

**BONHAMS, FLANSHAM, FELPHAM,
WEST SUSSEX PO22 8NP**

RESIDENTIAL DEVELOPMENT

Flood Risk Assessment

Prepared on Behalf of

Pallant Homes Ltd

2017/D1298/FRA1.4

28 March 2018



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SK100 Site Location Plan
SK101 LiDAR Contours
SK102 LiDAR Banding
SK200 Impermeable Areas Comparison
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Appendix A Architects Layout GA
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Appendix C BGS Historic Borehole Records (SU90SE27)
Appendix D WSCC Flood Risk Mapping and WSCC Highways
Appendix E Microdrainage/Run-off Calculations
Appendix F WSCC Correspondence

1 INTRODUCTION

1.1 Background

- 1.1.1 RGP Design Ltd (RGP) is instructed by Pallant Homes Ltd. to prepare a Site-Specific Flood Risk Assessment (FRA) to support a planning application for a residential development at Bonhams, Flansham, Felpham, West Sussex PO22 8NP
- 1.1.2 This FRA has been undertaken in accordance with Planning Practice Guidance: Flood Risk and Coastal Change (FRCC) and National Planning Policy Framework Section 10.
- 1.1.3 The proposed development will involve the construction of 10 residential units along with associated areas of hard and soft landscaping, included within **Appendix A**.
- 1.1.4 In preparing this report, RGP has made reference to the following documents and information:
- Environment Agency Flood Maps for Planning
 - Long Term Flood Risk Assessment Surface Water Flood Risk Maps
 - Long Term Flood Risk Assessment Reservoir Flood Risk Maps
 - Local Authorities Strategic Flood Risk Assessment
 - West Sussex County Council Drainage Records
 - Topographical Survey
 - LiDAR data
 - British Geological Survey & Report
- 1.1.5 This FRA has been prepared to assess if the proposed development is suitable for the site and confirms if mitigation is required to ensure that flood risk is not increased and that the proposed development remains safe during its design life.
- 1.1.6 This report has been prepared for the benefit of the named Client only.

1.2 Site Location and Description

- 1.2.1 The site is located on the Southern side of Hoe Lane, Flansham. The site is currently accessible via Hoe Lane off the A259. The A259 runs both East and Westbound to the Southern boundary of the site.
- 1.2.2 The site is located approximately 2.41km inland and lies approximately 4km from Bognor Regis, 13km from Chichester, 21km from Worthing, 39km from Portsmouth and 43km from Brighton.
- 1.2.3 The site lies at approximately 3.12m AOD to 2.01m AOD and falls from south to north.

- 1.2.4 There are no main rivers recognised within the vicinity of the site, however there is an existing watercourse which runs from West to East at the Northern boundary of the site. WSCC also confirm that the site once had historic ditches running around most of its boundaries, as well as an historic watercourse running North to South across the site.
- 1.2.5 The site is currently an undeveloped greenfield site, adjacent to land occupied by two existing properties, Bonhams and Flints.
- 1.2.6 The overall site area is 1.16Ha as shown on drawing **SK200**.
- 1.2.7 The existing impermeable area is 265m² (0.03Ha) as also shown on drawing **SK200**.

1.3 Ground Conditions

- 1.3.1 An intrusive geotechnical study has **not** been undertaken for the site, meaning precise infiltration testing results are not available. Furthermore, as a direct result it has not been possible to ascertain or determine the level of Groundwater, as Groundwater monitoring has not been conducted.
- 1.3.2 An historical borehole exists to the North East of the site (SU90SE27) as confirmed by BGS (**Appendix C**), with a recorded depth of 6.2m. At the time of the survey (October 1981), topsoil was recorded as being 400mm deep, with 'Brick earth' consisting of clay, silty, brown mottled grey-brown soil (2.40m thick), 'Raised Beach Deposits' consisting of silt, very sandy, chalky with chalk pebbles soil (1.9m thick) and 'Upper Chalk' (soft, weather at top) soil (1.50m thick) also contributing towards the overall recorded geological composition of the site.
- 1.3.3 With reference to the borehole mentioned in **1.3.2**, where the surface level was recorded as being 3.70m AOD, water was experienced during excavation works 800mm below the surface (2.90m AOD).
- 1.3.4 Information available from the BGS provides an indication as to the bedrock geology associated with the site. It is believed that the soil consists of Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation and Culver Chalk Forma. This, to a certain extent, is supported by the information available from the historical boring conducted in site, as mentioned in 1.3.2.
- 1.3.5 Superficial deposits are reported by the BGS as being River Terrace Deposits (undifferentiated) – Sand, Silt, and Clay.
- 1.3.6 The site is not located in a groundwater source protection zone and is outside of any groundwater vulnerability zones.

1.4 Existing Drainage

- 1.4.1 The existing drainage systems have been identified by reviewing the topographic survey along with statutory records obtained from the local Water Authority, Southern Water.
- 1.4.2 Surface Water:
 - The public sewer records (**Appendix B**) show there are no public or private Surface Water sewers within the vicinity of the site. It is believed that the site currently drains to the existing watercourse(s) located along the Southern and Northern edge of carriageway in Hoe Lane via an Outfall, at the Northern extent of the site.

- The run-off from the site is naturally drained partially by infiltration but mostly by overland flow to the existing watercourse beyond the northern boundary.
- Greenfield runoff rate (Q_{bar}) has been calculated to be 4.2l/s ($Q_1=3.5l/s$, $Q_{30}=9.4l/s$ and $Q_{100} = 13.3l/s$).
- The Greenfield run-off volume is calculated to be 272.719m³ (Based on FEH, SPR of 37.00%).

1.4.3 Foul Water:

- The public sewer records (**Appendix B**) show there is an existing Foul Water Pumped Rising Main crossing the centre of the site, running from the West to the East.
- Although not included in the public sewer records, it has been confirmed that the Pumped Rising Main material is Ductile Iron and is 600mm dia. in size.
- Upon exiting the site via the Eastern boundary, the Pumped Rising Main then diverts in a North-Easterly direction.
- The existing buildings on site are understood to connect to the existing public foul water sewer which runs from East to West along the centre of Hoe Lane. The size and depth of the sewer is not recorded in the public sewer records.

1.4.4 Highway Drainage:

- Hoe Lane is drained by traditional road gullies, the outfall of which falls 'over the edge' into the existing watercourse(s).
- The A259 is also drained by traditional road gullies which discharge into an existing swale/pond system which was recently installed with the new relief road. It is understood that this has been designed to account for a 100 year return.

2 PROBABILITY

2.1 Sources of Information

2.1.1 The NPPF requires that all sources of flooding are considered being Tidal, Fluvial, Pluvial, Groundwater, Sewers and man-made reservoirs/canals.

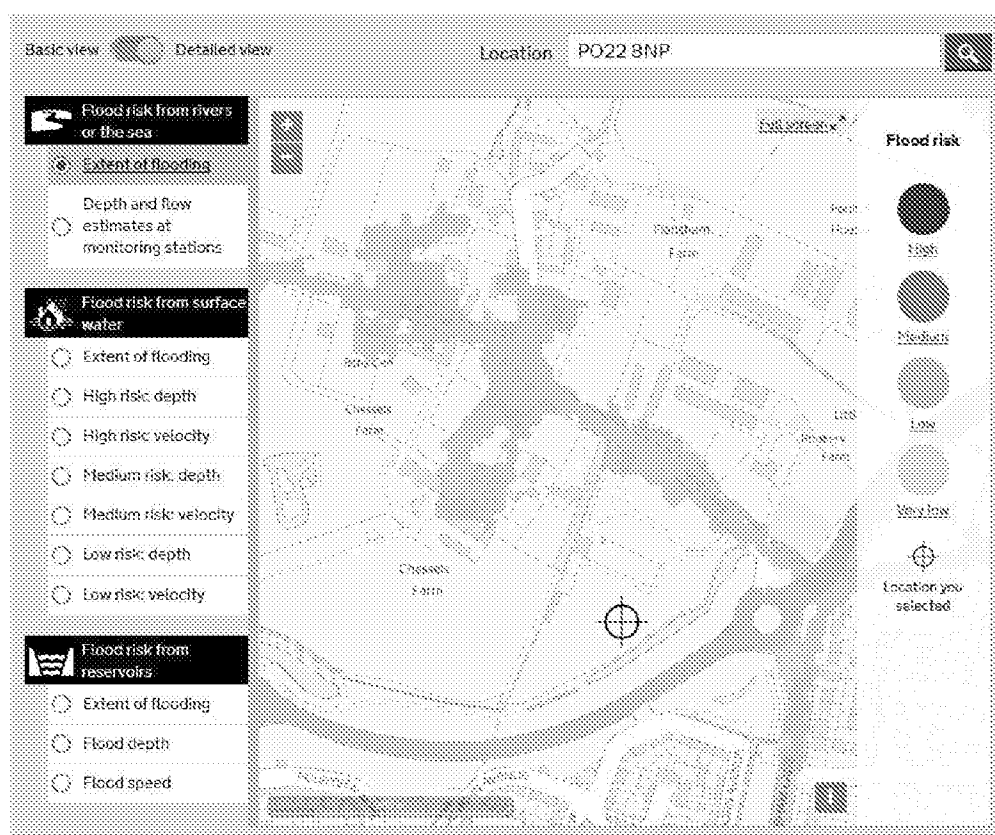
2.1.2 The likelihood of the site flooding has been established by reviewing the following information:

- Environment Agency Flood Maps for Planning
- Long Term Flood Risk Assessment Surface Water Flood Risk Maps
- Long Term Flood Risk Assessment Reservoir Flood Risk Maps
- Local Authorities Strategic Flood Risk Assessment
- Consultation with Local Authority/Lead Local Flood Authority
- Topographic Survey
- LiDAR Data

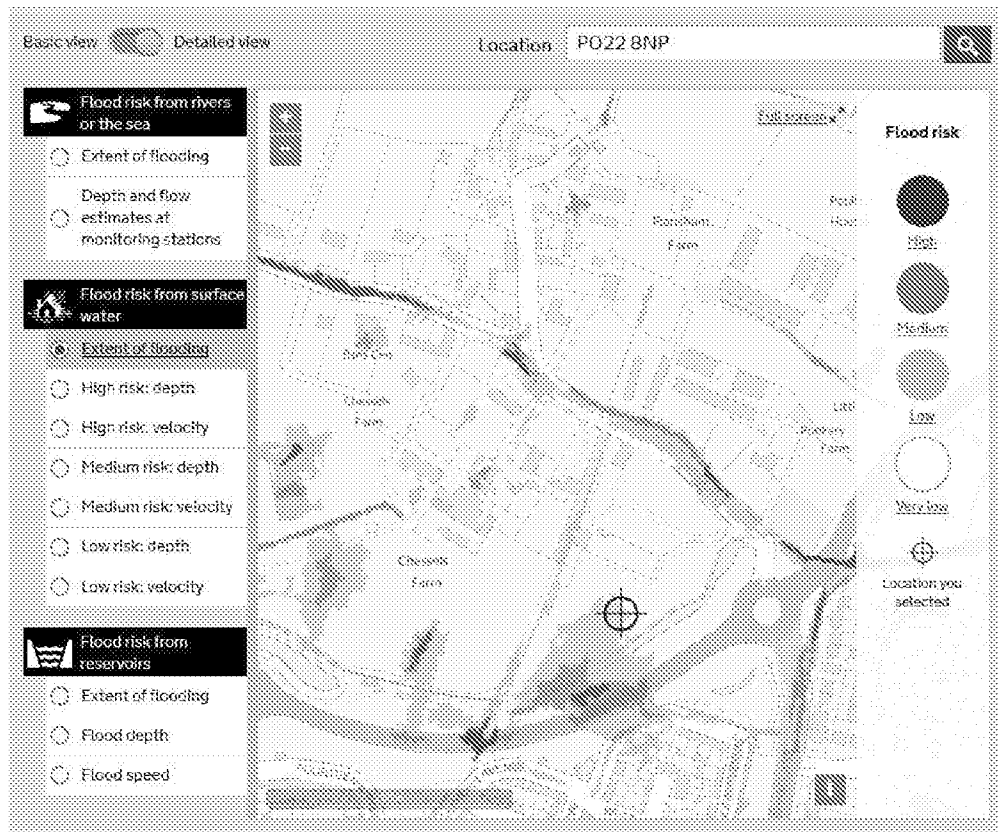
2.2 Flood Maps and Modelling

2.2.1 The Environment Agency's on-line Flood Maps for Planning (rivers and sea) show that the site is located fully within Flood Zone 1, as demonstrated below. This is also confirmed by information and mapping obtained from West Sussex County Council. The Northern boundary of the site is highlighted as being an area which may be susceptible to low risk of flooding from rivers and sea, owing to the existence of the watercourse which runs along this boundary edge.

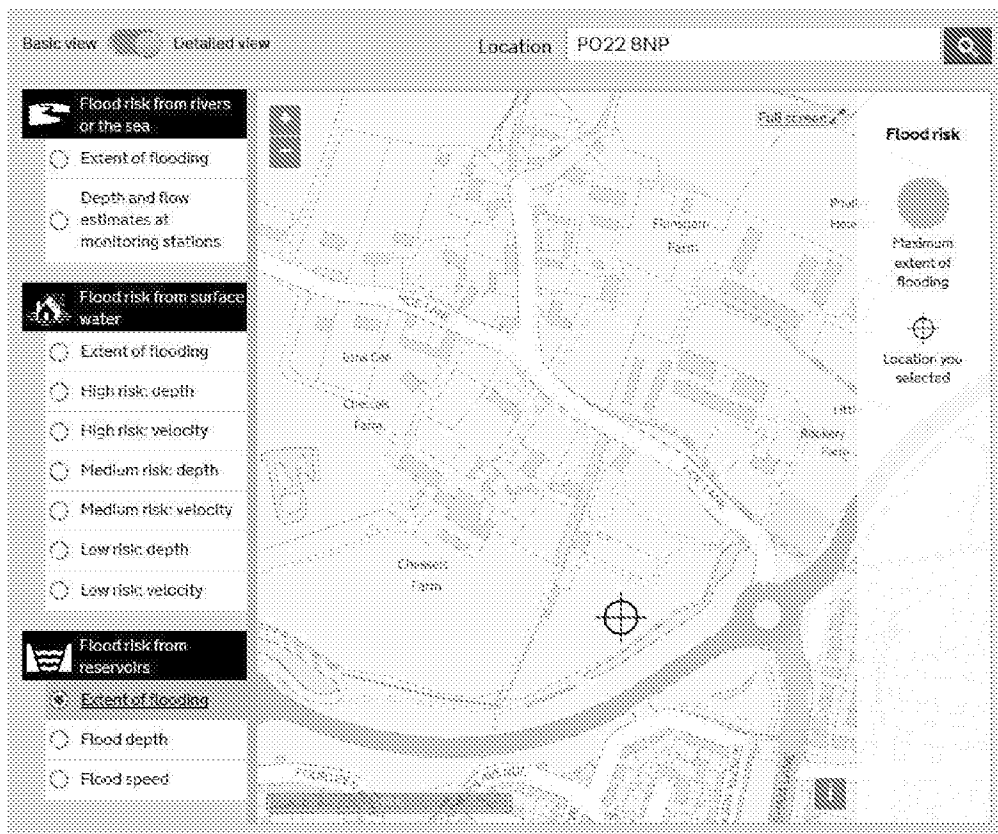
Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)



2.2.2 The Long-Term Flood Risk Map for Surface Water show that the site is at low risk of surface water flooding. An area at the Southern extent of the site appears to be the area of the site most susceptible to this type of flooding, should such an event occur.



2.2.3 The Flood Maps for Reservoirs (gov.uk) show that the site is not at risk from this source.



- 2.2.4 WSCC have confirmed that ESI Groundwater Mapping shows that the north-east section of the site is at moderate to low risk of ground water flooding.
- 2.2.5 The south-east section of the site is at high risk of Groundwater flooding.
- 2.2.6 Overall, the site has a low susceptibility rating for Groundwater flooding.

2.3 Strategic Flood Risk Assessment

- 2.3.1 The site falls within the boundaries of West Sussex County Council (WSCC).
- 2.3.2 West Sussex County Council has published a Local Flood Risk Assessment, covering 2013-2018 which has been approved by the Environment Agency. This document does not specifically reference the site. Flood mapping and information obtained from West Sussex County Council is consistent with other flood maps reviewed and detailed within this report.

2.4 Historic Flooding

- 2.4.1 As confirmed by WSCC (**Appendix F**), an event of historical flooding was recorded within close vicinity of the site. The area adjacent to the site, including Hoe Lane and the A259 has flooded in the past, prior to the completion of the relief road, which has seen improved drainage and flood risk management systems installed as part of the overall design.
- 2.4.2 WSCC has confirmed that they are not aware of any historical flooding within the confines of the site.
- 2.4.3 Furthermore, WSCC has specified that they are not aware of any existing flood alleviation and defences in the area surrounding the site, nor are there any proposed in the near future.
- 2.4.4 The new relief road has been designed for 100-year return period plus climate change to mitigate against potential flood risk.

2.5 Summary of Flood Risk

- 2.5.1 WSCC's Flood Risk Management Team has provided a letter response confirming no recorded events have affected the site. WSCC has also confirmed the site is 'Flood Zone 1'.

Source of Flooding	Level of Risk
Rivers and Watercourses	Low
The Sea	Very Low
Surface Water	Low
Groundwater	Low
Sewers (*)	Very Low
Artificial Sources	None

3 PROPOSED DEVELOPMENT

3.1 Description of Development

3.1.1 The development comprises the construction of 10 dwellings with access and estate roads, along with associated areas of hard and soft landscaping.

3.1.2 The type of development falls within the More Vulnerable classification (Flood Risk and Coastal Change Table 2) and is compatible with Flood Zones 1 and 2 (Flood Risk and Coastal Change Table 3).

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test Required	✓	✓	✓
Flood Zone 3a†	Exception Test Required †	✗	✓	✓	✓
Flood Zone 3b*	Exceptions Test Required *	✗	✗	✗	✓✗
✓ = Development is appropriate ✗ = Development should not be permitted					

3.1.3 The proposed development encompasses the entire site and has an impermeable area of approximately 3,797m², compared to 265m² in its current use. This is demonstrated as per drawing **SK200**.

3.1.4 The proposed site layout is shown on drawing **17-071_003_A (Appendix A)** prepared by MH Architects.

4 PROPOSED DRAINAGE STRATEGY

4.1 Surface Water

4.1.1 The SUDS manual and Building Regulations set out a hierarchy of drainage methods to ensure that developments maximise the use of sustainable drainage techniques. The hierarchy favours infiltration methods of disposal over other methods such as watercourse and sewers, as detailed below;

- i. Utilise infiltration techniques
- ii. Attenuate rainwater in ponds or open water features for gradual release
- iii. Attenuate rainwater by storing in tanks or sealed water features for gradual release
- iv. Discharge rainwater direct to a watercourse
- v. Discharge rainwater to a surface water sewer/drain
- vi. Discharge rainwater to a combined sewer

SUDS Technique	Suitable	Comments
Living Roof	Yes	No initial constraints.
Basins and Ponds	Yes	No current constraints exist limiting the use of such measures, although anticipated 'land take' should be considered
- Constructed Wetlands		
- Balancing Ponds		
- Detention Basins		
- Retention Ponds	Yes	
Filter strips and swales	Yes	There are no current constraints which would limit the use of such techniques, although potential 'land take' should be considered.
Infiltration Devices	No	Although a site specific geotechnical investigation has not been undertaken to confirm precise infiltration rates and underlying geological conditions, it is believed that the soils will not be conducive of allowing infiltration methods and techniques to be implemented. This should be confirmed following on-site investigation however.
- Soakaways		
- Infiltration trenches and basins		

Permeable surfaces and filter drains		Whilst such measures could be implemented, owing to the anticipated low rates of infiltration offered by the site, it is unlikely that sufficient levels of infiltration will be achieved in order to benefit the site from a drainage perspective.
- Gravelled areas	Yes	
- Solid paving blocks	Yes	
Porous paviers	Yes	
Tanked systems		No initial constraints.
Oversized pipes	Yes	
Cellular tanks	Yes	

4.1.2 As a result of the proposed development, the impermeable area(s) on the site will increase by 3532m² (from 265m² to 3797m²), leading to a potential increase of surface water run-off. This will, however, be mitigated against through the utilisation of SuDS techniques as detailed above, as well as in the drainage strategy outlined as per drawing **SK300**.

4.1.3 As discussed in section 1.3, the soil underlying the site is expected to have low infiltration potential; therefore, the surface water drainage strategy should use alternative methods for disposal of surface water run-off, giving consideration to the existing overland flow routes available.

4.1.4 The proposed surface water drainage system should comprise flow restriction and surface water storage to ensure that the rate of run-off leaving the site is no more than the existing situation. The following flow rates should be applied to the design:

- Q-Bar Rural = 4.2l/s
- Q-Bar Urban = 4.2l/s
- 1 year return period = 3.5l/s
- 30 year return period = 9.4l/s
- 100 year return period = 13.3l/s

4.1.5 Surface water run-off will be discharged to the existing watercourse at a restricted rate with storage provided in the sub-base of the tanked porous paving. Roof water can be discharged into the sub-base layer(s) of the porous paving where possible. A new Surface Water outfall is proposed at the North of the site, discharging into the existing watercourse on the North boundary, subject to land drainage consent. It is proposed that the flow control device restricts the discharge to a minimum of 4.2l/s (Q-Bar).

4.1.6 The strategy above will ensure that there is no increase in the rate of run-off leaving the site, therefore no increase in the risk of flooding from this source.

4.1.7 The drainage strategy is shown on drawing **SK300**.

4.2 Treatment

- 4.2.1 The use of porous paving will ensure that the run-off from the road receives a level of treatment that meets the requirement of the SUDS Manual due to naturally occurring microbes digesting Hydrocarbons entering the system and the filtration effects of the aggregates and geotextiles.
- 4.2.2 Impermeable hard stand areas will be drained by trapped road gullies and/or channel with a sump providing a basic level of treatment by collecting silts and oil pollutants. Catchpits will also be provided to collect silts and oil pollutants.
- 4.2.3 The CIRIA SUDS Manual C753 outlines three categories of pollution hazard identification for the various types of land use as follows:
- Total Suspended Solids (TSS).
 - Metals (M).
 - Hydrocarbons (H).
- 4.2.4 In accordance with C753 table 26.2 the proposed land uses at the site are categorised as follows:
- Residential Roofs - very low/TSS-0.2/M-0.2/H-0.05.
 - For other impermeable surfaces - low/TSS-0.5/M-0.4/H-0.4.
- 4.2.5 In accordance with C753 table 26.3 to establish whether a proposed surface water management technique can provide sufficient treatment for runoff, the values are compared. If the treatment score for each pollutant category is higher than the pollution score, then the chosen technique is sufficient. If a single technique is not judged to provide enough treatment, then other techniques can be added to the system.
- 4.2.6 The treatment afforded by the proposed outline surface water management strategy has been assessed based on the following components:
- Permeable pavement – TSS-0.7/M-0.6/H-0.7

4.2.7 In conclusion, the proposed porous pavement can be considered to provide sufficient treatment.

4.3 Foul Water Drainage

- 4.3.1 The site General Arrangement has been designed to cater for the arterial sewer protection strips.
- 4.3.2 It is proposed to connect the proposed development to the existing public foul water sewer located in the centre of Hoe Lane, subject to confirmation of its levels.
- 4.3.3 Based on the residual design guidance provided in Sewers for Adoption, the proposed foul flow will be in the region of 0.46l/s or 4,000 l/day.

4.4 Climate Change

- 4.4.1 NPPF sets out percentage increases to be applied to the peak rainfall intensity values used in the design of a surface water drainage system to allow for the effects of climate change.
- 4.4.2 In accordance with NPPF 'climate change allowances' update 12th April 2016, an increase of 20% should be applied for this development and a review should be undertaken to determine the impact of an increase of 40%. This has been applied to relevant calculations.
- 4.4.3 The available flood maps and the SFRA suggest that the effects of climate change will not affect the flood zone in which the site lies.

5 RESIDUAL RISK AND MITIGATION

5.1 Residual Risk

- 5.1.1 As discussed in Section 2, the site is low risk of flooding from all sources therefore there is no residual risk of flooding.

5.2 Mitigation

- 5.2.1 As discussed in Section 2 the site is at low risk of flooding from all sources therefore no mitigation is proposed.

6 SEQUENTIAL AND EXCEPTION TESTS

6.1 Sequential Test

- 6.1.1 The site is in Flood Zone 1 and is at the lowest risk of flooding. In view of this, the application of the sequential test is not required.
- 6.1.2 Although as established in 6.1.1 that the sequential test is not required – as the site falls fully within Flood Zone 1, the site arrangement has been set out sequentially in order to minimise the risk of potential flooding from the sources detailed within **Section 2.5 - Summary of Flood Risk**.

6.2 Exception Test

- 6.2.1 Table 3 within Paragraph 067 of Flood Risk and Coastal Change confirms that developments classified as "More Vulnerable" are suitable for Zones 1 & 2. The proposed development is in Zone 1 and therefore an exception test is not required.

7 FLOOD RISK MANAGEMENT

7.1 Safe Access and Egress

- 7.1.1 The proposed development falls entirely within Flood Zone 1 and is expected to remain in that zone throughout its design life.
- 7.1.2 The site is confirmed as being at low risk of surface water flooding and, in view of such, the risk of access and egress being affected by flooding is low.

7.2 Flood Warning

- 7.2.1 The site is at low risk of flooding therefore there is no requirement for a Flood Plan or warning system to be implemented.

7.3 Maintenance

- 7.3.1 Maintenance plays an important part in the long-term performance of a surface water drainage system and will be required to ensure that it remains fully operational.
- 7.3.2 Whilst the drainage system has been designed to operate with as little maintenance as possible, there are key operations that must regularly be undertaken to ensure that it remains in optimal condition, most of which are general housekeeping tasks that should be undertaken for any drainage system, but with additional attention to the catchpits upstream of the flow control devices and the permeable paving. These operations are summarised below together with recommended frequencies:
- Periodic desilting of catchpits, gully sumps and channel drains. These should be emptied at least as follows (but with an annual inspection and additional cleansing if required): On completion of drainage works, Year 1, Year 3, then every 5 years. The desilting of these items are required to ensure the Hydrobrake flow control device operates as per the design and does not become blocked.
 - Periodic jetting or rodding of pipework as required to clear blockages.
 - Gratings on any gullies and channel drains to be kept clear of debris.
 - Any manufacturer specific requirements for maintenance (i.e. for the Hydrobrake) should be added to the periodic maintenance.

Permeable Paving / Diffuser Units

- The areas of permeable paving are designed to allow infiltration of surface water run-off through the joints in the block paving surface course and into the subbase below. The water is then collected and discharged into the positive drainage system as the system is tanked.
- As part of the permeable paving system, diffuser units are used to discharge surface water run-off from roof areas into the subbase, as well as forming links between areas of permeable paving. These diffuser units are small heavy duty cellular units which allow more efficient discharge of surface water into the subbase base of the permeable paved areas.
- The areas of permeable paving will require additional maintenance measures to ensure they operate as designed. Failure to carry out this maintenance could increase the risk of flooding. The additional measures are as follow:
- Periodic surface sweeping to reduce silt and debris accumulation. The permeable surfaces should be swept at least every 8 to 12 weeks with additional sweeps in the autumn to clear fallen leaves.
- Removal / management of weed growth, as required. Typically, once or twice a year for regularly used areas.
- Periodic silt removal from permeable surfaces as described by the manufacturer. If any areas are showing signs of ponding, they shall be dealt with by raking out the joints and redressing. The entire surface shall be monitored and when there are signs of excessive siltation resulting in poor drainage over the whole area, the blocks shall be taken up and a replacement of bedding layer and geotextile shall be undertaken.
- Redressing of joints on the block paving as required.
- Catchpits upstream of diffuser units, should be emptied and inspected on the same regime as all catchpits specified previously set out in this document.

Hydrobrake (Flow Control Chamber)

- A Hydrobrake flow control system is self-activating, relying on upstream hydraulic head to generate an air-filled vortex within the centre of the casing. Once the vortex is initiated water drains down through a small opening in the back of the device at the designed restricted flow rate.
- The flow control device has two measures encase of emergency (i.e. blockage). The first is a door situated in the front of the unit itself, this can be operated from the surface by a release cable situated just under the manhole cover which closes under its own weight and does not require any mechanism to operate. The second is a high-level overflow pipe situated with the flow control manhole. Both measures allow the system to drain down freely, until the blockage can be cleared.
- The Hydrobrake flow control chambers will require additional maintenance measures to ensure it operates as designed. The additional measures are as follow:
- The sump within the flow control chamber should be monitored for build-up of silts and should be emptied as a minimum on the same regime as specified for catchpits previously within this document.
- The drain down door located on the centre of the unit will require inspection and opening annually, to ensure it is operating as intended.

Remedial/Repair Actions

- Significant storm events may cause significant damage to SuDS. As such it may be necessary to inspect and carry out essential recovery works to return the feature to full working order.
- Resetting of uneven blocks by lifting block area, removing bedding material and relaying to match original design.

Accidental Spillages

- It is not envisaged that any materials are to be stored onsite once the development is completed, which could cause major spills and potential pollution issues within the drainage system. If this situation alters in the future a specialist will be required to be contacted to confirm if any upgrades to the existing system are required.
- Minor spillages of fuels and oils from motor vehicles will be dealt with by the permeable paving and deep trapped gullies, by biodegrading / collecting the hydrocarbons respectively.

Future Alterations to the Development

- Any future alterations to the permeable paving should be confirmed by a specialist. Where possible any future services are to avoid being located through areas of permeable paving. If new services are required to run through areas of permeable paving, services should be installed below the permeable paving level with the permeable system reinstalled above.

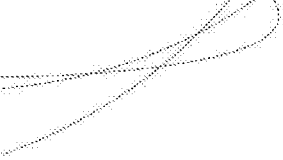
7.3.3 It is recommended that a simple maintenance strategy is prepared by monitoring the proposed drainage system over a specific duration to establish the rate at which silt builds up, which can then inform a programme of regular works.

8 OFFSITE IMPACTS

- 8.1.1 The proposed development will not have an impact on flooding issues off-site.
- 8.1.2 There will be no increase in the rate of run-off leaving the site and no significant impact to the existing water courses.
- 8.1.3 There will be no adverse impact on overland flood flow routes because the proposals will follow the existing general topography (falls from south to north).
- 8.1.4 The effects of climate change should be considered in the design of the proposed surface water drainage system, to ensure there is no off-site impact.

9 SUMMARY

- 9.1.1 This site-specific flood risk assessment is based on Flood Maps, the Local Authority's Strategic Flood Risk Assessment, Topographical Survey data, LiDAR and Public Sewer Records.
- 9.1.2 The site is currently an undeveloped greenfield site, adjacent to land occupied by two properties, Bonhams and Flints.
- 9.1.3 The site is approximately 1.16Ha in size and lies at approximately 3.12m to 2.01m AOD, sloping from south to north.
- 9.1.4 The existing impermeable area is 0.03ha and will increase to 0.38Ha because of the development.
- 9.1.5 The site lies within Flood Zone 1 and it is expected to remain in that zone for the duration of the development's life expectancy.
- 9.1.6 The run-off from the site is naturally drained, partially by infiltration, but mostly by overland flow to the existing watercourse along the northern boundary.
- 9.1.7 The wastewater from the proposed development will require a new connection to the public foul sewer located to the North of the site, in Hoe Lane.
- 9.1.8 The proposed drainage system will be designed to accommodate a 1 in 100-year critical design storm and cater for the effects of climate change by including a 20% increase in peak rainfall intensity. The impact of a 40% increase will be assessed.
- 9.1.9 There will be an increase in the rate of run-off generated by the site which will be dealt with using SUDS techniques within the boundary of the site ensuring that there is no impact offsite.
- 9.1.10 Following completion of the development the flood risk both on and off the site will remain unchanged
- 9.1.11 Application of the Sequential Test and Exception Test is not required.
- 9.1.12 A maintenance regime should be established to ensure the long-term effectiveness of the surface water drainage system.
- 9.1.13 In conclusion, from a flood risk point of view the proposed development is suitable.



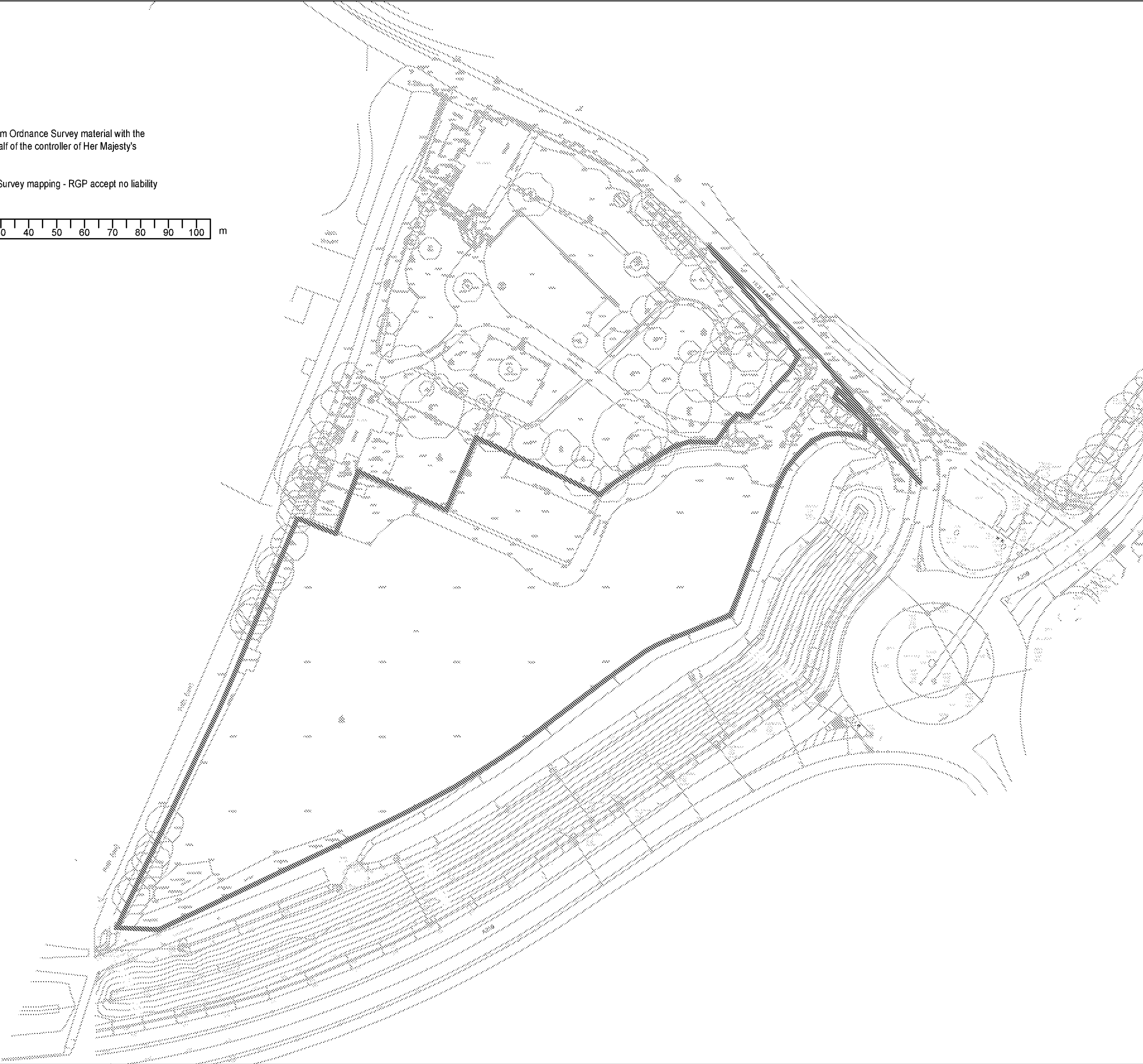
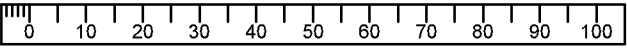
DRAWINGS



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1:1000@ A1
1:2000@ A3



NOTES

A3

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4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain.

-KEY-

 Site Boundary - 1.16ha

A	27/03/2018	Revised Site Boundary	SPB
-	10/05/2017	Original Issue	SPB
Rev	Date	Amendments	Drawn



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Metro House, Northgate, Chichester, West Sussex, PO19 1BE
Tel: 01243 210418 Fax: 01483 861682 www.rgp.co.uk

Client

Pallant Homes Limited

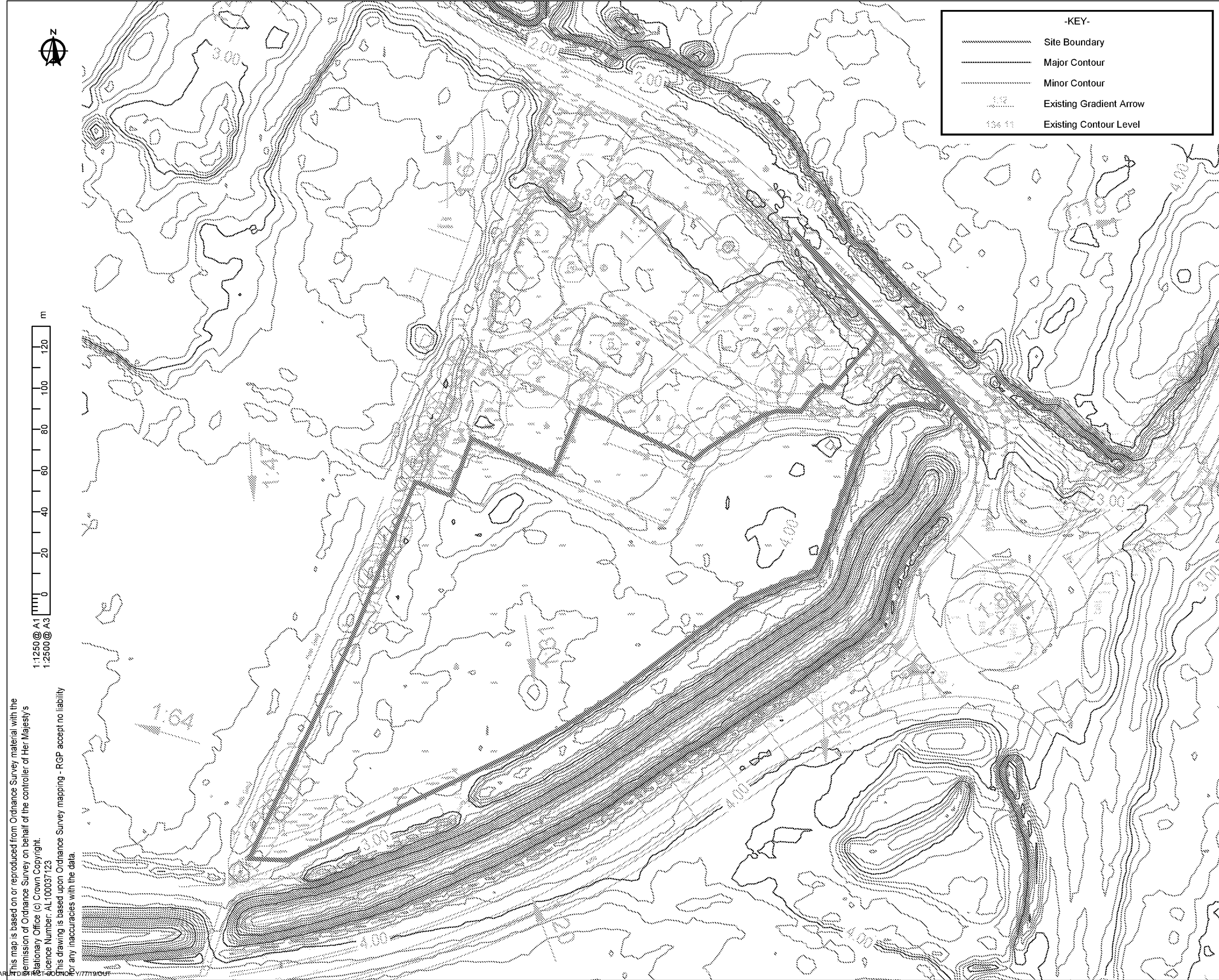
Project

Bonhams, Flansham,
Felpham, West Sussex PO22 8NP

Drawing Title

Site Location Plan

Scale	1:1000	Drawn By	SPB	Checked By	MJA	Approved By	MJA
Date	March 2018	Drawing No.	2017/D1298/SK100		Rev.	A	



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-KEY-	
	Site Boundary
	Major Contour
	Minor Contour
	Existing Gradient Arrow
	Existing Contour Level

NOTES

A3

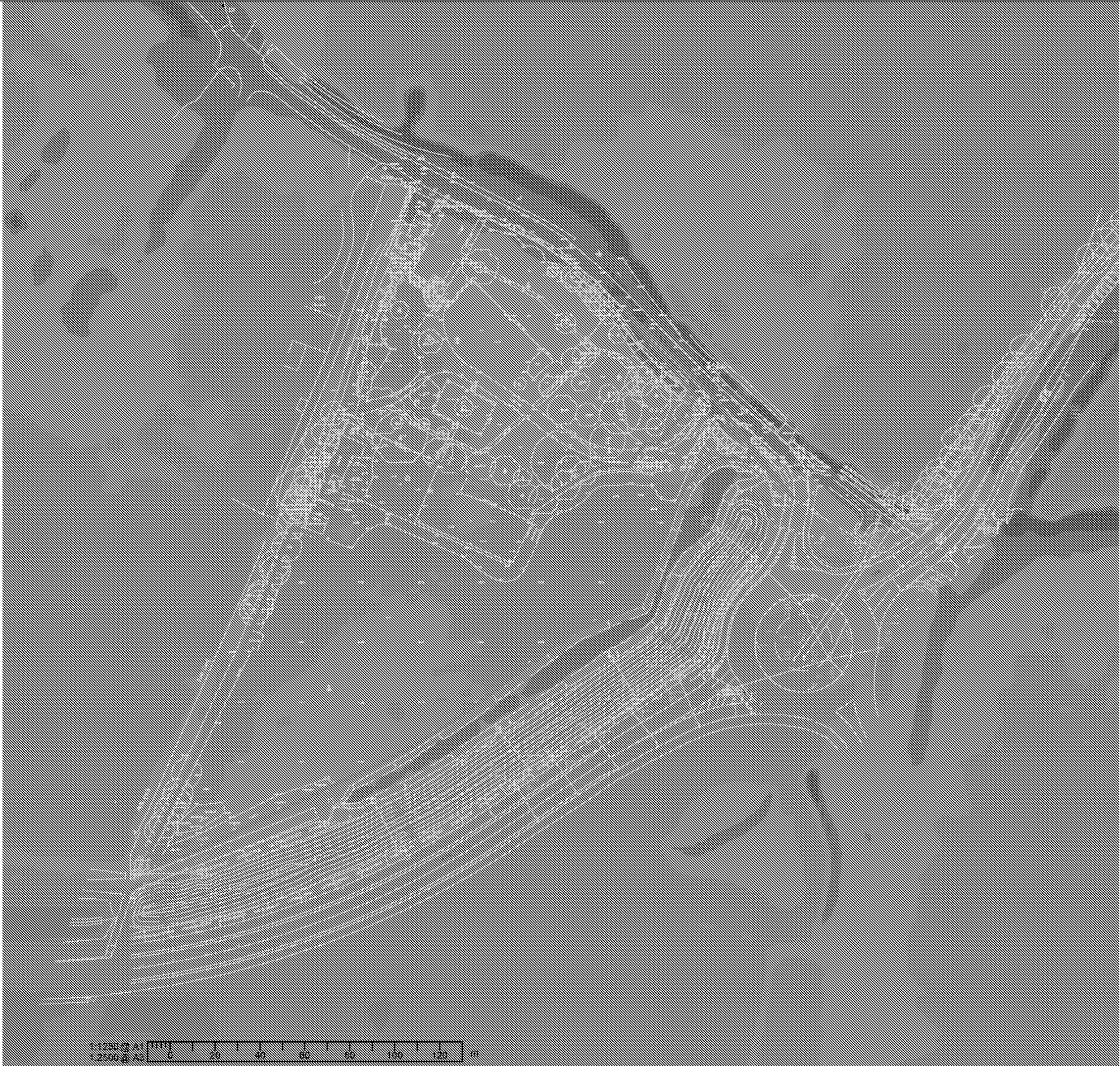
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Rev	Date	Amendments	Drawn
A	27/03/2016	Revised Site Boundary	SPB
-	17/05/2017	Original Issue	SPB
 Transport Planning and Infrastructure Design Consultants Metro House, Northgate, Chichester, West Sussex, PO19 1BE Tel: 01243 210418 Fax: 01483 861682 www.rgp.co.uk			
Client Pallant Homes Limited			
Project Bonhams, Flansham, Felpham, West Sussex PO22 8NP			
Drawing Title LIDAR Contours			
Scale	1:1250	Drawn By SPB	Checked By MJA
Date	March 2018	Approved By MJA	Rev. A



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ARUN DISTRICT COUNCIL 17/77/19/OUT



NOTES

A3

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SURFACE LEVEL DATA

NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR
1	0.00	0.50	
2	0.50	1.00	
3	1.00	1.50	
4	1.50	2.00	
5	2.00	2.50	
6	2.50	3.00	
7	3.00	3.50	
8	3.50	4.00	
9	4.00	4.50	
10	4.50	5.00	
11	5.00	5.50	
12	5.50	6.00	
13	6.00	6.50	
14	6.50	7.00	

-KEY-

Site Boundary - 1.16ha

A	27/03/2016	Revised Site Boundary	SPB
-	17/05/2017	Original Issue	SPB
Rev	Date	Amendments	Drawn



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Client

Pallant Homes Limited

Project
Bonhams, Flansham,
Felpham, West Sussex PO22 8NP

Drawing Title
LiDAR Banding

Scale	1:1250	Drawn By	SPB	Checked By	MJA	Approved By	MJA
Date	March 2018	Drawing No.	2017/D1298/SK102	Rev.	A		



NOTES

A3

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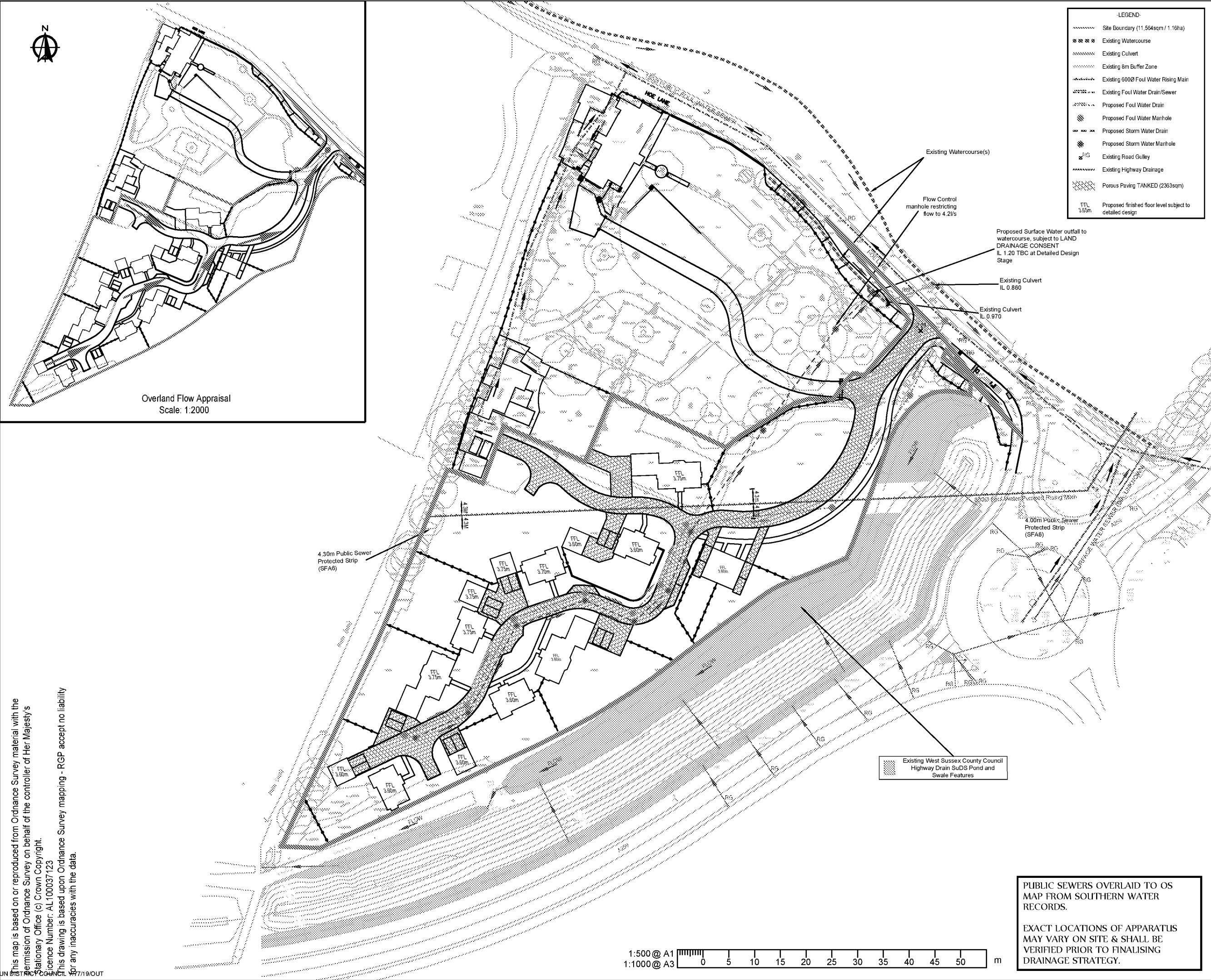
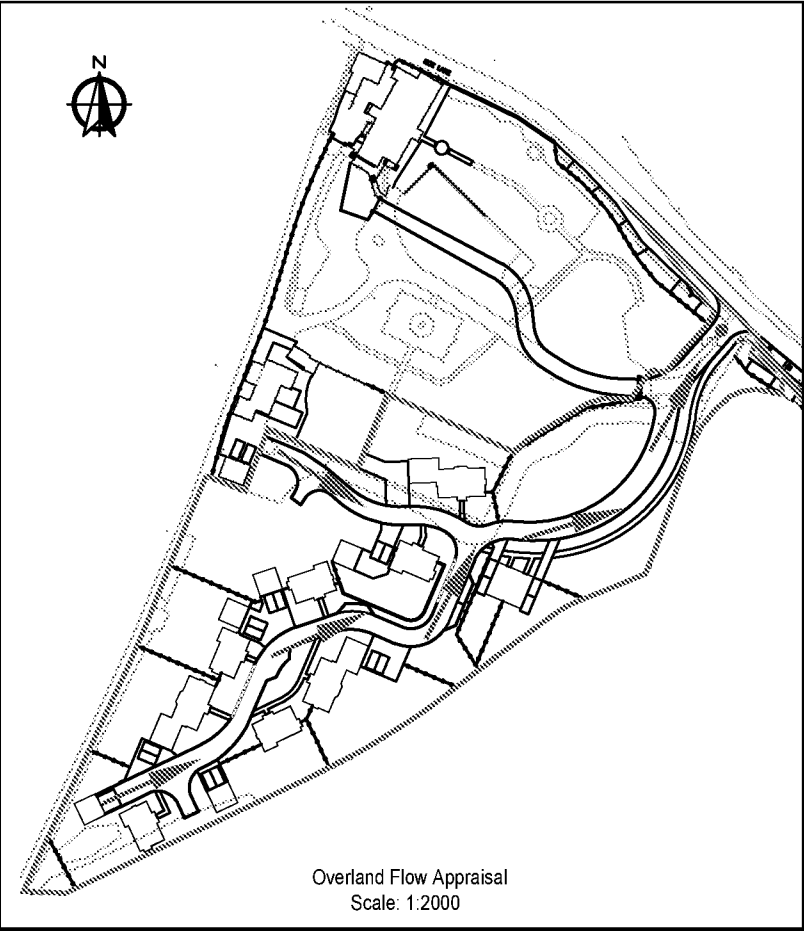
C	27/03/2016	Revised Architect's Layout	SPB
B	23/11/2017	Revised Architect's Layout	SPB
A	05/06/2017	Revised Architect's Layout	SPB
-	15/05/2017	Original Issue	SPB
Rev	Date	Amendments	Drawn

Transport Planning and Infrastructure Design Consultants
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Client
Pallant Homes Limited

Project
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Felpham, West Sussex PO22 8NP

Drawing Title
Impermeable Areas Comparison

Scale 1:1250	Drawn By SPB	Checked By MJA	Approved By MJA
Date March 2018	Drawing No. 2017/D1298/SK200	Rev. C	



-LEGEND-	
	Site Boundary (11,564sqm / 1.16ha)
	Existing Watercourse
	Existing Culvert
	Existing 8m Buffer Zone
	Existing 6000 Foul Water Rising Main
	Existing Foul Water Drain/Sewer
	Proposed Foul Water Drain
	Proposed Foul Water Manhole
	Proposed Storm Water Drain
	Proposed Storm Water Manhole
	Existing Road Gully
	Existing Highway Drainage
	Porous Paving TANKED (2363sqm)
	F.F.L. 3.65m
	Proposed finished floor level subject to detailed design

NOTES

1.

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4.

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C	27/03/2018	Revised Architect's Layout	SPB
B	22/11/2017	Revised Architect's Layout	SPB
A	05/06/2017	Revised Architect's Layout	SPB
-	17/05/2017	Original Issue	SPB

Rev	Date	Amendments	Drawn

Southport Planning and Infrastructure Design Consultants

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Tel: 01243 210418 Fax: 01483 861682 www.rgp.co.uk

Client

Pallant Homes Limited

Project

Bonhams, Flansham,
Felpham, West Sussex PO22 8NP

Drawing Title

Proposed Drainage Strategy

Scale	1:1000	Drawn By	SPB	Checked By	MJA	Approved By	MJA
Date	March 2018	Drawing No.	2017/D1298/SK300	Rev.	C		

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PUBLIC SEWERS OVERLAID TO OS MAP FROM SOUTHERN WATER RECORDS.
EXACT LOCATIONS OF APPARATUS MAY VARY ON SITE & SHALL BE VERIFIED PRIOR TO FINALISING DRAINAGE STRATEGY.

