

Our Ref: 47484/MJD

Your Ref:

18 March 2018

Ms Rackham  
G N Rackham & Sons Limited  
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IP22 1AB

**Email Only**

Dear Ms Rackham

**RE: High Road, Roydon - Flood and Drainage Statement**

We refer to your instructions to consider the flooding and surface water drainage aspects for a potential residential development off High Road, Roydon. The site comprises of greenfield land and is approximately 2.8ha in size. The main access will be off High Road.

Our assessment for assessing the drainage on the site, for land south of High Road, Roydon has been made on the basis of the proposal for approximately 65 dwellings. The topography of the site predominantly falls to the south.

The site is located off the A1066 (High Road) in Roydon with a grid reference of 610181,280128 and an approximate postcode of IP22 5RB. The site is south of existing dwellings with a the egress onto High Road. To the south and east are agricultural fields. Finally, to the west are farm buildings and surrounding land.

The flood risk and drainage assessment overview has been carried out in accordance with the National Planning Policy Framework (NPPF) – Planning Practice Guidance on Flood Risk and Coastal Change, published by the Department for Communities and Local Government (DCLG). Reference is also made to the Norfolk County Council, Lead Local Flood Authority (LLFA) Guidance, dated April 2017.

**Proposed Development**

For the purposes of establishing the likely drainage parameters for the site, the site area of approximately 2.8Ha, with a density of impermeable area at 40% to 50%, will be used to provide a range of necessary water attenuation, Sustainable Drainage Systems (SuDS) and/or storage for the development. Additionally, an area of 10% of the overall site area will be assumed to be highways.

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### **Existing Flood Sources**

When assessing any development site, there are four potential sources of flooding which need to be considered both in terms of their effect on the development itself and its end users and that caused to others. The main sources of flooding that need to be considered are, Fluvial and/or tidal flooding; Ground water impact; Overloading of the existing drainage network and Surface water flooding.

### **Fluvial and Tidal Sources of Flooding**

From investigation of the existing watercourses and the Environment Agency (EA) floodplain maps, there are no identified influences of fluvial or tidal flooding at the site and the site is in Flood Risk Zone 1. The nearest source of flooding is approximately 200m south of the sites southern boundary. Therefore this has not been investigated further.

### **Groundwater Vulnerability**

The EA defines groundwater Source Protection Zone around all major groundwater abstraction points. Source Protection Zones (SPZ) are defined to protect areas of groundwater that are used for potable supply, (including mineral and bottled water) or for use in the production of commercial food and drinks. From EA mapping, the site does not lie in a groundwater source protection zone.

In addition, the Groundwater Vulnerability Zone Maps have been investigated and indicate that the site is predominantly in the medium risk for groundwater vulnerability. Medium areas offer some groundwater protection and are the intermediate between high and low vulnerability. This does not preclude the land from being developed.

### **Existing Surface Water System and Ground Conditions**

Existing sewer records were obtained from Anglian Water to understand what, if any, surface water sewers were present within the vicinity of the site. Surface Water sewers were not found to be present within the vicinity of the site.

The ground conditions that have been obtained via the borehole scans on the British Geological Survey (BGS) website, are described as layers of clay and sands and gravels. Further investigations will be required to determine whether infiltration techniques are feasible but given the sands and gravels recorded at depths of between 1.5m and 5.0m below ground, it is anticipated that infiltration techniques will be possible.

The existing surface water flooding for the 1 in 100 and 1 in 1000 year events have been investigated and indicate a very small amount of surface water flooding in the south west corner of the site. This will not preclude development of the site. Consideration to this area of the site is to be kept clear of development and managed for potential exceedance events. Any new systems of drainage should consider the flow from the site and suitable SuDS to accommodate storage requirements before discharging into the ground.

### **Flood Risk Impact**

It has been determined using the Ordnance Survey level information available, that surface water runoff from the site will occur in a southerly direction. A proportion of rainfall falling across the existing site will likely infiltrate into the soils of the site given the current ground conditions.

To determine the rainfall data for the site when undertaking the detail design, the Flood Estimation Handbook (FEH) data would normally be used however to provide an indication of the drainage parameter of the site the Rainfall Studies Report rainfall (FSR) has been used at this preliminary stage.

### **Soil Types and SuDS Suitability**

The NPPF and appropriate guidance indicates that the Flood Risk Assessment should identify the risks of flooding and manage those risks to ensure the site remains safe. One way to manage the flood risk is to incorporate SuDS within proposals for new sites. There is a general requirement that SuDS be installed where appropriate, in order to limit the amount of surface water runoff entering drainage systems and to return surface water into the ground to follow its natural drainage path. This advice is also replicated in the SuDS Manual C753 (2015) and also LLFA guidance.

The details of the ground conditions have yet to be determined through a full ground investigation but advice on the use of SuDS/soakaways is such that they are likely to be used.

### **SuDS Assessment and Flood Risk Management**

The suitability of the use of SuDS on the site is based on the criteria as set out in the Ciria document C753 dated November 2015, where in Chapter 26 the appropriateness of SuDS can be established. It is therefore suggested that the following would apply for draining various parts of the site;

- Private Drives – Permeable paving and to soakaway if needed.
- Residential Roofs – Through permeable paving to soakaways
- Highways – To infiltration basin, pond/wetland or swales

A surface water strategy is therefore proposed to utilise the permeable paving and soakaways for the drives and private roof areas and swales and/or infiltration basins for the highway water for events up to the 1 in 100 year storm event, plus climate change at 40%. This strategy is based on the SuDS management train as favourable soakage rates are likely.

Having determined that the soils across the site do possess sufficient infiltration capacity for the use of infiltration devices, the methods of surface water disposal have been shown to be have been investigated.

### **Summary**

It can be seen from the indicative ground conditions taken from the ground investigation via the BGS that infiltration techniques are likely to be suitable at depths between 1.5m and 5.0m. Further intrusive investigations are required in order to determine the infiltration parameters.

The strategy will have to be agreed with the LLFA, but, with above ground storage, permeable paving and soakaways, the strategy is in accordance with National and Local planning policy.

Sufficient land must be set aside for accommodating the soakaways, swales, ponds and/or infiltration basins, which will be included within the outline masterplan for the site. Pollution control can be achieved via permeable paving for the private drives and swales or ponds for the highways.

**Summary Table for Flood Risk and Surface Water Drainage**

Matters	Comment	Satisfactory	Needs some Upgrade	Not Satisfactory
Flood Risk Zone	The site is in Flood Risk Zone 1. Suitable for residential development			
High Risk Surface Water Flooding	There are no existing surface water flooding issues of High Risk			
Medium Risk Surface Water Flooding	There are no existing surface water flooding issues of Medium Risk which cannot be mitigated or included within the development boundary.			
Low Risk Surface Water Flooding	There are no existing surface water flooding issues of Low Risk which cannot be accommodated within the development drainage strategy.			
Groundwater Protection	There are no local Groundwater Protection Zones and Groundwater Vulnerability risk is medium, which is all satisfactory to allow development to take place on the site.			
Proposed Surface Water Drainage	The proposals will conform to the SuDS Manual and LLFA guidance for use of permeable paving, soakaways and infiltration ponds which are dependent upon a detailed site investigation to determine if infiltration devices could be used onsite, but is likely given the currently public local borehole information.			

In conclusion, the site is suitable for development where the proposed dwellings can be placed outside of any flood areas and surface water drainage from the development can be adequately managed in accordance with National and Local Planning policy, so not to cause a detrimental effect downstream.

I trust the foregoing is satisfactory but if we can be of any further assistance, please do not hesitate to contact us.

Yours sincerely

Martin Doughty BEng (Hons), CEng, FCIHT, FICE, MAPM  
 Director on behalf of Richard Jackson Limited