

RIDGE

PROPERTY & CONSTRUCTION CONSULTANTS

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY, JLL – DAIRY CREST DEPOT, HAVANT

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Prepared for

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APPENDIX

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Executive Summary

This report explores the flood risk the proposed development could be exposed to and examines the possible flood risks the proposed development could pose to the surrounding area.

This report outlines the surface water management strategy that can be implemented.

The surface water drainage network has been designed to discharge to the adjacent waterway, Riders Stream, at the greenfield run-off rate. The design will accommodate the surface water run-off generated by a critical storm from a 1 in 100-year return period plus an additional allowance for climate change has been added which equates to an additional 40%.

The site is above the 1 in 100-year and 1 in 1000-year flood levels provided by the Environment Agency.

An environmental permit from the EA is required for any works taking place within 8m of the top of bank of a main river.

The foul water drainage network is proposed to discharge to an existing Southern Water public foul water sewer. This is subject to network capacity.

The Local Authority SUDS Officer Organization (LASOO) through its publication “Non-Statutory Technical Standards for Sustainable Drainage” has set out guidance together with a number of technical standards that can be used to “judge” whether a drainage scheme submitted through the planning process complies with current policy (both national and local).

The table below sets out how this development proposals drainage strategy complies with this guidance and meets the technical standards expected.

Technical Standard	LASOO Strategy Comment	Report Comment
S1	Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary) the peak flow control Standards (S2 and S3) and volume control Standards (S4 to S5) need not apply.	N/A.
S2	For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1-year rainfall event and the 1 in 100-year rainfall event should never exceed the peak greenfield runoff rate for the same event.	N/A
S3	For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1-year rainfall event and the 1 in 100-year rainfall event should be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.	Rate of discharge from the site will be controlled to greenfield runoff, 7.4 l/s.
S4	Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 years, 6-hour rainfall event should never exceed the greenfield runoff volume for the same event.	Refer to S3.
S5	Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 years, 6-hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.	Refer to S3.
S6	Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.	Discharge from the site is being reduced to greenfield runoff rate, therefore betterment from the existing case has been provided. Flood risk will therefore not be adversely affected.
S7	The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30-year rainfall event.	Drainage will be designed so that no flooding occurs onsite in a 30-year event + 40% climate change.
S8	The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100-year rainfall event in any part of: a building (including a basement) or in any utility plant susceptible to water (e.g. pumping station or electricity substation within the development).	Refer to S7. Any flooding during the 100 - year event + 40% climate change will be contained onsite. Alternatively, the system will be designed to contain the 100 -year event + 40% climate change underground. Subject to detailed design and client requirements.

Technical Standard	LASOO Strategy Comment	Report Comment
S9	The design of the site must ensure that so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100-year rainfall event are managed in exceedance routes that minimise the risks to people and property.	The proposed levels of the site will drain away from the proposed buildings and the site will slope towards the adjacent stream. Exceedance flows can then make their way across the site and into the stream. This will not increase the risk of flooding to people and property.
S10	Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.	Contractor to advise.
S11	The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.	Contractor to advise.
S12	Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity	N/A.

1.0 INTRODUCTION

- 1.1.1. This Flood Risk Assessment and Drainage Strategy report has been prepared by Ridge and Partners LLP on behalf of the Southern Co-operative Group (Portsmouth) in support of a planning submission for a 92-apartment residential development on a parcel of land located in Havant, Hampshire.
- 1.1.2. This report has been prepared to address the requirements of the National Planning Policy Framework (NPPF – July 2018) and the Lead Local Flood Authority, through
- Assessing whether the site is likely to be affected by flooding
 - Assessing whether the proposed development will cause flooding
 - Presenting any flood risk mitigation measures necessary to ensure that the proposed development will be safe whilst ensuring flood risk is not increased elsewhere
 - Ensuring the surface water management strategy for the development incorporates the philosophies of the suds manual.

2. SITE INFORMATION

2.1 LOCATION

- 2.1.1. The site is located on Dunsbury Way which is in Havant, Hampshire. Site Reference information is included in Table 1.

ITEM	DESCRIPTION
Site Name	Dairy Crest Depot, Havant
County & Local Council Area	Hampshire County Council (Lead Local Flood Authority) Havant Borough Council (Planning Authority) Southern Water (Water Authority)
British National Grid Ref	N: 108,210; E: 471,315

Table 1: Site Referencing Information

- 2.1.2. The site is a brownfield site. The site is currently home to a Dairy Crest depot (disused) and a funeral home. The site can be accessed either from Dunsbury Way or Fulflood Rd.



(Source: OS Open Source.)

Figure 1: Site Location

2.2 TOPOGRAPHY

- 2.2.1. A topographical survey was conducted by Digital Terrain Surveys LLP in April 2017, refer to Appendix A. The northern boundary has a level of 15.75mAOD while the southern boundary has a level of 14.5m AOD. Therefore, there is a 1.25m difference in level over a distance of some 100m which equates to a slope of 1 in 80.

2.3 GEOLOGY

- 2.3.1. According to the British Geological Survey (BGS) 1:50,000 scale geological mapping available online¹, the natural geology of the site is superficial deposits of Head – Clay, Silt, Sand and Gravel overlaying bedrock geology of Bognor Sand Member – sand, and London Clay Member – Sand.

2.4 HYDROLOGY

- 2.4.1. The site is adjacent to Riders Stream, which is classified by the Environment Agency (EA) as a main river, refer to Figure 2. Riders Stream is culverted under Dunsbury Way, this culvert is adjacent to the site.
- 2.4.2. An environmental permit from the EA is required for any works taking place within 8m of the top of bank of a main river.

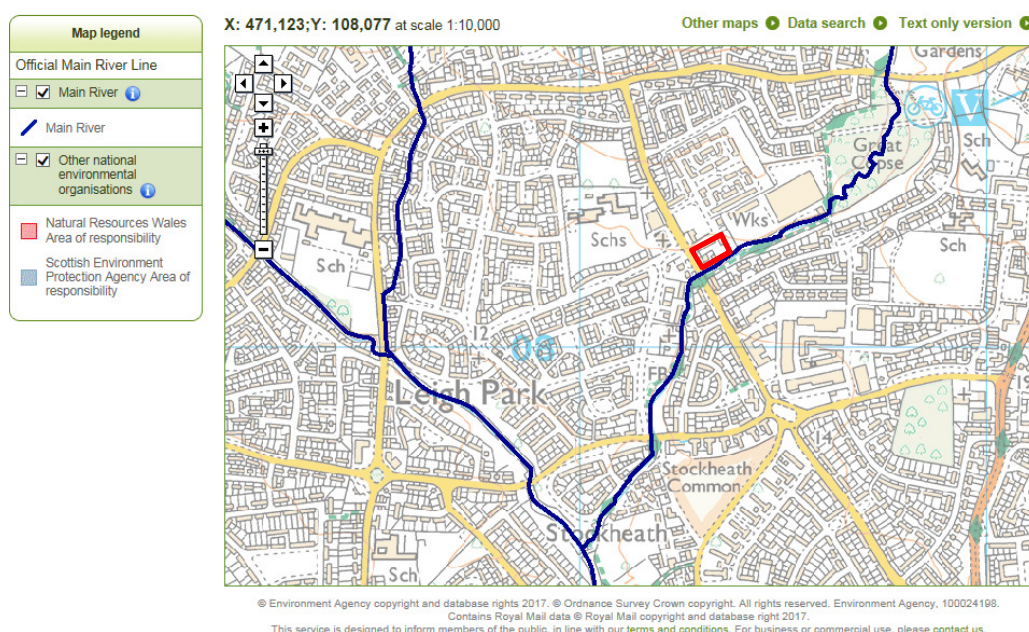


Figure 2: EA Main Rivers Consultation Map

¹ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

2.5 GROUNDWATER

- 2.5.1. According to the Environment Agency (EA) groundwater source protection map, the proposed site is located in an inner zone 1c. This means that the site is located over a confined aquifer which may be affected by deep drilling.
- 2.5.2. The site is located over a secondary aquifer: “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. These are generally aquifers formerly classified as minor aquifers.”
- 2.5.3. The site is not located in a groundwater vulnerability zone.

2.6 EXSITING SITE

- 2.6.1. The site is the currently home to a Dairy Crest depot (disused) and a funeral home. The site can be accessed either from Dunsbury Way or Fulflood Rd.

2.7 PROPOSED DEVELOPMENT

- 2.7.1. The proposed development is comprised of 92 residential properties. There is a single proposed building with a mixture of 1 and 2-bedroom apartments, refer to Appendix B for proposed site layout.
- 2.7.2. The development site is approximately 0.45 hectares in size. The green field run-off rate has been calculated using the HR Wallingford green field run-off estimation tool. See Appendix C for results, a summary of which is below:

	Q (1 YEAR)	QBAR	Q (5 YEAR)	Q (30 YEAR)	Q (100 YEAR)
Greenfield	2.0	2.3	3.0	5.2	7.4

Table 2: Greenfield Runoff rates

3. SOURCES OF FLOOD RISK

3.1 INTRODUCTION

- 3.1.1. This section summarises the potential flood risk to the site from various sources. A summary of the flood risk from these sources is given in Table 2.

POTENTIAL SOURCE OF FLOODING	OVERALL RISK
Fluvial	Low
Tidal	Low
Surface Water	Low
Groundwater	Moderate
Sewer	Low
Infrastructure Failure	Very Low

Table 3: Flood Risk Summary

3.2 FLUVIAL & TIDAL FLOODING

- 3.2.1. The site is shown by the Environment Agency's Flood Zone mapping to be wholly within Flood Zone 1 (Low Risk), refer to Figure 3. Flood Zone 1 comprises land assessed as having a 0.1%, or less, Annual Exceedance Probability (AEP) of fluvial or tidal flooding in any given year, equivalent to the 1 in 1,000-year, or more, return period event.
- 3.2.2. The closest watercourses to the site is the river called Riders Stream which runs adjacent to the site. Riders Stream is not tidal; therefore, the risk of tidal flooding can be discounted.
- 3.2.3. Product 4 data for the site, refer to Appendix D, indicates that the 1 in 1000-year flood level of Riders Stream, adjacent to the site, is between 13.313 mAOD and 13.392 mAOD. This is significantly lower than the existing ground level of the site, which ranges from 14.50mAOD to 15.75m AOD.

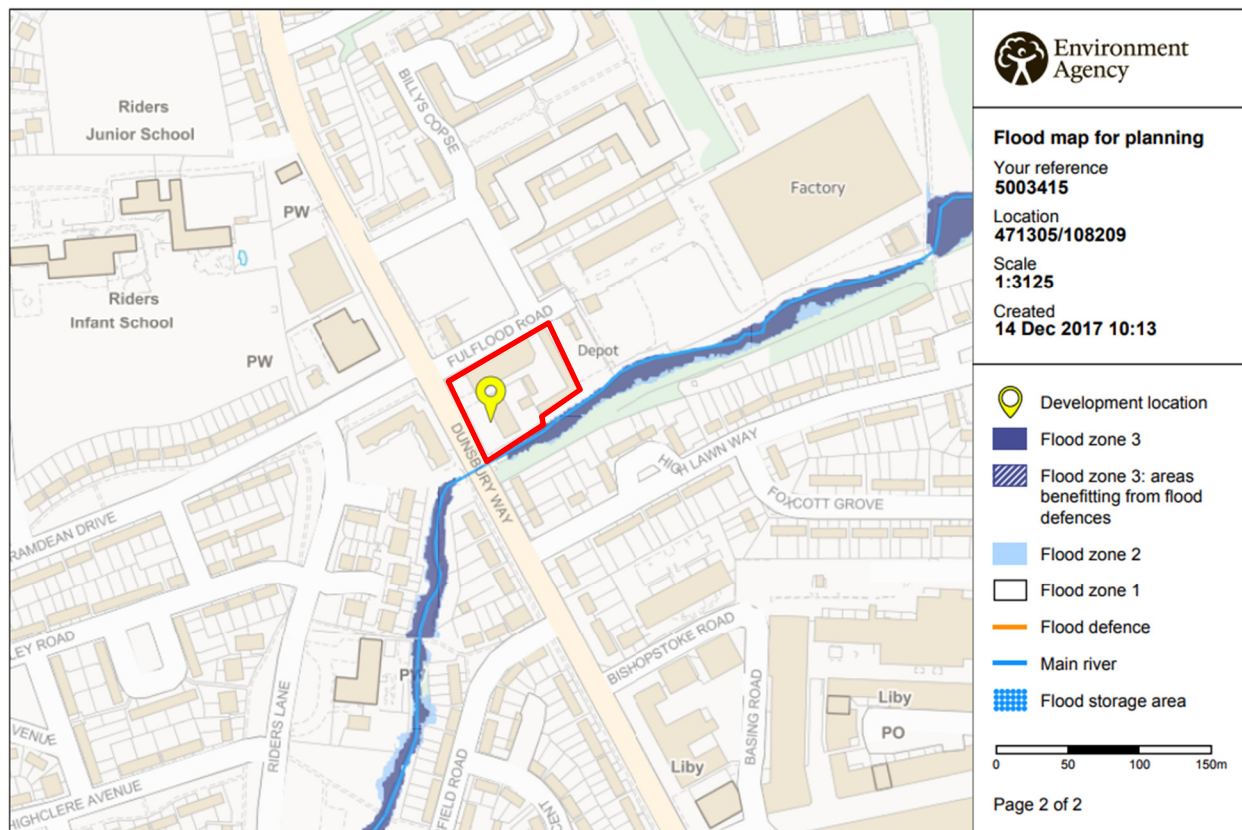


Figure 3: Flood Zone Mapping <https://flood-map-for-planning.service.gov.uk/summary/471305/108209>

- 3.2.4. According to the Partnership for Urban South Hampshire (PUSH) flood maps, refer to Figure 4, the site will be within a flood zone in 100 years' time in 2115.
- 3.2.5. The site level is approximately 3m above the water level of the adjacent waterway, 1.4m above the 1 in 100-year flood level and 1.1m above the 1 in 1000-year flood level in accordance with the flood levels were provided by the Environment Agency, refer to Appendix D. The PUSH maps which take into account climate change, show that the flood is within the flood zone, refer to Figure 4. Flood levels have not been provided and therefore we cannot quantify this. However, with our experience as the site is over a metre above the 1 in 1000-year flood level, it is highly unlikely that the influence of climate change will cause such an increase in flood level, and therefore unlikely that the site will flood from fluvial sources.

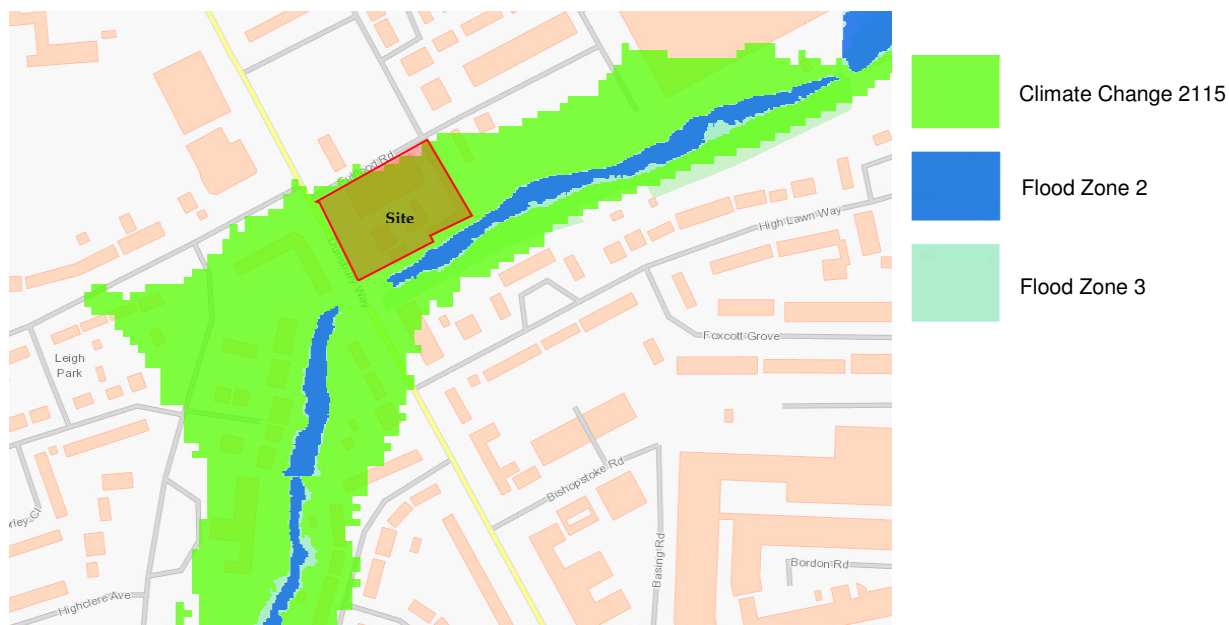


Figure 4: PUSH Flood Map Climate Change 2115

3.3 SURFACE WATER FLOODING

- 3.3.1. Surface water flooding occurs as the result of an inability of intense rainfall, or overland flows, to infiltrate to ground. This often happens when the maximum soil infiltration rate or storage capacity is reached. Such flows either drain into existing land drainage features or follow the general topography which can concentrate flows and lead to localised ponding/flooding.
- 3.3.2. The Environment Agency Surface Water Flooding Map, refer to Figure 5, shows that the majority of the site at a very low risk of flooding from this source. A 'very low' risk is associated with a $\leq 0.1\%$ AEP, equivalent to the 1 in $\geq 1,000$ -year return period of surface water flooding. However, there are spots on the site that are at low risk from flooding from surface water. A 'low' risk is associated with a 0.1% and 1% AEP, equivalent to between a 1 in 1000 and 1 in 100-year return period of surface water flooding.
- 3.3.3. Onsite measures will be undertaken to mitigate the risk of surface water flooding, such as raising finished floor levels above surrounding ground levels and sloping ground away from the building towards Riders Stream.

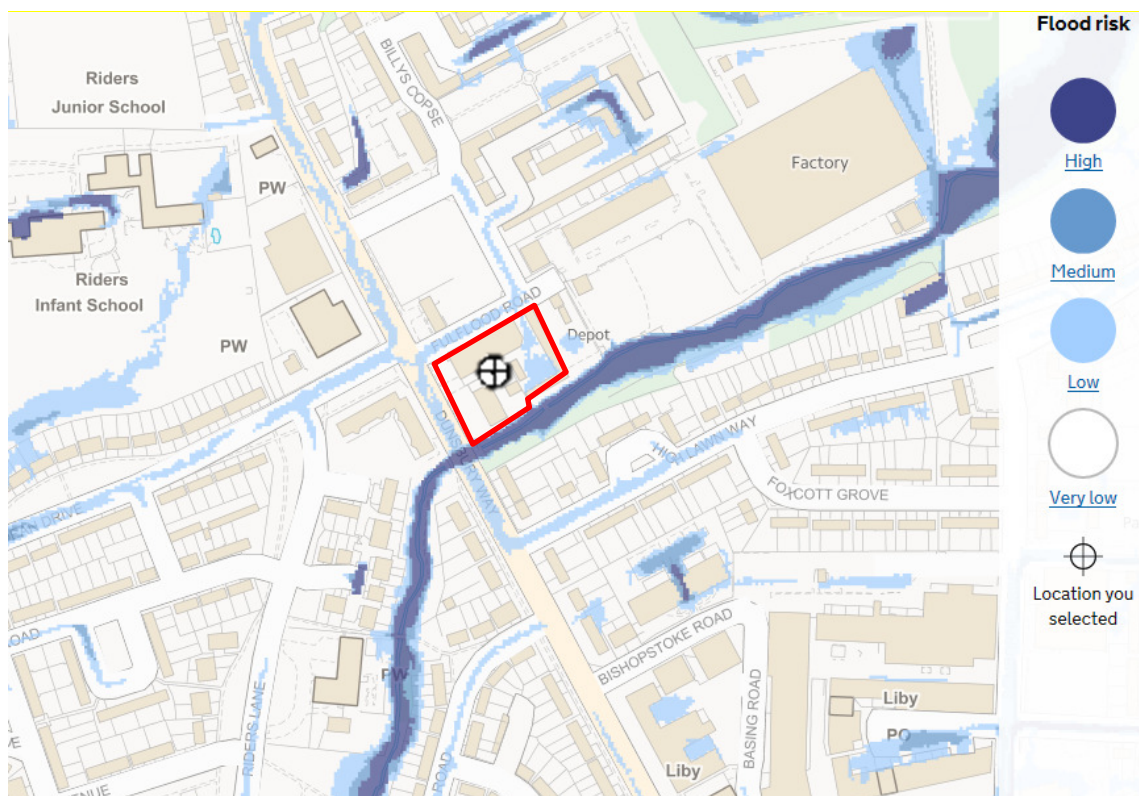


Figure 5: Surface Water Flooding Map

3.4 GROUNDWATER FLOODING

- 3.4.1. Groundwater flooding occurs when periods of abnormally high rainfall results in the emergence of groundwater at the ground surface, causing damage to property and infrastructure. Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).
- 3.4.2. BGS suggests, based on the underlying geology, that the site lies within 50m of an area that is susceptible to clearwater flooding. To establish the true risk of groundwater flooding to the proposed site, it is recommended that further site investigation, such as borehole water monitoring, is undertaken to confirm underlying geology and monitor the groundwater levels. It is important to monitor the groundwater for as long a period of time as possible to take into account the seasonal effects.
- 3.4.3. Onsite measures may be required to mitigate the risk of groundwater flooding, further to additional ground investigation.

3.5 SEWER FLOODING

- 3.5.1. South Hampshire Integrated Water Management Strategy suggest that the age, capacity and condition of the existing sewers, particularly in Portsmouth where surface water drains into a combined sewer, often lead to incidents of hydraulic overload. The Southern Water network adjacent to the site is not combined, therefore the risk of flooding is low.

3.6 INFRASTRUCTURE FAILURE FLOODING

- 3.6.1. The Environment Agency reservoir flooding map indicates that there is no flood risk from reservoirs. Therefore, the risk of flooding from reservoirs can be discounted.

- 3.6.2. There are no nearby canals, therefore the risk of flooding from canals can be discounted.

3.7 HISTORIC FLOODING

- 3.7.1. There have been reports of problems with leaves blocking the grills protecting the culvert which runs underneath Dunsbury Way. These are maintained by the EA, and there is a maintenance schedule in place. There are no other reports of historic flooding around this site.

4. NATIONAL PLANNING POLICY FRAMEWORK REQUIREMENTS

4.1 SEQUENTIAL TEST

- 4.1.1. The National Planning Policy Framework (NPPF) Sequential Test requires that a sequential approach is followed to steer new development to areas with the lowest probability of flooding (i.e. Flood Zone 1, then 2, then 3).
- 4.1.2. The proposed residential development is considered 'more vulnerable' with respect to flood risk. The site is indicated to be within Flood Zone 1 (low risk) and at a low to moderate risk from all other sources. More vulnerable development is considered appropriate in Flood Zone 1 and accordingly, the proposals meet the requirements of the Sequential Test.

4.2 EXCEPTION TEST

- 4.2.1. A NPPF Exception Test (GOV.UK (B), Point 7) requires that a Proposed Development provides wider sustainability benefits to the community that outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.
- 4.2.2. The Proposed Development has been demonstrated to pass the sequential test and an exception test is not explicitly required. Further consideration has however been made to ensure these conditions are met as far as practicable.

4.3 FLOOD RESISTANCE & RESILIENCE

- 4.3.1. A small area of the site is considered to be at a low risk of surface water flooding within the specific area. It is recommended that the finished floor levels (FFLs) are set at a level that is above the 1 in 100-year plus 40% climate change and that surrounding ground slopes away to a level 150mm below building FFLs at the site. **Appendix G**, drainage strategy, shows the surface water path ways in relation the proposed development layout.
- 4.3.2. This will ensure any surface water flooding or design exceedance flows, should they occur, are directed away from any buildings (in line with best practice). The surface water management strategy in Section 5.0 will manage the rainfall run-off accordingly.

5. SURFACE WATER MANAGEMENT

5.1 EXISTING SURFACE WATER DRAINAGE

- 5.1.1. From a visual inspection onsite and the topographical survey, the existing private surface water drainage is assumed to outfall directly into Riders Stream, this outfall has an invert level of 12.25mAOD.



Figure 6: Existing outfall to Riders Stream

- 5.1.2. A CCTV survey to check the condition of the existing network is recommended.

5.2 THE LEAD LOCAL FLOOD AUTHORITY

- 5.2.1. The lead local flood authority for this site is:

Hampshire County Council.
The Castle
Winchester
SO23 8UJ

5.3 THE WATER AUTHORITY

5.3.1. The water authority for this site is:

Southern Water
Southern House
Sparrowgrove
Otterbourne
Winchester
SO21 2SW

5.4 BUILDING REGULATIONS

5.4.1. All surface water and foul water drainage will be designed in accordance with the regulations set out in Part H of the Building Regulations 2015 and that of Sewers for Adoption 7th Edition.

5.5 PROPOSED SW DRAINAGE STRATEGY

5.5.1. The design of this drainage strategy will follow current philosophies and guidance contained within the SuDs Manual (CIRIA C753), which as much as possible, will be based around the following:

- Using surface water runoff as a resource
- Managing rainwater close to where it falls
- Managing runoff on the surface
- Allowing rainwater to soak into the ground
- Promoting evapotranspiration
- Slowing and storing runoff to mimic natural runoff characteristics
- Reducing contamination of runoff through pollution prevention and controlling the runoff at source
- Treating runoff to reduce the risk of urban contaminants causing environmental pollution

5.5.2. The proposed drainage strategy can be viewed in Appendix F. It is based upon the following:

DRAINAGE TYPE	MANAGEMENT STRATEGY	APPROVING AUTHORITY
Surface water from properties: Option 1	Discharge to Riders Stream via new connection. Store the 1 in 30-year storm event plus 40% CC underground and the 1 in 100-year event plus 40% CC above ground in the carpark.	Environment Agency
Surface water from properties: Option 2	Discharge to Riders Stream via new connection. Store the 1 in 30-year storm event plus 40% CC underground.	Environment Agency
Surface water from properties: Option 3	Discharge to Public Sewer	Water Authority

Table 4: Surface Water Drainage Strategy Summary Table

5.6 SURFACE WATER FROM PROPERTIES

- 5.6.1. Surface water run-off captured from roofs, building hardstanding areas and private parking spaces will be conveyed by gravity to the outfall. The flow will be controlled to greenfield runoff rate, 7.4 l/s (1 in 100-year storm event plus 40% Climate Change (CC)), and the excess flow will be attenuated in cellular storage underneath the carpark, refer to Appendix F for the Drainage Strategy. The system will be designed to contain the run-off generated by a critical storm from a 1 in 100-year return period plus 40% CC onsite. The storage onsite will either take the 1 in 30-year storm plus 40% CC, or 1 in 100-year storm plus 40% CC underground. This is subject to client requirements.
- 5.6.2. The hierarchy for surface water discharge in Building Regulations Part H goes infiltration, watercourse and last sewer, outfall to Riders Stream via a new connection is our preferred option. It is assumed that infiltration is not suitable on this site due to a presumed high groundwater table. Further testing onsite could be done to validate this presumption. In the case that discharge to Riders Stream is not possible, then the surface water would then be discharged to the public sewer at greenfield runoff rate, 7.4 l/s. This would be subject to a S106 agreement with Southern Water and a capacity check.

- 5.6.3. The proposed outfall is to have a minimum level of 13.023, as this is the 1 in 100-year flood level. If the proposed outfall is set lower than this, then additional storage would need to be provided to take into account the period of time that the flood level is above the outfall. This is because during this time the site will not be able to discharge into the stream.
- 5.6.4. Some form of propriety system should be used to treat the runoff from the external hardstanding area. This will be using SuDS principles to treat runoff to reduce the risk of urban contaminants causing environmental pollution.

The EA Guidance, Flood Risk Assessments: Climate Change Allowances states:

APPLIES ACROSS ALL OF ENGLAND	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2020S' (2015 TO 2039)	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2050S' (2040 TO 2069)	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2080S' (2070 TO 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

Table 5: EA Guidance Climate Change Allowances

- 5.6.5. The design life of the proposed buildings is 100 years. The proposed surface water sewer will need to be designed to accommodate 1 in 100-year storm event plus an additional 40% for climate change.

5.7 DESIGNING FOR EXCEEDANCE

- 5.7.1. The proposed site levels are to provide a slope away from the proposed building. The proposed site levels are also to be designed in such a way that any exceedance flows flow across the site into the adjacent waterway, Riders Stream. This will not cause an increase in risk to people or property.

5.8 MAINTENANCE

- 5.8.1. All SuDS designed elements will come with a maintenance schedule as suggested within the SUDS Manual CIRIA C753. Refer to Table 6 for cellular soakaway and proprietary system maintenance considerations.

MAINTENANCE	CELLULAR SOAKAWAY	PROPRIETARY RUN-OFF TREATMENT SYSTEM
REGULAR		
Inspection	■	■
Litter & Debris removal (Including oil and grease removal in the proprietary system)	■	■
Grass Cutting	■	
Weed & Invasive Plant Control	□	
OCCASIONAL		
Remove sediment and debris (Including oil, grease and floatables removal in the proprietary system)	□	□
Change the Filter Media		□
REMEDIAL		
Reconstruct Soakaway	□	
Replace Malfunctioning Parts		□

■ = Will be required

□ = May be required

Table 6: Maintenance Considerations SuDS Systems

6. FOUL WATER MANAGEMENT

6.1 EXISTING FOUL WATER DRAINAGE

- 6.1.1. The existing private foul water network of the site is unknown.
- 6.1.2. There is an existing Southern Water 225Ø Vitriified Clay (VC) foul water sewer to the north of the site, a 225Ø VC foul water sewer to the west of the site and 300Ø VC foul water sewer to the south of the site. Refer to Appendix G.
- 6.1.3. A CCTV survey to check the condition of the existing network would be recommended.

6.2 PROPOSED FOUL WATER DRAINAGE

- 6.2.1. The development will generate a foul water discharge of 4.3 l/s. This is based on 4,000 litres (l) per dwelling per day, (Sewers for Adoption 7th Edition B5.1.1). 92 dwellings, $92 \times 4,000 = 368,000$ l/day, 86,400 seconds/day, $368,000 / 86,400 = 4.3$ l/s.
- 6.2.2. The proposed drainage strategy can be viewed in Appendix F. It is based upon the following:

Drainage type	Management strategy	Approving Authority
Foul Water from properties: Option 1	Discharge to Public Sewer via existing connection.	Water Authority
Foul Water from properties: Option 2	Discharge to Public Sewer via new connection.	Water Authority

Table 7: Foul Water Drainage Strategy Summary Table

- 6.2.3. Option 1 would be to discharge to the public sewer via the existing connection. This would be subject to an indirect S106 with Southern Water and a capacity check.
- 6.2.4. Option 2 would be to discharge to the public sewer via a new connection. The foul water sewer that runs along the southern edge of the proposed site would be the preferred location for such a connection. The invert level of this sewer ranges between 13.15mAOD and 12.37mAOD. This would be subject to a S106 agreement with Southern Water and a capacity check.

7. CONCLUSIONS

7.1 FLOOD RISK

7.1.1. There is moderate risk of flooding from groundwater. Further testing, such as groundwater monitoring is recommended to determine the level of risk from groundwater flooding.

7.1.2. There is low risk from other sources.

7.2 SURFACE WATER MANAGEMENT

7.2.1. The surface water will be attenuated back to greenfield, thus providing betterment. The surface water network will be designed to either hold the 1 in 30-year storm plus 40% CC, or 1 in 100-year storm plus 40% CC underground (dependant of client requirements). The preferred outfall is Riders Stream via either a new outfall, however if this is not possible then a connection to the public sewer would be required.

7.2.2. An environmental permit from the EA is required for any works taking place within 8m of the top of bank of a main river.

7.2.3. SuDS principals will be used to improve the quality of the surface water run-off.

7.2.4. Exceedance flows, storms greater than 1 in 100-year plus climate change, will flow overland across the site and into Riders Stream, thus minimising risk to people and property. The proposed levels of the site will drain away from the proposed buildings and the site will slope towards the adjacent stream.

7.3 FOUL WATER MANAGEMENT

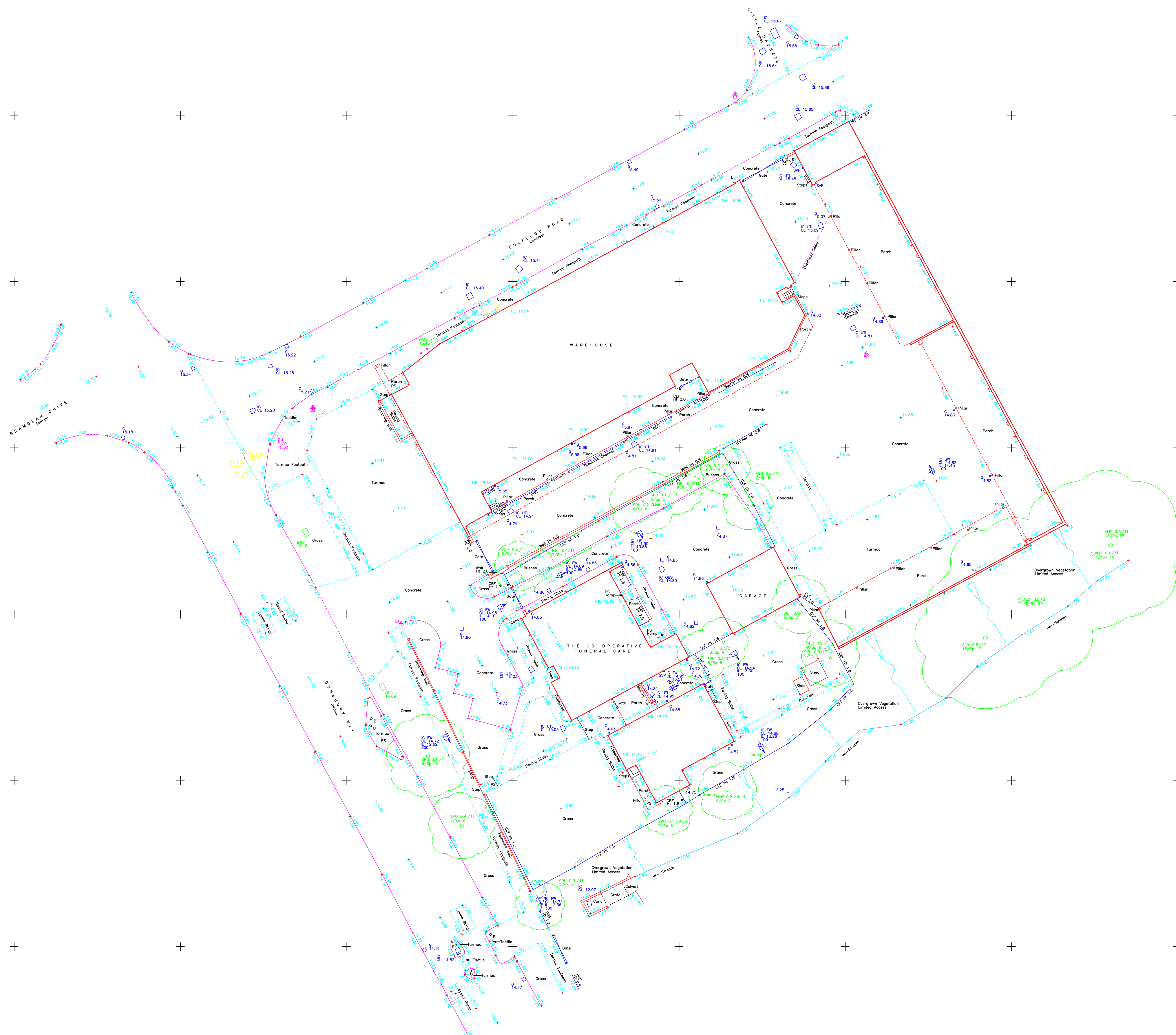
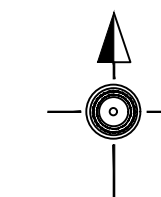
7.3.1. The foul water is proposed to discharge to the existing Southern Water manhole. This is subject to network capacity and a S106 agreement with Southern Water.

REFERENCES

- Sewers for Adoption 7th Edition (2015)
- Gov.uk National Planning Policy Framework (NPPF – July 2018)
- The Suds Manual C753 Nov 2015
- Environment Agency – online flood mapping
- Groundsure Geo Insight Report, Reference: GS-3817576, Dated 20/04/2017
- www.gov.uk/guidance/flood-risk-activities-environmental-permits

8. APPENDIX A

8.1 Topographical Survey

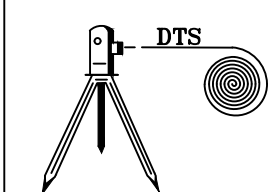
[illegible]

STATION SCHEDULE				
STN NO	EASTINGS	NORTHINGS	HEIGHT	
01	471326.747	108262.554	15.669	
02	471275.940	108244.878	15.387	
03	471286.543	108216.840	14.788	
50	471342.507	108211.309	14.878	
REMARKS				
Insert levels, pipe sizes and pipe connections have surveyed by visual inspection only and therefore complete accuracy of this information can be				
NORTHPOINT				
The survey grid is related to OSN202 and has been by using GPS receivers.				
LEVELS				
Levels are related to OSBM2 and have been obtained using GPS receivers.				

DRAINAGE
Invert levels, pipe sizes and pipe connections have been surveyed by visual inspection only and therefore the complete accuracy of this information cannot be guaranteed

NORTHPOINT
The survey grid is related to OSTN02 and has been fixed by using GPS receivers.

LEVELS are related to OSGM02 and have been obtained by using GPS receivers.



Digital Terrain Surveys LLP	
Land Survey Partnership	
Client	The Southern Co-operative
Location	Dunsbury Way Havant Hampshire
Type of Survey	Site Survey
Plotted Scale 1:200 @ A0	Date April 2017
Ref No DTS280417-SW1	Q A Checked PH/LH
Drawing Number 1 of 1	Revision