

Chippindale Foods Ltd

**Flood Risk Assessment Report**

For

**Proposed Kingsley Farm Redevelopment**

At

Kingsley Farm  
Kingsley Road  
Harrogate  
North Yorkshire  
HG1 4RF

Beam Consulting  
14 Bond Street  
Wakefield  
West Yorkshire  
WF1 2QP

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## EXECUTIVE SUMMARY

This Flood Risk Assessment (FRA) has been prepared in support of a Planning Application for Proposed Kingsley Farm redevelopment at Kingsley Road, Harrogate, North Yorkshire, HG1 4RF.

The assessment has been undertaken in accordance with the requirements of:

- National Planning Policy Framework (NPPF) March 2012 and its Technical Guidance
- North West Yorkshire Level 1 Strategic Flood Risk Assessment (SFRA) Volume II: Final Technical Report July 2010
- North West Yorkshire Level 1 SFRA User Guide Final Report July 2010

The existing Farmhouse, main office building and outbuildings are proposed to be retained in conjunction with the proposed site wide residential development comprising residential properties, associated roads and drives.

The site is located within Flood Zone 1 (low probability of flooding) that comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year.

Two site drains are running West to East into a culvert heading towards the current main office building. Whilst it was not readily identified, it is likely that this drain ultimately discharges to Star Beck which commences immediately adjacent to the Traffic Lights on the bend on Kingsley Road at the eastern extremity of Kingsley Farm.

Based on the drainage and site assessment, surface water discharge infiltration methods are not a viable solution on this site and therefore the flow will require restricting before discharging into the Star Beck as existing and on-site attenuation provided. Hence, it is proposed to provide 127 l/s flow control (30% less than the existing) with 298m<sup>3</sup> attenuation system for 1 in 100 year rainfall event and 30% allowance for Climate Change. A pumping chamber may be required subject to detailed design and level information.

All drives should have drainage channels in order for the surface water run-off not to discharge onto the road.

Surface water drainage from the existing buildings should continue to discharge to the current drainage system subject to CCTV survey. The existing site drains should remain.

Proposed development foul water shall discharge into the existing drainage system 150mm diameter sewer near Kingsley Road subject to CCTV survey.

The final levels of the proposed development should remain generally as the existing.

Surface and foul water drainage system discharge from the site will be subject to all the necessary statutory consents and approvals as necessary.

The final solution to be utilized will depend on further on-site investigation and the development of the detailed design.



## 1.0 INTRODUCTION

This Flood Risk Assessment (FRA) has been prepared in support of a Planning Application for Proposed Kingsley Farm redevelopment at Kingsley Road, Harrogate, North Yorkshire, HG1 4RF.

The assessment has been undertaken in accordance with the requirements of:

- National Planning Policy Framework (NPPF) March 2012 and its Technical Guidance
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- North West Yorkshire Level 1 SFRA User Guide Final Report July 2010

The Report is based on the following information:

- i. Site location
- ii. Current HTC Architects' proposal
- iii. Site Topographical Survey by First Point Surveys undertaken February 2013
- iv. EA online Flood Maps which show indicative hydraulically modelled flooding from rivers or sea without defences - the natural flood plain area that could be affected in the event of flooding from rivers and the sea - based on Light Detection And Ranging (LIDAR) satellite digital terrain maps (DTM's).
- v. Consultation with Mike Wickens, Senior Land Drainage Engineer at Harrogate Borough Council (Harrogate BC).
- vi. Consultation with David Piersey at Environment Agency (EA).
- vii. Site visit February 8, 2013.

All comments and opinions contained in this report, including any conclusions are based on information available to Beam Consulting Engineers during investigations prior to completion of the report. Conclusions drawn by Beam Consulting Engineers may differ if the available information is subsequently found to be inaccurate, incomplete or misleading. Beam Consulting Engineers accept no responsibility should this prove to be the case, nor if additional information exists or becomes available in relation to this site.

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- i. The date on which the assessment was undertaken, and
- ii. The date on which the report is issued

Beam Consulting Engineers make no representation whatsoever in relation to the legal significance of findings reported or any legal matters referred to in the following report.

This document is a risk assessment of flooding issues associated with the noted site. The information presented and recommendations/conclusions stated are based on published statistical data and are for guidance only. The statements provide no guarantee against flooding of the site or elsewhere, nor as to the absolute accuracy of water levels, flow rates and associated probabilities referenced. This Report is the copyright of Beam Consulting Engineers Ltd. It cannot be used or reproduced without the express written authority of Beam Consulting Engineers Ltd and payment thereof.

## **2.0 BACKGROUND INFORMATION**

### **2.1 EXISTING DEVELOPMENT**

The site is located within a rural area off Kingsley Road in Harrogate. A site location plan is included in Appendix A.

Kingsley Farm and associated Egg Production Facility currently occupy the site comprising areas of grassed fields, Farmhouse, main office building, a number of food processing buildings, various outbuildings of a variety of sizes, associated tracks, footpaths and grassed/garden areas adjacent to the Farmhouse.

In total the site occupies 51085m<sup>2</sup> (5.1085ha) of which 6465m<sup>2</sup> is roof area, 5170m<sup>2</sup> hardstandings and 39450m<sup>2</sup> undeveloped grassed area (see drawing in Appendix G).

### **2.2 GROUND CONDITIONS**

Ground conditions on site have been advised to be clay.

Based on Landmark maps (included in Appendix D), the site is underlain by a minor Secondary A aquifer which is variably permeable with soil permeability noted as low.

### **2.3 PROPOSED DEVELOPMENT**

The existing Farmhouse, main office building and outbuildings are proposed to be retained in conjunction with the proposed site wide residential development comprising residential properties, associated roads and drives (see HTC Architects drawing 1080.09 in Appendix B).

In total the site occupies same 51085m<sup>2</sup> (5.1085ha) as existing of which 5065m<sup>2</sup> is roof area, 7702m<sup>2</sup> hardstandings and 38318m<sup>2</sup> undeveloped grassed area/ gardens (see drawing in Appendix G).



### 3.0 FLOOD RISK

#### 3.1 RISK OF FLOODING OF DEVELOPMENT SITE

Flood risk and general site assessment based on the following sources of information:

- i. EA online Flood Maps:
  - a. The site is located within Flood Zone 1 (low probability of flooding) that comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year - see Appendix C.
- ii. North West Yorkshire Level 1 Strategic Flood Risk Assessment (SFRA) Volume II: Final Technical Report July 2010:
  - a. The site area is not mentioned with the report.
  - b. The nearest watercourse - Star Beck, which commences immediately adjacent to the Traffic Lights on the bend on Kingsley Road at the eastern extremity of Kingsley Farm, is noted to be source of flooding for 3.6Ha Land at Kingsley Road, which is further down from the site location.
- iii. Consultation with David Piersey at Environment Agency, Land Drainage Department:
  - a. The site is located within Flood Zone 1.
  - b. The site area is larger than 1ha and therefore a formal flood risk assessment is required.
  - c. The current site development and greenfield land appears to naturally drain into the Star Beck. The proposed development discharge should not be greater than the existing.
  - d. Harrogate BC to be consulted for detailed site information and specific discharge restrictions.
- iv. Consultation with Mike Wickens, Senior Land Drainage Engineer at Harrogate Borough Council (Harrogate BC):
  - a. The Star Beck, which commences immediately adjacent to the Traffic Lights on the bend on Kingsley Road at the eastern extremity of Kingsley Farm, and where the current site surface water is understood to currently discharge, has major flooding problems downstream. Proposed development surface water discharge requires detailed assessment and analysis - proposal should be submitted for review.
  - b. Ground conditions within this area of Harrogate is mainly clay with low infiltration rate based on adjacent site assessments, hence unsuitable for infiltration methods. However, the proposed development surface water discharge SUDS (Sustainable Urban Drainage System) options should be considered using infiltration methods.
- v. Site visit February 8, 2013:
  - a. The site slopes significantly to the West to East towards the Star Beck.
  - b. Two site drains were noted running West to East one running into a culvert heading towards the main office (see photos in Appendix E). Whilst it was not readily identified, it is likely that this drain ultimately discharges to Star Beck which commences immediately adjacent to the Traffic Lights on the bend on Kingsley Road at the eastern extremity of Kingsley Farm.

### 3.2 SEQUENTIAL AND EXCEPTION TEST

Based on NPPF and its Technical Guidance the sequential and exception tests are not applicable as the site is within Flood Zone 1 and hence outside the floodplain.

Whilst the Sequential Test is not applied, considering the site area is 5.15 ha, the principles are followed in general as shown below:

Possible Hazard	Comments/ Remediation
<b>A. Flooding caused by local sources - natural watercourses on or near to the site?</b>	Two site drains are running West to East into a culvert heading towards the current main office building. Whilst it was not readily identified, it is likely that this drain ultimately discharges to Star Beck which commences immediately adjacent to the Traffic Lights on the bend on Kingsley Road at the eastern extremity of Kingsley Farm.
<b>B. Flooding caused by local sources - run-off from adjacent properties/ adjoining land</b>	Farmers fields to the East of the site are located higher than the site resulting in surface water runoff down the two identified site drains. The drains present on site will be retained and therefore surface water discharge methods to remain the same and flood risk not increased.
<b>C. Contribution to Flood Flows from Development Drainage Flooding caused to adjacent properties from surface run-off from hard-paved areas</b>	The proposed site development is to be positively drained maintaining existing site levels, drainage channels are to be provided where required to eliminate any surface water run-off from roads and drives.
<b>D. Contribution to Flood Flows from Development Flooding caused to 3rd party properties</b>	Two site drains are running West to East into a culvert heading towards the current main office building. Whilst it was not readily identified, it is likely that this drain ultimately discharges to Star Beck which commences immediately adjacent to the Traffic Lights on the bend on Kingsley Road at the eastern extremity of Kingsley Farm. The drains present on site will be retained. To reduce the flood risk downstream, the proposed development, surface water will be discharged at a rate that is 30% less than the existing. In addition 30% is to be allowed for Climate Change.



Whilst the Exception Test is not applied, considering the site area is 5.15 ha, the principles are followed in general in the flood risk assessment below:

Possible Issue	Comments/ Remediation
<b>E. Benefit of Site Development to the Wider Community over Flood Risk</b>	Two site drains are running West to East into a culvert heading towards the current main office building. Whilst it was not readily identified, it is likely that this drain ultimately discharges to Star Beck which commences immediately adjacent to the Traffic Lights on the bend on Kingsley Road at the eastern extremity of Kingsley Farm. The drains present on site will be retained. To reduce the flood risk downstream, the proposed development, surface water will be discharged at a rate that is 30% less than the existing. In addition 30% is to be allowed for Climate Change.
<b>F. Does an alternative site exist for the development?</b>	The proposed property replaces the existing development of similar impermeable area size. The site has been allocated for a residential development and is in line with the Borough and wider development aims.
<b>G. Can the site be made safe?</b>	The site can be made more resilient to floods as per section 4 of this report.

#### 4.0 SURFACE WATER DRAINAGE ASSESSMENT AND STRATEGY

Based on the assessments in the previous sections of this report, the existing site is positively drained into the Star Beck and grassed areas are currently undrained with rainwater percolating into the ground by infiltration.

The existing and proposed development impermeable areas compare as follows:

	Existing, m <sup>2</sup>	Proposed, m <sup>2</sup>	Proposed - Existing, m <sup>2</sup>	Proposed - Existing, %
Roofs	6465	5065	-1400	-21.7
Hardstanding	5170	1757	2532	49.0
Roads		5945		
Total	11635	12767	1132	9.7

Based on the table above, the existing development impermeable area is 11.6ha and proposed 12.7ha, which is approximately 10% increase. Based on calculations in Appendix F, the existing site currently discharges at 181.5l/s, comprising 1 in 2 year 50mm/hr run-off from impermeable areas and 5l/s/ha from grassed areas.

To reduce the flood risk downstream, the proposed development surface water discharge is to be reduced by 30% equal to 127l/s. In addition 30% allowance is to be made for Climate change as per NPPF.

In compliance with SUDS (Sustainable Urban Drainage Systems) various proposed development surface water discharge methods have been considered as per the table below.

Soakaways	The use of soakaways is an ideal solution for developments such as this, however it is understood that the ground is mainly clay, which makes the use of soakaways not an appropriate solution for this site.
Permeable paving/discharge to soft landscape	As with the above ground conditions make the use of permeable paving not an appropriate solution for this site.
Ponds or wetlands	Ponds or wetlands can be used in conjunction with restricted discharge outlets to control the maximum rate of discharge from a site.
Swales	Swales are similar to wetlands except they are designed to empty when not required to balance flows; similar comments apply.
French drains	See comments on soakaways above.
Restricted flows, combined with onsite storage	Restricted flows with on-site attenuation is a common solution on sites where infiltration methods are not possible such as in this case. Attenuation can be in form of oversized pipes and/or attenuation tank.

Based on the above SUDS assessment, infiltration methods are not a viable solution on this site and therefore the flow will require restricting before discharging into the Star Beck as existing and on-site attenuation provided. Hence, it is proposed to provide 127 l/s flow control (30% less than the existing) with 298m<sup>3</sup> attenuation system for 1 in 100 year rainfall event and 30% allowance for Climate Change. See drawing 04-08-02 in Appendix G for proposed strategy. A pumping chamber may be required subject to detailed design and level information.

All drives should have drainage channels in order for the surface water run-off not to discharge onto the road.

Surface water drainage from the existing buildings should continue to discharge to the current drainage system subject to CCTV survey.



## 5.0 FOUL WATER DRAINAGE ASSESSMENT AND STRATEGY

Based on the Topographical Survey drawings by First Point Surveys and Birtle Site Engineers (included in Appendix D), the existing foul water drainage system runs eastwards to the lower part of the site and discharges into the existing foul water drainage manhole at the bend in Kingsley Road.

Based on the Birtle Site Engineers January 2010 drawing *Drainage survey and level survey*, 150mm diameter drains are present at the rear of the main farmhouse. The smallest noted gradient of the existing foul water 150mm diameter pipe is 1 in 22.5, which based on *Tables for hydraulic design of pipes, sewers and channels, 8th edition by HR Wallingford* and pipe roughness  $K_s$  of 1.5 is equal to 31.8l/s pipe capacity.

The foul water discharge from the proposed development including the farmhouses that will arise is 14.1 l/s (see calculation sheet 3 in Appendix F), which is 50% less than the existing pipe capacity and therefore it is proposed to discharge into the existing drainage system subject to CCTV survey. See drawing No 04-08-02 in Appendix G for proposed strategy.

## 6.0 RECOMMENDATIONS

It is recommended that the surface and foul water drainage strategy follows the principles illustrated in Appendix G on schematic drawing No 04-08-02. The following measures are to be fulfilled in determining the drainage solution:

1. In order to mitigate the effects of surface water drainage from the site, provide 127 l/s flow control (30% less than the existing) with 298m<sup>3</sup> attenuation system for 1 in 100 year rainfall event + 30% allowance for Climate Change.
2. All drives should have drainage channels in order for the surface water run-off not to discharge onto the road.
3. Surface water drainage from the existing buildings should continue to discharge to the current drainage system subject to CCTV survey. The existing site drains should remain.
4. The final levels of the proposed development should remain generally as the existing.
5. Proposed development foul water shall discharge into the existing drainage system 150mm diameter sewer near Kingsley Road subject to CCTV survey.
6. Surface and foul water discharge from the site will be subject to all the necessary statutory consents and approvals as necessary.
7. The final solution to be utilized will depend on further on-site investigation and the development of the detailed design.