

RIDGE

FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY PAGHAM PHASE 3 LOCAL CENTRE & CARE HOME

November 2021

FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY
PAGHAM PHASE 3 – LOCAL CENTRE & CARE HOME

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SECTION 1

INTRODUCTION

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1. INTRODUCTION

1.1. Appointment and Brief

Hanbury (PM) Ltd has commissioned Ridge and Partners LLP to prepare a Flood Risk Assessment (FRA) and Drainage Strategy report for the management of foul and surface water in support for the approval of reserved matters application for the local centre and care home at land south of Summer Lane & west of Pagham Road, Pagham, West Sussex.

Planning permission was granted in 2018 for a mixed-use development comprising of up to 400 residential dwellings with associated access roads, parking area, a care home, a local centre, provision of land for a primary school and a scout hut, cycle route, public open space and allotments (reference P/140/16/OUT). The outline planning application was accompanied by a Flood Risk Assessment and Drainage Strategy, prepared by MJA consulting.

This report is solely for the local centre' parcel which comprises of retail, community and commercial uses, 20 residential apartments and a 70 bed care home.

The purpose of the report is to assess the drainage network of the application site and any impact the new structures will have. The assessment is based on all sources, taken from recorded and modelled data where known, in order to position the development in the context of National Planning Policy Framework (July 2021) and its associated Planning Policy Guidance (PPG).

It is noted that the planning permission requires the submission of full details of the proposed surface water drainage scheme (condition 10) and full details of the proposed foul drainage system (condition 13), prior to the commencement of development.

1.2. Aims and Objectives

The FRA and DS has been prepared with reference to the following requirements:

The FRA and DS must:

- Review and conform with the most up-to-date local flood risk information, including the Preliminary Flood Risk Assessment (PFRA), Strategic Flood Risk Assessment (SFRA) and Catchment Management Plan for the area of interest.
- Review the Environment Agency's online flood risk mapping.
- Review Planning Policy applicable to the application site.
- Adopt current design standards; and
- Consider long term maintenance with respect to practicality, ownership and funding.

The FRA and DS should:

- Review the Planning History of the site;
- Adhere to current best practice guidance;
- Initial Liaison with the Local Sewerage Undertaker;
- Initial Consultation with the Lead Local Flood Authority, EA and CCT;
- Mimic the existing drainage characteristics of the application site as far as is practical;
- Adhere to current best practice guidance; and
- Contribute to the enhanced amenity and aesthetic value of the application site.

1.3. Limitations

The purpose of this report as outlined in Section 1.2, together with those related matters specifically referred to therein and it is not intended to be used for any other purposes. The report is for the sole benefit and may only be relied upon by the addressee, to whom we will owe a duty of care. The report and any part of it is confidential to the addressee and should not be disclosed to any third party for any purpose, without the prior written consent of Ridge and Partners LLP as to the form and context of such disclosure. The granting of such consent shall not entitle the third party to place reliance on the report, nor shall it confer any third-party rights pursuant to the Contracts (Rights of Third Parties) Act. The report may not be assigned to any third party.

1.4. Reference Information

The following information has been obtained and interrogated as part of this study:

- MJA Consulting (2016) Flood Risk Assessment & Development Drainage Strategy
- Arun District (2016) Arun District Local Plan
- Southern Water (2019) Sewer records.

In addition, the following documents have been consulted:

- Communities and Local Government Document. (2019). The National Planning Policy Framework;
- Environment Agency. (2016). Flood Risk Assessments: Climate Change Allowances;
- Environment Agency. (2013). Rainfall Runoff Management for Developments;
- Environment Agency. (2019). Flood Risk Assessments: Climate Change Allowances;
- CIRIA. (2015). C753 – The SuDS Manual;
- Secretary of State. (2015). Building Regulations Approved Document H;
- Butler & Davies. (2012). 2nd Ed. Urban Drainage;
- British Geological Survey Online Mapping Tool;
- DEFRA / EA Interactive online mapping (magic.defra.gov.uk);
- Department for Environment, Food and Rural Affairs. (2015). Non-Statutory Technical Standards for Sustainable Drainage Systems;
- Department for Environment, Food and Rural Affairs & Environment Agency. (2017). Flood Risk Assessment for Planning Applications;

SECTION 2

PROJECT BACKGROUND

Arup Internal Document - Restricted

2. PROJECT BACKGROUND

2.1. Site Location and Existing Land Use

The application site is located in the administrative area of Arun District Council. The site is located to the west of Pagham, adjacent to existing residential development along Pagham Road and Summer Lane. The site is intersected by an existing watercourse and right of way. The site comprises of an open, flat, agricultural field. The surrounding land to the south and west is generally agricultural with residential properties of Pagham to the eastern boundary and summer lane to the north. The north-west and south of the site are open fields. This field, as well the land to the north, west and south, were granted planning permission for development as part of the outline application (P/140/16/OUT). The application site is located at British National Grid co-ordinates of approximately 488886 E, 098129 N.



Figure 1: Site location

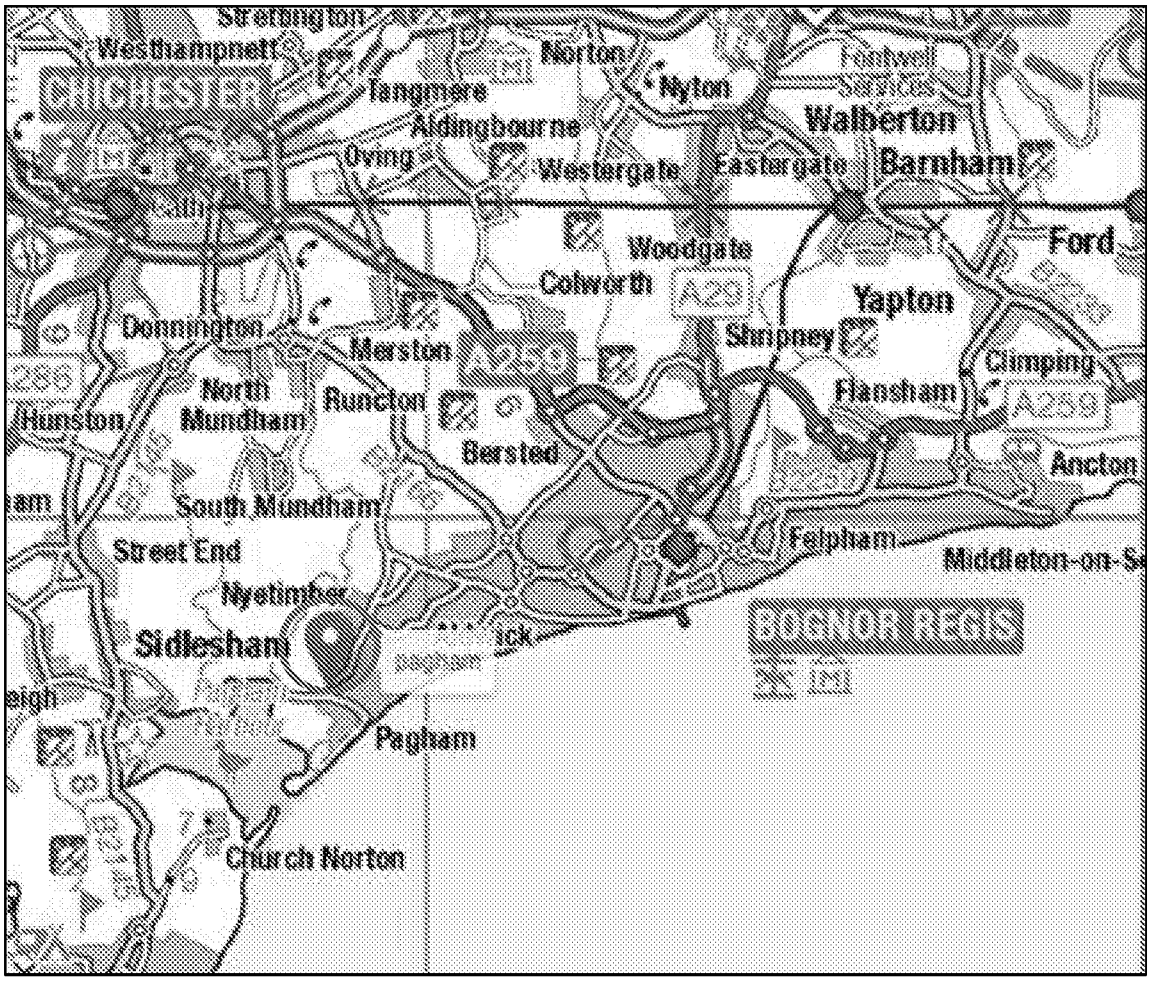


Figure 2: Regional site location

2.2. Existing Drainage Infrastructure

The Sewerage Undertaker is understood to be Southern water and a review of their asset records (see appendices) suggests the following significant public infrastructure on or within close vicinity of the application Site:

- To the Southern Boundary:
  - 150 mm diameter sewer running south in the front gardens of houses in Pagham Road which terminates at a pump station which transfers flows to the gravity network in St Thomas Drive.

- To the Northern Boundary:
  - Foul sewer in summer lane which gravitates east and terminates at Nyetimber Lane Pumping station.

- To the Eastern Boundary:
  - 150 mm diameter sewer running south in the front gardens of houses in Pagham Road which terminates at Kings beach pump station which transfers flows to the gravity network in St Thomas Drive.

2.3. Topography

The site is predominately flat but has a gentle fall from south to north-east at an elevation of approximately 3.72 to 5.73m AOD. There is also a nominal fall from west to east.

2.4. Geology and Hydrogeology

British Geological Survey (BGS) online mapping indicates that superficial deposits exist within the site. The Geology of Britain Viewer indicates that the site is likely underlain by River Terrace Deposits over Bedrock Geology of the London Clay Formation. The Environment Agency's online mapping suggests the underlying superficial soils is classified as Secondary A and the site is known to be located within medium to low groundwater vulnerability zone.

The table below identifies the expected composition of the published strata and associated aquifer classification.

Table 1. Geology and Hydrogeology (BGS)

SUPERFICIAL DEPOSITS	DESCRIPTION
Unit Name	River Terrace Deposits
Geology Description	Sand, silt and clay.

Aquifer Classification	Secondary A
Aquifer Description	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers

BEDROCK GEOLOGY	DESCRIPTION
Unit Name	London Clay Formation
Geology Description	Clay, silt and sand
Aquifer Classification	Unproductive
Aquifer Description	These rocks have negligible significance for water supply or baseflow to rivers, lakes and wetlands. They consist of bedrock or superficial deposits with a low permeability that naturally offer protection to any aquifers that may be present beneath.

2.5. Hydrology - Surface Water Features

There are a number of ditches/watercourses which bound the site to the East, North West and North. These feed the Pagham rife approximately 550 to the west, which is classed as a Main River. Existing surface water generated by the Application Site is assumed to discharge to the existing ditch network.

2.6. Proposed Development

The outline planning permission is for a mixed-use development comprising of up to 400 dwellings, a care home with up to 70 beds, a Local Centre comprising up to 2000sqm of A1/A2/A3/D1/sui generis floorspace, provision of land for a 1FE primary school (with sufficient space to ensure that it is expandable to 2FE), provision of land for a scout hut, safeguarding of land to help link the site to the Pagham Harbour Cycle Route & other community uses including public open space & allotments.

This report covers the local centre' parcel which comprises of retail, community and commercial uses, 20 residential apartments and a 70 bed care home. The report builds on the strategy set out in the FRA submitted as part of the Outline Application, Flood Risk Assessment & Development Drainage Strategy, MJA Consulting (AMc/16/0708/5415). The report is in support of the Reserved matters application for the Local Centre Parcel with the land being safeguarded for the school subject to a separate Flood Risk Assessment and Drainage Strategy at a later point.

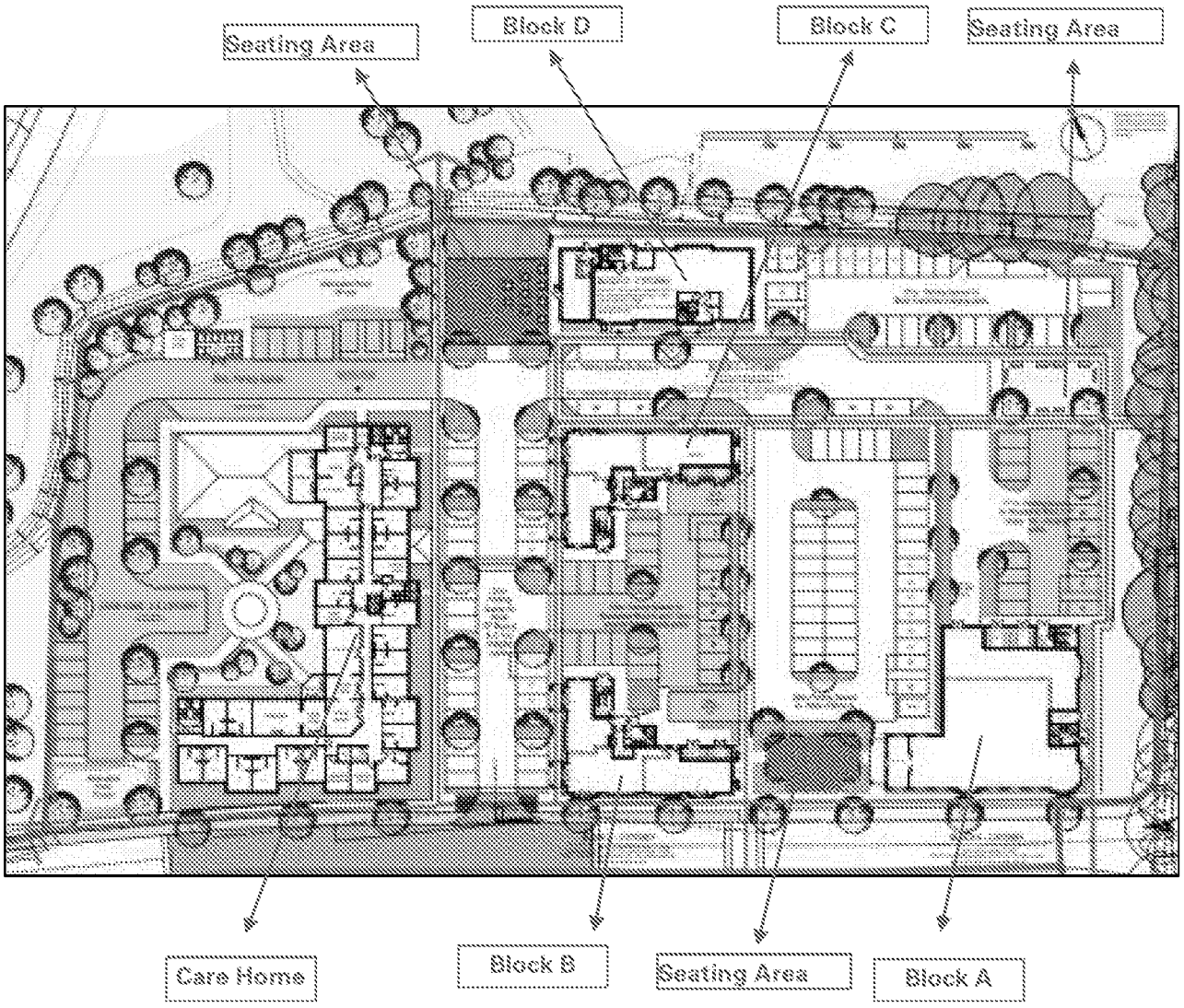


Figure 3: Proposed Plan

SECTION 3

QUANTIFYING FLOOD RISK

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3. QUANTIFYING FLOOD RISK

According to the Environmental Agency Flood map for Planning service, the site is currently located within Flood Zone 1. This means that there is a low probability of river or sea flooding. Figure 4 below illustrates the flood zone map.

3.1. Flood Zone

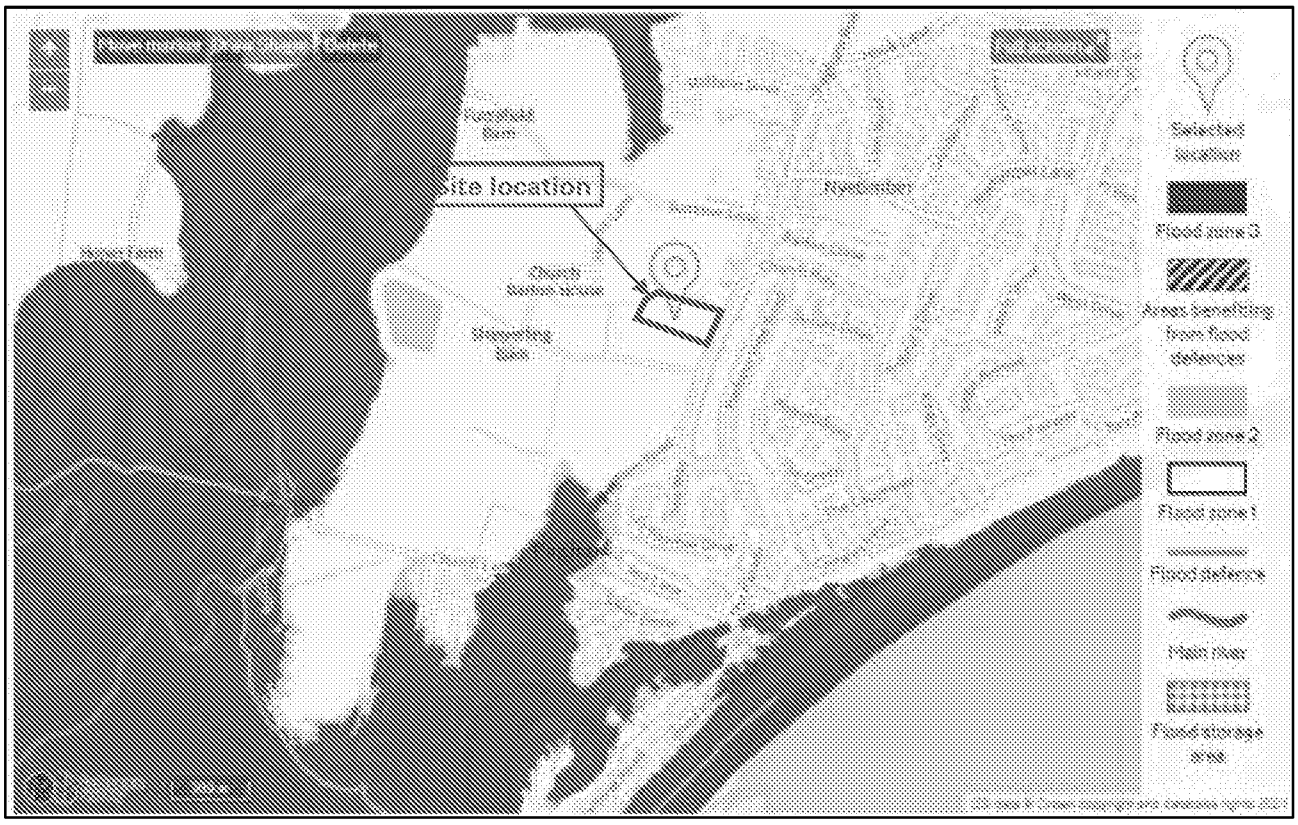


Figure 4: Environment Agency Flood Zone Map

Figure 4 above confirms that the developed part of the site sits in a Flood Zone 1 area which has less than 1 in 1000 (<0.1%) annual probability of flooding. The application site is circa 1.46 Ha.

Pagham is currently protected by a number of sea defences including the Inland Banks and Pagham Harbour which currently offer 1:200 year storm protection. These flood defences provide a protection to 3.90 AOD which includes some freeboard to allow for wave action but doesn't currently include for climate change. The current sea defences for the coastline of Pagham to east Head is mainly protected by timber, concrete and shingle defences which include large shingle banks which dominate Pagham Beach, Pagham Harbour and Church Norton. From Pagham to the river Arun, there is a mixture of defences, with the land behind consistently low lying.

The flood defences are as follows:

Pagham Harbour	Embankment, wharf, quaysides
Pagham – Aldingbourne Rife	Shingle ridge to ease of harbour entrance.
	Section of sea wall (secondary defence)

The site lies approximately 1.6km from Pagham Harbour and has minimal risk of being affected by minor breaches of sea defences.

3.2. Surface Water Flooding

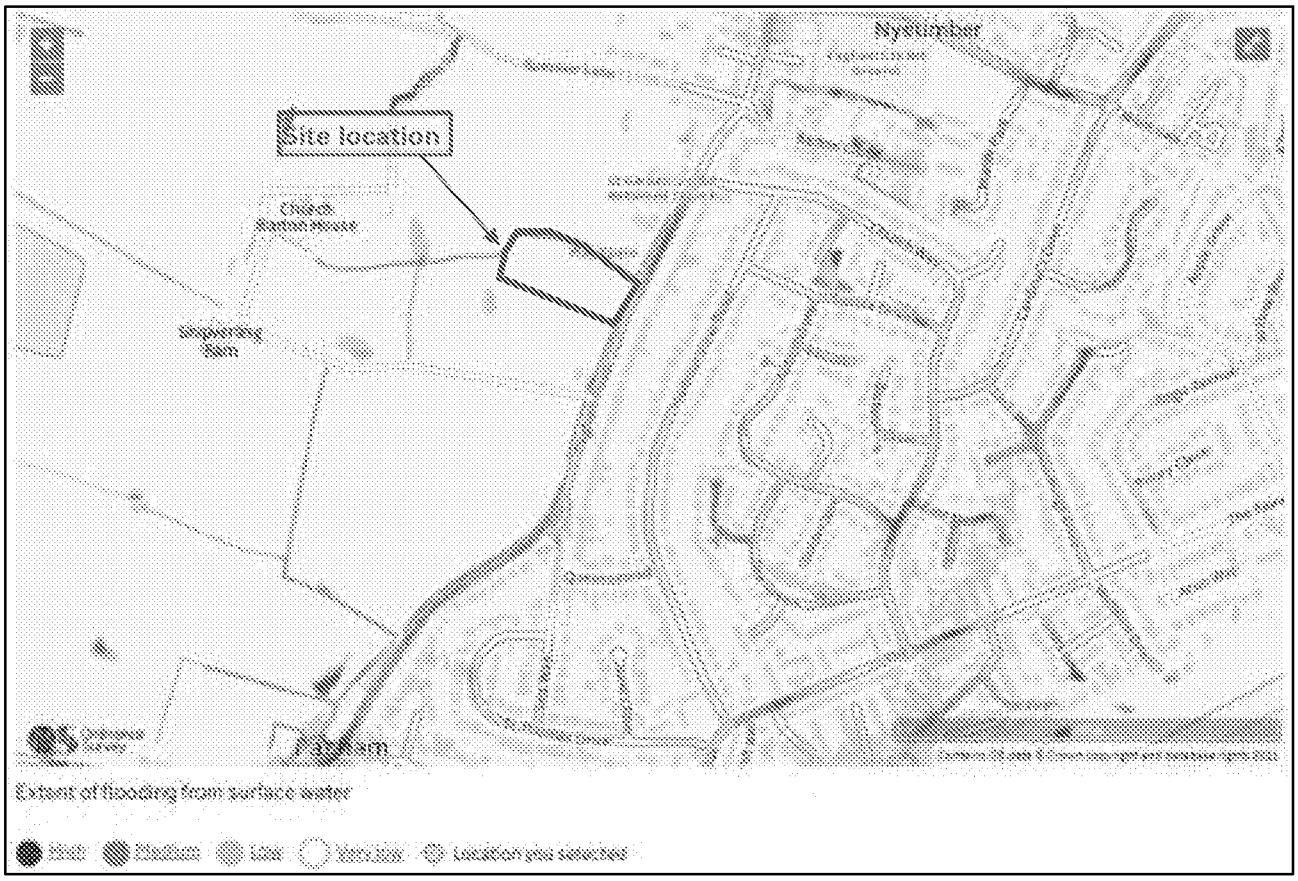


Figure 5: Extract of EA Flood map showing Extent of Surface Water flooding

As shown in figure 5, the majority of the site sits within areas that suffer from a very low extents of flooding from Surface Water.

3.3. Groundwater flooding

There is no recorded incidents of groundwater flooding within the vicinity of the site have been found during the investigations.

3.4. River and Sea Flooding

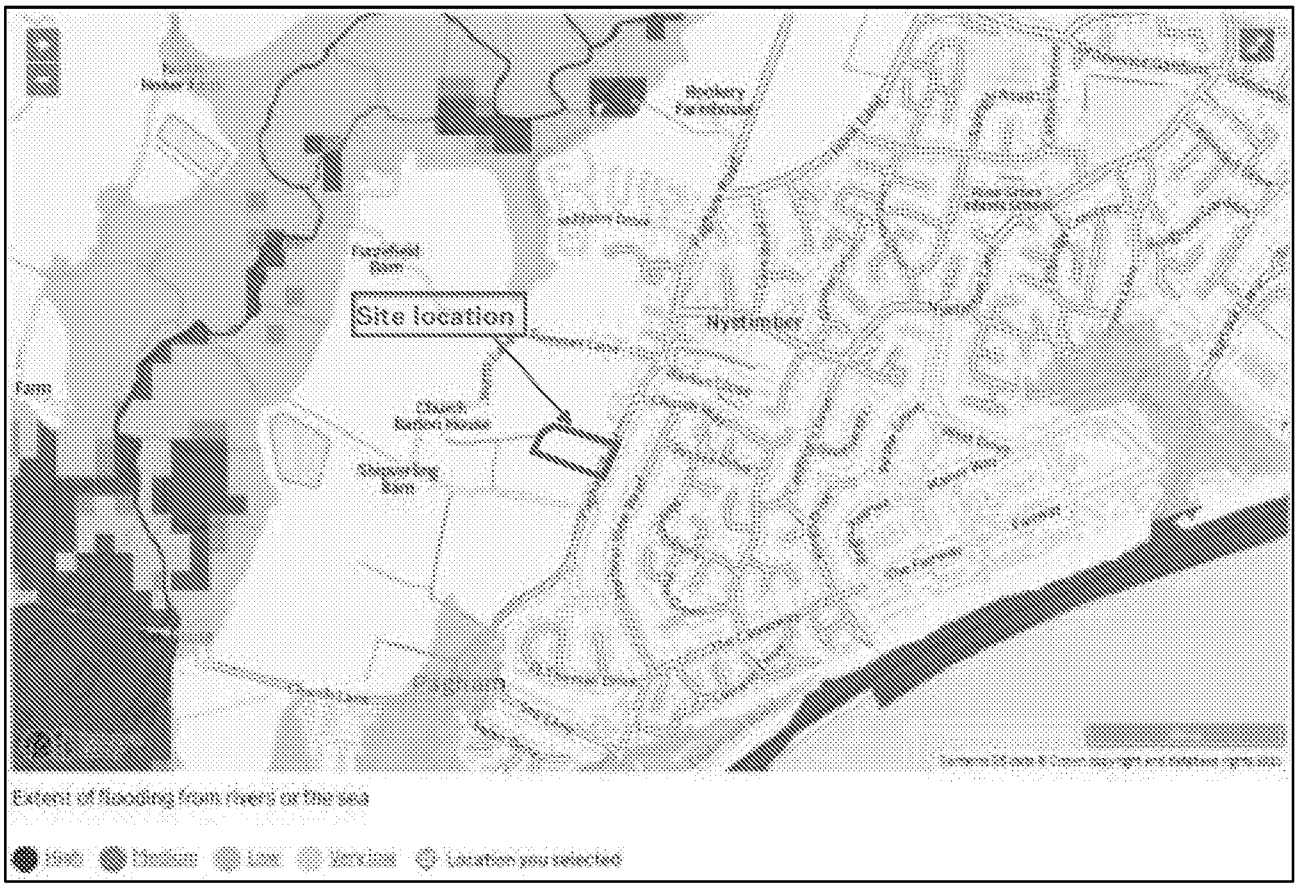


Figure 6 Extract of EA Flood map showing Extent of river or sea flooding.

Figure 6 shows that the there is no predicted flooding from rivers or the sea. The site currently sits within areas that suffer from a very low extent of flooding from rivers or the sea. It is therefore considered that the site is at a very low risk of flooding from rivers or sea.

3.5. Flooding from Reservoirs

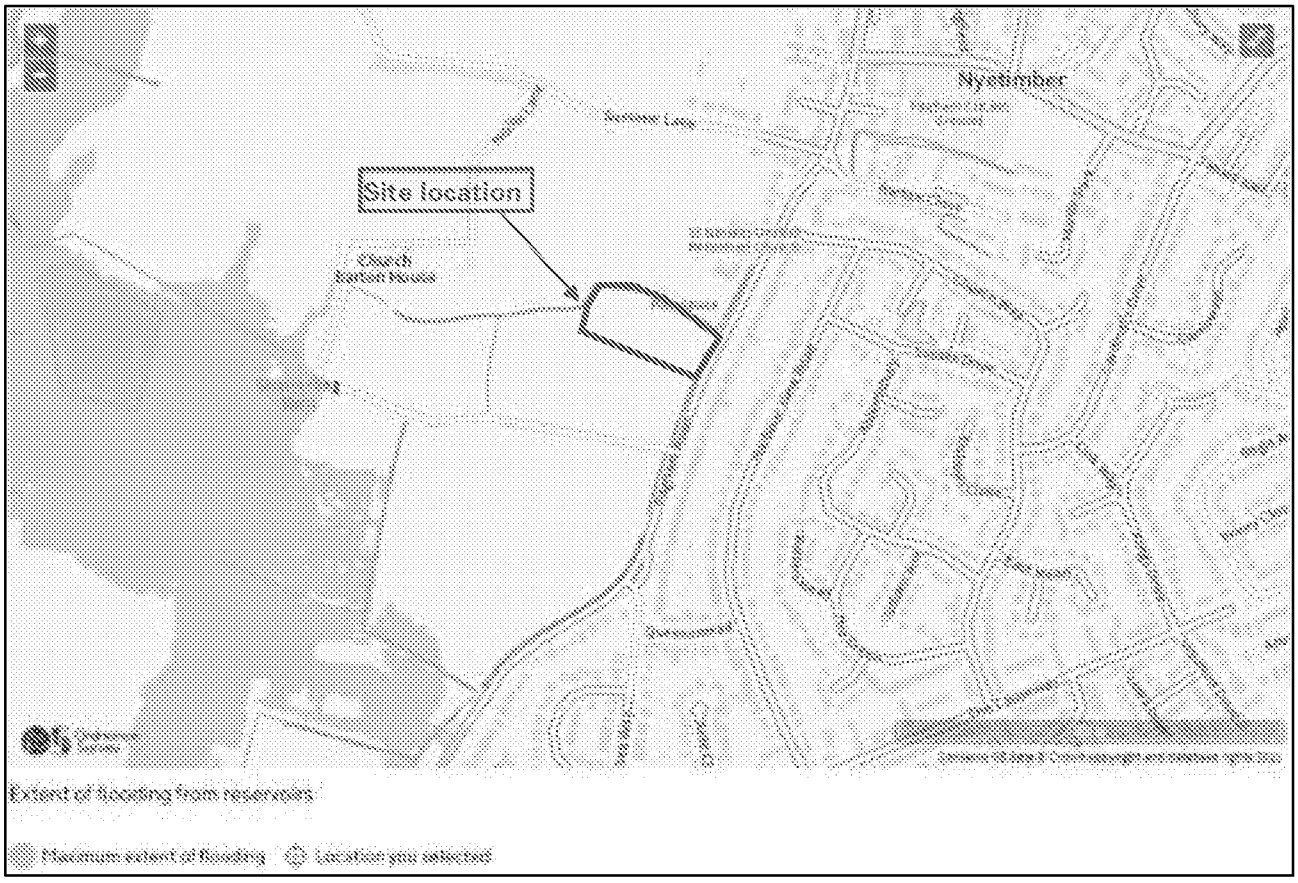


Figure 7 Extract of EA Flood map showing extent of flood water due to Reservoir flood risk

As shown in figure 7, the developed site does not sit within areas that are at risk of flooding from reservoirs. It is therefore considered that the application site is currently at a very low risk of flooding from reservoirs.

3.6. Historical flooding

According to the SFRA report, there is no historical flooding from surface water on the site.

Table 2: Level of risks of each source

SOURCE	LEVEL OF RISK
Surface water	Very Low*
River and sea	Very Low
Reservoirs	Very Low

*Small part within the south-west boundary which suffer from a low extent of flooding.

SECTION 4
ANALYSIS OF NATIONAL AND LOCAL POLICY

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4. ANALYSIS OF NATIONAL AND LOCAL POLICY

4.1. National Policy

National Planning Policy Framework (NPPF)

Communities and Local Government Document. (2021). *The National Planning Policy Framework* requires the Planning Application to demonstrate that the Proposed Development will be safe for the duration of its' design life, taking into account the vulnerability of its' users and without increasing flood risk elsewhere, and where possible, reducing flood risk overall.

Non-Statutory Technical Standards for Sustainable Drainage Systems

Department for Environment, Food and Rural Affairs. (2015). *Non-Statutory Technical Standards for Sustainable Drainage Systems* state that the peak rate of discharge from a redevelopment during the 1:1 year and 1:100 year rainfall events should be as close as reasonably practical to the corresponding greenfield runoff rate, but should never exceed that of the pre-development state.

The standards also recommend that, where reasonably practicable, the runoff volume generated from the 1:100 year, 6 hour rainfall event should be constrained to the corresponding greenfield runoff volume.

Building Regulations Approved Document H

Secretary of State. (2015). *Building Regulations Approved Document H* establishes a hierarchy for surface water disposal and encourages a SuDS approach. The hierarchy stipulates that surface water runoff which is not collected for re-use must be discharged in the following order of priority:

1. Discharge to ground via infiltration; or, where not reasonably practicable,
2. Discharge to a surface water body (i.e. river, watercourse or the like); or, where not reasonably practicable,
3. Discharge to a surface water sewer, highway drain or other surface water drainage system; or, where not reasonably practicable,
4. Discharge to a combined sewer.

4.2. Local Policy

Arun Local Plan (2018)

Policy W DM2

Arun local plan policy for flood risk states the following:

- Development in areas at risk from flooding, identified on the latest Environment Agency flood risk maps and the Council's Strategic Flood Risk Assessment (SFRA), will only be permitted where all of the following criteria have been satisfied:
    a. The sequential test in accordance with the National Planning Policy Guidance has been met.
    b. A site-specific Flood Risk Assessment demonstrates that the development will be safe, including access and egress, without increasing flood risk elsewhere and reduce flood risk overall.
    c. The sustainability benefits to the wider community are clearly identified.
    d. The scheme identifies adaptation and mitigation measures.
    e. Appropriate flood warning and evacuation plans are in place; and
    f. New site drainage systems are designed to take account of events which exceed the normal design standard i.e. consideration of flood flow routing and utilising temporary storage areas.

- The reports prepared as part of the criteria above must take into account contingency allowances, taking climate change into account as set out in Flood Risk Assessments: climate change allowances section of the NPPG.

- In locations where strategic flood defence or resilient and resistant construction measures are necessary within the site itself, proposals will be required to demonstrate how measures have been incorporated as an intrinsic part of the scheme in a manner which is compatible with the latest Strategic Flood Risk Assessment.

- All development proposals must take account of relevant Surface Water Management Plans, Catchment Flood Management Plans and related Flood Defence Plans and strategies such as the Lower Tidal River Arun Strategy. The council may require financial contributions from development on sites where measures to address flood risk or to improve the environmental quality of watercourses have been identified by these Plans and Strategies.

SECTION 5

FOUL WATER MANAGEMENT

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5. FOUL WATER MANAGEMENT

5.1. Introduction

The following foul strategy is to outline how conditions 13 & 14 of the Outline Application can be resolved:

13 - Before the development hereby permitted is commenced, details of a proposed foul drainage system shall be submitted to and approved in writing by the Local Planning Authority (including details of its siting, design and subsequent management/ maintenance, if appropriate) and no dwelling shall be occupied until works for the disposal of sewage have been fully implemented in accordance with the approved details.

14 - Occupation of the development is to be phased and implemented to align with the delivery by Southern Water of any sewerage network reinforcement required to ensure that adequate waste water network capacity is available to adequately drain the development.

5.2. Existing Discharge Rates and Points of Connection

As the existing application site is an agricultural field which is vacant, it can be considered that there are no foul flows leaving the site. The incumbent sewerage undertaker is southern water. The overall outline application site has an existing foul rising main crossing within it which crosses at south-east to north-west direction from Pagham Village pump station to the WWTW (Pagham).

5.3. Proposed Discharge Rates and Points of Connection

All foul water drainage will be designed and constructed in accordance with the Building Regulations Part H and it is intended to connect to new foul water sewers constructed as part of the construction phase.
Primary foul runs have been preliminarily sized as 150 mm diameter.

The Local Sewerage Undertaker is Southern water with the nearest treatment works being Pagham Treatment Works. Through consultation with Southern Water, the development will be timed to align with the upgrades to the Treatment Works and the connection to the public sewer timed to align with this.

Foul Flows will be connected via a gravity connection to the site wide drainage network which culminates in a Foul Water Pumping station. The rising main for the pumping station will then connect to the Public Foul Sewer network at MH SZ89980302 in line with the consultations with Southern Water.

5.4. Analysis & Summary

The analysis demonstrates that the Proposed Development will generate a very small net increase in foul water volume and peak flow to the public foul water sewer network, as summarised below:

Table 3 Existing and proposed foul water flow estimation

DESCRIPTION	RESULT	UNIT
Existing Flow	0	l/s
Proposed Flow	3.61	l/s
Increase / Decrease	3.61	l/s

The increase is directly attributable to the new proposed development.

SECTION 6
SURFACE WATER MANAGEMENT

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6. SURFACE WATER MANAGEMENT

6.1. Existing Site Location Data

The site location and hydrological data used within this assessment is summarised as follows:

- Grid Reference: SZ888981, 488886 (Easting), 098129 (Northing)
- Average Annual Rainfall (SAAR): 711mm/year
- Soil Index: 0.4
- UK Hydrological Region: Region 7

6.2. Existing Total Site Area

Total existing site area is calculated as follows:

ITEM	AREA (SQ. M)	AREA (HECTARES)
Area for retail, community and commercial uses, 20 residential apartments and a 70 bed care home	14566	1.46

Therefore, existing permeable percentages are calculated as follows:

	PERMEABLE	IMPERMEABLE
Area (Ha)	1.46	0
Percentage (%)	100	0

6.3. Calculation of Greenfield Runoff Rates

Greenfield runoff rates have been estimated for the site using the methodology outlined in the Institute of Hydrology Report 124 method as set out within the Interim Code of Practice for SuDS (ICP) and Environment Agency guidance for catchment areas of 50 hectares or less. This method of assessment is widely recognised as current best practice for estimation of catchment release rates for small catchments.

Detailed calculations can be found within the appendices of this document with results summarised below

RETURN PERIOD (T IN X YEARS)	GREENFIELD RUN OFF RATE (L/S)
1	4.3
QBar (2.3)	**5.1**
30	**11.5**
100	**16.1**

6.4. Proposed Site Total Area

The application site covered by this report is divided into two catchments, catchment **A** (west) and catchment **B** (east) as shown on the proposed drainage strategy drawing.

Total proposed site area is calculated as follows:

ITEM	AREA (SQ. M)	AREA (HECTARES)
Catchment A	4725	0.473
Catchment B	9841	0.984

6.5. Proposed Site Impermeable Area & Percentages

Total impermeable areas for the proposed site have been calculated as follows; however, due to site geology and ground water risks being known to be unlikely to support infiltration techniques.

ITEM	AREA (SQ. M)	AREA (HECTARES)
	Catchment A	
Buildings	1480	0.148
Roads/Paths/Parking	1152	0.115
Totals:		**0.263**
	Catchment B	
Buildings	1665	0.167
Roads/Paths/Parking	4585	0.459
Seating/Community Shared Area (to soft)	345	0.035
Seating/Community Shared Area (to drain)	127	0.013
Totals:		**0.674**

Therefore, proposed permeable and impermeable percentages are calculated as follows:

	PERMEABLE	IMPERMEABLE
Area (Ha)	0.56	0.937
Percentage (%)	36	64
Change from Existing (%)	-64	+64

6.6. Allowance for Climate Change

Table 2 (Peak Rainfall Intensity Allowance in Small and Urban Catchments) of Environment Agency (2019). Flood Risk Assessments: Climate Change Allowances confirms the climate change allowance of **40%** should be adopted for the Application Site, assuming a lifespan of 100 years for residential development as recommended within the NPPF.

6.7. Proposed Flow Restriction per Catchment and Attenuation Estimates

The proposed flow restriction that will be discharging at the Qbar greenfield flow rate (5.1/s) as set out in the Drainage Strategy document by MJA Consulting (Document ref AMc/16/0708/5415). The total estimated required storage required to attenuate down to this flow rate for the 1 in 100yr + 40% is 812 m^3 (Table 3) is calculated in MicroDrainage – Source Control.

The attenuation will be provided within, permeable paving and a series of overflow ponds for catchment A. The permeable build-up of the roads and paths in the centre of the site will provide 312m^3 storage through 400mm storage with 30% voids. Calculations and the drainage strategy drawing are as attached in the appendices.

Table 4 - Proposed Flow Rate and and Catchment split

CATCHMENT	PROPOSED RUN OFF RATE (L/S)	PROPOSED STORAGE ESTIMATE 1 IN 100 YR + 40% CC
A	1.65	161 - 229
B	3.45	410 - 580
Total	**5.1**	**574 – 812**

Table 5 Proposed storage methods

ITEM	DESCRIPTION	PROVIDED STORAGE VOLUME m^3
Catchment A		
Permeable paths/roads	450mm depth of storage Stones with 30% voids	155
Pond (North)	160m^2 x 0.3m deep	56
Pond (South)	75m^2 x 0.3m deep	26
Sub Total		237
Catchment B		
Permeable paths/roads	450mm depth of storage Stones with 30% voids	618
Total		**855**
Total required		**812**
Extra storage provided		**43**

6.8. Water Quality

The Proposed Development intends to construct new surface water sewers and associated drainage networks.

Car parking areas are understood to be to serve the community only and of an insufficient area to constitute a requirement for hydrocarbon interceptors. Notwithstanding this, the permeable paving will offer a level of treatment for hydrocarbons (in accordance with CIRIA 753).

This new construction to modern standards is likely to reduce the risk of overall pollutant loading and therefore the vulnerability of water quality within the wider surface water catchment is low.

6.9. Summary

Surface Water management is summarised as follows:

- Surface water will be managed through permeable paving and an shallow ponds.
- The proposed flow restriction that will be discharging at the Qbar greenfield run off rate which is 5.1l/s .
- The whole site will provide 855m^3 of storage which caters for the 1 in 100 yr. + 40 % event

- The underlying soils present at the Application Site suggest they are unsuitable for soakaways due to the groundwater levels.

With the above in consideration, the Proposed Development would therefore contribute to a reduction in flood risk associated with the exceedance of the public sewerage network within the vicinity of the Application Site, by providing a significant reduction in peak discharge rates and avoiding an increase in total runoff volume. This will be subject to a detailed design which will be submitted to discharge the proposed Surface Water Drainage condition.

SECTION 7

OUTLINE OWNERSHIP AND MAINTENANCE SCHEDULE

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7. OUTLINE OWNERSHIP AND MAINTENANCE SCHEDULE

To ensure the long-term performance of the proposed DS, the on-site drainage system will be owned and maintained by the site operator or a maintenance company (MC) in accordance with the indicative schedule below:

ELEMENT / DRAINAGE COMPONENT	OWNERSHIP	MAINTENANCE REQUIREMENTS
Flow Restriction Device & Chamber	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods. Check function of flow restriction componentry to suit manufacturer's guidance. **Inspection annually and before / after extreme storm events**.
Catchpit Manholes	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods. **Inspection annually and before / after extreme storm events**.
Permeable paving	Site Operator / MC	Non-aggressive brushing of the whole surface (avoiding disruption of the jointing material, with suction rates adjusted, based on a trial), either manually or mechanically carried out annually. Top up of the gritstone may be required after cleaning. Weed control – excessive weed growth can be managed by localised spot-treatment with weed killers, in accordance with suppliers' recommendations. **Inspection annually**.
Rain Water Pipes	Site Operator / MC	Clearance of leaves / debris from guttering and hopper inlets. Rodding points provided to clear blockages via conventional rodding methods. **Inspection annually and before / after extreme storm events.**
Soil Vent Piles / "Stub Stacks"	Site Operator / MC	Rodding points to be provided to clear blockages via conventional rodding methods. **Inspection annually**.
Gullies (Internal & External)	Site Operator / MC	To be monitored for silt build-up and cleaned as required. Where provided, ensure air traps are primed and sealed to prevent smells. **Inspection quarterly.**

ARUN DISTRICT COUNCIL P/158/21/RES

Below Ground Pipework Generally	Site Operator / MC	To be inspected for reduction in cross-sectional area (i.e. due to blockage, silt or debris build-up, root ingress etc) general condition of materials, pipe displacement and the like. **Inspection annually and where appropriate before / after extreme storm events**.
Manholes / Inspection Chambers Generally	Site Operator / MC	To be inspected for debris and integrity of chambers and covers generally. **Inspection annually and where appropriate before / after extreme storm events.**

SECTION 8

CONCLUSIONS

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8. CONCLUSIONS

- Outline planning permission has been granted for the construction of a mixed-use development comprising of up to 400 dwellings, a care home with up to 70 beds, a Local Centre comprising up to 2000sqm of A1/A2/A3/D1/sui generis floorspace, provision of land for a 1FE primary school (with sufficient space to ensure that it is expandable to 2FE), provision of land for a scout hut, safeguarding of land to help link the site to the Pagham Harbour Cycle Route & other community uses including public open space & allotments. This report looks to accompany an application for the approval of reserved matters for the local centre and care home parcel.

- According to the Environmental Agency Flood map for Planning service, the site is currently located within Flood Zone 1 and no other Flood Risks have been identified as part of this Flood Risk Assessment

- The underlying soils present at the Application Site are known to be unsuitable for soakaways due to the groundwater vulnerability therefore soakaways and other infiltration devices are considered to be unsuitable.

- The proposed drainage strategy is to utilise permeable paving and overflow ponds to restrict the flow leaving the site to the Qbar greenfield run off rate of 5.1l/s (As set out in the Outline Application) and store up to the 1 in 100 yr event plus an allowance for 40% climate change. The proposed outfall is to the existing ditch that flows round the site to the north.

- It should be noted that this strategy presents one possible solution to demonstrate that the Proposed Development can be sustainably drained and should not be interpreted as the definitive solution. The outline planning permission requires the submission and approval of a full surface water drainage strategy and foul drainage system, and therefore the detail is yet to be agreed.

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APPENDIX A

Existing site Plan & surveys

TREES

A	Ash
AL	Alder
AP	Apple
B	Beech
C	Cedar
CB	Copper Beech
CH	Cherry
CY	Cypress
E	Elm
EL	Elder
EU	Eucalyptus
F	Fir
FM	Field Maple
FR	Fruit
HZ	Hazel
HC	Horse Chestnut
HO	Holm Oak
HW	Hawthorn
HY	Holly
JM	Japanese Maple
LB	Laburnum
LM	Lime
LO	Locust Tree
LR	Laurel
M	Maple
MG	Magnolia
OK	Oak
P	Pine
PA	Palm
PL	Plane
PM	Plum
PO	Poplar
PP	Pissardii Plum
PR	Pear
R	Redwood
RD	Red Oak
RH	Rhododendron
RO	Rowan
SB	Silver Birch
SC	Sweet Chestnut
SP	Scots Pine
SU	Spruce
SY	Sycamore
U	Unidentified
W	Willow
WN	Walnut
Y	Yew

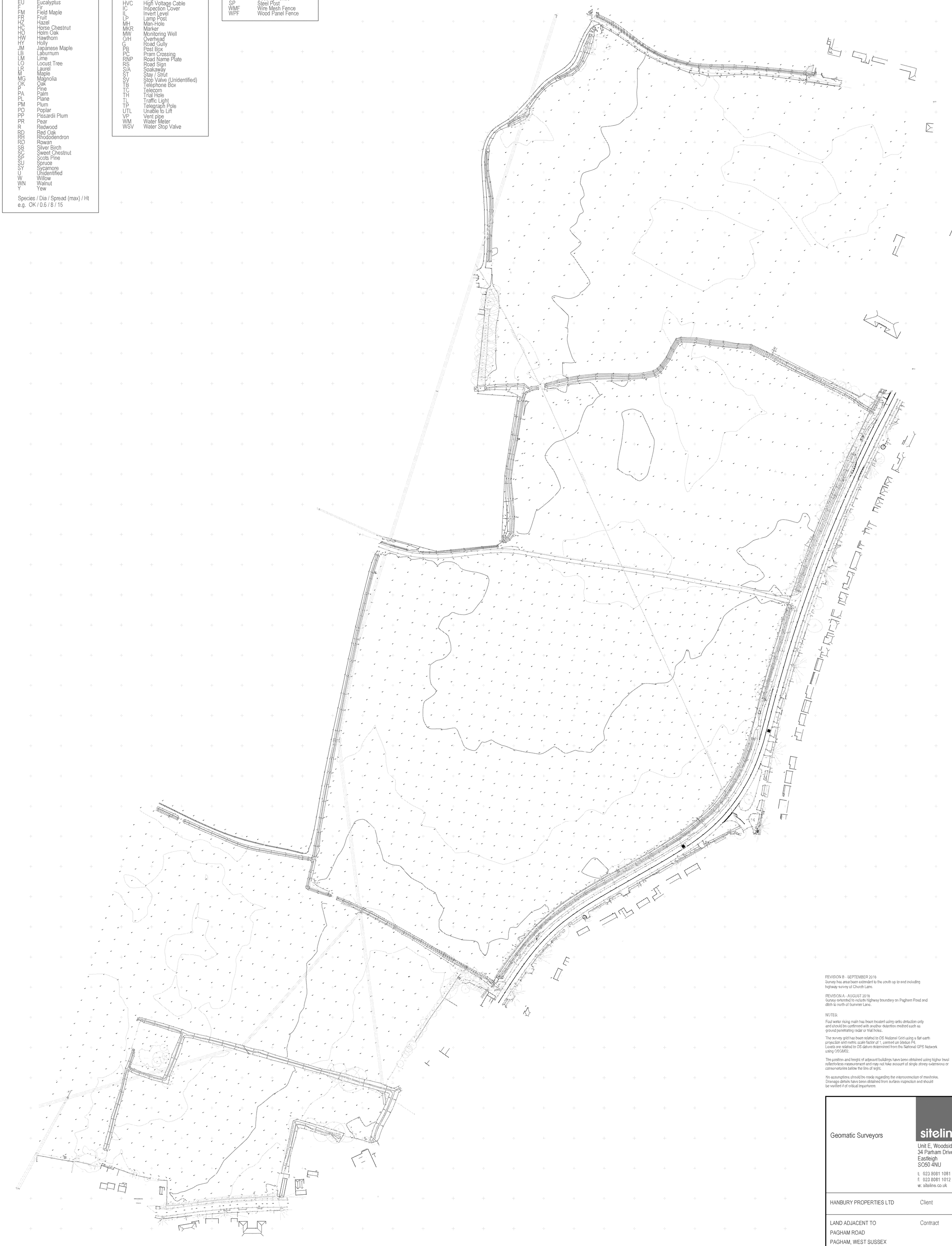
Species / Dia / Spread (max) / Ht
e.g. OK / 0.6 / 8 / 15

KEY

BT	British Telecom
BOL	Bollard
CB	Control Box
CL	Cover Level
CTV	Cable Television
EL	Electric
EP	Electricity Pole
FH	Fire Hydrant
GSV	Gas Stop Valve
HT	Height
HVC	High Voltage Cable
IC	Inspection Cover
IL	Invert Level
LP	Lamp Post
MH	Man-Hole
MKR	Marker
MW	Monitoring Well
O/H	Overhead
G	Road Gully
PB	Post Box
PC	Pram Crossing
RNP	Road Name Plate
RS	Road Sign
S/A	Soakaway
ST	Stay / Strut
SV	Stop Valve (Unidentified)
TB	Telephone Box
TC	Telecom
TH	Trial Hole
TL	Traffic Light
TP	Telegraph Pole
UTL	Unable to Lift
VP	Vent pipe
WM	Water Meter
WSV	Water Stop Valve

FENCES

BWF	Barbed Wire Fence
CBF	Closed Board Fence
CP	Concrete Post
CPF	Chestnut Paling Fence
CWF	Chicken Wire Fence
IRF	Iron Railing Fence
PKF	Picket Fence
PRF	Post & Rail Fence
PWF	Post & Wire Fence
SCF	Security Fence
SP	Steel Post
WMF	Wire Mesh Fence
WPF	Wood Panel Fence



REVISION B - SEPTEMBER 2016
Survey has area been extended to the south up to and including highway survey of Church Lane.

REVISION A - AUGUST 2016
Survey extended to include highway boundary on Pagham Road and ditch to north of Summer Lane.

NOTES:

Foul water rising main has been located using radio detection only and should be confirmed with another detection method such as ground penetrating radar or trial holes.

The survey grid has been related to OS National Grid using a flat earth projection and metric scale factor of 1, centred on Station P4. Levels are related to OS datum determined from the National GPS Network using OSGM02.

The position and height of adjacent buildings have been obtained using higher level reflectorless measurement and may not take account of single storey extensions or conservatories below the line of sight.

No assumptions should be made regarding the interconnection of manholes. Drainage details have been obtained from surface inspection and should be verified if of critical importance.

Geomatic Surveyors

siteline

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34 Parham Drive
Eastleigh
SO50 4NU

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HANBURY PROPERTIES LTD	Client
LAND ADJACENT TO PAGHAM ROAD PAGHAM, WEST SUSSEX	Contract
SITE SURVEY	Title
657PG02B	Drawing No.
JULY 2016	Date
1:1000 (A0)	Scale
MU/MJR/CC	Surveyor

ARUN DISTRICT COUNCIL P/156/21/RES

APPENDIX B

PROPOSED SITE PLAN

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Do Not scale off this drawing, use only figured dimensions and report any discrepancies or omissions to the Architect immediately.

rev.	date	description

N

Site boundary

CARE HOME

1.9 Ha
SAFEGUARDED PRIMARY
SCHOOL LAND (TO BE
TRANSFERRED TO WSCC)

LB

4.6m

80

76

72

Shelter

4.3m

0 10m 20m 30m 40m 50m

Roberts Limbrick
ARCHITECTS

project
Pagham Community Hub RM

client
Hanbury Properties

drawing
Proposed Site Wider Context

status
PLANNING

ROBERTS LIMBRICK LTD
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scale 1:500 @ A0
date 29/07/21 author DP

project	drg no.	rev.
10165	PL03	

APPENDIX C
SOUTHERN WATER ASSET PLANS

98548



97219

487979

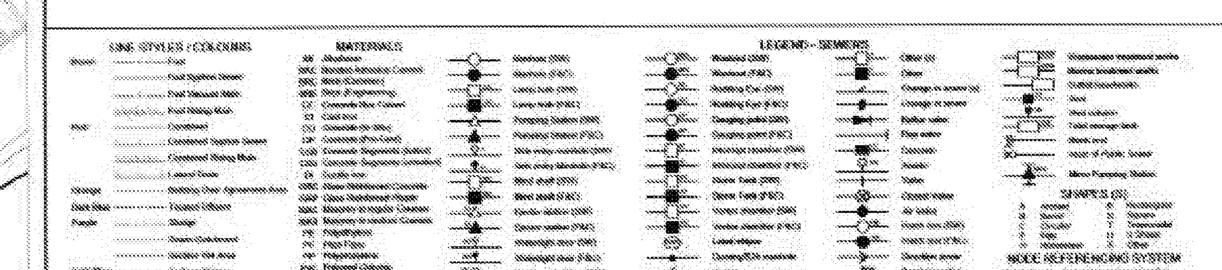
489418

SEWER RECORDS

Node	Cover	Invert	Size	Material	Shape	
0001X	5.73		225	VC	CIRC	
0051X	5.84	4.08	375	CP	CIRC	
0052X	5.87	4.47	225	CP	CIRC	
0053X	5.78	4.89	150	CP	CIRC	
0054X	5.56	3.99	225	CP	CIRC	
0055X	5.73	4.71	150	CP	CIRC	
0101X	5.42	4.88	150	BAC	CIRC	
0102X	5.24	4.38	150	BAC	CIRC	
0103X	5.64	4.28	225	VC	CIRC	
0151X		5.07	150	VC	CIRC	
0152X	6.03	4.8	150	CP	CIRC	
0201X			OTHER	BRC	CIRC	*
0201X	5.77	5.11	150	BAC	CIRC	*
0202X			OTHER	BRC	CIRC	
0203X			OTHER	BRC	CIRC	
0205X			UNK	UNK	CIRC	
0200X			OTHER	BRC	CIRC	
0210X			OTHER	BRC	CIRC	
021PX	4.12		OTHER	PE	UNK	
0301X	5.73	4.05	150	BAC	CIRC	
0302X	5.1	4.48	150	BAC	CIRC	
0303X			OTHER	BRC	CIRC	
0304X			OTHER	BRC	CIRC	
0300X			UNK	BRC	CIRC	
0310X			OTHER	BRC	CIRC	
0320X			OTHER	BRC	CIRC	
0351X	4.33	3.13	450	CP	RECT	
0401X	4.87	4.2	150	VC	CIRC	*
0401X	5.35		150	BAC	CIRC	*
0402X	5	3.78	150	BAC	CIRC	
0403X	4.93	3.63	150	BAC	CIRC	
0404X	4.95	3.16	150	BAC	CIRC	
0405X	4.88	2.94	150	BAC	CIRC	
0406X	4.87	3.28	150	BAC	CIRC	
0407X	4.78		150	VC	CIRC	
0451X	4.67	3.16	450	CP	CIRC	
0452X	4.9	3.18	450	CP	CIRC	
0453X	4.93	3.23	450	CP	CIRC	
0454X	4.87	3.37	300	CP	CIRC	
0455X	4.87	3.48	150	CP	CIRC	
0501X	4.98	1.6	375	CI	CIRC	
0502X	4.83	2.03	225	CI	CIRC	
0503X	4.8	2.82	150	CI	CIRC	
0504X			150	VC	CIRC	
0510X			375	CI	CIRC	
0601X	4.77	2.18	225	CI	CIRC	
0602X			100	UNK	CIRC	
0603X			UNK	UNK	CIRC	
0600X			225	VC	CIRC	
0610X			UNK	UNK	CIRC	
0620X			UNK	UNK	CIRC	
0630X			225	VC	CIRC	
0701X	4.93	2.52	225	VC	CIRC	
0703X			100	VC	CIRC	
0704X			100	VC	CIRC	
0705X			100	VC	CIRC	
0751X	4.93	3.89	150	VC	CIRC	
0801X	4.78	2.59	225	CI	CIRC	
0802X	4.93	3.03	150	PF	CIRC	
0851X	5.05	3.61	450	CP	CIRC	
0852X	5.23	4.01	150	CP	CIRC	
0853X	5.16	4.21	150	VC	CIRC	
0854X	4.99	3.73	150	VC	CIRC	
0855X	5	3.57	600	CP	CIRC	
0856X	5.02	3.59	450	CP	CIRC	
0901X	5.5	3.05	225	VC	CIRC	
0902X	5.13	2.83	225	VC	CIRC	
0903X	5.51	3.6	150	VC	CIRC	
0904X	5.18	3.66	150	PF	CIRC	
0951X	5.58	3.85	450	CP	CIRC	
0952X	5.28	3.79	450	CP	CIRC	
0953X	5.31	4.31	150	CP	CIRC	
0954X	5.26	4.21	150	CP	CIRC	
0955X	5.36	4.02	225	CP	CIRC	
0956X	4.97	4.34	150	CP	CIRC	
1001X	5.75		150	VC	CIRC	
1002X		3.95	225	VC	CIRC	
1000X			150	VC	CIRC	
1051X	5.88	3.82	375	CP	CIRC	
1052X	5.72	4.23	150	VC	CIRC	
1053X	5.64	4.24	150	CP	CIRC	
1101X	6.06	4.83	150	VC	CIRC	
1102X	6.09	4.82	150	VC	CIRC	
1104X	6.74	4.05	150	VC	CIRC	
1105X	6.08	4.41	150	VC	CIRC	
1151X	5.97	4.35	300	CP	CIRC	
1152X	6.05	5.32	150	CP	CIRC	
1153X	5.97	4.8	225	CP	CIRC	
1201X			OTHER	BRC	CIRC	*
1201X		4.4	225	VC	CIRC	*
1200X			OTHER	BRC	CIRC	
1210X			OTHER	BRC	CIRC	
1251X	6.15	4.53	225	CP	CIRC	
1252X	6.19	5.82	100	VC	CIRC	
1253X	6.07	5.15	150	CP	CIRC	
1254X	6.09	5.28	100	VC	CIRC	
1301X	5.47	3.51	150	BAC	CIRC	
1302X	5.45	3.33	150	BAC	CIRC	*
1302X			OTHER	BRC	CIRC	*
1303X	5.91	5.12	150	BAC	CIRC	*
1303X			OTHER	BRC	CIRC	*
1304X	6.23	5.46	150	BAC	CIRC	*
1304X			OTHER	BRC	CIRC	*
1305X			100	PF	CIRC	
1300X			OTHER	BRC	CIRC	
1310X			150	BAC	CIRC	*
1310X			OTHER	BRC	CIRC	*
1320X			OTHER	BRC	CIRC	*
1320X			100	PF	CIRC	
1330X			OTHER	BRC	CIRC	
1401X	5.68	3.99	150	BAC	CIRC	*
1401X		3.05	150	BAC	CIRC	*
1402X	4.86	3.48	150	BAC	CIRC	*
1402X	5.68	3.7	150	BAC	CIRC	*
1403X	5.79	4.44	150	BAC	CIRC	*
1403X	4.98	3.37	150	BAC	CIRC	*
1404X	4.87	3.23	150	BAC	CIRC	*
1404X	5.67	3.68	150	BAC	CIRC	*
1405X	4.88	3.65	100	VC	CIRC	*
1405X		3.64	150	BAC	CIRC	*
1406X	5.41	3.95	150	BAC	CIRC	*
1406X	4.91	3.39	150	PF	CIRC	*
1407X	4.88	3.14	150	CI	CIRC	*
1407X	5.64	3.75	150	BAC	CIRC	*
1408X	4.93	3.35	150	BAC	CIRC	*
1409X	4.86	4.23	100	PF	CIRC	*
1409X			UNK	UNK	CIRC	*
1400X			150	BAC	CIRC	
1410X			OTHER	BRC	CIRC	
1410X			UNK	UNK	CIRC	
1451X	4.86	3.54	225	CP	CIRC	
1452X	4.84	3.4	225	CP	CIRC	
1453X	4.91	3.92	150	CP	CIRC	
1454X	4.84	3.78	150	CP	CIRC	
1455X	4.88	3.79	150	CP	CIRC	
1456X	4.91	3.59	225	CP	CIRC	
1457X	4.98	3.52	225	CP	CIRC	
1458X	4.87	4.15	150	CP	CIRC	
1459X	4.85	3.72	150	CP	CIRC	
1460X	4.92	4.04	150	CP	CIRC	
1501X	4.73	1.81	375	CI	CIRC	*
1501X	5.21	4.25	150	BAC	CIRC	*
1502X	4.81	2.59	150	BAC	CIRC	*
1502X		4.45	150	BAC	CIRC	*
1503X	4.85	2.77	150	BAC	CIRC	
1504X		2.97	150	BAC	CIRC	
1505X	4.98	3.68	150	BAC	CIRC	
1507X			UNK	UNK	CIRC	
1508X			UNK	UNK	CIRC	
1506X			UNK	UNK	CIRC	
1551X	5.15	4.41	300	CP	CIRC	*
1551X	4.84	3.38	450	CP	CIRC	*
1552X	4.85	4.04	150	CP	CIRC	
1553X	4.85	3.92	150	CP	CIRC	
1601X	4.95	1.93	300	CP	CIRC	
1602X	4.54	1.87	375	CI	CIRC	
1603X	4.53	1.88	300	CP	CIRC	
1604X	5.29	1.99	225	VC	CIRC	
1605X	5.18	2.01	225	VC	CIRC	
1606Y	5.16	2.09	225	VC	CIRC	*
1606X	5.18	2.11	225	CI	CIRC	*
1607X		2.3	225	CI	CIRC	
1651X		3.94	150	CP	CIRC	
1652X	4.58	3.38	450	CP	CIRC	
1701X	5.27	4.09	150	PF	CIRC	
1702X	5.2	3.76	150	PF	CIRC	
1703X	5.18	3.52	150	VC	CIRC	
1751X	5.23	3.42	600	CP	CIRC	
1801X	5.15	3.85	150	VC	CIRC	
1802X	5.1	3.78	150	PF	CIRC	

Node	Cover	Invert	Size	Material	Shape	
1803X	5.31	3.41	150	VC	CIRC	
1804X	5.3	3.78	150	VC	CIRC	
1851X	4.98	3.8	450	CP	CIRC	
1852X	5.15	3.85	150	CP	CIRC	
1853X	5.13	3.89	225	CP	CIRC	
1854X	5.22	4.04	150	CP	CIRC	
1901X	5.42	3.78	150	VC	CIRC	
1902X	5.84	3.62	150	PF	CIRC	
1903X	5.26	3.46	150	VC	CIRC	
1904X	5.37	3.19	225	VC	CIRC	
1951X	5.31	3.71	375	CP	CIRC	
1952X	5.42	3.77	150	VC	CIRC	
1953X	5.24	3.65	450	CP	CIRC	
1954X	5.34	3.56	300	CP	CIRC	
1955X	5.36		450	CP	CIRC	
1956X	5.33	4.17	150	CP	CIRC	
2001X	5.57	3.85	150	PF	CIRC	
2002X	5.56	4.3	150	BAC	CIRC	
2003X	5.72	4.38	150	BAC	CIRC	
2004X	5.72	4.22	150	PF	CIRC	
2051X	5.71	3.91	300	CP	CIRC	
2052X	5.88	4.85	150	CP	CIRC	
2053X	5.36	4.39	225	CP	CIRC	
2054X	5.78	4.8	150	VC	CIRC	
2101X	5.94	4.72	150	VC	CIRC	
2102X			150	UNK	CIRC	
2151X	5.87	4.93	150	CP	CIRC	
2152X		4.6	225	CP	CIRC	
2153X	5.87	4.09	300	CP	CIRC	
2154X	5.95	4.25	225	CP	CIRC	
2155X	5.9	4.26	150	VC	CIRC	
2201X	6.23	5.21	150	VC	CIRC	
2202X	6.35	5.07	150	VC	CIRC	
2203X	6.22	4.87	150	VC	CIRC	
2204X	6.11	4.73	150	BAC	CIRC	
2206X	6.06	5.29	150	VC	CIRC	
2207X	6.24	4.83	150	BAC	CIRC	
2251X	6.21	5.01	150	VC	CIRC	
2252X	6.22	4.82	150	CP	CIRC	
2253X	6.17	5.27	150	CP	CIRC	
2254X	6.07	4.95	150	CP	CIRC	
2255X	6.02	4.77	225	CP	CIRC	
2301X	5.57	3.21	150	BAC	CIRC	*
2301X			OTHER	BRC	CIRC	*
2302X		2.92	150	BAC	CIRC	*
2302X			OTHER	BRC	CIRC	*
2300X			OTHER	BRC	CIRC	
2310X			OTHER	BRC	CIRC	
2401X	4.89	3.77	150	PF	CIRC	
2402X		4.01	150	PF	CIRC	
2403X			OTHER	BRC	CIRC	
2404X			UNK	VC	CIRC	
2405X			UNK	VC	CIRC	
2406X			150	PF	CIRC	
2400X			OTHER	BRC	CIRC	*
2408X			UNK	UNK	CIRC	*
2410X			UNK	UNK	CIRC	
2451X	4.86	3.98	225	CP	CIRC	
2452X	4.84	3.89	300	CP	CIRC	
2453X	4.91	4.11	150	CP	CIRC	
2501X	4.77	3.31	150	PF	CIRC	
2502Y	4.88	2.1	150	PF	CIRC	
2503X	4.95	3.14	150	PF	CIRC	
2504X	4.74	3.58	150	PF	CIRC	
2505X	4.69	2.69	150	PF	CIRC	
2506X			150	PF	CIRC	
2551X	4.77	4.21	150	PF	CIRC	*
2551X	5.38	4.3	375	CP	CIRC	*
2552X	4.74	3.81	375	CP	CIRC	
2553X	5.03	4.25	150	CP	CIRC	
2554X	4.94	3.98	225	VC	CIRC	
2555X	4.86	3.79	375	CP	CIRC	
2556X	4.82	4.16	225	CP	CIRC	
2557X	4.99	4.23	150	CP	CIRC	
2558X	4.9	4.17	150	CP	CIRC	
2559X	4.88	3.76	375	CP	CIRC	
2560X	4.79	3.7	375	CP	CIRC	
2561X	4.78	3.9	225	CP	CIRC	
2601X	4.92	2.04	300	CP	CIRC	
2602X	4.92	2.21	150	CP	CIRC	
2603X	4.82	2.33	150	PF	CIRC	
2604X	4.9	3.17	150	PF	CIRC	
2605X	4.81	3.56	100	PF	CIRC	
2606X	4.81	3.3	150	PF	CIRC	
2607X	5.26	3.76	150	PF	CIRC	
2608X	5.13	2.56	150	PF	CIRC	
2609X			OTHER	BRC	CIRC	
2610X			OTHER	BRC	CIRC	
2611X			OTHER	BRC	CIRC	
2612X			OTHER	BRC	CIRC	
2651X	5.11	3.31	225	CP	CIRC	
2652X	4.83	3.43	225	CP	CIRC	
2653X	4.79	3.61	225	CP	CIRC	
2654X	4.88	3.78	150	CP	CIRC	
2655X	4.66	3.95	150	CP	CIRC	
2656X	4.73	3.41	450	CP	CIRC	
2657X	4.82	3.45	450	CP	CIRC	
2658X	4.94	3.48	450	CP	CIRC	
2659X			OTHER	BRC	CIRC	
2660X			OTHER	BRC	CIRC	
2661X			OTHER	BRC	CIRC	
2662X			OTHER	BRC	CIRC	
2663X			OTHER	BRC	CIRC	
2664X			OTHER	BRC	CIRC	
2701X	5.2	3.35	150	PF	CIRC	
2702X	5.19	3.83	150	PF	CIRC	
2703X	5.23	3.62	150	VC	CIRC	
2704X	5.19	3.78	150	PF	CIRC	
2705X			OTHER	BRC	CIRC	
2751X	5.38	3.33	600	CP	CIRC	
2752X	5.38	3.74	150	CP	CIRC	
2801X	5.31	2.76	225	VC	CIRC	
2802X	5.23	3.05	150	VC	CIRC	
2803X	5.39	2.86	225	VC	CIRC	
2804X	5.46	3.08	150	VC	CIRC	
2805X		3.28	150	VC	CIRC	
2806X	5.35	3.23	150	VC	CIRC	
2807X	3.7	1.68	150	VC	CIRC	
2851X	5.32	3.34	300	CP	CIRC	
2852X	5.29		300	CP	CIRC	
2853X	5.35		150	VC	CIRC	
2854X	5.37	3.56	150	CP	CIRC	
2855X	5.24	3.92	150	CP	CIRC	
2901X	5.6	4.1	150	PF	CIRC	
2902X	5.6	4.33	150	BAC	CIRC	
2903X	5.56	4.14	150	BAC	CIRC	
2904X	5.56	3.78	150	BAC	CIRC	
2905X	5.41	3.29	150	BAC	CIRC	
2906X	5.32	3.12	150	PF	CIRC	
2907X	5.27	3.27	150	VC	CIRC	
2908X	5.38	3.44	150	PF	CIRC	
2951X	5.61	4.81	150	CP	CIRC	
2952X	5.66		150	CP	CIRC	
2953X	5.53		225	CP	CIRC	
3001X	5.81	3.14	225	BAC	CIRC	
3002X		3.47	150	BAC	CIRC	
3003X	5.93	3.77	150	VC	CIRC	
3004X	5.74	3.63	150	BAC	CIRC	
3005X	5.76	3.84	150	PF	CIRC	
3006X	5.68	3.91	150	PF	CIRC	
3007X	5.7	4.03	150	BAC	CIRC	
3008X	5.69	4.09	150	PF	CIRC	
3010X	5.62	4.25	150	PF	CIRC	
3051X	5.72	3.77	525	CP	CIRC	
3052X	5.67		225	CP	CIRC	
3050X	5.7		225	CP	CIRC	
3101X	6.52	5.03	150	BAC	CIRC	
3102X	6.26	4.3	150	BAC	CIRC	
3103X	6.27	3.85	150	BAC	CIRC	
3151X	5.9	3.89	450	CP	CIRC	
3152X	6.05	4.41	225	CP	CIRC	
3153X	6.11	4.52	225	CP	CIRC	
3154X	5.93	4.89	150	CP	CIRC	
3201X	6.06	4.21	150	BAC	CIRC	*
3201X	2.34	-0.34	150	PF	CIRC	*
3202X	5.59	4.07	150	BAC	CIRC	*
3202X	2.136		150	PF	CIRC	*
3203X	6.54	4.09	150	BAC	CIRC	*
3203X	2.19		150	PF	CIRC	*
3204X	2.44	-0.66	225	VC	CIRC	*
3204X	6.63	4.05	150	BAC	CIRC	*
3205X	6.54	3.83	150	BAC	CIRC	
3206X	6.85	4.14	150	BAC	CIRC	
3207X			UNK	UNK	CIRC	
321PX	2.15	2.15	125	CI	CIRC	
3251X	6.46	4.38	300	CP	CIRC	
3252X	6.23	4.9	150	CP	CIRC	
3253X	6.41	4.83	150	CP	CIRC	
3254X	6.47	5.1	150	VC	CIRC	
3250X		4.04	450	CP	CIRC	

Node	Cover	Invert	Size	Material	Shape	
3301X	5.19	2.6	150	BAC	CIRC	
3302X	5.54	2.42	150	BAC	CIRC	
3303X	6.43	2.37	150	BAC	CIRC	
3350X	4.39		450	CP	CIRC	
3401X	6.48	2.33	150	BAC	CIRC	*
3401X			OTHER	BRC	CIRC	*
3402X			OTHER	BRC	CIRC	
3403X			OTHER	BRC	CIRC	
3410X			OTHER	BRC	CIRC	
3420X			OTHER	BRC	CIRC	
3501X	4.67	3.13	100	PF	CIRC	*
3501X	4.85	2.83	150	PF	CIRC	*
3502X	5.7	2.67	150	BAC	CIRC	*
3502X	4.74	2.92	150	PF	CIRC	*
3502X	4.72	2.73	150	PF	CIRC	*
3503X	4.93	3.8	150	PF	CIRC	
3504X	4.64	3.4	150	PF	CIRC	
3505X			100	VC	CIRC	*
3505X	4.69	3.24	150	PF	CIRC	*
3506X	4.79	3.43	150	PF	CIRC	
3507X	4.66	3.12	150	PF	CIRC	
3508X	4.66	3.31	150	PF	CIRC	
3509X	4.71	3.34	150	PF	CIRC	
3510X	4.82	3.52	150	PF	CIRC	
3511X			150	PF	CIRC	
3512X			150	PF	CIRC	
3551X	5.61	4.22	450	CP	CIRC	*
3551X	4.66	2.91	1050	CP	CIRC	*
3552X	4.88	3.88	375	CP	CIRC	*
3552X	5.56	4.31	375	CP	CIRC	*
3553X	4.86	3.59	450	CP	CIRC	
3554X	4.78	3.78	300	CP	CIRC	
3555X	4.81	3.57	450	CP	CIRC	
3556X	4.81	3.85	300	CP	CIRC	
3557X	4.84	3.57	450	CP	CIRC	
3558X	4.87	3.51	450	CP	CIRC	
3559X		3.49	450	CP	CIRC	
3560X	4.71	3.77	300	CP	CIRC	
3561X	4.79	3.82	300	CP	CIRC	
3562X	4.74	3.86	300	CP	CIRC	
3563X	4.63	3.99	150	VC	CIRC	
3564X		4.19	150	VC	CIRC	
3565X	4.82	3.87	300	CP	CIRC	
3566X	4.75	4.05	225	CP	CIRC	
3601X	5.05	2.26	300	CP	CIRC	
3602X	5.07	2.14	300	CP	CIRC	
3603X	4.7	2.36	150	BAC	CIRC	
3604X	4.97	3.37	150	PF	CIRC	
3605X	4.83	2.43	150	PF	CIRC	
3606X	4.83	3.01	150	PF	CIRC	
3607X	4.76	2.89	150	PF	CIRC	
3608X		3.35	150	PF	CIRC	
3609X	4.94	3.93	150	PF	CIRC	
3600X			150	PF	CIRC	
3610X	4.72	4.11	150	PF	CIRC	
3611X			UNK	UNK	CIRC	
3612X			UNK	UNK	CIRC	
3613X			100	PF	CIRC	
3651X	4.96	2.38	OTHER	CP	CIRC	
3652X	4.88	3.12	OTHER	CP	CIRC	
3653X	4.63	3.15	300	CP	CIRC	
3654X	4.88	3.08	OTHER	CP	CIRC	
3655X	4.85	3.58	450	CP	CIRC	
3656X	4.85	3.45	450	CP	CIRC	
3657X	4.96	3.49	300	CP	CIRC	
3658X	5.13	4.12	150	CP	CIRC	
3650X		3.65	450	CP	CIRC	
3701X	5.24	2.31	300	CP	CIRC	
3702X	5.24	3.48	150	BAC	CIRC	
3703X	5	2.38	225	CP	CIRC	
3704X	4.73	3.04	150	BAC	CIRC	
3705X	4.92	2.52	150	PF	CIRC	
3706X	4.86	3.34	150	PF	CIRC	
3707X	4.97	3.52	150	PF	CIRC	
3708X	4.87	3.7	150	PF	CIRC	
3709X			150	VC	CIRC	
3700X			100	VC	CIRC	
3751X	5.24	3.2	900	CP	CIRC	
3752X	5.24	4.11	150	CP	CIRC	
3753X	4.75	3.82	150	CP	CIRC	
3754X	4.91	3.54	300	CP	CIRC	
3755X	4.87	3.78	150	PF	CIRC	
3756X	4.98	3.91	150	PF	CIRC	
3801X		2.63	225	BAC	CIRC	
3802X	4.94	2.49	225	BAC	CIRC	
3803X	5.06	2.38	225	BAC	CIRC	
3804X	5.07	3.12	150	BAC	CIRC	
3805X	4.83	2.71	175	CI	CIRC	
3806X	5.13	2.85	175	CI	CIRC	
3807X	5.09	3.48	150	VC	CIRC	
3851X	5.01	3.33	900	CP	CIRC	
3852X	4.82	3.28	900	CP	CIRC	
3853X	4.82	3.34	OTHER	CP	CIRC	
3854X	5.07	3.24	900	CP	CIRC	
3855X	4.96	3.97	150	CP	CIRC	
3856X	5.09	3.39	OTHER	CP	CIRC	
3901X	5.43	2.89	225	BAC	CIRC	
3902X	5.58	3.35	150	BAC	CIRC	
3903X	5.48	2.83	225	BAC	CIRC	
3951X	5.43	3.39	600	CP	CIRC	
3952X	5.51	3.83	300	CP	CIRC	
3953X	5.38	4.33	150	CP	CIRC	
3954X	5.25	3.39	600	CP	CIRC	
4003X	5.99	4.31	150	VC	CIRC	
4052X	5.61	4.8	150	CP	CIRC	
4102X	6.02	3.37	225	BAC	CIRC	
4151X	6.27	4.01	300	CP	CIRC	
4155X	6	3.92	375	CP	CIRC	
4204X	6.44	4.37	150	BAC	CIRC	*
4204Y	6.44		UNK	UNK	CIRC	*
4206X			UNK	UNK	CIRC	
4207X			UNK	UNK	CIRC	
4302X	2.655		OTHER	PE	CIRC	
4304X	3.275	0.479	150	VC	CIRC	*
4304X	6.6	5.41	150	BAC	CIRC	*
4306X	2.353		150	VC	CIRC	
4307X	2.227	0.194	150	VC	CIRC	
4401X	3.07		150	PF	CIRC	
4402X	2.597		150	VC	CIRC	
4403X	3.6	1.9	150	VC	CIRC	
4408X	6.69	1.96	150	BAC	CIRC	
4501X	4.6	3.62	150	PF	CIRC	*
4501X	4.27	2.24	150	PF	CIRC	*
4551X	4.81	2.89	1050	CP	CIRC	
4554X	4.89	4.14	150	VC	CIRC	
4606X			100	PF	CIRC	
4600X			100	PF	CIRC	
4610X			150	PF	CIRC	
4758X	4.81	4.38	150	PF	CIRC	
4759X	5.58	4.88	150	PF	CIRC	
4806X			UNK	UNK	CIRC	
4800X			175	BAC	CIRC	
4855X		3.39	OTHER	CP	CIRC	
4902X	5.27	3.33	150	PF	CIRC	
4908X			150	VC	CIRC	
4952X	5.47	4.05	150	VC	CIRC	
5301X	2.521		150	VC	CIRC	
5351X	2.6	1	600	CP	CIRC	
5401X	2.97	1.43	150	PF	CIRC	
5402X	2.88	1.29	150	PF	CIRC	
5403X	2.49		150	PF	CIRC	
5404X			150	PF	CIRC	
5451X	2.94	1.54	675	BRE	CIRC	
5452X	2.66	1.48	600	CP	CIRC	
5453X	2.44	1.36	675	CP	CIRC	
5501X	2.83	1.29	150	BAC	CIRC	
5502X	2.67	1.53	150	BAC	CIRC	
5500X			UNK	VC	CIRC	
5510X			150	BAC	CIRC	
5552X	2.8	1.41	OTHER	BRE	HORS	
5553X	2.91	1.66	600	CP	CIRC	
5554X	2.96	1.7	325	CP	CIRC	
5550X	2.8		225	CP	CIRC	
6201X	4.14	2.42	150	PF	CIRC	
6202X	3.98	3.16	150	PF	CIRC	
6203X	4.05	3.15	150	PF	CIRC	
6204X	4.02	2.47	150	PF	CIRC	
6251X	4.01	1.85	375	CP	CIRC	
6252X	4.14	2.78	225	CP	CIRC	
6253X	3.95	2.95	150	CP	CIRC	
6254X	3.84	1.76	375	CP	CIRC	
6255X	3.83	1.8	450	CP	CIRC	
6301X	3.98	1.88	150	PF	CIRC	
6302X	4.11	1.88	150	PF	CIRC	
6303X	4.13	1.55	150	PF	CIRC	
6304X	4.14	1.42	150	PF	CIRC	
6305X			150	PF	CIRC	
6306X	4.35	2.01	150	PF	CIRC	
6307X	4.13	1.85	150	PF	CIRC	
6308X	4.19	2.21	150	PF	CIRC	



O.S. Ref.	SZ8897NE	Drawn by:	yadavsa
Scale:	1:2500	Date:	24/12/2018

Title: 321607_Pagham Road, Bognor Rig

The information contained on this plan is provided as a guide to the approximate position of existing public sewers. The accuracy thereof cannot be guaranteed.

THIS INFORMATION MUST BE TREATED WITH CAUTION AND THE ACTUAL POSITION OF THE PUBLIC SEWERS MUST BE ESTABLISHED ON SITE, IN ALL CASES.

Southern Water must be informed before lifting manhole covers or excavating trial holes.

[illegible]

N

Southern Water

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APPENDIX D
SURFACE WATER CALCULATIONS

Arup Internal Document - Restricted

Green Field Run Off rates

ARUN DISTRICT COUNCIL P/158/21/RES

ICP SUDS Mean Annual Flood

Input

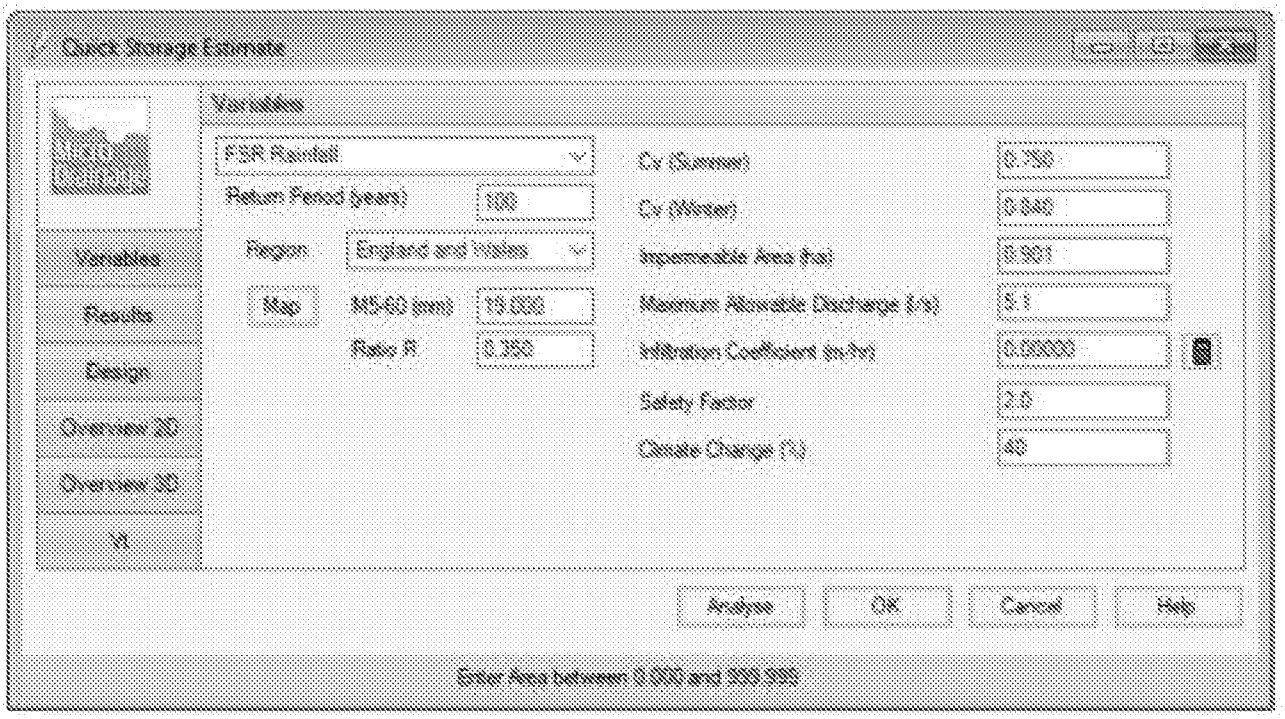
Return Period (years)	100	Soil	0.400
Area (ha)	1.460	Urban	0.000
SAAR (mm)	711	Region Number	Region 7

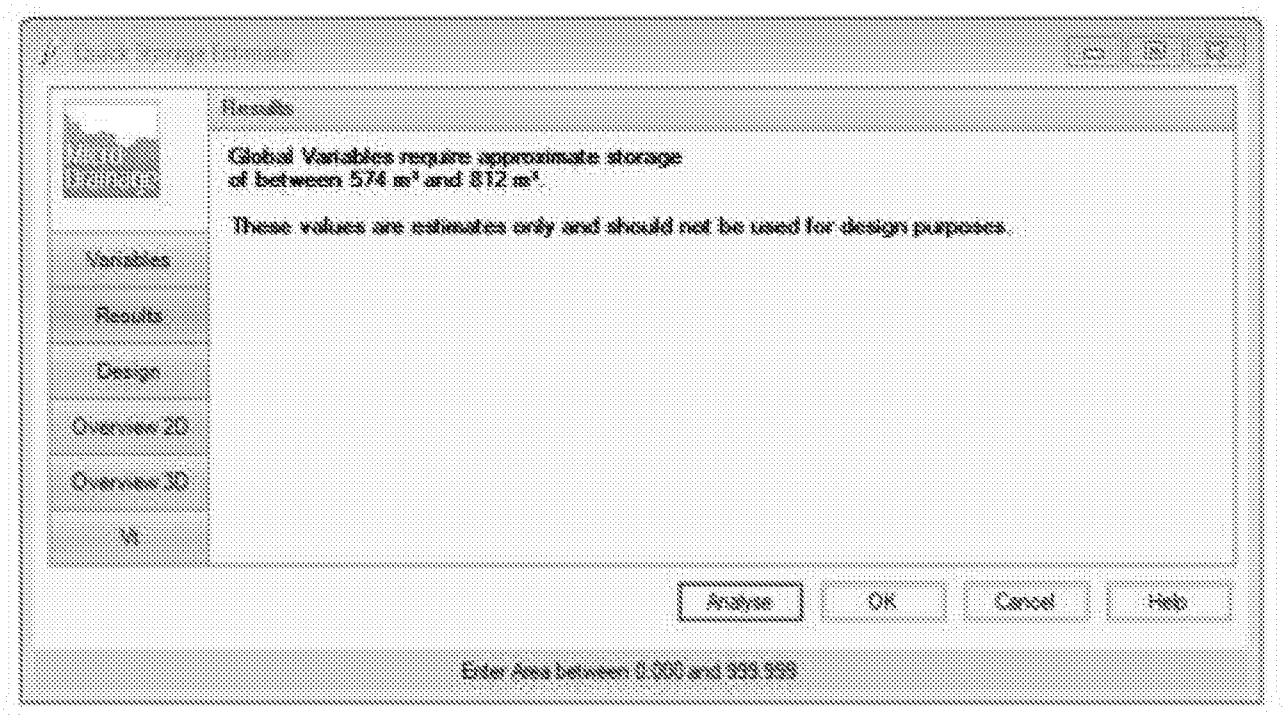
Results l/s

QBAR Rural	5.1
QBAR Urban	5.1
Q100 years	16.1
Q1 year	4.3
Q30 years	11.5
Q100 years	16.1

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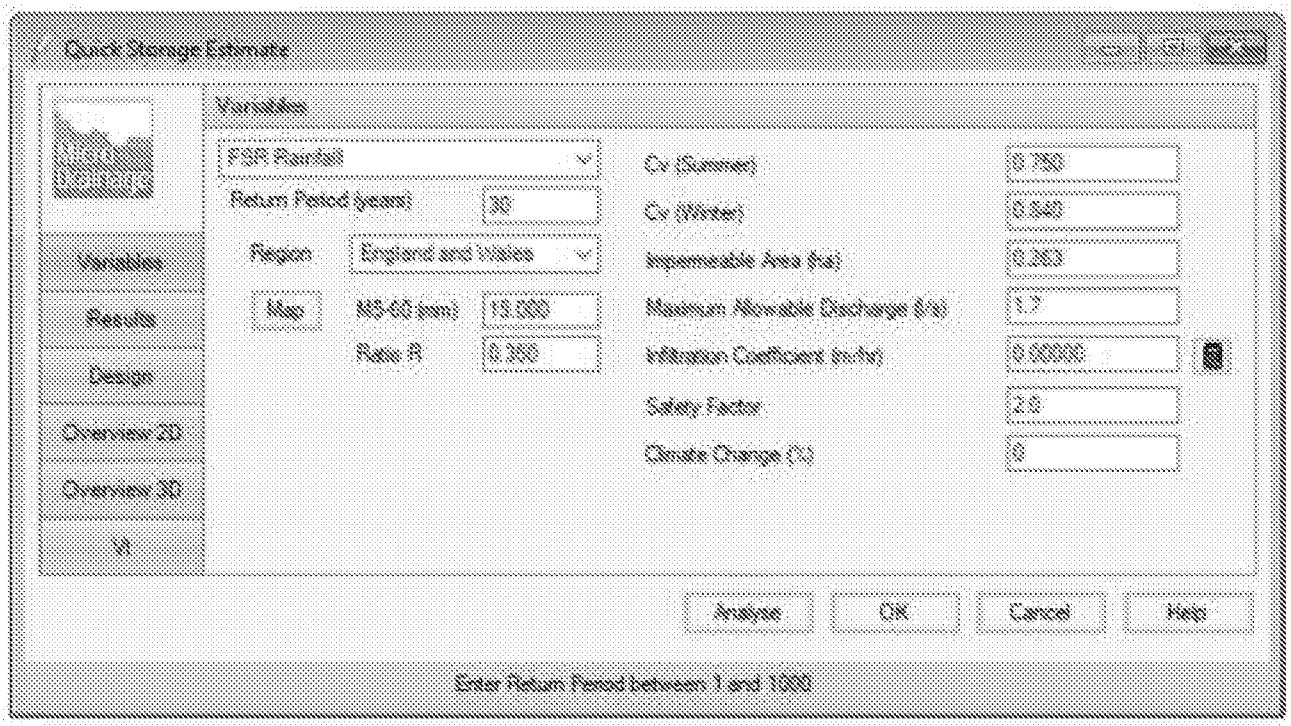
Storage Estimates
Site – 1 in 100yr + 40 % CC

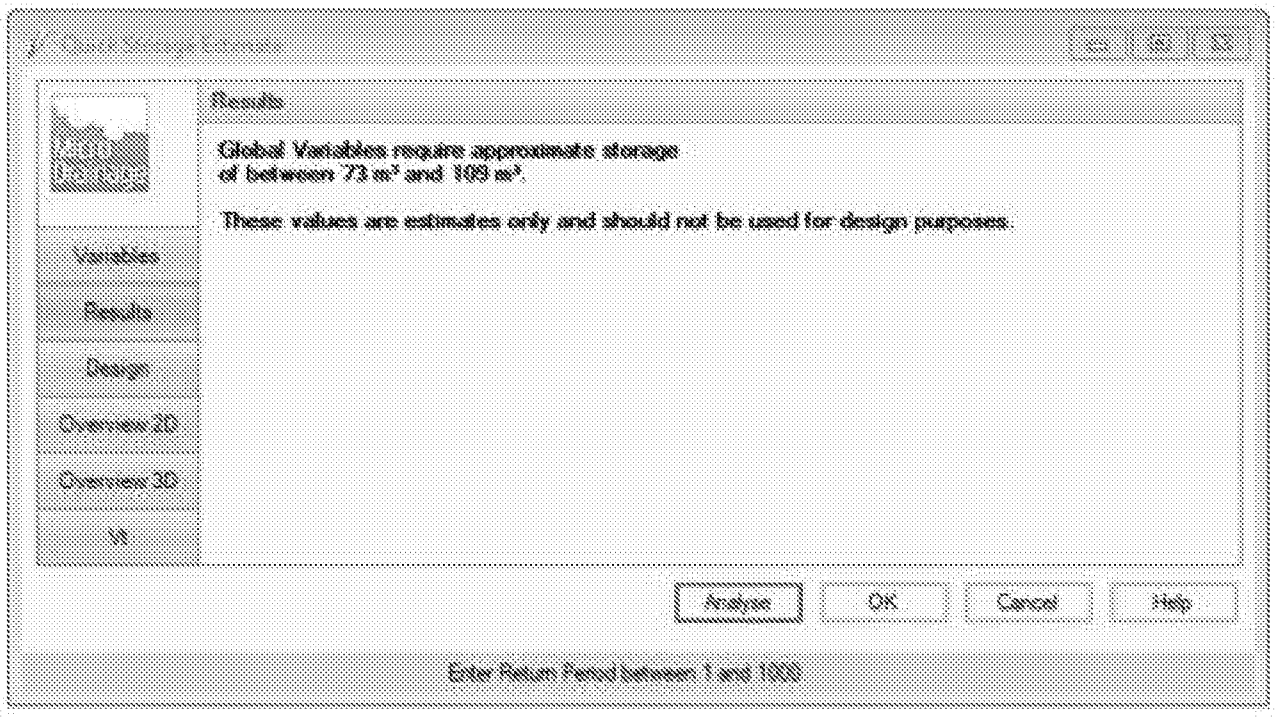




ARUN DISTRICT COUNCIL P/158/21/RES

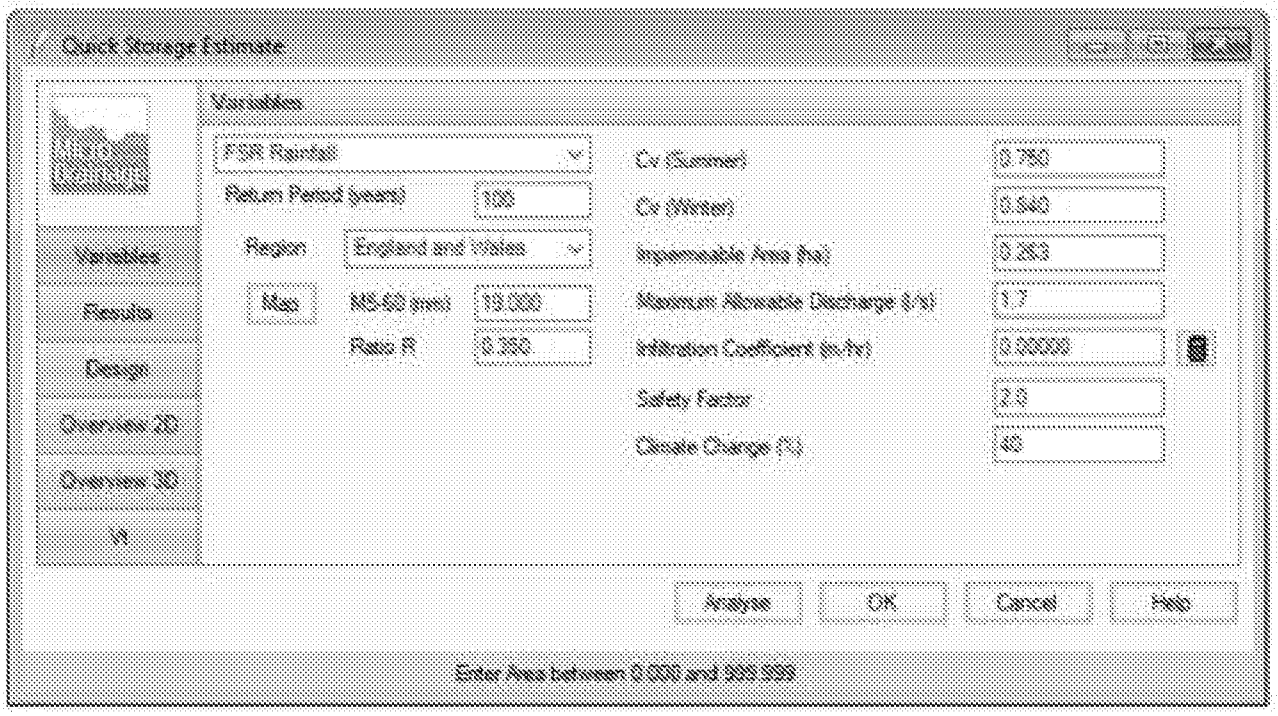
Catchment A – 1 in 30

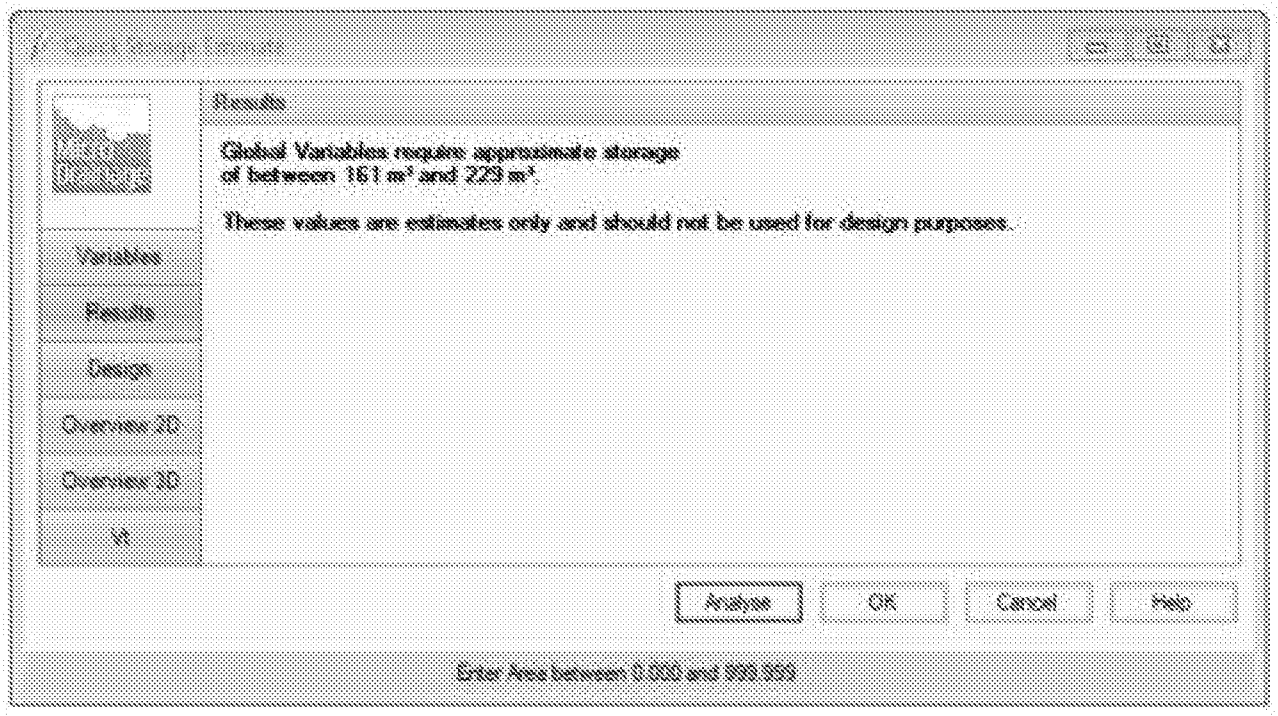




ARUN DISTRICT COUNCIL P/158/21/RES

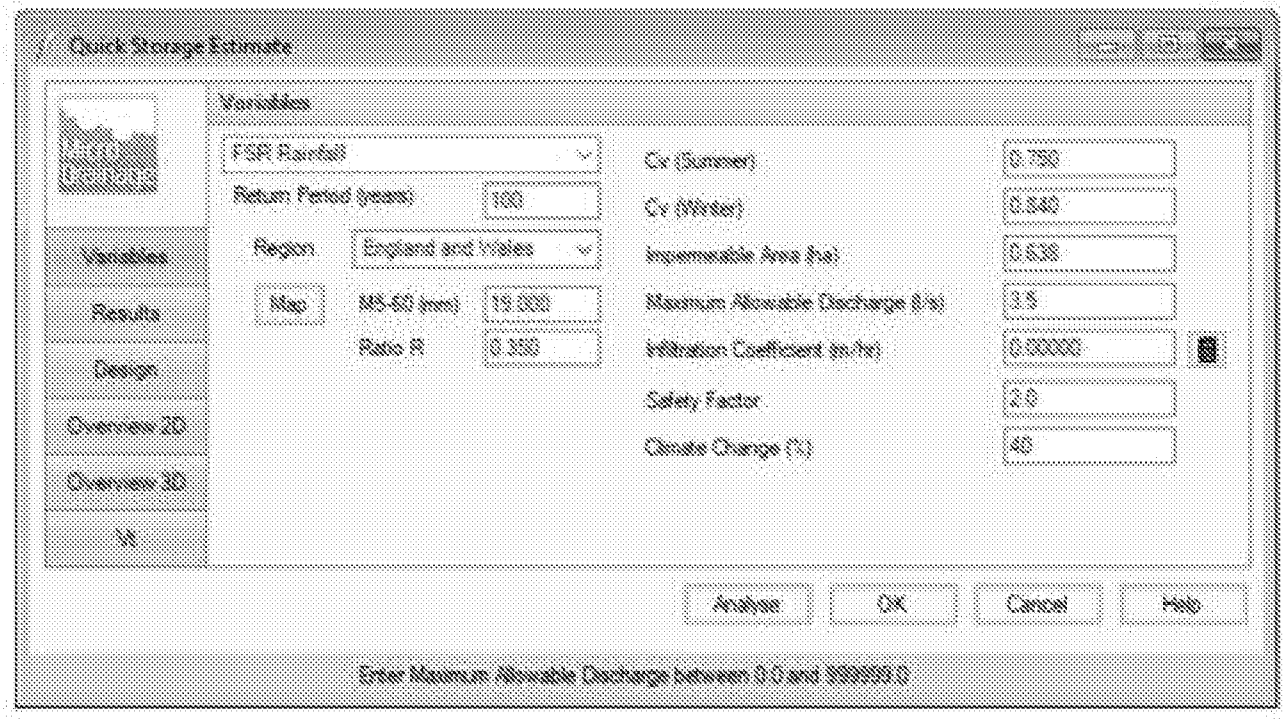
Catchment A – 1 in 100 yr + 40 CC

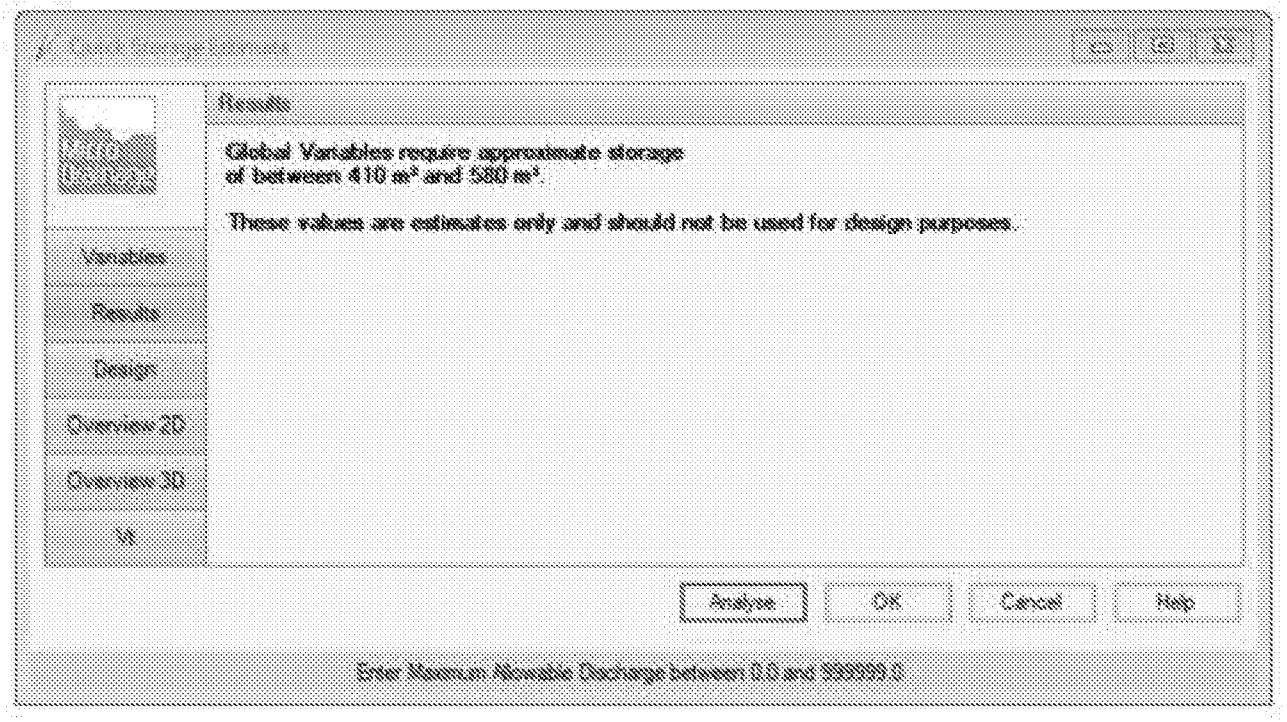




ARUN DISTRICT COUNCIL P/158/21/RES

Catchment B – 1 in 100 yr + 40%





ARUN DISTRICT COUNCIL P/158/21/RES

APPENDIX F
FOUL WATER FLOW CALCULATIONS

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RIDGE	PROJECT	CALCULATION SHEET			
PARTNERSHIP HOUSE MOORSIDE ROAD WINCHESTER SO23 7RX	Pagham Phase 3	JOB No.	5015416		
	CALCULATION	PAGE	1 of 1		
	Foul Water Flow Estimate	DATE	29/10/2021		
		BY	AA	CHECKED	TC

Foul water discharge rates are to be calculated in accordance with Sewers for Adoption and Urban Drainage (*Butler & Davies, 2nd Ed, 2004*):

RESIDENTIAL *(Note that minimum design flow of 4000 l/s/unit applies, after recommendations given in SfA)*

Description	Units	Persons	G	Infiltration	Peak Flow	Volume	
			l/hd.day	*Factor*	*Factor*	*l/day/unit*	*l/day*
1 Bed 2 person	2	2	15	1.10	6	*4000*	*8000*
2 bed 3 person		3	15	1.10	6	*4000*	*0*
2 bed 4 person	18	4	15	1.10	6	*4000*	*72000*
3 bed 5 person		5	15	1.10	6	*4000*	*0*
3 bed 6 person		6	15	1.10	6	*4000*	*0*
						TOTAL:	**80000**

Anticipated Usage Hours: 24 hrs = 86400 s **Estimated Flow (Q_f):** **0.93** **l/s**

NURSING HOME *350 l / 24 hour day / bed*

Beds	G	Infiltration	Peak Flow	Volume	
	l/unit.day	*Factor*	*Factor*	*l/day/unit*	*l/day*
70	350	1.10	6	*2310*	*161700*

Anticipated Usage Hours: 24 hrs = 86400 s **Estimated Flow (Q_f):** **1.87** **l/s**

COMMUNITY / ASSEMBLY HALLS *10 l / 12 hour day / seat or person*

Peak Occupancy	G	Infiltration	Peak Flow	Volume	
	l/unit.day	*Factor*	*Factor*	*l/day/unit*	*l/day*
80	10	1.10	6	*66*	*5280*

Anticipated Usage Hours: 12 hrs = 43200 s **Estimated Flow (Q_f):** **0.12** **l/s**

RESTAURANT *35 l / 12 hour day / customer* (café)

Peak Occupancy	G	Infiltration	Peak Flow	Volume	
	l/unit.day	*Factor*	*Factor*	*l/day/unit*	*l/day*
40	35	1.10	6	*231*	*9240*

Anticipated Usage Hours: 12 hrs = 43200 s **Estimated Flow (Q_f):** **0.21** **l/s**

SHOPPING CENTRE / RETAIL *400 l / 12 hour day / 100 m2*

Area	G	Infiltration	Peak Flow	Volume	
m^2	l/100m^2.day	*Factor*	*Factor*	*l/day/100m^2*	*l/day*
780	400	1.10	6	*2640*	*20592*

Anticipated Usage Hours: 12 hrs = 43200 s **Estimated Flow (Q_f):** **0.48** **l/s**

RIDGE PARTNERSHIP HOUSE MOORSIDE ROAD WINCHESTER SO23 7RX	PROJECT Pagham Phase 3	CALCULATION SHEET			
		JOB No.	5015416		
	CALCULATION	PAGE	1 of 1		
	Foul Water Flow Estimate	DATE	29/10/2021		
		BY	AA	CHECKED	TC

DEVELOPMENT SUMMARY

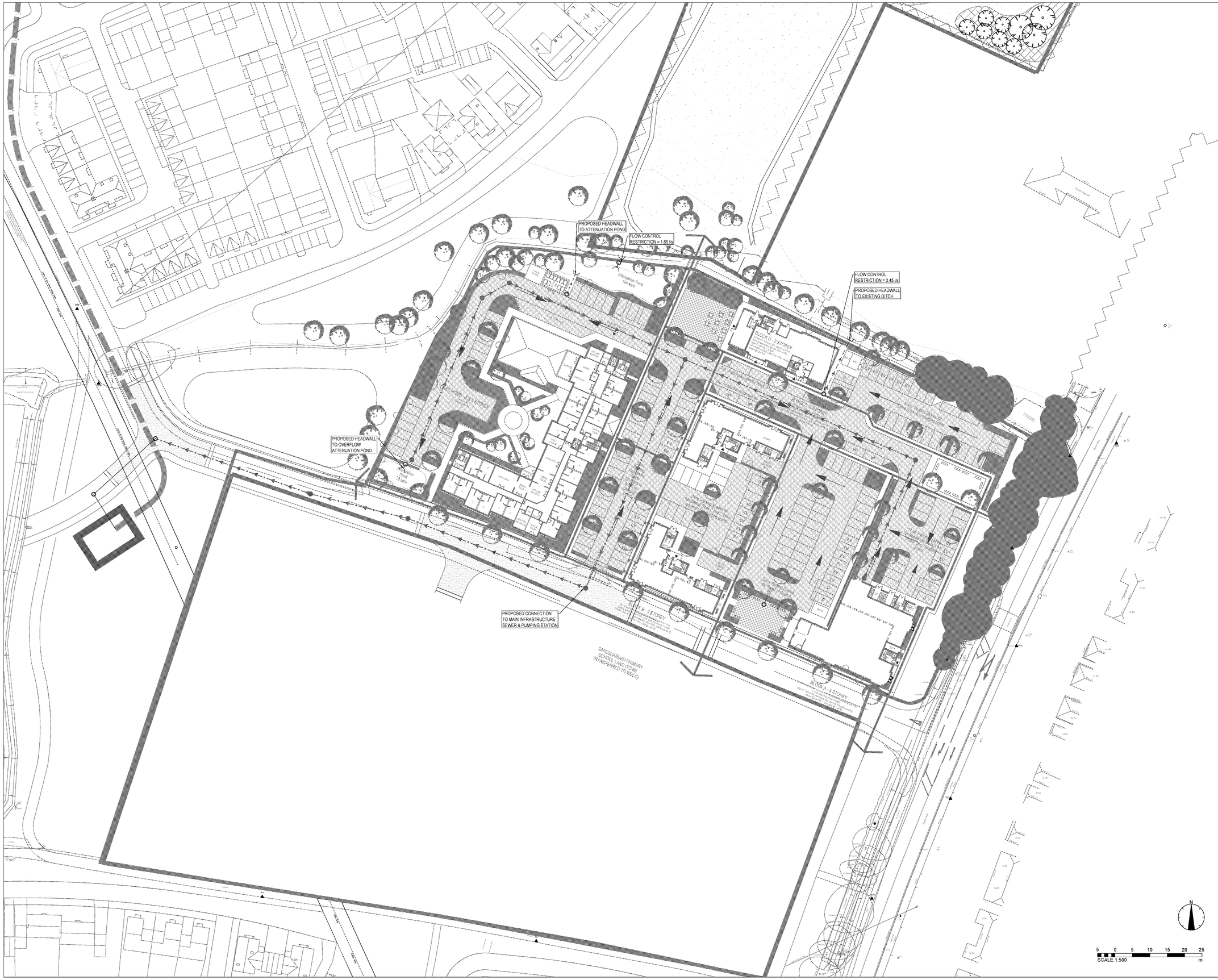
Residential	=	0.93	l/s
Nursing Home	=	1.87	l/s
Community / Assembly Halls	=	0.12	l/s
Restaurant (café)	=	0.21	l/s
Shopping Centre/Retail	=	0.48	l/s

Total Foul Water Discharge (Q_f) = 3.61 l/s

APPENDIX F

PROPOSED DRAINAGE STRATEGY

Arup Internal Document Restricted



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EXTERNAL REFERENCES:

THIS INFORMATION & RIDGE & PARTNERS LLP CIVILS 3D MODEL & ASSOCIATED 3D OUTPUTS ARE BASED UPON THE FOLLOWING INFORMATION FROM THE DESIGN TEAM

ARCHITECT REFERENCE:
- **ROBERTS LIMBRICK DWG No. 10165SK01 Rev M** (DATED 22/10/2021)

SURVEY REFERENCE:
- **SITELINE DWG No.** 657PG02B (DATED JULY 2016)

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LEGEND

- SITE BOUNDARY
- PRIVATE FOUL DRAIN
- PRIVATE S.W. DRAIN
- EXISTING DRAIN
- MANHOLE
- MANHOLE WITH BACKDROP
- PROPOSED DIFFUSER
- CROSS FALL/FLOW DIRECTION
- CATCHMENT A
- CATCHMENT B
- PROPOSED ATTENUATION POND
- PROPOSED PERMEABLE PAVING

REV	DESCRIPTION	DATE	DRAWN
-	INITIAL ISSUE	02/11/2021	JM

ORIGINATOR:

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PARTNERSHIP HOUSE
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TEL: 01962 834400
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CLIENT:
HANBURY PROPERTIES

IN ASSOCIATION WITH:

PROJECT:
PAGHAM - PHASE 3

TITLE:
DRAINAGE STRATEGY

TECH:	CSE:	ICSE:	SCALE: 1:500 @ A1
JM			INITIAL ISSUE: 02/11/2021

STATUS:
PRELIMINARY

DRAWING No:

PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
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