SUPPLEMENTARY FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY REPORT

Proposed Commercial Development, Spa Field Industrial Estate, Slaithwaite

Reference	AMF/FRA/Y21172
Date	September 2021
Version	1

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CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

D M Textile Machinery Ltd
Brooks Mill,
Clay Lane,
Slaithwaite,
Huddersfield,
HD7 5BG

This report has been prepared for the sole use and reliance of the above-named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of RWO Group. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

VERSION	PURPOSE/DESCRIPTION	DATE
1	First Issue	28.09.2021

1.0 EXECUTIVE SUMMARY

This Flood Risk Assessment report is provided to supplement an initial Flood Risk Appraisal prepared Farrar Bamforth Associates Limited and responds to comments raised by the LLFA (Kirklees MBC) through the planning process.

The proposed development site is located in Flood Zone 1, 2 & 3 on the Environment Agency flood maps.

Flood Zone 1 is defined as a low-risk area, which comprises land assessed as having less than 1 in 1,000 annual probability of river or sea flooding (0.1%).

Flood Zone 2 is defined as a medium risk area, which comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1-0.1%), or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5-01%) in any year.

Flood Zone 3 is defined as a high-risk area, which comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of sea flooding (>0.5%) in any year.

The proposed development usage of industrial is compatible with flood zones 1, 2 & 3 when following the NPPF guidance.

Reviewing the flood map against the topographical survey, the lowest levels are located at the footpath dropped kerbs on the western boundary of the site, with the footpath being consistently lower than the development site. As such floodwater would overtop the footpath and flow down the public footpath adjacent to the sites western boundary and would not impact the site. It is therefore considered the site is located wholly in Flood Zone 1.

A minimum FFL of 31.250m AOD is proposed with the service yard between the existing and proposed buildings set to falls to a central channel to convey flood flows through the site without impacting the buildings in an extreme rainfall event.

Other sources of flooding have been assessed and the risk of flooding from these sources is considered to be low and/or manageable with mitigation.

Surface water and foul water from the proposed development shall discharge to the existing site drainage systems subject to a CCTV drain survey to demonstrate the satisfactory condition of the drains. The proposed surface water discharge rate shall be restricted to either greenfield rates or brownfield rates reduced by 30%, subject to a drainage survey and calculations to demonstrate the existing brownfield rate.

2.0 INTRODUCTION

RWO has been instructed by Farrar Bamforth Associates Limited on behalf of their client D M Textile Machinery Ltd to prepare a Supplementary Flood Risk Assessment report to support a proposed commercial development at Spa Field Industrial Estate, Slaithwaite.

An initial Flood Risk Appraisal prepared Farrar Bamforth Associates Limited accompanied the planning application, this supplementary report is provided in response to comments raised by the LLFA (Kirklees MBC) through the planning process. A copy of the LLFA comments is provided in Appendix H.

A copy of the Flood Risk Appraisal prepared Farrar Bamforth Associates Limited is provided in Appendix G.

3.0 THE SITE

The proposed development site is approximately 0.4Ha in area and rectangular in shape. The site is located approximately 600m northeast of Slaithwaite town centre and has an approximate centre of SE 08609 14294. A site location plan is included in Appendix A.

The site is currently brownfield in nature with an existing hardstanding of circa 0.34Ha which is utilised as a service yard and storage in its current form.

The Huddersfield Narrow Canal is located to the south, with the River Colne beyond.

The site is generally flat with levels of circa 131m AOD although there is a slight fall from east to west with a level variation of 0.2 – 0.5m, making the western boundary the lower area of the site. There is a footpath/access track to the western extent which is lower than the proposed development site by up to 5m at the greatest variation. A topographic survey of the site is provided in Appendix B.

Figure 1 – Site location (Red marker indicates the approximate site location)

4.0 PROPOSED DEVELOPMENT

The proposed development comprises a single commercial building that will be serviced from the existing service yard. As part of the development site, the site access/egress is to be relocated east by approximately 10m.

A proposed site layout plan is included in Appendix C.

5.0 FLOOD RISK

The site under consideration is located within Flood Zone 1, 2 & 3 on the latest version of the Indicative Floodplain Maps produced by the Environment Agency (EA) a copy of the flood map is provided in Appendix D.

Flood Zone 1 is defined as a low-risk area, which comprises land assessed as having less than 1 in 1,000 annual probability of river or sea flooding (0.1%).

Flood Zone 2 is defined as a medium risk area, which comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1-0.1%), or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5-01%) in any year.

Flood Zone 3 is defined as a high-risk area, which comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of sea flooding (>0.5%) in any year.

When reviewing the flood map against the topographical survey included in Appendix B, the lowest levels are located at the footpath dropped kerbs on the western boundary of the site, with the footpath being consistently lower than the development site. As such flood water would overtop the footpath and flow down the public footpath adjacent the sites western boundary and would not impact on the site. A flood routing plan is provided in Appendix E.

Planning Practice Guidance states that commercial uses of land are appropriate in Flood Zone 1, 2 & 3.

Reviewing the existing building which is located in flood zone 1 and the FFL, which is at 31.260m AOD, it is recommended that the proposed building be located at a similar level. Discussions with the architect have taken place and the new building has a proposed FFL of 31.250m AOD.

Based upon the topographical survey and Environment Agency flood maps, the development flood risk is low and/or manageable.

The proposed site usage falls within the 'less vulnerable' category as identified in the Planning Practice Guidance Table 2: Flood Risk Vulnerability Classification. As such the exception test, will not need considering based on the Planning Practice Guidance Table 3: Flood risk vulnerability and flood zone 'compatibility'.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Table 1 – 'Planning Practice Guidance Table 1: Flood Risk Vulnerability Classification'

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity-generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind Turbines.
Highly Vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunication installations required to be operational during flooding. • Emergency disposal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure").
More vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, *subject to a specific warning and evacuation plan.*
Less vulnerable • Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, ***general industry***, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals workings and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewerage treatment works (if adequate measures to control pollution and manage sewerage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of defence installations. • Shipbuilding, repairing, dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastal stations. • Amenity open space, nature conversation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, *subject to specific warning and evacuation plan.*

Table 2 – 'Planning Practice Guidance Table 2: Flood Risk Vulnerability Classification'

Surface Water (Pluvial) Flooding

The Environment Agency Surface Water (Pluvial) Flood Map provided below indicates the site has a low, medium and high risk of surface water (pluvial) flooding. When comparing this to the topographical survey the overland flood route appears inaccurate, taking into account the lower levels of the footpath on the western boundary and drop kerb associated with the footpath access.

Figure 2 – Surface Water (Pluvial) Flood Map

Photo 1 on the following page along with the flood routing plan, included in Appendix E, demonstrates the overland flow route would differ from the Environment Agency Surface Water (Pluvial) Flood Maps.

It is proposed to re-construct the service yard between the existing and proposed buildings with a central channel to convey flood flows through the site without impacting the buildings in an extreme rainfall event.

Based upon the available information the risk of pluvial flooding is low and/or manageable.

Photo 1 – Drop kerb and footpath on the western boundary

Groundwater Flooding

A historic site investigation prepared in 2004 by Ground Investigation Specialists has been reviewed to identify the risk of groundwater flooding to the proposed development site. Based upon the historic report the risk of groundwater flooding is low.

> 6.2 Groundwater
>
> From the available information the water table appears to lie at a depth of between 5.70 and 6.50 metres, dropping gently southwards towards the river, although within the made ground a pocket of perched water was encountered at a depth of 3 metres in trial pit 3.

Extract 1 – Ground Investigation Specialist report extract

Flooding from Sewers

The foul sewers near the site are public sewers owned by Yorkshire Water and will be subject to regular maintenance and inspection, therefore blockage of these sewers is unlikely.

Flooding from Reservoirs, Canals and Other Artificial Sources

The Environment Agency Surface Water Reservoir Flood Map provided below indicate the southwest corner of the site is potentially at risk of flooding from reservoirs.

The topographical survey included in Appendix B indicates the southwest corner of the site is located circa 5m above the levels of the footway and the canal located immediately beyond the southwest corner of the site is therefore considered the site is not at risk of reservoir flooding.

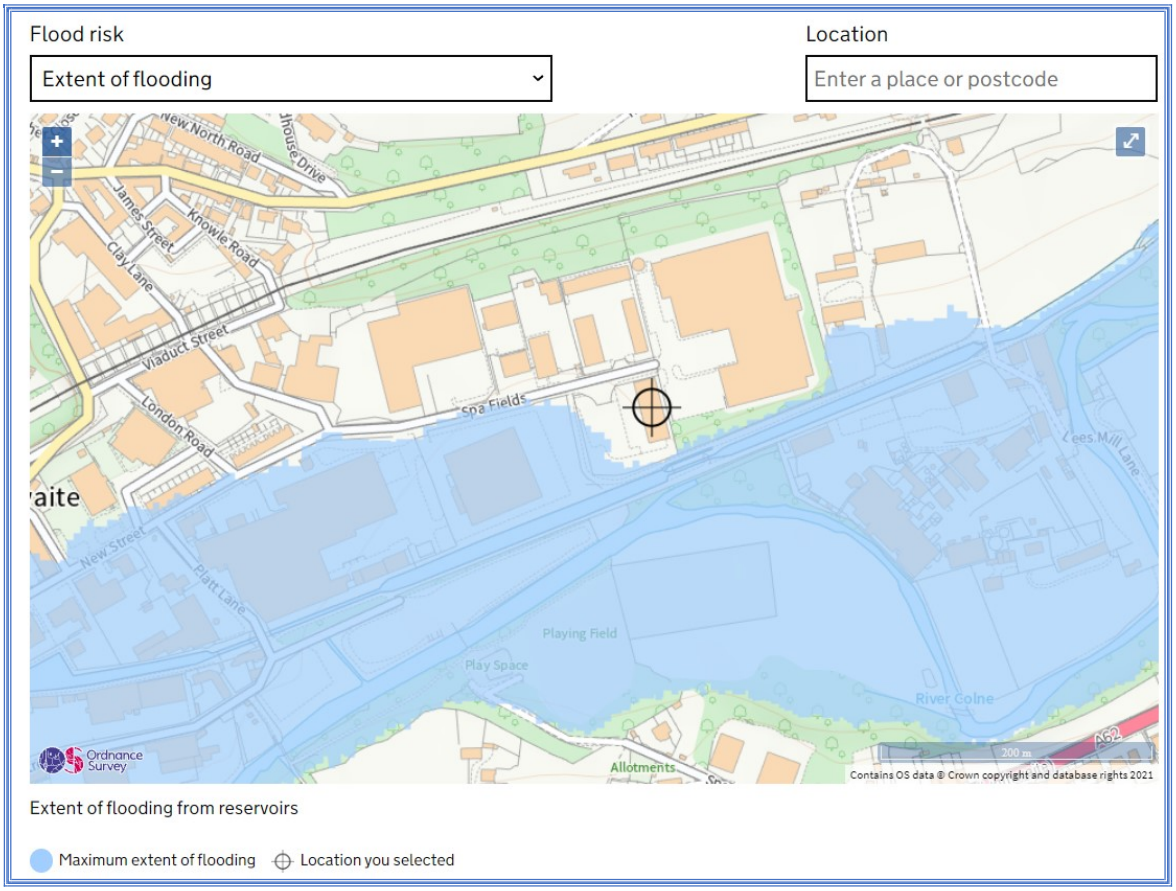

Figure 3 – Reservoir Flood Map

6.0 FOUL & SURFACE WATER DRAINAGE

Surface Water Drainage

It is proposed to discharge surface water to the existing surface water drainage system serving the site.

The LLFA (Kirklees MBC) have advised;

- Brownfield areas may discharge surface water to the existing drainage system at a rate restricted to 70% of the existing rate to allow for the future effects of climate change. However, the Developer must demonstrate through a drainage survey that the existing sites discharge to the existing drainage network. If an existing discharge cannot be proved the discharge to sewer/watercourse shall be restricted to greenfield discharge rates.
- Greenfield areas of the sites shall be restricted to greenfield discharge rates.

At the time of writing a survey of the existing drainage system has not been undertaken, therefore for the purposes of this report, it is assumed the sites will discharge on a greenfield discharge rate basis this will give 'worst case' volumes of attenuation. Any increase in discharge rate following drainage survey work to demonstrate brownfield discharge rates will reduce the attenuation volumes. An IH124 calculation is included in Appendix F which gives a discharge rate of 1.33 l/s. In accordance with Building Regulations Part H, a minimum orifice of 75mm is required to avoid blockage which would give a discharge rate of approximately 3.5 l/s. Based on good practice and building regulations a discharge rate of 3.5 l/s is proposed for surface water discharge.

As surface water discharge from the sites will be restricted, on-site surface water attenuation will be required. The following provides an initial calculation of the approximate volumes of attenuation using the 'Quick Storage Estimate' element of Windes Microdrainage:

Attenuation Volumes

Storage Design Parameters

- M5-60 = 19.20
- Ratio R = 0.258

<u>The Site</u>

- Restricted discharge rate = 3.5 litres/second.
- Proposed Impermeable area = 0.4 Ha
- 1:30 Year Return Period = between 116 and 202m^3.
- 1:100 Year Return Period (+30% cc) = between 243 and 386m^3.

The proposed on-site drainage system shall be designed in accordance with the requirements of Sewers for Adoption and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall events.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall events (including an allowance of 30% for the effects of future climate change), as defined in NPPF Technical Guidance.

Foul Water Drainage

It is proposed to discharge foul water from the new building to the existing foul drain serving the site. A CCTV survey of the existing drainage system shall be undertaken to demonstrate satisfactory condition.

7.0 CONCLUSIONS

This assessment has looked at the implications of a proposed commercial development in relation to flood risk.

The proposed development site is located in Flood Zone 1, 2 & 3 on the Environment Agency flood maps.

Flood Zone 1 is defined as a low-risk area, which comprises land assessed as having less than 1 in 1,000 annual probability of river or sea flooding (0.1%).

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The proposed development usage of industrial is compatible with flood zones 1, 2 & 3 when following the NPPF guidance.

Reviewing the flood map against the topographical survey, the lowest levels are located at the footpath dropped kerbs on the western boundary of the site, with the footpath being consistently lower than the development site. As such floodwater would overtop the footpath and flow down the public footpath adjacent to the sites western boundary and would not impact the site. It is therefore considered the site is located wholly in Flood Zone 1.

A minimum FFL of 31.250m AOD is proposed with the service yard between the existing and proposed buildings set to falls to a central channel to convey flood flows through the site without impacting the buildings in an extreme rainfall event.

Other sources of flooding have been assessed and the risk of flooding from these sources is considered to be low and/or manageable with mitigation.

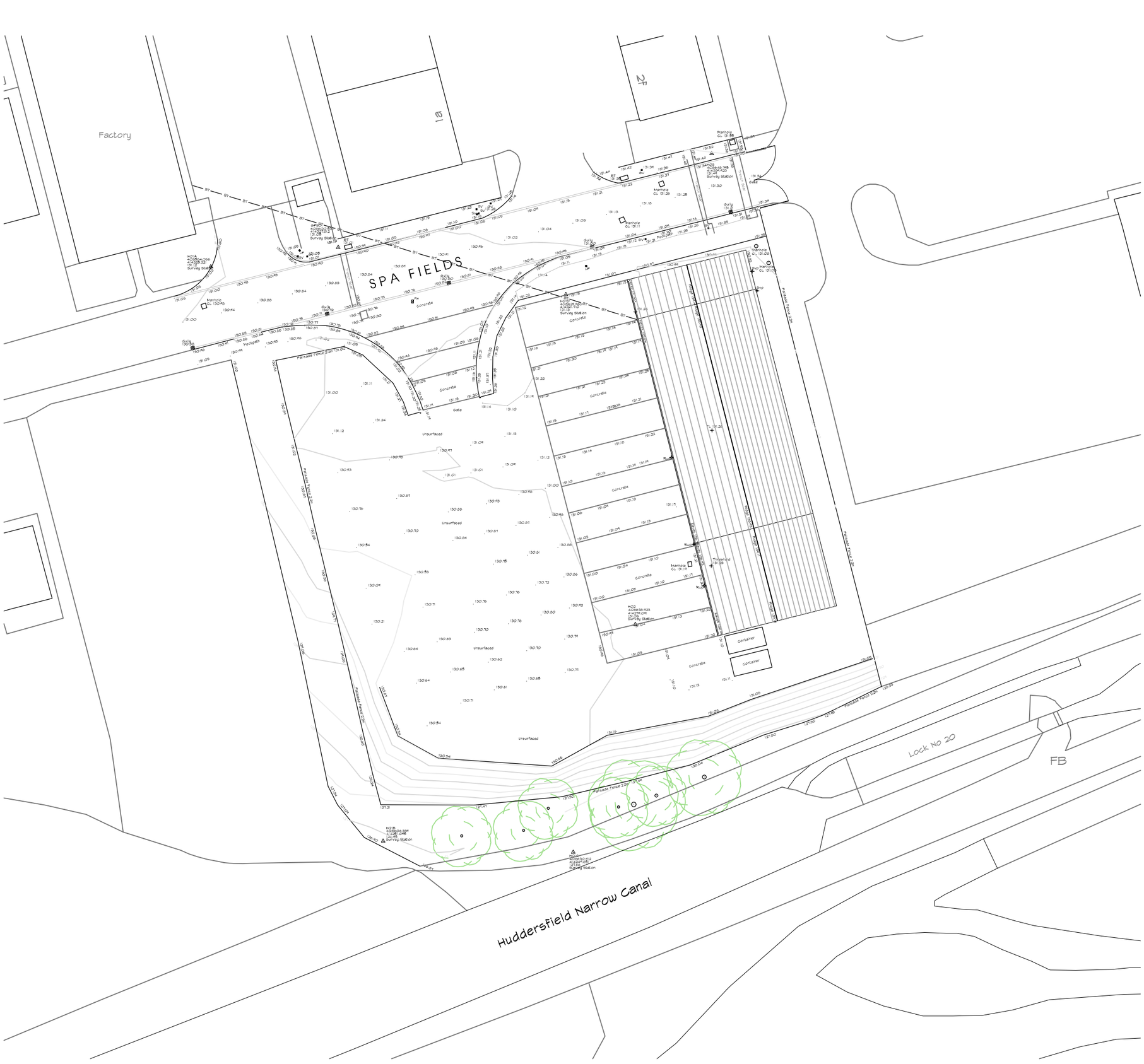
Surface water and foul water from the proposed development shall discharge to the existing site drainage systems subject to a CCTV drain survey to demonstrate the satisfactory condition of the drains. The proposed surface water discharge rate shall be restricted to either greenfield rates or brownfield rates reduced by 30%, subject to a drainage survey and calculations to demonstrate the existing brownfield rate.

Andrew Fairburn
For and behalf of RWO

Appendix A Site Location Plan

Location Map	
Site	Spa Field Industrial Estate
Client	M D Textile Machinery Ltd
Job Number	Y21172
Scale	NTS

Appendix B Topographic Survey



EXISTING SITE LAYOUT

REVISIONS:

Proposed Industrial Building

at Spa Fields Industrial Est.
Slaithwaite
Huddersfield
HD7 5BB

for DM Textile Machinery Ltd.

Existing Site Layout

Farrar Bamforth Associates Ltd.

Chartered Architectural Technologists

51, Trinity Street, Huddersfield HD1 4DN
Tel. (01484) 424008 Fax. (01484) 512305
E-mail : design@farrarbamforth.co.uk
Website : www.farrarbamforth.co.uk

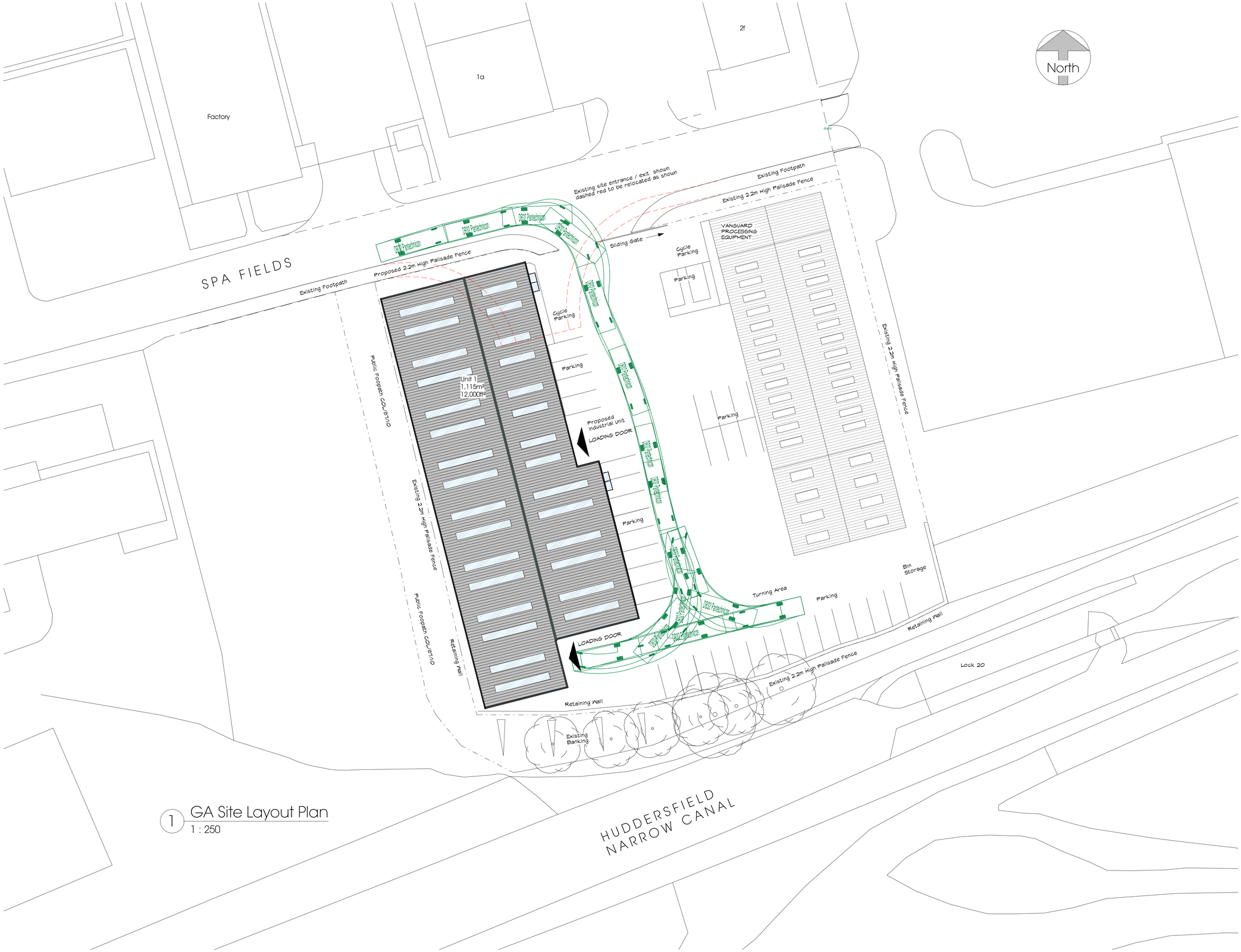
Drawn	SJG		
Date	May 2016		
Scale	1:500 @ A3		
Drawing No.	20-C21-01	Rev.	

Appendix C Proposed Site Layout

Drawing to be read in conjunction with; all 20 series GA floor plans, 21 series elevations & GA sections & 90 Series Site Plan

Based on topographical survey provided by Holden Surveys Ltd ref:FBA_158 _Spa Fields. The boundary shown is based on information supplied by others, not Farrar Bamforth Associates, and all boundaries are to be verified on site. Farrar Bamforth Associates Ltd are to be notified immediately should any discrepancies be found.

Refer to civil engineers drawings for details of all site setting out.



1 GA Site Layout Plan
1 : 250

Scale @ 1:250
0 5 10 25m

Rev	Description	Date	By	Rvw
P05	PLANNING ISSUE	12.02.21	JH	JR
P04	Gate alterations	04.01.21	JH	JR
P03	Gate dimensions added	15.12.20	JH	JR
P02	Amended as Client discussions	19.10.20	VS	JR
P01	Preliminary issue	25.09.20	JH	JR

Proposed Industrial Building

at Spa Fields Industrial Estate
Slaithwaite,
Huddersfield
HD7 5BB

for DM Textile Machinery Ltd

Farrar Bamforth Associates Ltd.
Chartered Architectural Technologists
51 Trinity Street, Huddersfield, HD1 4DN
Tel. (01484) 424008 Fax: (01484) 512305
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GA Site Layout Plan

Project	Originator	Zone	Level	Type	Role	Number	Revision
20C21 -	FBA -	ZZ -	XX -	DR -	A -	9001 -	P05

Drawn	Date	Suitability	Revision Status	Scale at A1
JH	Sep 20	S4	Planning	As indicated

Appendix D Gov.UK Flood Map

Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
408632/414291

Scale
1:2500

Created
28 Sep 2021 21:05

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

Appendix E Flood Routing Plan


Factory
EXISTING LOWPOINT ON ROAD
FLOOD FLOW OVERTOP PATH AT DROPPED CROSSING
SITE ACCESS LEVELS CIRCA 300mm HIGHER THAN LEVELS OF EXISTING ROAD CHANNEL, THEREFORE FLOOD WATER WOULD FLOW DOWN PUBLIC FOOTPATH BEFORE ENTERING THE SITE
FLOOD FLOW ALONG EXISTING PUBLIC FOOTPATH
FLOOD FLOWS TO LOWPOINT OF PUBLIC FOOTPATH
LOWPOINT WOULD EVENTUALLY OVERTOP TO CANAL IF FLOOD WATER CONTINUED (DEPTH OF CIRCA 1m OF WATER REQUIRED BEFORE OVERTOPPING TO CANAL)
KEY
FLOOD ROUTE DIRECTIONS
Huddersfield Narrow Canal
Lock No 20
FB
Palisade Fence 2.2m
Concrete
Unsurfaced
Gate
Container
Manhole
Gully
Footpath

Appendix F IH124 Calculation

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Registration successful. You are now logged in.

Calculated by:	Liam Harvison
Site name:	Spa Field Ind. Est.
Site location:	DM Textile Machinery

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.62504° N
Longitude:	1.87104° W
Reference:	1946792372
Date:	Sep 22 2021 21:29

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.4

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics	Default	Edited
SAAR (mm):	1169	1169
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	1.33	1.33
1 in 1 year (l/s):	1.14	1.14
1 in 30 years (l/s):	2.32	2.32
1 in 100 year (l/s):	2.76	2.76
1 in 200 years (l/s):	3.15	3.15

Appendix G Farrar Bamforth Flood Risk Appraisal report

Farrar Bamforth Associates Ltd.
Architectural Consultants

51 Trinity Street, Huddersfield, HD1 4DN
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E-mail: design@farrarbamforth.co.uk
Website: www.farrarbamforth.co.uk

(20/C21)

FLOOD RISK APPRAISAL

Proposed Industrial Unit
at
Spa Field Industrial Estate, Slaithwaite, HD7 5BB
for
D M TEXTILE MACHINERY LIMITED

1.0 Introduction

1.1 Farrar Bamforth Associates Ltd have been appointed to undertake a Flood Risk Appraisal for the proposed erection of a new industrial unit within the site curtilage of the existing premises occupied by Vanguard Processing Equipment Ltd.

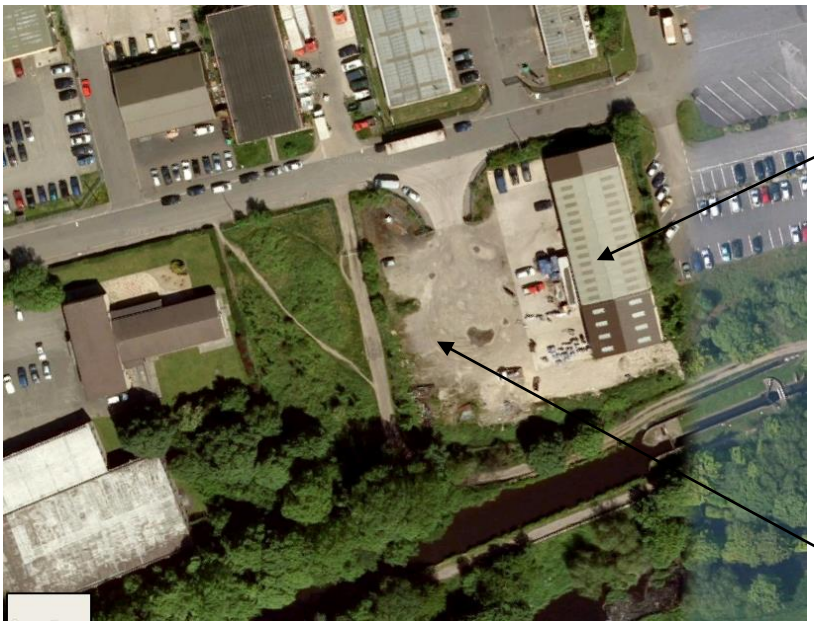
1.2 This appraisal has been prepared in accordance with National Planning Policy Framework, Planning Practice Guidance.

1.3 The Environment Agency for Planning Map and Kirklees PPS Flood Zone Map records have been consulted during the preparation of this report

1.4 The development is shown to be partially within Flood Zone 3 on the Environment Agency for Planning Map but not indicated within a flood zone on the Kirklees PPS Flood Zone Map

2.0 Existing Situation

2.1 The development site is situated on the south side of Spa Fields Industrial Estate at the end of the existing industrial road.



2.2 The site is currently occupied by Vanguard Processing Equipment and includes a vast service yard and external storage area which comprises of existing concrete / compacted hardcore.

2.3 The existing site area is approximately 4120m^2, of which 3423m^2 is made up of hard standing area

2.4 The existing surface water drain runs through the site.

3.0 Proposed Development

3.1 The proposal involves the construction of a steel portal frame industrial building opposite to the existing Vanguard Unit which is to remain.

3.2 The Site Layout drawing 20C21-9001-P05 shows the proposed building position, the vehicular parking and repositioning of the site entrance to accommodate the additional industrial unit.

3.3 The proposed floor level is 130.750 which is 510mm below the existing unit on site (131.26)

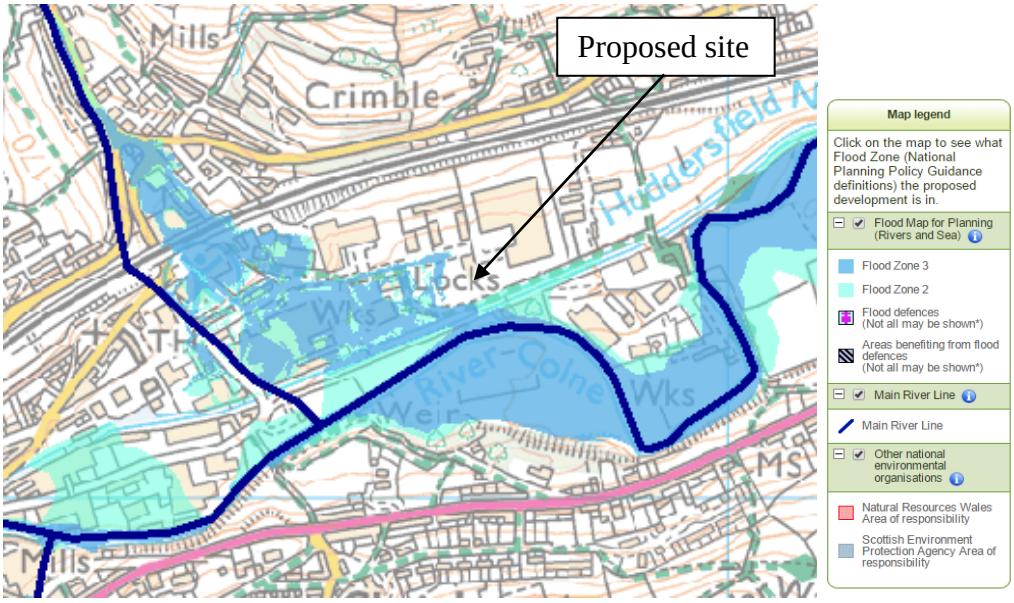
4.0 Flooding Risk - History of Flooding

4.1 The River Colne rose to 74.476 AOD at Longroyd Bridge (down-stream) on 21st January 2008. This is understood to be the highest recorded level at this location.

4.2 The recorded flood levels are significantly below the proposed floor level of 130.750m.

5.0 Sources of Flooding

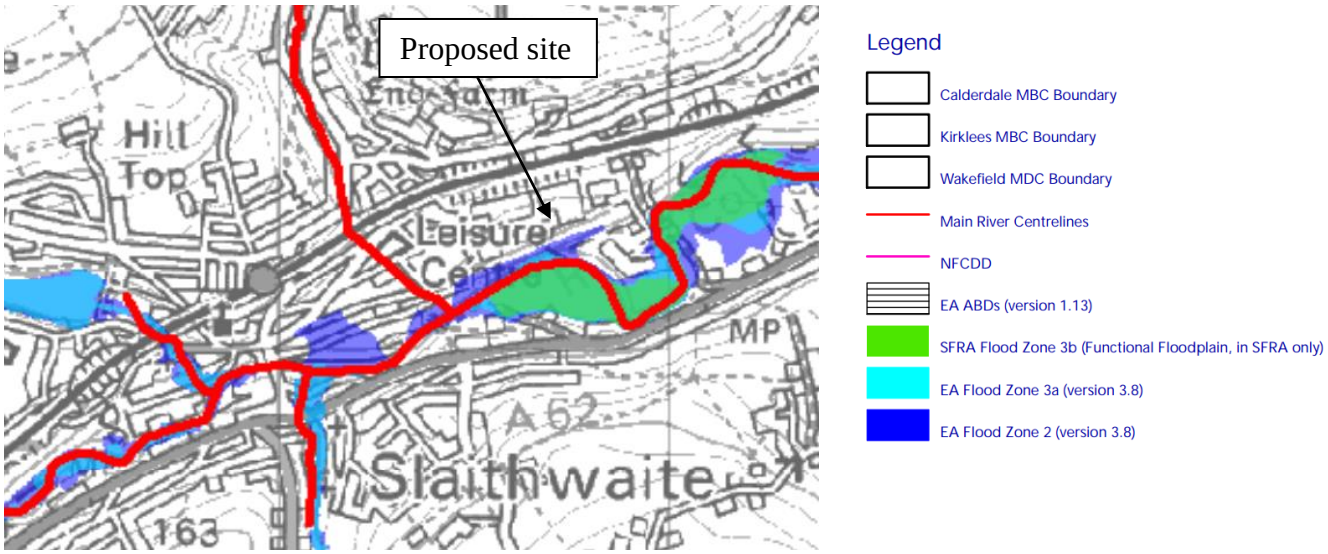
5.1 The site is considered to be outside the extent of extreme flooding zone and placed within Flood Zone 3 on the Environment Agency for Planning Map (see extract below).



Flood Zone definitions set out in the National Planning Policy Guidance are:

- Flood Zone 1 - land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)
- Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year
- Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year

The site is considered to have an annual probability of fluvial flooding of between 0.5% and 1%.



6.0 Vulnerability of Different Development Types

- Essential Infrastructure: Transport infrastructure (railways and motorways etc,,,), utility infrastructure (primary sub-stations, water treatment facilities; power stations; and wind turbines)
- Water Compatible Development: Flood control infrastructure; water and sewerage infrastructure; navigation facilities.
- Highly Vulnerable: Emergency services; basement dwellings; mobile home parks; industrial or other facilities requiring hazardous substance consent
- More Vulnerable: Hospitals; residential dwellings; educational facilities; landfill sites; caravan and camping sites
- Less Vulnerable: Commercial premises; emergency services not required during a flood; agricultural land

7.0 Sequential Test

7.1 As set out in the National Planning Policy Framework (NPPF), the aim of the Sequential Test is to steer new development to area at the lowest probability of flooding.

7.2 The Flood Zones are the starting point for the sequential approach (See Table 3)

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Paragraph: 067 Reference ID: 7-067-20140306

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Key:

✓ Development is appropriate

X Development should not be permitted.

7.3 Table 3 states that the proposed development falls under the Category 'less vulnerable'. Table 3 states that everything within the 'less vulnerable' category is appropriate in this zone (Zone 3)

7.4 Therefore it is considered that the development proposed is appropriate for this site and the sequential test has been applied in accordance with the guidance.

8.0 Conclusion

8.1 The sequential test concludes that this development is appropriate in this location.

8.2 There is no requirement for an Exception test.

8.3 It is recommended that the vehicle parking and turning areas are installed using a sustainable drainage system.

8.4 Considering the above, it is envisaged that there is no increase in flood risk to the site therefore the site can be developed.

Appendix H LLFA Correspondence

Consultation Response from KC, Lead Local Flood Authority		
2021/90605 land at, Vanguard Processing Equipment, Spa Fields Industrial Estate, Slaithwaite, Huddersfield, HD7 5BB		
Erection of an industrial building (B1(c) use)		
Date Responded: 31 March 2021	**Responding Officer: Aleksandra Tomczyk**	**Responding Ref: 0**

Summary

Kirklees Flood Management and Drainage, as the Lead Local Flood Authority (LLFA), OBJECT to this planning application and require FURTHER INFORMATION is provided on the following:

- **Flood risk to the site; and**
- **Surface water drainage management.**

Kirklees LLFA also offer the below additional information and comments.

Kirklees records

The side slopes from approximately 132mAOD in the north, to approximately 130mAOD in the south. Huddersfield Narrow Canal runs along the southern site boundary, and River Colne further south. Canal Lock number 20 is located along the north eastern site corner.
There is a public surface water and combined sewer along Spa Fields – northern site boundary.
The western part of the site is located within Flood Zone 2 and 3, according to the Environment Agency's *Flood map for planning*. The north western part of the site is located within up to medium surface water flood risk, according to the Environment Agency's *Long term flood risk map*. The south western part of the site is located within the extents of reservoir flood risk, according to the same map.
Records show that this location is unlikely to be suitable for infiltration features.

Additional comments

The applicant proposes to develop an industrial building in the area of Slaithwaite.

The applicant submitted the following relevant documents:

- Drawing *OS / Location Plan*, prepared by Farrar Bamforth Associates, number 20C21-FBA-ZZ-XX-DR-A-0101, revision P02, dated 12.02.21;
- Drawing *Existing Site Layout*, prepared by Farrar Bamforth Associates, dated May 2016;
- Drawing *GA Site Layout Plan*, prepared by Farrar Bamforth Associates, number 20C21-FBA-ZZ-XX-DR-A-9001, revision P05, dated 12.02.21; and
- *Flood Risk Appraisal*, prepared by Farrar Bamforth Associates, undated.

Flood Risk Assessment

Kirklees LLFA reviewed the *Flood Risk Appraisal* document and make the following comments:

- Taking into consideration the different flood risks highlighted above, the applicant should carry out a site-specific flood risk assessment, in accordance to the National Planning Policy Framework and Planning Practice Guidance. This document should assess all types of flooding and the development's impact on them, as well as any mitigations required. The submitted document does not provide sufficient level of detail.

Kirklees LLFA require an analysis of flow routing for the site to be provided, including any inflows from offsite and any flows originating on site, such as drainage exceedance or gulley bypass. Short, intense storms may bypass road gullies, particularly on steep ground, common across Kirklees. The designed flow route should avoid property curtilages where reasonably practicable, utilising roads and open spaces.
Flow routing from attenuation should also be considered, in case of an exceedance event. The applicant should use *Designing for Exceedance* guidance to inform this design and safe management

of any exceedance volumes.

Surface Water Drainage Design

The only information on the management of surface water on site has been provided within the Application Form, which states that the flows will be accommodated within the existing surface water drains on site.

The applicant should confirm the location and condition of these drains. The discharge point of the system should also be confirmed. This information should be provided to the LLFA for review.

If any increase of impermeable area on site is proposed, the applicant should also provide an assessment of how this increase will impact the existing system.

Informative

Section 38 road adoption by Kirklees as a Highway Authority cannot take place unless sewerage located under the carriage way is adopted first. Therefore, all structures under an adoptable carriageway would need to meet the standards as set out by the statutory undertaker, including but not limited to *Design & Construction Guidance** and Yorkshire Water local guidance and any subsequent updates.

As part of a Section 106 agreement the Council are required to ensure the site is managed in a safe and suitable way up until adoption by a regulatory body. This requirement should also apply to drainage on the site, during the build out a management and maintenance plan including responsible management company must be secured. This should be enforced until adoption **and continued for the life of the development if adoption fails.** Adoption can fail at any step in the development process from concept design to site inspection post construction.

**Design & Construction Guidance has replaced 'Sewers for Adoption' giving provision for Sewerage Undertakes to adopt SuDS features and facilities.*

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