprise fine and medium grained poorly cemented sandstones, with occasional coarser bands. At outcrop they would be expected to be weathered to loose and medium dene sands. Permeability would be expected to be at least intermediate and, in some places, quite high, and soakage rates are therefore expected to be reasonable, so anticipated useable for soakaway drainage/SUDS.

There are some exceptions to this in specific areas and locations, and these are listed below.

Very north of Sandown. Underlain at the surface by Atherfield Clay and the Vectis Formation (no drift deposits shown on the geological map). These comprise mudstones and siltstones and expected to be weathered at surface outcrop to clays and clayey silts. These would be of low permeability therefore soakage into these is expected to be slow, so not generally suitable for soakaway drainage.

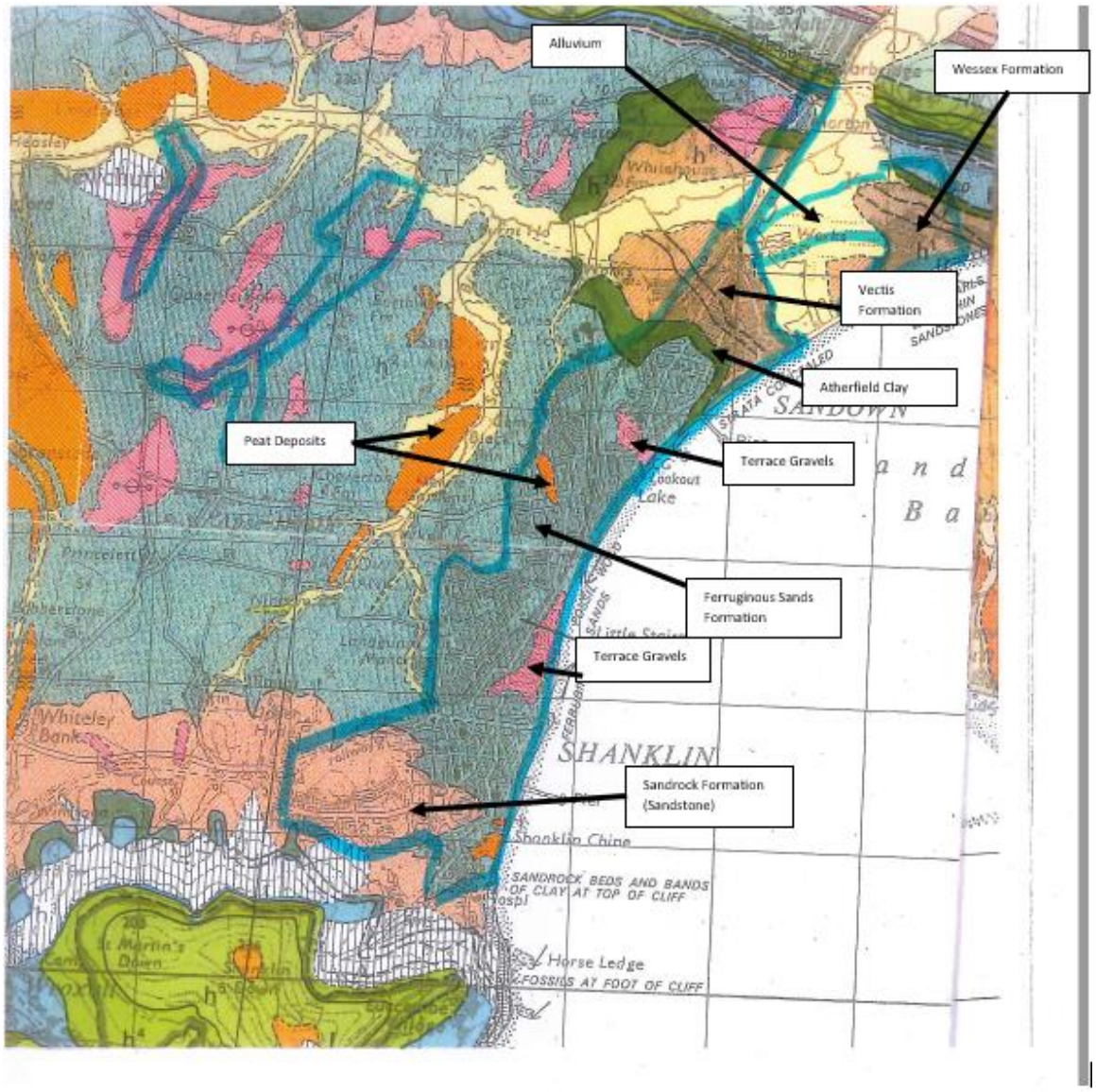
In the area of the village of Yaverland (north of Sandown), this is underlain at the surface by Wessex Formation (no drift deposits mapped). These are fine to coarse grained sandstones and siltstones. These would be of mixed low to high permeability. They are therefore expected to present moderate, reasonably practical, opportunities for soakage, although may be variable place to place.

Elsewhere there are scattered, isolated areas of drift deposits as follows:

River Terrace Deposits – one small area in Sandown and one in Shanklin. Both comprising a mix of sand and gravel, therefore highly permeable so expected to offer high soakaway rates.

Peat -there are two small areas of peat mapped, one in Sandown at Lake Green Road and one at Shanklin Chine. Soakage into these is expected to be at least moderate.

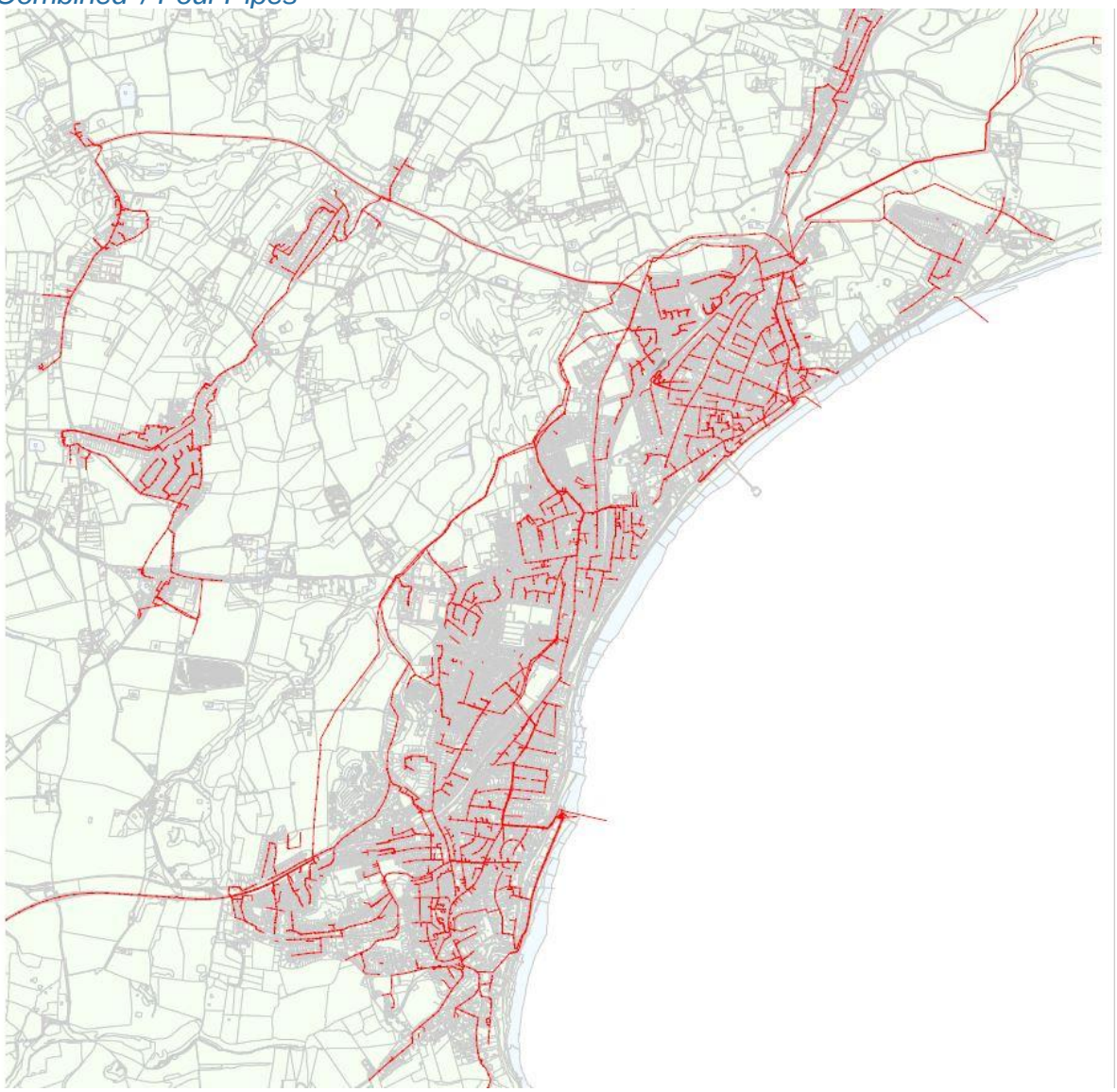
There is alluvium in the valley of the river Yar, north of Sandown and some small parts of the study area encompass this. This would be a soft to firm unconsolidated, compressible silty clay, but can contain layers of silt, sand, peat and gravel. A stronger, desiccated surface zone may be present. Soakage expected to be variable, generally slow, although some locations quicker when sand/gravel is present. The predictability of the locations of higher permeability zones is not possible from the geological map.



Geology of Sandown[26]

[26] www.bgs.ac.uk

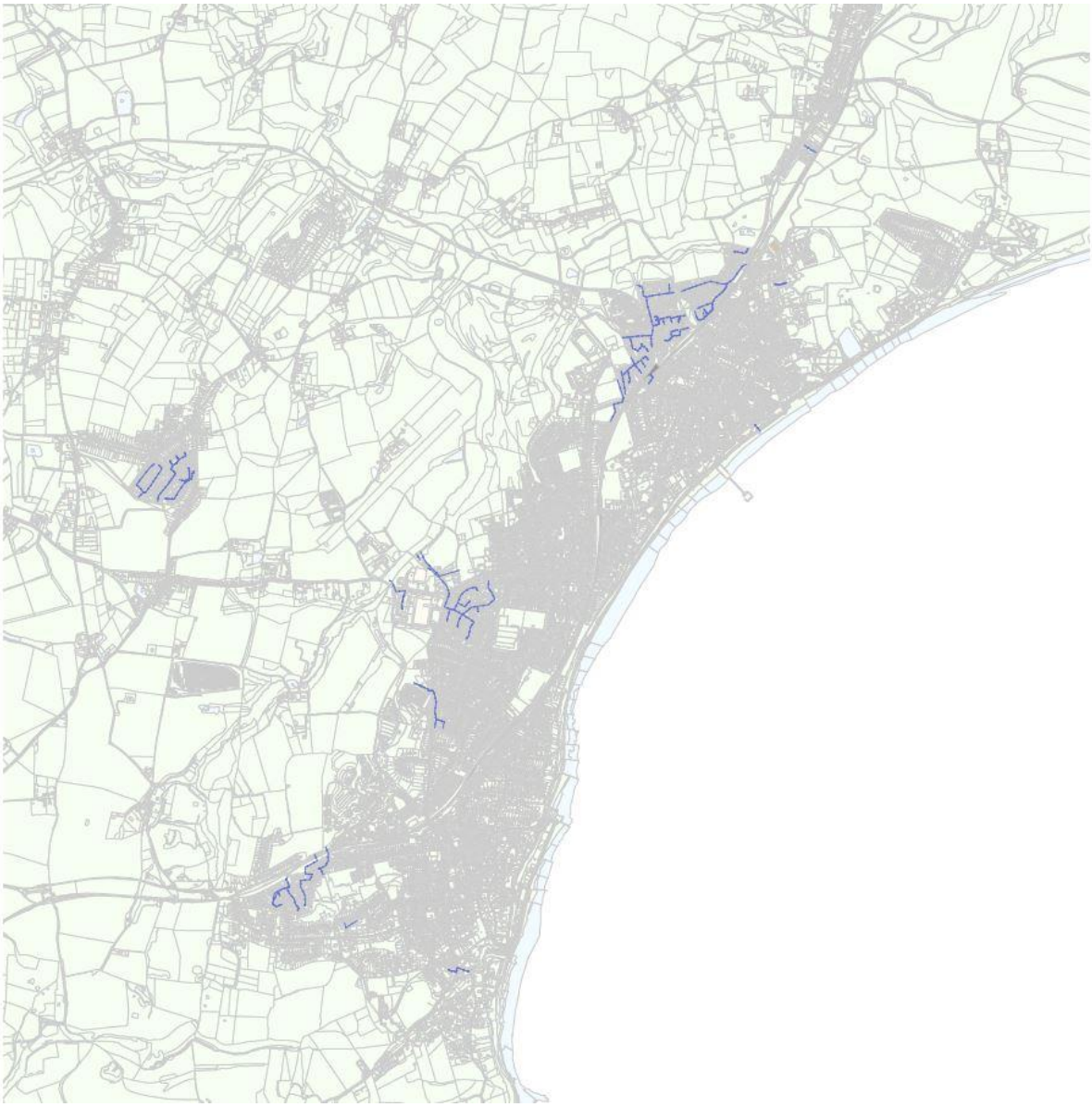
Combined / Foul Pipes[27]



Surface Water Pipes [28]

[27] Southern Water Asset Miner System

[28] Southern Water Asset Miner System

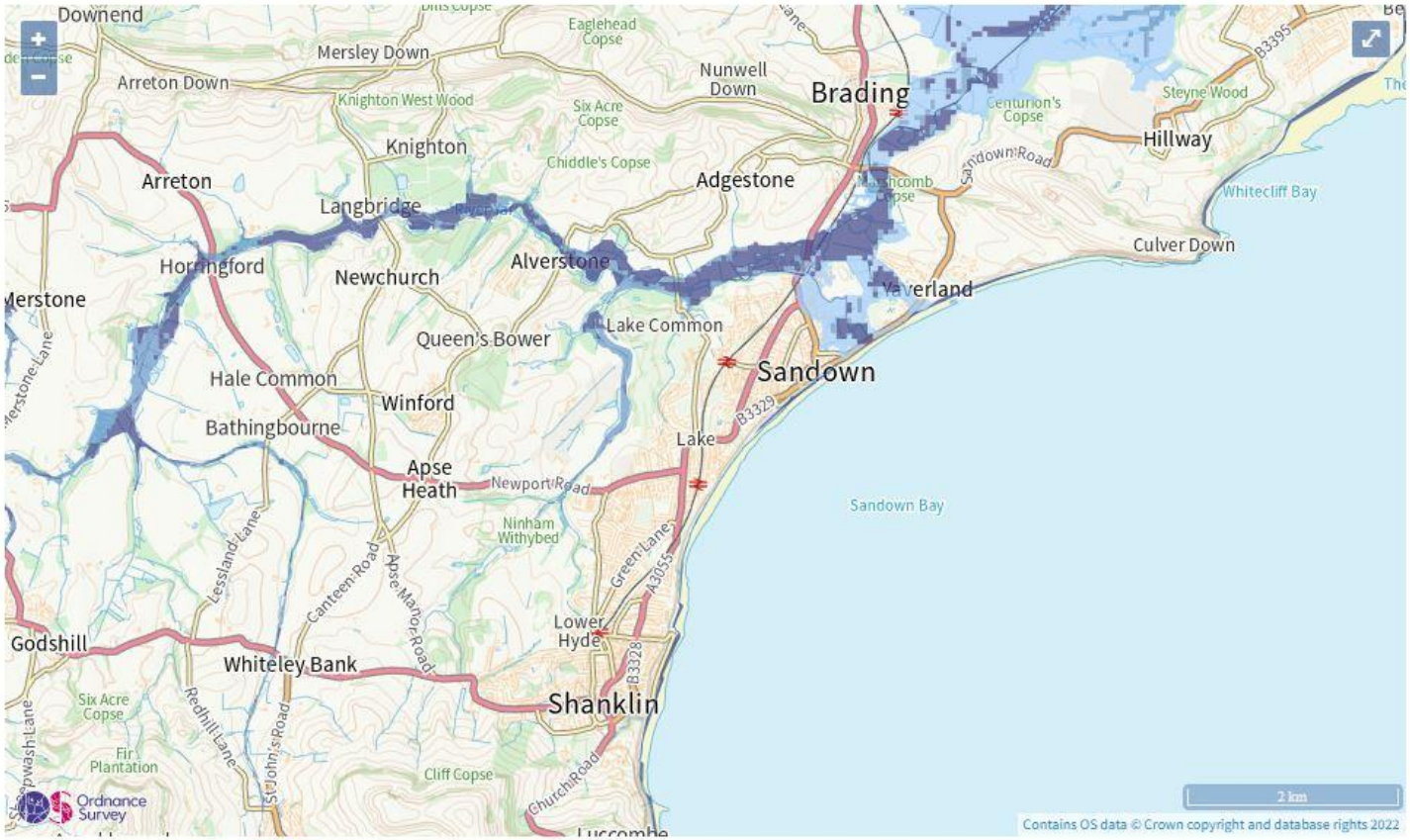


Highway Gullies

29

[29] Island Roads, 2022

River and Coastal Flooding[30]

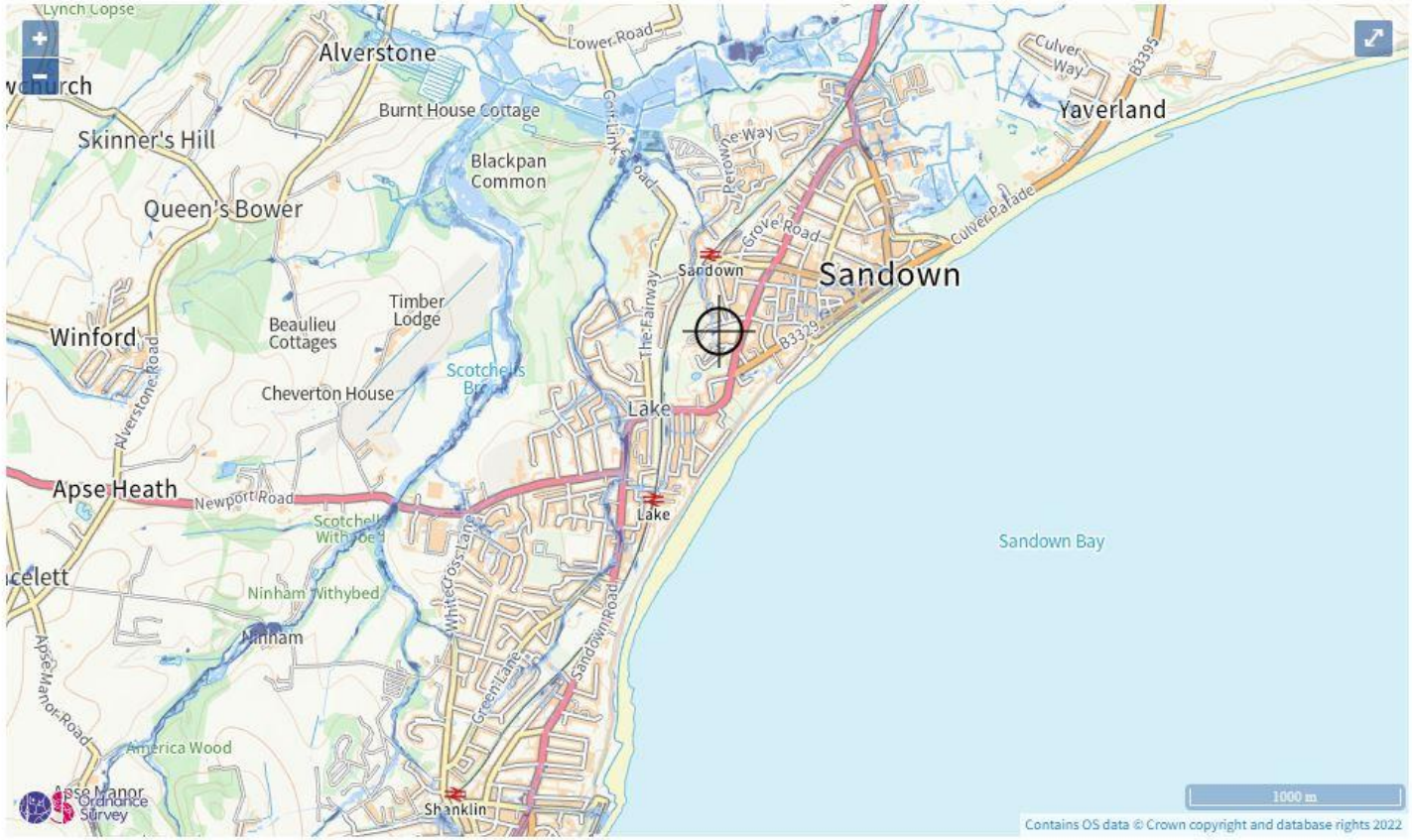


Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected

[30] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Surface Water Flooding [31]



Extent of flooding from surface water

High Medium Low Very low Location you selected

[31] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Appendix L – Ventnor

CSO Spills

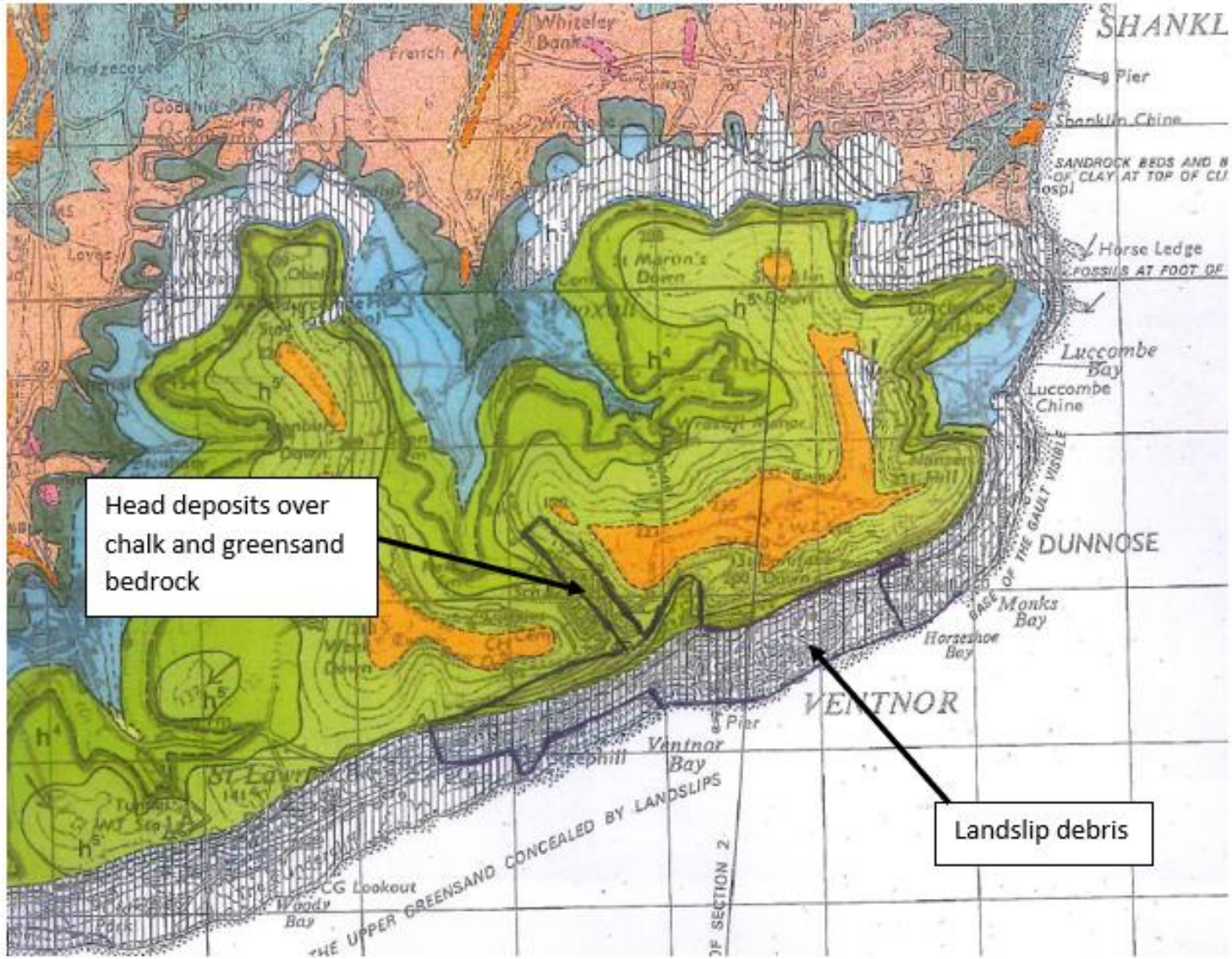
No	Mnemonic ID	Overflow Name	Urban Area	EA Spills (Count) 2020
1	BONCHURC	BONCHURCH EMO	Ventnor	1
2	FLBRVENT	FLOWERS BROOK VENTNOR CEO	Ventnor	2
3	LIPOVENT	LION POINT VENTNOR CEO	Ventnor	10
4	STEECOVE	STEEPHILL COVE EMO	Ventnor	1

Geology

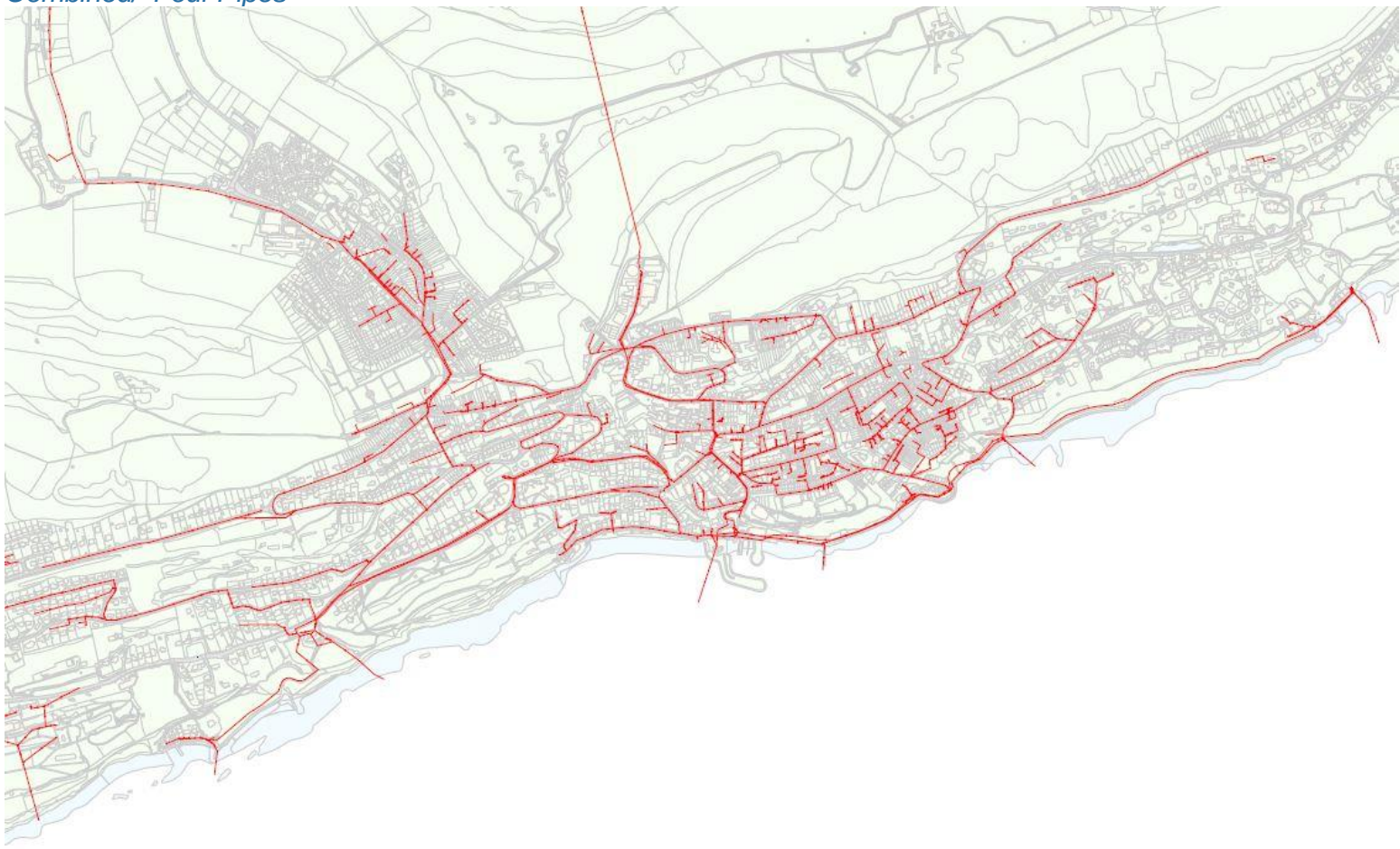
Below is a geological map of the Ventnor study area with the study area outline marked. The area is principally underlain by a considerable thickness of landslip debris underlain by Gault Clay.

The landslip debris, shown with diagonal lines on the map, is derived from the Chalk and Upper Greensand from upslope. Borehole records show it to comprise a mix of chalk and sandstone cobbles and larger blocks, in a matrix of sand. Permeability for soakaways is expected to be reasonable.

The Lowerville valley area (B3327) in the north is above the landslip area. It is principally underlain by a solid geology of Upper Greensand and Chalk, and as such soakage rates for soakaways/SUDS are expected to be high.


Head deposits over chalk and greensand bedrock
Landslip debris
SHANKL
Pier
Shanklin Chine
Horse Ledge
Luccombe Bay
Luccombe Chine
DUNNOSE
Monks Bay
Horseshoe Bay
VENTNOR
Pier
Ventnor Bay
CG Lookout
Woody Bay
THE UPPER GREENSAND CONCEALED BY LANDSLIPS
Whiteley Bank
Maron's Down

Combined/ Foul Pipes[32]



[32] Southern Water Asset Miner System

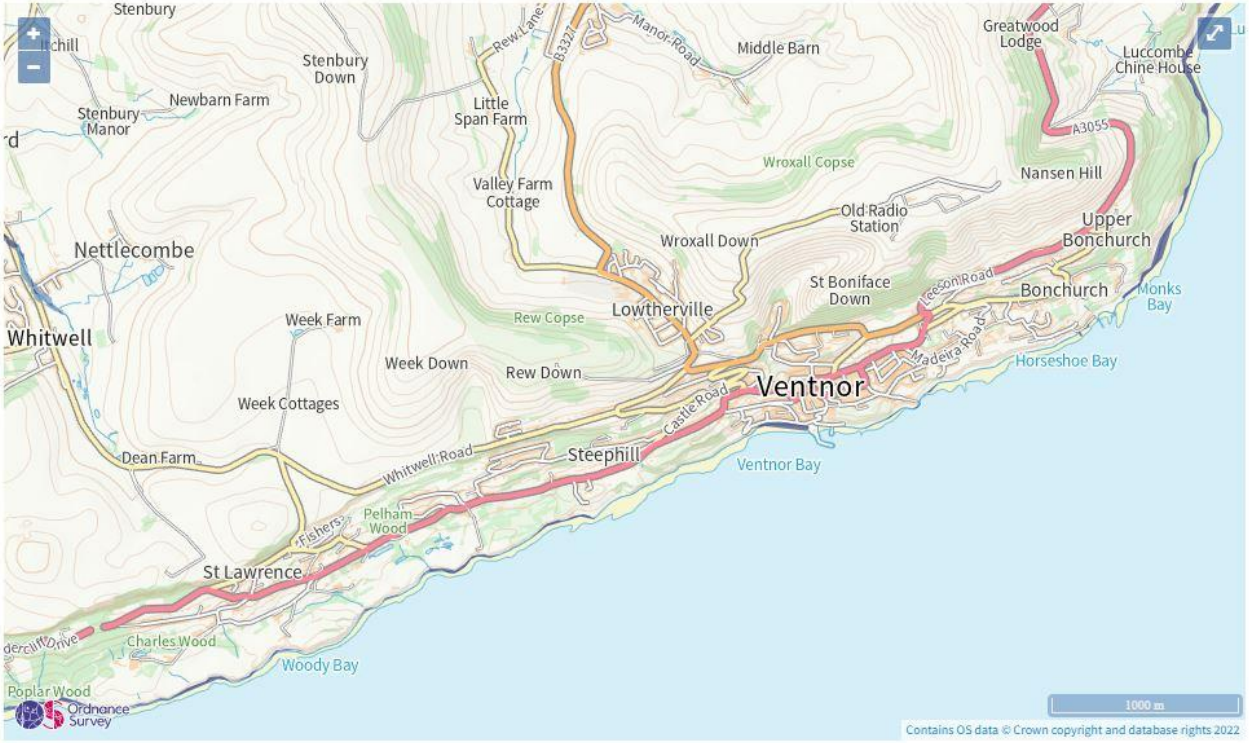
Surface Water Pipes[33]

[33] Southern Water Asset Miner System

Highway Gullies[34]

[34] Island Roads, 2022

Rivers and Coastal Flooding[35]

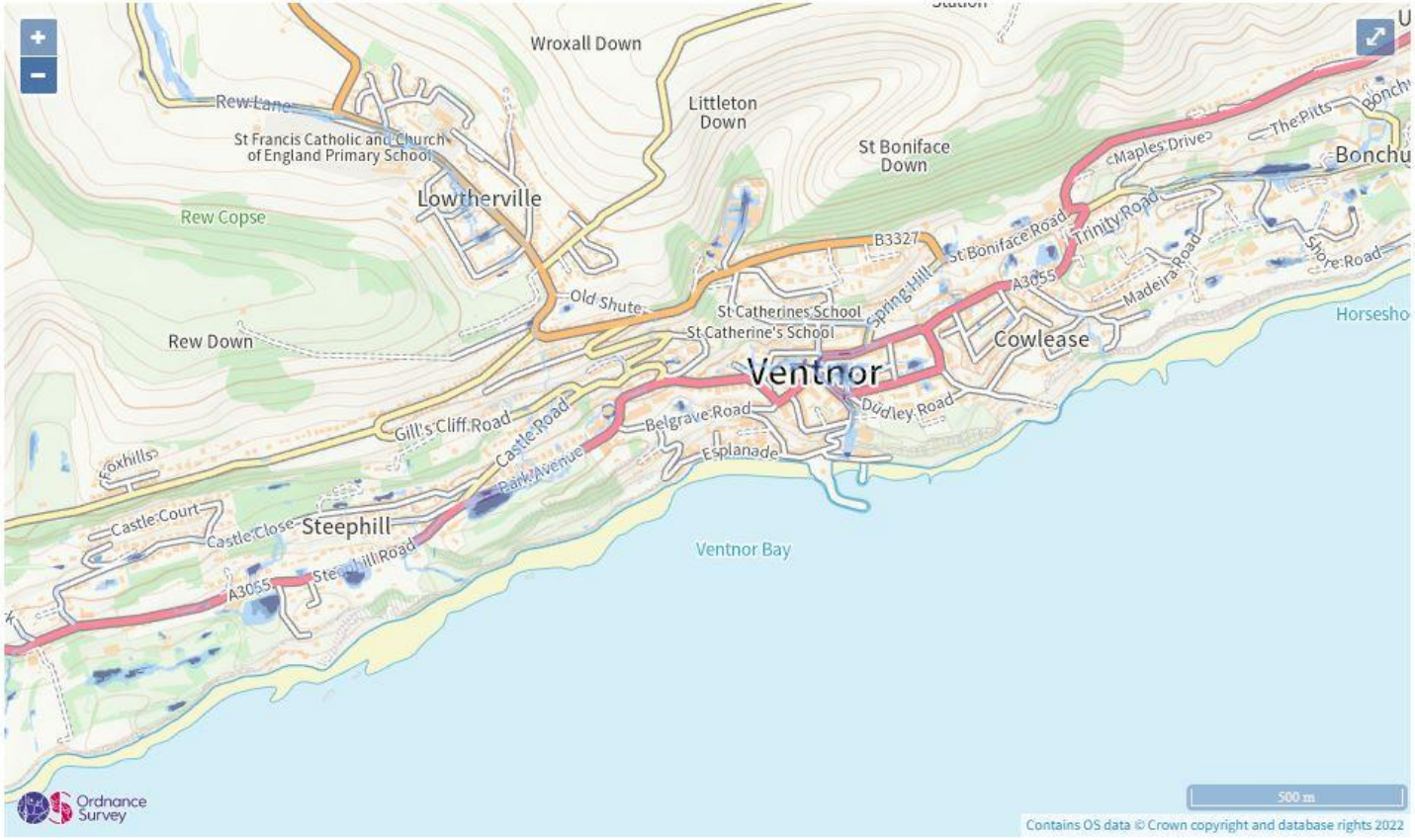


Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected

[35] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Surface Water Flooding[36]



[36] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Appendix M – Yarmouth

CSO Spills

No	Mnemonic ID	Overflow Name	Urban Area	EA Spills (Count) 2020
1	BOBRFRES	BOW BRIDGE FRESHWATER CEO	Yarmouth	33
2	COLAFRBA	COASTGUARD LANE FRESHWATER BAY CEO	Yarmouth	10
3	COLWCHIN	COLWELL CHINE CEO	Yarmouth	3
4	HPVITOTL	HURST POINT VIEW TOTLAND EMO	Yarmouth	4
5	KINGMANO	KINGS MANOR CEO	Yarmouth	2
6	LIDRNORI	LINSTONE DRIVE NORTON IOW CSO	Yarmouth	0
7	MARDTOTL	MADEIRA ROAD TOTLAND CEO	Yarmouth	13
8	MIRDYARM	MILL ROAD YARMOUTH CSO	Yarmouth	1
9	MOLALINS	MONKS LANE LINSTONE CHINE CSO	Yarmouth	6
10	NEWRALUM	NEW ROAD ALUM BAY EMO	Yarmouth	0
11	NORTGREE	NORTON GREEN CEO	Yarmouth	0
12	NORTNIOW	NORTON TRANSFER IOW INLET CEO	Yarmouth	2
13	NORTOIOW	NORTON TRANSFER IOW PUMPED CEO	Yarmouth	107
14	NORTTIOW	NORTON TRANSFER IOW SSSI CEO	Yarmouth	21
15	SCGRFRES	SCHOOL GREEN ROAD FRESHWATER CEO	Yarmouth	18
16	SGRDFRES	SCHOOL GREEN ROAD FRESHWATER OUTSIDE 33 CSO	Yarmouth	1
17	INSTYARM	THE INSTITUTE YARMOUTH CEO	Yarmouth	7
18	PRTOPIER	THE PROMENADE TOTLAND PIER CEO	Yarmouth	0
19	THORBOUL	THORLEY ROAD BOULDNOR CEO	Yarmouth	9

Geology

Below is a geological map of the Yarmouth Isle of Wight study area, with the study area outline marked on, and showing the main ground condition types expected.

For SUDS design, you are mainly interested in the permeability of the near surface (say the top 3m) of the local geology, that is the ground that the soakage will take place into. By reference to the geological map 'Isle of Wight Special Edition (parts of sheets 344, 345, 330, 331) and the British Geological survey (BGS) online geological mapping, the surface and near surface geology over the study area is as below.

The area is large, covering Totland, Freshwater and Yarmouth, so there is a considerable variation of geology over the site as a whole.

There are no superficial deposits mapped apart from some alluvium, underlain by sand/gravel (Terrace Gravels) in the river Yar valley itself, see below geological map.

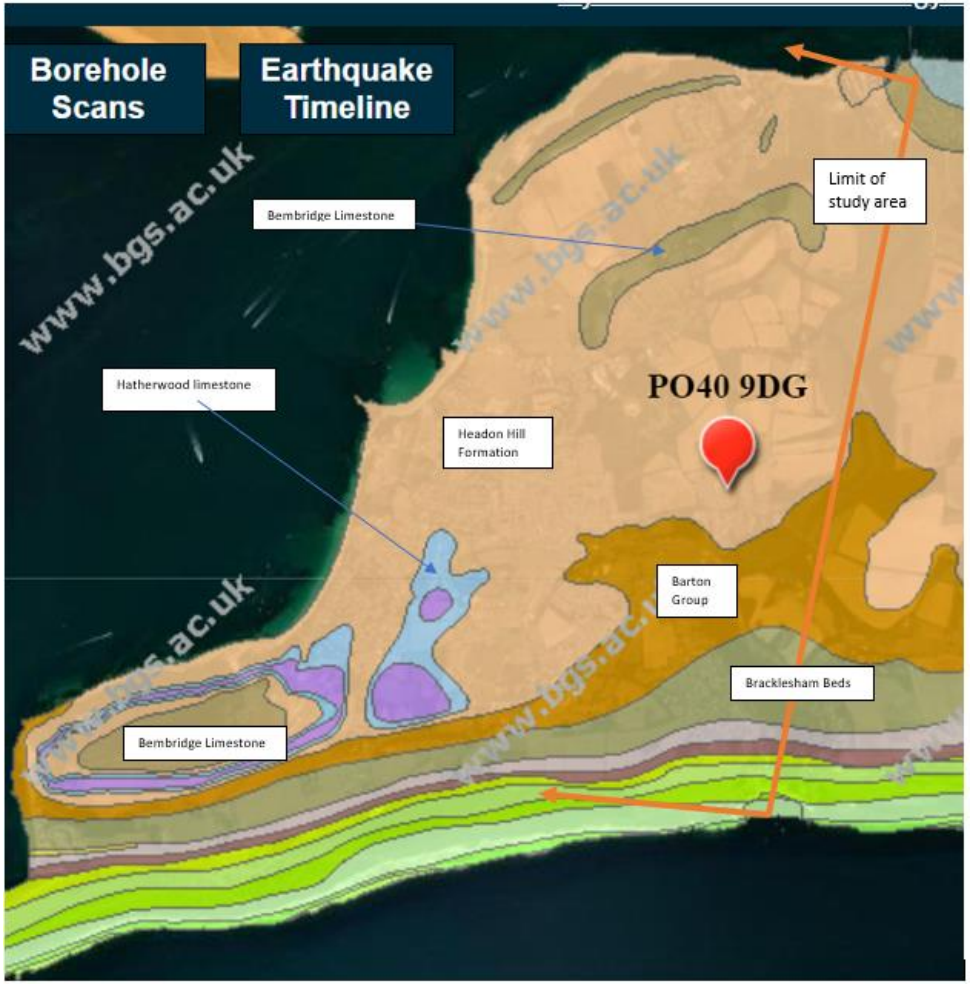
The alluvium is of only limited extent, but the Terrace Gravels form a deposit of significant width, several hundred metres wide both sides of the river, along the mid length of the river Yar. These would be expected to be of high permeability, so well suited for soakaway drainage in that particular part of the site.

Over the majority of the remainder of the site, a solid geology of the Headon Hill Formation outcrops at surface. These are described by the BGS as mudstone and limestone, the former dominating; probably weathered at surface to clays. I would expect soakage into this to be limited.

The Bracklesham Beds and Barton Group are described by the BGS overall as sandstones, mudstones and siltstones, weathered to 'clays, silts and sands' at outcrop and are expected on site to comprise a mix of consolidated firm and stiff clays, firm silts and dense sands. Soakage rates are therefore expected to be slow or at least indifferent in these although some soakage may be possible.

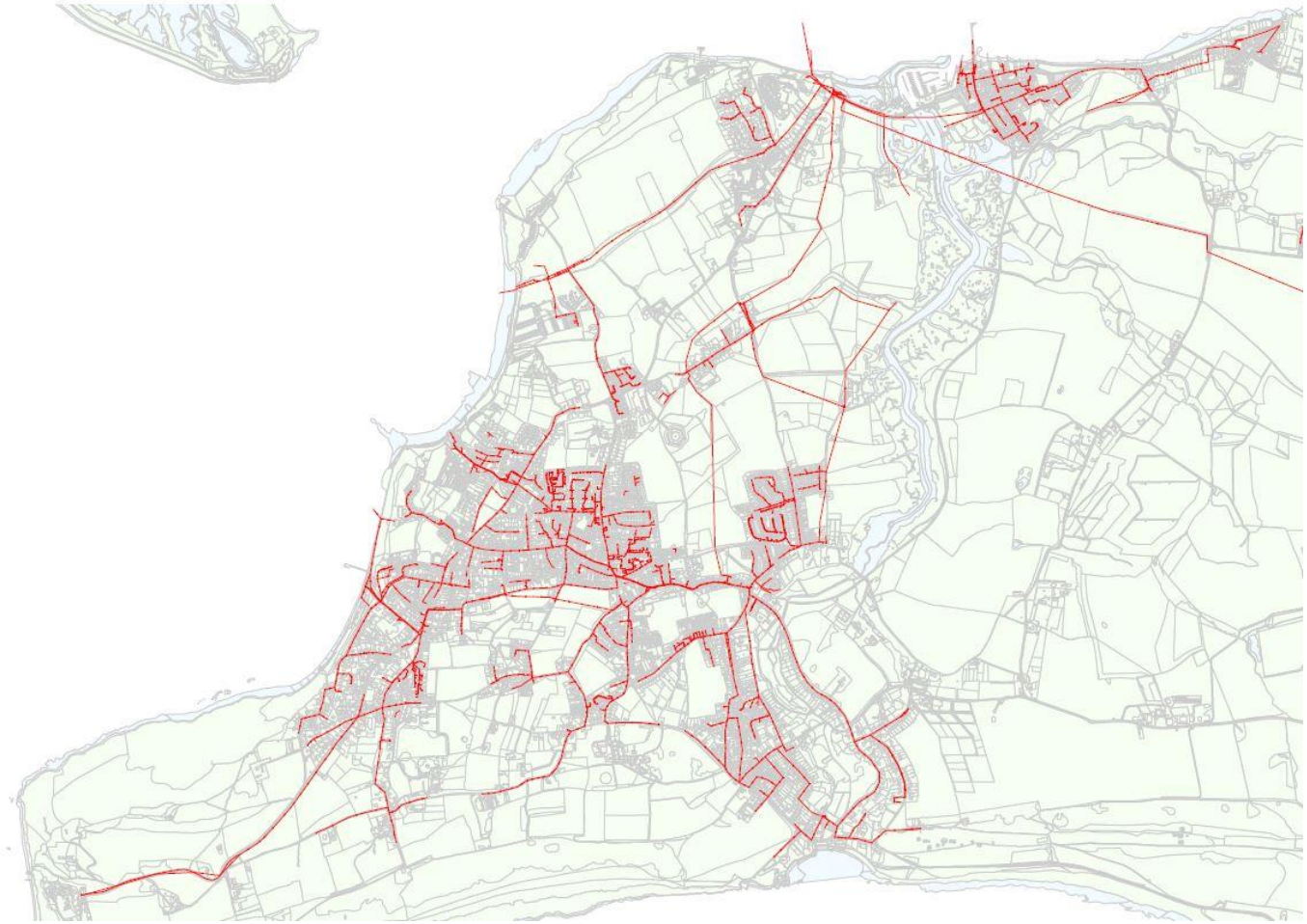
There are local outcrops of Heatherwod Limetone and Bembridge Limestone, and although of high permeability, are local only, so unlikely to be of any practical use.

Along the south coast is a thin outcrop of Chalk and Greensand, and soakage into these would be expected to be high. However, they are just outside the study area, and comprise a ridge of high group, so are above the general flow direction of surface water so not likely to be of use.


Borehole Scans
Earthquake Timeline
Limit of study area
Bembridge Limestone
Hatherwood limestone
Headon Hill Formation
PO40 9DG
Barton Group
Bracklesham Beds
Bembridge Limestone
www.bgs.ac.uk

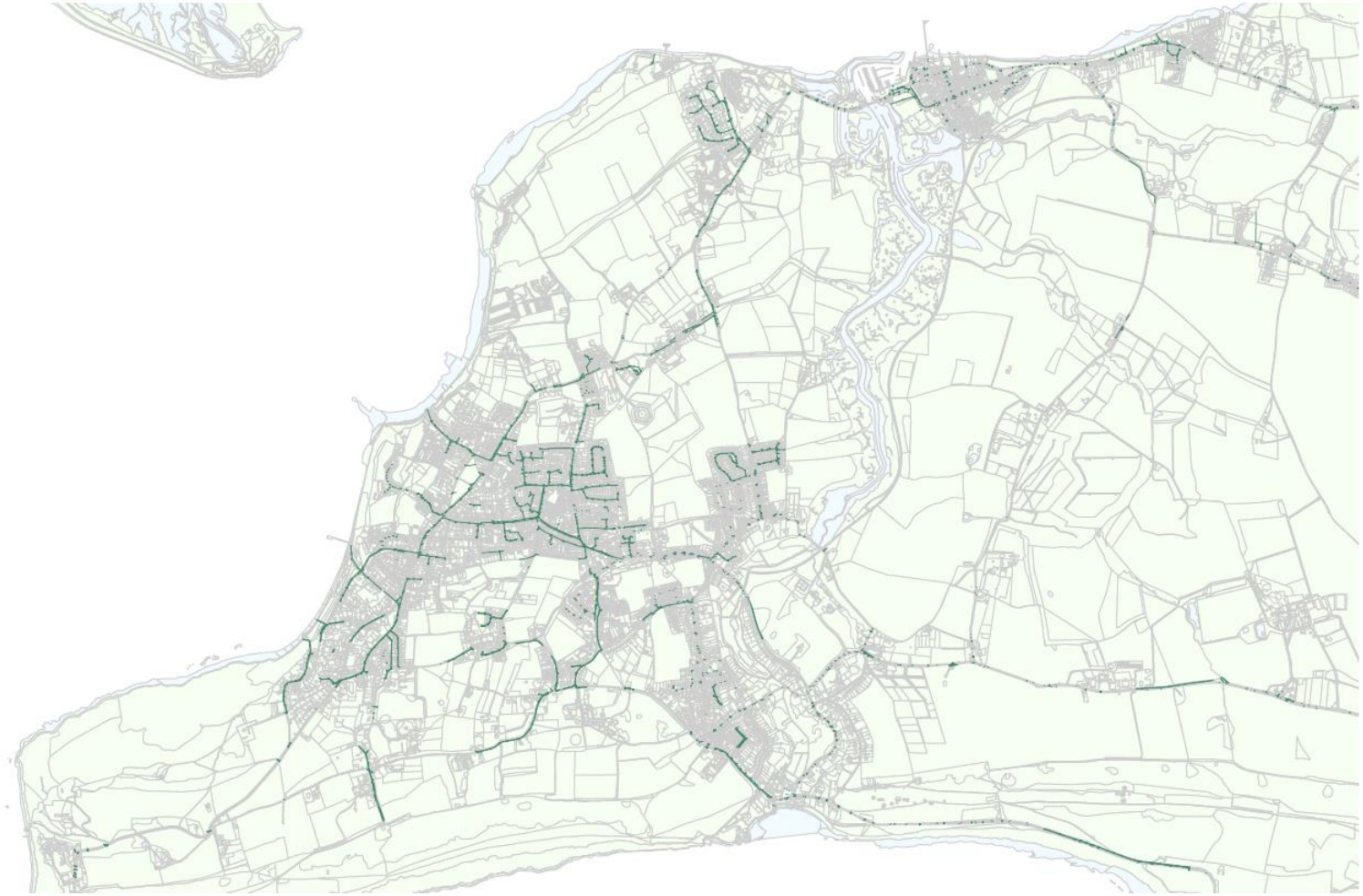

Borehole Scans
Earthquake Timeline
Terrace Gravels
PO40 9DG
alluvium
www.bgs.ac.uk

Combined / Foul Pipes[37]



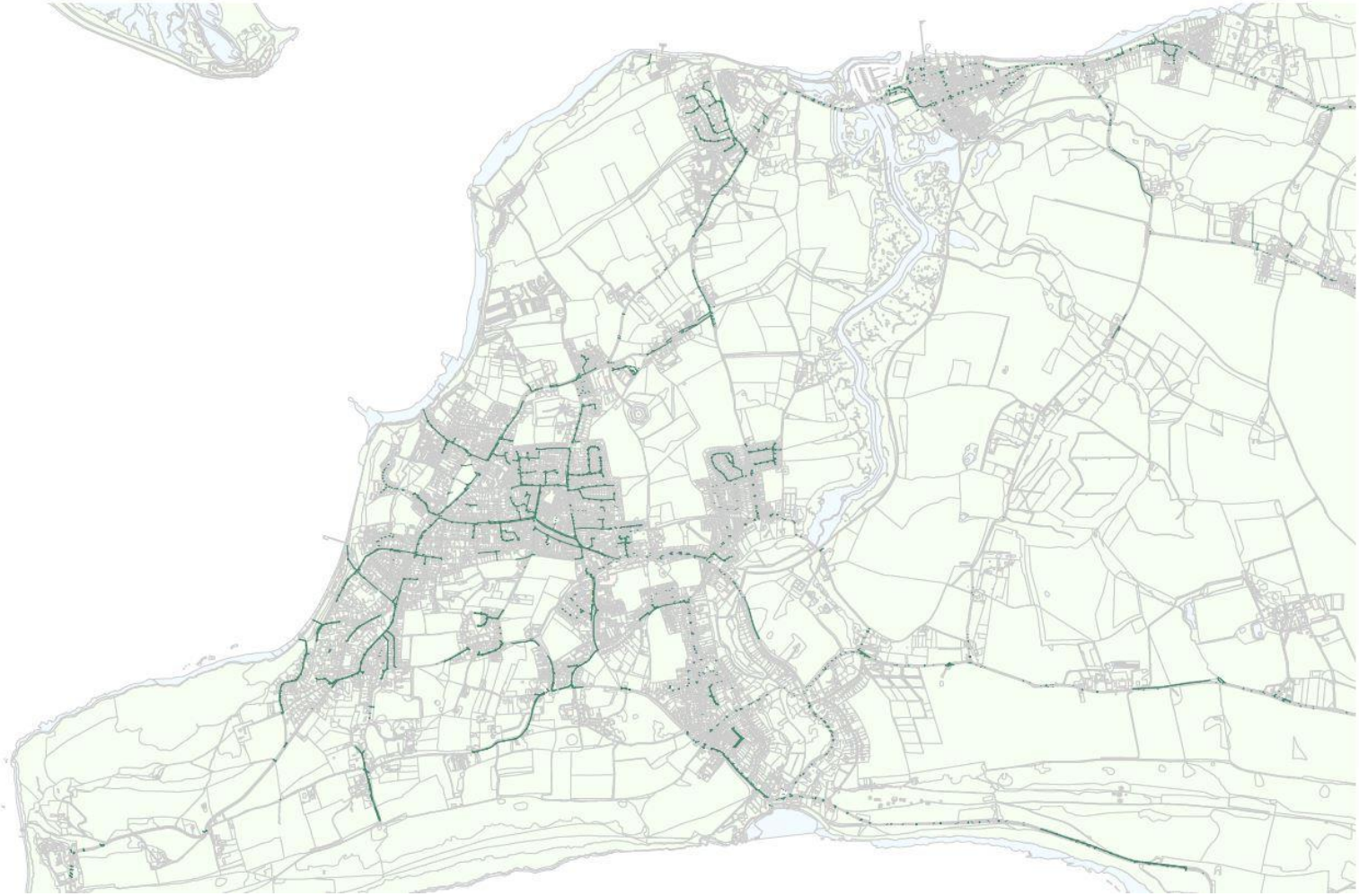
[37] Southern Water Asset Miner System

Surface Water Pipes[38]



[38] Southern Water Asset Miner System

Highway Gullies[39]



[39] Island Roads, 2022

River and Coastal Flooding[40]

[40] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Surface Water Flooding[41]

[41] Your long-term flood risk assessment - GOV.UK (check-long-term-flood-risk.service.gov.uk)

Appendix N – Planned Isle of Wight Investments in other Schemes

Water Supply Investment for 2020 – 2025 Dedicated Isle of Wight Schemes > £31m

Location	Scheme and Scope	Benefit
Sandown Water Supply Works	Investment £11m - Pump, tank and treatment improvements	Benefit – Water quality, resilience and future plans
Sandown Water Supply Works	Investment £2.5m– Installing eel screens to prevent eel trapping	Benefit – Environmental and regulatory
Carisbrooke Water Supply Works	Investment £500k – install a fish pass to aid fish migration	Benefit - Environmental and regulatory
Totland Water Booster Station	Investment £500k – Pump, dosing and control refurbishment	Benefit – Water Quality and resilience
Knighton Water Supply Works	Investment £2.5m – pH correction	Benefit – Water quality
Carisbrooke Water Supply Works	Investment £4.5m – Pumping, dosing and storage refurbishment	Benefit – Water quality and resilience
Cowes, Newport and Brading water supply zones	Investment £7.7m – Pipe relays, flushing and monitoring	Benefit – Water Quality and leakage
Ventnor Water Supply Works	Investment £1.2m – UV dosing and refurbishment	Benefit – Water quality
Cooks Castle reservoir	Investment £500k – Full structural refurbishment	Benefit – Water quality
Greatwoods reservoir	Investment £500k – Full structural refurbishment	Benefit – Water quality

Regional Schemes whereby a portion of which will be allocated to the Isle of Wight

Location	Scheme and Scope	Benefit
Sustainable Fixes	Investment £60m	Benefit – Money allocated where investment will pay for itself within 3 years
Smart Networks	Investment £15m – installing real-time water quality and pressure information	Benefit – water quality and leakage reduction
HAZREV	Investment £60m – Region wide water quality and resilience improvements on water supply sites	Benefit – water quality and resilience

Waste water Investment for 2020 – 2025 Dedicated Isle of Wight Schemes

Location	Scheme and Scope	Benefit
Sandown Wastewater Treatment Works	Investment £7m - Increase in Flow to treatment	Benefit – Environment and discharge reduction
Sandown Wastewater Treatment Works	Investment £2.6m - Increase storm storage	Benefit – Environment and discharge reduction
Godshill Wastewater Treatment Works	Investment £4.9m - Pump away scheme to Sandown catchment.	Benefit – Environment and discharge reduction
Shalfleet Wastewater Treatment Works	Investment £1.5m – Phosphorous removal scheme	Benefit – Environmental and permit compliance
Calbourne Wastewater Treatment Works	Investment £1.3m – Phosphorous removal scheme	Benefit – Environmental and permit compliance
Calbourne Wastewater Treatment Works	Investment £70k – Increase in Flow to Treatment	Benefit – Environment and discharge reduction

Roud Wastewater Treatment Works	Investment £2.1m – Phosphorous removal scheme	Benefit – Environmental and permit compliance
Roud Wastewater Treatment Works	Investment £600k – Increase in Flow to Treatment	Benefit – Environment and discharge reduction
Sandown Wastewater Treatment Works	Investment £50k - Population Growth - £50k – this is to get the project to the next investment decision stage. At this stage we will know what is required for the full scheme.	
Wroxall Wastewater Treatment Works	Investment £4.1m – Phosphorous removal scheme	Benefit – Environmental and permit compliance
Wroxall Wastewater Treatment Works	Investment £400k – Increase in Flow to Treatment	Benefit – Environment and discharge reduction