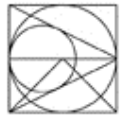




Woods Hardwick

Infrastructure LLP

Civil Engineering Consultants



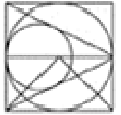
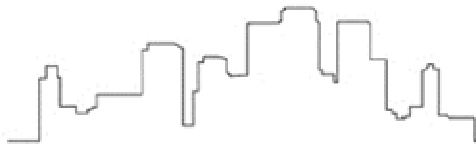
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Flood Risk Assessment Compliance

**For
Camp Road, Upper Heyford
Phase 7b**

March 2017

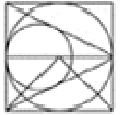
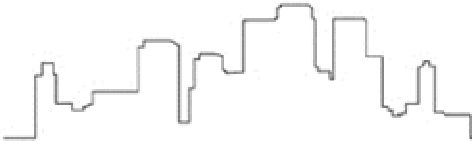


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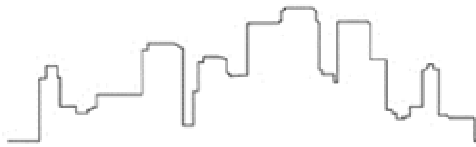
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- Appendix A Residential Parcel Plan
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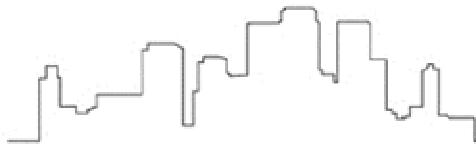
1.0 **Introduction**

- 1.1 This Flood Risk Assessment Compliance report has been prepared on behalf of the Dorchester Group in support of their Reserved Matters application for the new dwellings on phase 7b (formerly the western part of parcel D2d) north of Camp Road, Upper Heyford.
- 1.2 The purpose of this report is to demonstrate that the proposed drainage design complies with the approved Flood Risk Assessment (FRA) carried out by Waterman dated October 2010 (Ref C11234 ES 001).
- 1.3 Refer to the Site Residential Parcel Plan given in **Appendix A**.
- 1.4 This report is intended to assist in the discharge of any planning conditions that requires the developer to demonstrate compliance with the approved FRA.



2.0 Overview of Approved FRA

- 2.1 The entire site is located within Flood Zone 1.
- 2.2 The FRA sets out a detailed approach to attenuation across the Upper Heyford site which comprises of areas identified for retention, areas for refurbishment and areas for redevelopment to provide new residential dwellings.
- 2.3 The Environment Agency (EA) has confirmed that areas identified solely for retention and refurbishment do not require attenuation of existing surface water discharge.
- 2.4 The fundamental principle of the FRA is that runoff from proposed areas of redevelopment should be attenuated to existing 1 in 100 year flows with a 30% allowance for climate change.
- 2.5 Attenuation is to be provided through the use of balancing ponds, permeable paving and attenuation tanks where necessary.
- 2.6 The FRA splits the development into four main catchment areas and provides a series of calculations for each.
- 2.7 The FRA also requires a 10% betterment of existing flows entering the eastern tributary of the Gallos Brook.



3.0 Proposed Development

- 3.1 Phase 7b comprises 9 new dwellings located north of Camp Road, Upper Heyford. Refer to **Appendix B** for proposed layout. Phase 7a (formerly the eastern half of Parcel D2d) is covered by a separate application.
- 3.2 The FRA denotes this development as draining into Catchment Area 3 however following a review of the survey it is understood this area drains into Catchment Area 2.
- 3.3 Extensive intrusive site investigations have been undertaken which covered the entire site. The general ground conditions comprise of layers of silt and clay underlain by weathered limestone bedrock at an average depth of 1.5m.
- 3.4 The Indicative Surface Water Drainage Layout within the approved FRA suggests attenuation of surface water for Catchment 2 can be provided by the use of, attenuation tanks.

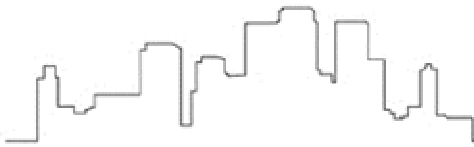
Discharge Strategy

- 3.5 Paragraph 3.20 of the FRA states: "In accordance with PPS25, local policy and EA guidance the rate of surface water runoff from new development would be controlled so that it does not increase over the existing situation for the 1 in 100 year even, while taking climate change into account".
- 3.6 It is proposed to connect the new network, attenuation and flow controls serving the phase to the existing "central" network within Phase 7a upstream of run 1.028 on the proposed calculations. The existing system conveys both existing and new development flows to the central outfall.
- 3.7 The FRA prescribes the following existing 1 in 100 year runoff rates for use in calculations:

Existing 1 in 100yr	Greenfield runoff- 10.7 l/s/ha	Greenfield brownfield- 112.8 l/s/ha
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- 3.8 The purpose of this report is not to revisit the calculation of these rates. Further information on how these rates were derived can be found in the approved FRA.
- 3.9 Following detailed assessment of the topographical survey and site visits the following calculations can be derived:

Phase 7b	
	Flow rate
Existing Impermeable surfacing of 1489m sq	16.8 l/s
Actual rate in pipe 9.001	4.4 l/s



Attenuation Strategy and SUDS elements

- 3.10 The parcels contain attenuation in the form of an underground tank which caters for the additional attenuation required due to the new flow restriction on the outfall from this phase. It will either be maintained by the Water Company or a management company.
- 3.11 Living roofs have been discounted as they are not in keeping with the strict urban planning requirements within a conservation area. Rain water harvesting has also been discounted due to ongoing maintenance issues and integration into domestic plumbing.
- 3.12 The use of porous paving or other infiltration devices have been discounted due to the lack of infiltration.
- 3.13 It is noted that the approved treatments plan for the overall planning layout which dictates the road class and amount of porous paving per phase does not have any requirements for porous paving in this area.

4.0 Hydraulic Performance

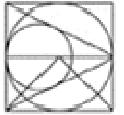
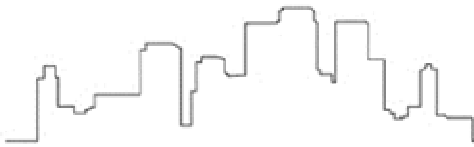
- 4.1 A detailed Microdrainage model has been constructed to simulate the 1 in 100 year storm in both existing and proposed systems (plus climate change post development).
- 4.2 The proposed Microdrainage model (see **Appendix C**) demonstrates that the proposed 1 in 100 year (plus climate change) discharge rate does not exceed the allowable discharge rate.
- 4.3 The achieved discharge rates are significantly lower than the allowable discharge rates.

Exceedance

- 4.3 If an area of the drainage network was to become blocked or in instances where a storm in excess of the designated storm occurs, there is the potential for the storage structures and drainage system to be overwhelmed, leading to flooding. Finished floor levels and external levels have been designed in consideration of these, so that during these periods flood water will be directed away from the proposed building entrances and into the roads and soft landscaping areas.
- 4.4 The existing flood route indicates that water would flow to the south into the existing road network. The proposals do not alter this extreme event flood route, although flooding from on parcel sources for storm events up to and including a 100 year event (plus climate change) have been completely removed.

Pollution prevention

- 4.5 As no parking area is 800m sq or greater, PPG3 states that trapped gullies will provide suitable protection against contamination.
- 4.6 It is noted that the off parcel sewer passes through a petrol interceptor before discharge into the existing watercourse which meets the requirements of PPG3.



Maintenance

- 4.6 Private drainage serving multiple dwellings or located within shared areas will be maintained by the maintenance company.
- 4.7 Adoptable drainage will be maintained by the water company.
- 4.8 SUDS features (such as storage tanks) contributing to the overall drainage strategy will be maintained by the maintenance company.
- 4.9 Refer to "SUDS Maintenance Regime" report dated March 2017 which covers this phase for further details. This document along with relevant designer's risk assessments, calculations and drawings will be made available to the maintenance company.

5.0 Summary and Conclusions

- 5.1 This report has been prepared to allow discharge of any planning conditions which require evidence of compliance with the approved Waterman Flood Risk Assessment.
- 5.2 The FRA confirms no attenuation is required for areas being refurbished or retained.
- 5.3 The FRA requires surface water runoff from new development to be restricted to existing 1 in 100 year runoff rates, and flows attenuated including a 30% allowance for climate change.
- 5.4 A Microdrainage model has been created and the results demonstrate a significant betterment in discharge rates.

APPENDIX A

Residential Parcel Plan

APPENDIX B

Proposed levels and drainage layout

APPENDIX C

Proposed Microdrainage Calculations

Note:	<p>The calculations include the entire network including existing areas outside of this phase. The runs numbers which relate to Trenchard Circle (in the order shown in the calculations) are:</p> <p>9.000 9.001 9.002 9.003</p>
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APPENDIX D

Residual Flooding Masterplan