



**PROPOSED AGRICULTURAL
BUILDING
(PART RETROSPECTIVE)
LOWDHAM ROAD,
GUNTHORPE**

Flood Risk Assessment

Prepared for: Cluttons

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Revision	Amendments	By	Date
P01	Preliminary issue	Graham Taylor (IEng MICE)	02.12.21

1.0 Introduction

- 1.1 Taylor Consulting Engineers have been commissioned to undertake a Flood Risk Assessment (FRA) to support the retrospective planning application for the agricultural building.
- 1.2 This Flood Risk Assessment has been produced using the relevant data and flood maps available at the time of the report. Any subsequently updated flood data and maps would need to be assessed against the development to ensure there is no change in the flood risk to the assessed site.
- 1.3 The site is indicated as being located within Flood Zone 3 based on the online flood maps.

Zone 3 – Land having greater than 1% annual probability of flooding in any year.

Zone 2 – Land having between 1% and 0.1% annual probability of flooding in any year.

Zone 1 – Land having less than 0.1% annual probability of flooding in any year.

The contents of this FRA describe the assessment of the proposals and the implications of the proposed development on flood risk. The FRA has been prepared following guidance provided in the National Planning Policy Framework (February 2019) and the Planning Practice Guidance to the National Planning Policy Framework (October 2018).

A planning application has been submitted and this assessment seeks to provide the level of detail necessary to demonstrate that the potential effects of flood risk (to the proposal) have been addressed by identifying the source and probability of flooding to the application site, including effects of climate change;

- Determining the consequences of flooding to and from the proposed development proposal and advising on the how this will be managed, if necessary; and
- Demonstrating the flood risk issues described in this assessment are compliant with the relevant guidance.

The scope of data available is summarised in this report and in the associated plans (attached within appendices). An assessment of areas potentially at risk from flooding has been undertaken and the proposed building has been examined in relation to their potential to increase flood risk both on and off site. This FRA supports the construction of the proposed building to demonstrate that flood risk has been given material consideration throughout the development process and the proposed building should not be restricted at this site due to flood risk.

2.0 Policy & Guidance

2.1 Flood & Water Management Act, 2010

Combined with the Flood Risk Regulations 2009, (which enact the EU Floods Directive in England and Wales) the Act places significantly greater responsibility on Local Authorities to manage and lead on local flooding issues. The Act and The Regulations together raise the requirements and targets Local Authorities need to meet, including:

- Playing an active role leading Flood Risk Management;
- Development of Local Flood Risk Management Strategies (LFRMS);
- Implementing requirements of Flood and Water Management legislation;
- Preparation of preliminary flood risk assessments and flood risk management plans; and
- Development and implementation of drainage and flooding management strategies;

The Flood and Water Management Act also clarifies three key areas that influence development:

- Sustainable Drainage Systems (SuDS) - the Act makes provision for a national standard to be prepared on SuDS, and developers will be required to obtain local authority approval for SuDS in accordance with the standards, likely with conditions;
- Flood risk management structures - the Act enables the EA and local authorities to designate structures such as flood defences or embankments owned by third parties for protection if they affect flooding or coastal erosion. A developer or landowner will not be able to alter, remove or replace a designated structure or feature without first obtaining consent; and
- Permitted flooding of third-party land - The EA and local authorities have the power to carry out work which may cause flooding to third party land where the works are deemed to be in the interest of nature conservation, the preservation of cultural heritage or people's enjoyment of the environment or of cultural heritage

2.2 National Planning Policy Framework (NPPF) February 2019

In determining an approach for the assessment of flood risk for the proposal there is a need to review the policy context. Government Guidance requires that consideration be given to flood risk in the planning process. The National Planning Policy Framework was issued in February 2019 and outlines the national policy on development and flood risk assessment.

The Framework states that the inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.

The essence of NPPF is that:

- Local Plans should be supported by Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking advice from the

- Environment Agency and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards;
- Policies in development plans should outline the consideration, which will be given to flood issues, recognising the uncertainties that are inherent in the prediction of flooding and that flood risk is expected to increase as a result of climate change;
 - Planning authorities should apply the precautionary principle to the issue of flood risk, using a risk-based search sequence to avoid such risk where possible and managing it elsewhere;
 - The vulnerability of a proposed land use should be considered when assessing flood risk;
 - Use opportunities offered by new developments to reduce the causes and impacts of flooding;
 - Planning authorities should recognise the importance of functional floodplains, where water flows or is held at times of flood and avoid inappropriate development on undeveloped and undefended floodplains; and
 - The concept of Flood Risk Reduction, particularly in circumstances where development has been sanctioned on the basis of the “Exception Test”.

2.3 Planning Practice Guidance

The Planning Practice Guidance provides additional guidance to local planning authorities to ensure the effective implementation of the planning policy set out in the National Planning Policy Framework on development in areas at risk of flooding.

The document provides supporting information on:

- The application of the sequential approach and Sequential and Exception Tests;
- Measures to reduce flood risk to acceptable levels;
- How to manage residual risks; and
- Guidance on how to take climate change into account

2.4 The Strategic Flood Risk Assessment (SFRA)

The SFRA is a planning tool that will assist the councils in their selection and development of sustainable site allocations away from vulnerable flood risk areas. The assessment focuses on the existing site allocations, but also sets out the procedure to be followed when assessing additional sites for development in the future. The SFRA will assist the council to make the spatial planning decisions required to inform the forthcoming Local Development Frameworks (LDF).

Having reviewed the SFRA, the site is not specifically mentioned although fluvial flooding has been identified as the main risk to this area and has flooded close to the site.

3.0 Development Site Details

3.1 Development Description & Location

The site is located at grid reference SU 64525 70755. The site is located north of Gunthorpe with the River Trent located 500m south of the site.

The existing site comprises of existing farmhouse with associated agricultural buildings and external yards. The property accesses onto Lowdham Road to the west of the site. The retrospective planning application is for the agricultural building located northeast of the farmhouse.

Plans of the works can be found in Appendix D.



Figure 1 – Location Plan

3.2 Vulnerability Classification

The site is indicated as being located within Flood Zone 3 on the online flood maps.

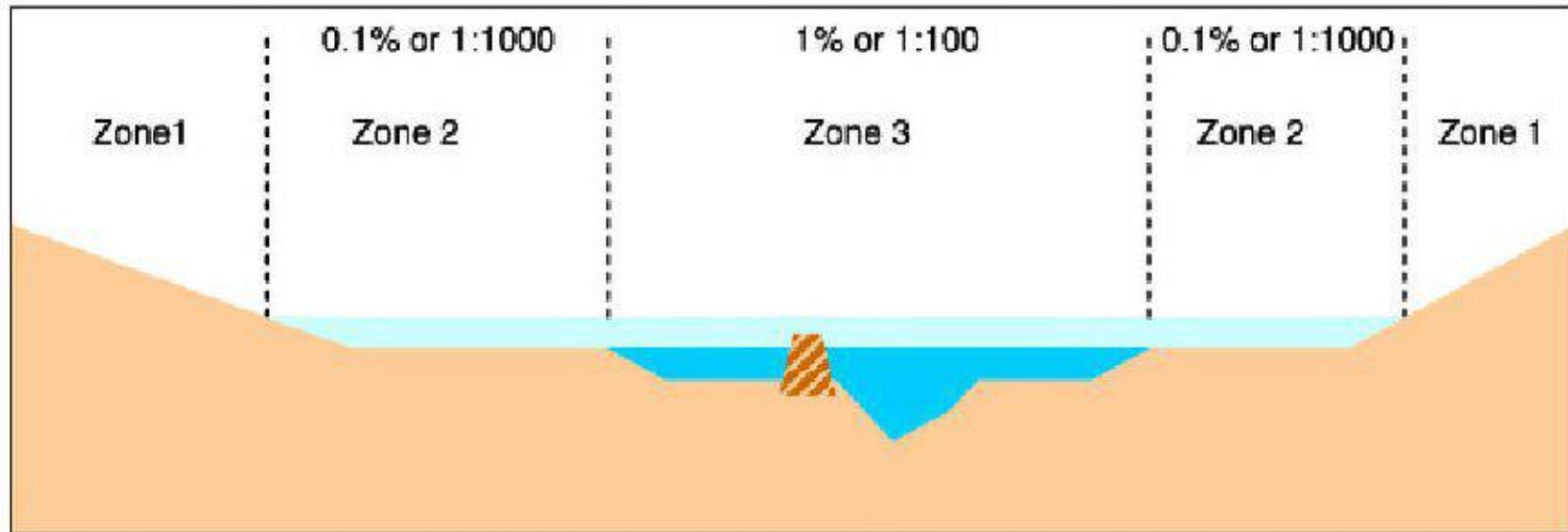


Figure 2 - Flood Zones

The Environment Agency's flood zone map is provided in Appendix C.

The existing site is agricultural therefore should be considered "less vulnerable"; the proposed works do not alter the vulnerability classification based on the Environment Agency Flood risk assessments: climate change allowances Guidance 2017.

A topographical survey to OSBM confirms that the finished floor level (FFL) of the existing building is 17.83 AOD. The external hardstanding area to the west is at 17.75m with the field to the north at 17.55m.

3.3 Site Drainage

The existing surface water drainage is believed to discharge into the sands and gravel superficial soils near the surface.

Existing topographical survey can be found in Appendix B.

4.0 Flood Probability and Hazard

4.1 Catchment Background

The site lies within the Dover Beck Catchment which is part of the wider Humber Catchment.

Dover Beck Catchment (tributary of Trent) is a river in Nottinghamshire. Dover Beck Catchment (tributary of Trent) takes in water from an area around 67.533 km² in size and is part of the Nottinghamshire South A catchment area. Dover Beck Catchment (tributary of Trent) is 23.992 km long and is not designated artificial or heavily modified.



Figure 3 – Dover Beck Catchment, Source Environment Agency

4.2 Local Geology

BGS Geology maps and boreholes indicate that the site is underlain by sand and gravel, over Gunthorpe Mudstone. The ground water levels are likely to be located within the sands and gravels and will fluctuate seasonally.

4.3 Groundwater Source Protection Zone

The site lies outside the groundwater Source Protection Zone.

No additional measures for the protection of the groundwater will be required.

4.4 Historical Flooding

A review of historic flooding was carried out within the SFRA. The site is close to the flooding during the 1947 flood event indicated in green on the extract below.

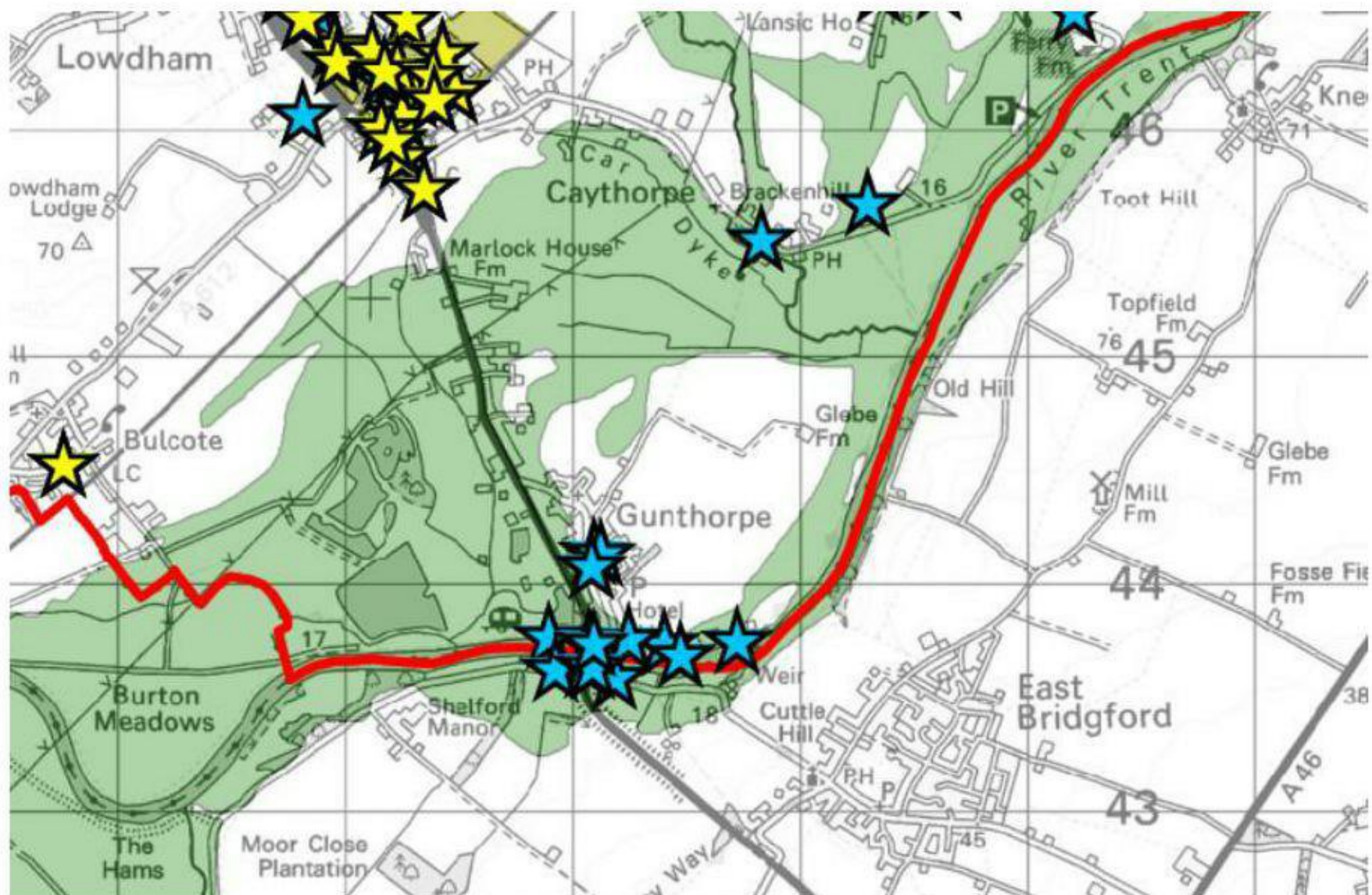


Figure 4 – Historical Flood Map SFRA

4.5 Flood Zone

Flood zones describe the extent of flooding that would occur on the basis that no flood defences were in existence. They also describe the extent to which land under scrutiny is afforded protection by the presence of defences. The definition of Flood Zones is provided in the EA Flood risk assessments: climate change allowances.

4.6 Sources of Flooding – Flood Risk

The NPPF describes potential sources of flooding. It is necessary to consider the risk of flooding from all sources within an FRA. This section provides a review of flooding from land, sewers, groundwater and artificial sources, in addition to rivers.

4.7 Fluvial and Tidal Flood Risk

A review of the flood extents from the SFRA and Environment Agency flood data indicate that the site is in flood zone 3 on the EA flood maps and based on the available flood data.

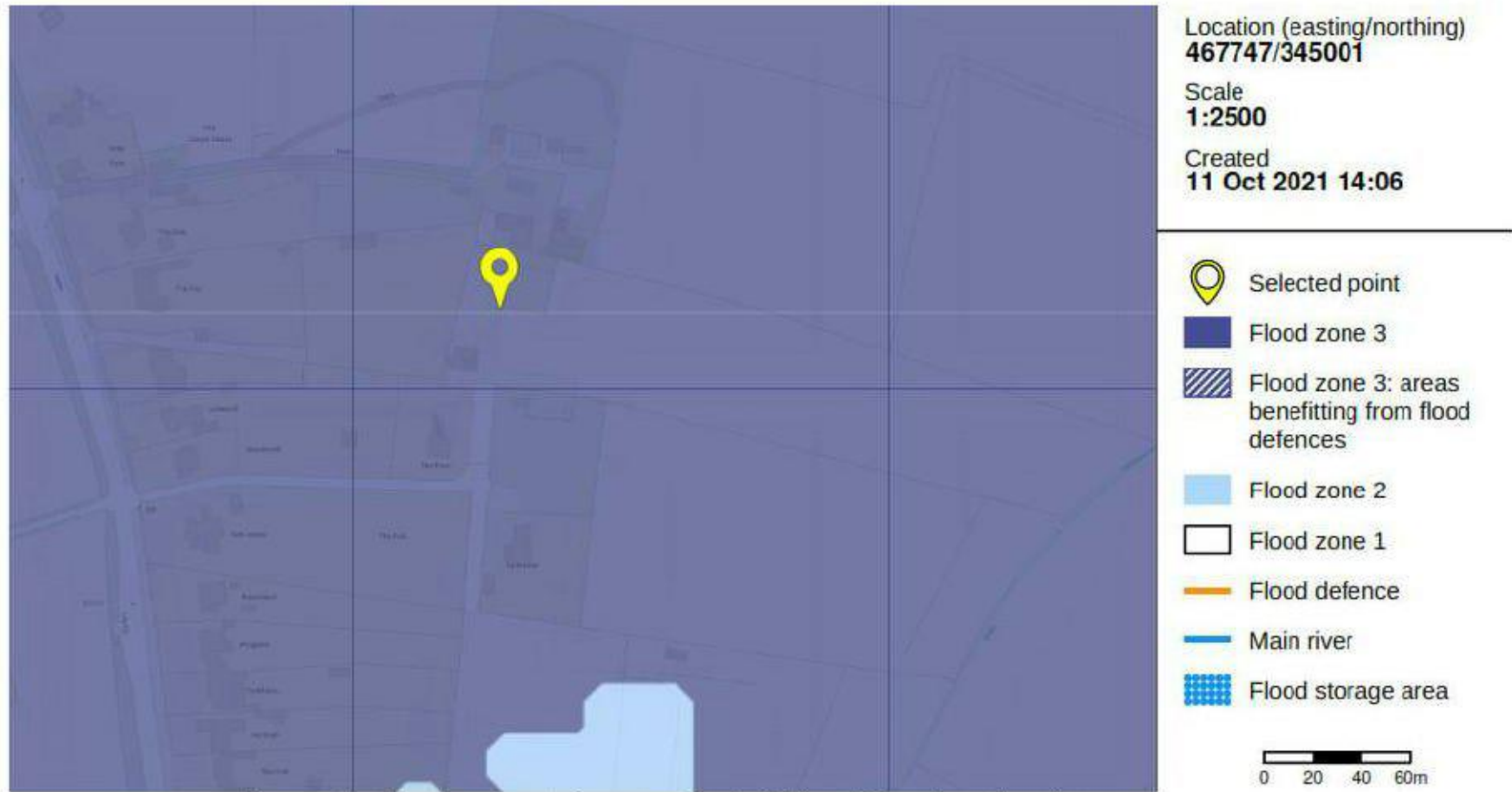


Figure 5 - Environment Agency Fluvial Flood Map for planning

The building being reviewed is an agricultural storage building therefore will not increase the vulnerability on or off site.

The flood data provided by the Environment Agency has confirmed the following modelled flood levels for the site. The Environment Agency have confirmed that the Halcrow model levels should be used to assess the site.

Flood Event	Halcrow 2011 Model Level (m AOD)	JBA Model 2014 (m AOD)
5%AEP	N/A	N/A
1%AEP	17.90	N/A
1%AEP+ 20%cc	18.10	N/A
0.1%AEP	18.40	N/A

Using current guidance for climate change for the Humber Catchment (Lower Trent and Erewash) 2050's Central allowance for climate change of 17% should be used to assess the site with a review of the higher central allowance 23%.

The flood data provided by the Environment Agency gives a 1%AEP + 20% climate change flood level of 18.10m AOD.

The building in the location at 17.83m AOD therefore 270mm below the 20% climate change flood level.

The agricultural building is located slightly above the existing ground level but is below the design flood level therefore is at risk of fluvial flooding in extreme events. Additional flood resilience measure will be required to ensure the building is adequately protected for fluvial flood events.

4.8 Flood Risk from Surface Water & Overland Flow

Flooding from land can be caused by rainfall being unable to infiltrate into the natural ground or enter the drainage systems due to blockage, or flows being above design capacity. This can then result in (temporary) localised ponding and flooding. The natural topography and location of buildings / structures can influence the direction and depth of water flowing off impermeable and permeable surfaces.

The Environment Agency surface water flood maps show the site is outside any areas at risk of surface water flooding up to and including the 1000-year surface water flood event.

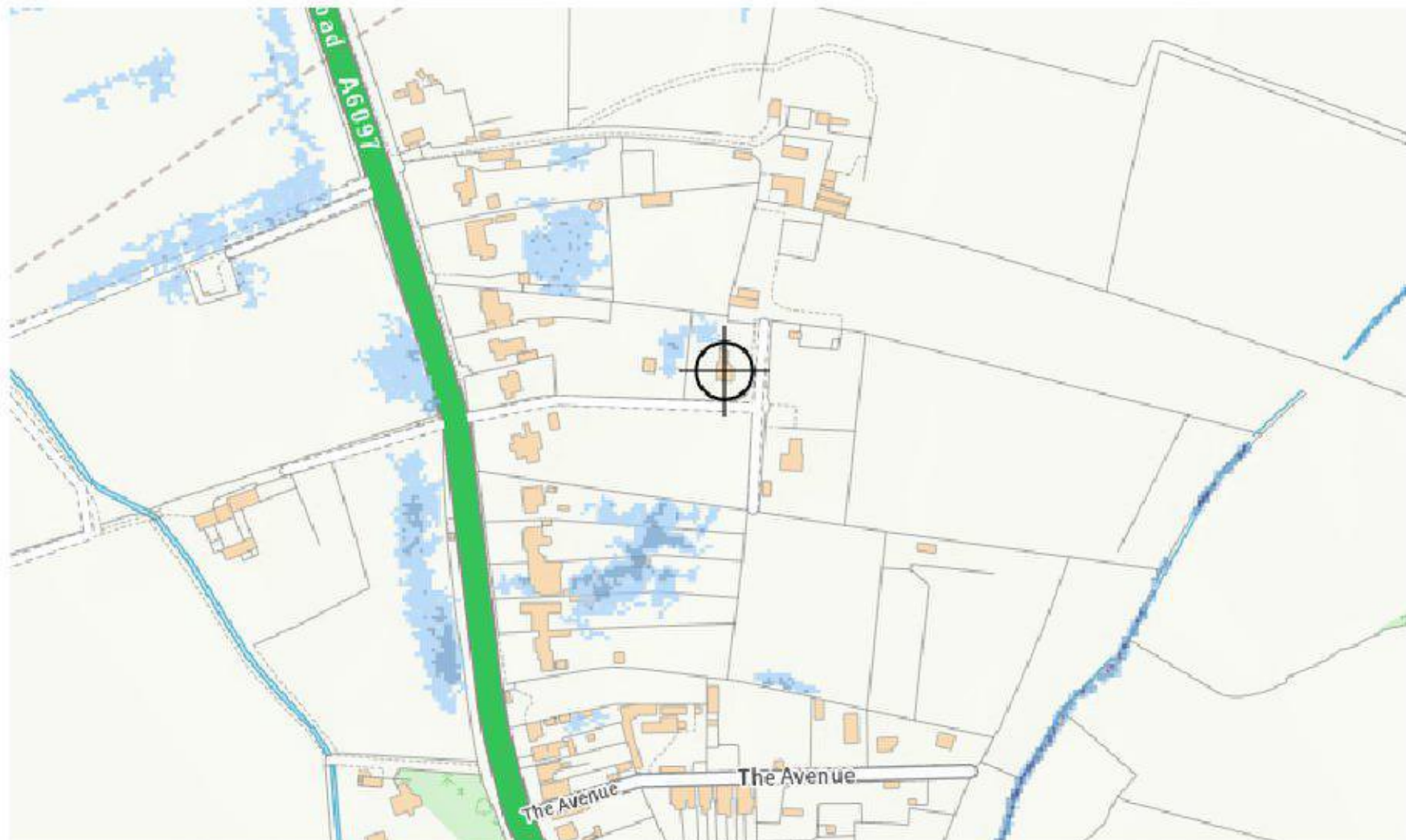


Figure 6 – Environment Agency 1000-year Surface water flood map

Based on the information reviewed, it is considered that the agricultural building is at a **LOW** risk of surface water and overland flow flooding.

4.9 Flood Risk from Groundwater

There are several mechanisms which produce groundwater flooding including prolonged rainfall raising groundwater levels, high in bank river levels, artificial obstructions and groundwater rebound.

The BGS geology mapping and boreholes indicate sands and gravels over mudstone. The underlying ground conditions are porous and may result in high groundwater level during flood events.

The risk of groundwater flooding to the site is considered **LOW** as there are no basements and any groundwater flooding would be associated with fluvial flooding therefore the fluvial flooding will take precedence.

4.10 Flood Risk from Sewers

Surface water flooding as a result of sewer blockages, failures or insufficient capacity has the potential to contribute significant flood risk in urban areas. This is due to the rapid runoff rates associated with urban land use and the volume of water that flows into the sewer systems in relatively short periods of time.

The surface water system for the building has been designed to discharge under gravity into local soakaways. All surrounding buildings are assumed to discharge into the ground as there are no public surface water sewers local to the site.

There are no reported sewer flooding events indicated on the SFRA local to the site.

It is concluded that there is a **LOW** risk of sewer flooding to the agricultural building.

4.11 Flood Risk from Artificial Sources

Artificial sources of flooding include reservoirs, canals, lakes and mining abstraction.

The site is located outside the extent of flooding from reservoirs but would be at risk when there is also flooding from rivers.

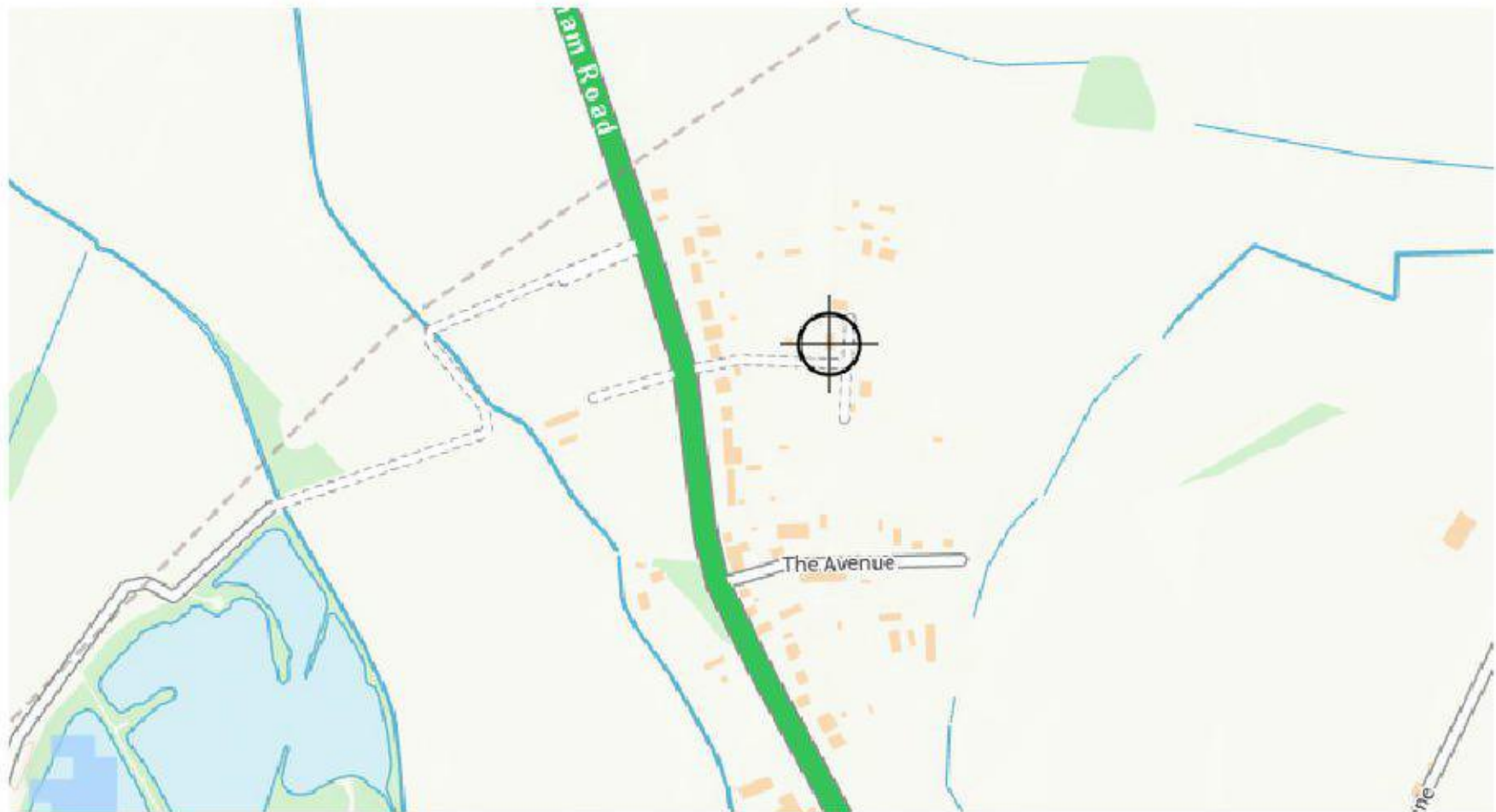


Figure 7 – Reservoir Flood Map when rivers are normal

The Environment Agency states that “Reservoir flooding is extremely unlikely. There has been no loss of life in the UK from a reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to make sure reservoirs are well maintained.”

The agricultural building is at a **LOW** risk of reservoir flooding.

5.0 Flood Risk Management

5.1 Principles of Flood Risk Management

NPPF requires a precautionary approach to be undertaken when making land use planning decisions regarding flood risk. This is partly due to the considerable uncertainty surrounding flooding mechanisms and how flooding may respond to climate change. It is also due to the potentially devastating consequences of flooding to the people and property affected.

Flood risk is a combination of the probability of flooding and the consequences of flooding. Hence 'managing flood risk' involves managing either, the probability of flooding or the consequences of flooding, or both.

NPPF requires flooding from tidal, fluvial, overland, surface water & sewerage and from groundwater to be considered. The flood risk management measures discussed in this section are based on the sources of flooding identified in Section 4 that are considered to pose a risk to the development proposals.

5.2 Flood Risk Management

Section 4 identified the sources of flooding that require investigating to ensure that the risk to the building is an acceptable level in compliance with NPPF:

- Fluvial Flood Risk.

5.3 Fluvial Flood Risk

The location of the agricultural building is in flood zone 3.

The building is at risk of fluvial flooding and has already been constructed therefore the floor level cannot be adjusted. The building is for agricultural use and is therefore classified as less vulnerable.

The existing building needs to incorporate flood resilience measures to ensure that any critical equipment and storage of materials likely to be damaged from water are raised 300mm above the design flood level. A raised floor could be incorporated in specific storage areas within the building to allow flood water to flow under the raised floor during flood events.

The doors into the building will be constructed to allow flood water into the building by incorporating bars at 100mm centres below the design flood level of 18.10m to allow flood water to flow into and out of the building during extreme flood events.

6.0 Safe Access/Egress Arrangements

6.1 Access & Egress

Demonstrating safe access and egress is available for the site for the development lifetime is a key factor in demonstrating compliance with the NPPF. This requires site occupants to be able to safely access and exit the building in design flood conditions. Vehicular access to allow the emergency services to safely reach the development during design flood conditions is also normally required.

Main access and egress from the site will remain unchanged into A6097. The agricultural building will not adversely affect the access and egress to the site for both pedestrian and emergency access which will remain unchanged. There is no increased burden on emergency services as a result of this building.



Figure 8 – Flood depth hazard

7.0 Flood Resilience and Resistance.

The agricultural building will be allowed to flood during extreme fluvial flood events to ensure that there is no loss of floodplain storage. The building will be made flood resilient to reduce the impact of flooding which will include the following measures:

- All electrical sockets and equipment should be located 300mm above the design flood level at a level >18.40m.
- Storage racking to be installed to enable any products that could be damage by water to be raised above the design flood level.
- Raised access floors can be installed within storage areas to raise the floor above the design flood level and allow flood water to be stored below the raised floor.

8.0 Floodplain Volume

The Environment Agency Humber River Basin – Flood risk Lower Trent and Erewash management catchment has been recorded as having 10,383 hectares of agricultural land in defined areas at high risk of fluvial flooding.

Agricultural Land (Grades 1, 2 & 3)					
Defined Area	Area of agricultural land (hectares) in defined area	Area of agricultural land (hectares) in defined area at high risk	Area of agricultural land (hectares) in defined area at medium risk	Area of agricultural land (hectares) in defined area at low risk	Area of agricultural land (hectares) in defined area at very low risk
River Basin District					
Humber	1,548,525	70,840	104,693	83,847	2,783
Management Catchment					
Aire and Calder	52,144	3,711	5,198	2,089	6
Derbyshire Derwent	23,255	929	228	291	0
Derwent (Humber)	148,291	5,642	11,464	8,426	19
Don and Rother	82,505	2,027	4,797	9,296	9
Dove	34,402	1,209	532	895	1
Esk and Coast	10,795	216	32	75	0
Hull and East Riding	193,031	4,938	18,703	14,243	14
Idle and Torne	109,789	7,960	13,064	9,545	4
Louth Grimsby and Ancholme	132,775	9,108	12,860	5,066	2,391
Lower Trent and Erewash	189,558	10,383	24,176	17,806	285
Soar	117,200	3,079	1,567	1,224	16
Staffordshire Trent Valley	91,092	1,758	1,799	1,060	4
Swale, Ure, Nidd and Upper Ouse	192,927	11,740	4,722	6,775	16
Tame Anker and Mease	108,398	3,270	2,206	1,944	11
Wharfe and Lower Ouse	61,133	4,079	3,319	5,099	8

Figure 9 – Environment Agency Agricultural Land at risk of flooding

The construction of the agricultural building is 20.5m x 6.7m building with additional open-air storage. The building has been constructed using blockwork and concrete floor. The floor level of the building is located slightly above the existing ground level therefore is allowed to flood during a flood event. The walls of the agricultural building occupy a plan area of 18m² which would have an insignificant effect on the overall flood storage area of the Lower Trent and Erewash flood storage.

9.0 Conclusion

- The agricultural building is in Flood Zone 3 and would flood to a depth of 270mm in the 1%AEP+20% climate change event.
- The building will be allowed to flood to reduce the impact on the local and wider flood storage volumes
- Flood resilience measures will be implemented to ensure critical electrical equipment and storage of vulnerable items are raised above the design flood level.
- Doors will be constructed to allow flood water to flow through the building during extreme flood events to minimise the impact on the surrounding area.
- The building will not increase the risk of flooding on or off site.

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Appendix A

Flood Zones

Table 1: Flood zones

(Note: These flood zones refer to the probability of river and sea flooding, ignoring the presence of defences)

Zone 1 - low probability**Definition**

This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

Appropriate uses

All uses of land are appropriate in this zone.

Flood risk assessment requirements

For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a flood risk assessment. This need only be brief unless the factors above or other local considerations require particular attention.

Policy aims

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems².

Zone 2 - medium probability

Definition

This zone comprises 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.

Appropriate uses

Essential infrastructure and the water-compatible, less vulnerable and more vulnerable uses, as set out in table 2, are appropriate in this zone. The highly vulnerable uses are *only* appropriate in this zone if the Exception Test is passed.

Flood risk assessment requirements

All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage systems.

Zone 3a - high probability

Definition

This zone 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 flooding from the sea (>0.5%) in any year.

Appropriate uses

The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone.

The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

Flood risk assessment requirements

All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;

- relocate existing development to land in zones with a lower probability of flooding; and
- create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b - the functional floodplain

Definition

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. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

Appropriate uses

Only the water-compatible uses and the essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows; and
- not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

Flood risk assessment requirements

All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;
- relocate existing development to land with a lower probability of flooding.

Table 2: Flood risk vulnerability classification

<p>Essential infrastructure</p> <ul style="list-style-type: none">• 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.
<p>Highly vulnerable</p> <ul style="list-style-type: none">• Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding.• Emergency dispersal points.• Basement dwellings.• Caravans, mobile homes and park homes intended for permanent residential use³.• Installations requiring hazardous substances consent⁴. (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”)⁵.
<p>More vulnerable</p> <ul style="list-style-type: none">• 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 waste⁶.• Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.⁷
<p>Less vulnerable</p> <ul style="list-style-type: none">• Police, ambulance and fire stations which are <i>not</i> required to be operational during flooding.

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 working and processing (except for sand and gravel working).
- Water treatment works which do *not* need to remain operational during times of flood.
- Sewage treatment works (if adequate measures to control pollution and manage sewage 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 defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation 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 a specific warning and evacuation plan*.

Notes to table 2:

a. This classification is based partly on Department for Environment, Food and Rural Affairs and Environment Agency research on *Flood Risks to People (FD2321/TR2)*⁸ and also on the need of some uses to keep functioning during flooding.

b. Buildings that combine a mixture of uses should be placed into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.

c. The impact of a flood on the particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.

Table 3: Flood risk vulnerability and flood zone ‘compatibility’

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	x	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	x	x	x

Key: ✓ Development is appropriate.
 x Development should not be permitted.

Notes to table 3:

This table does not show:

- a. the application of the Sequential Test which guides development to Flood Zone 1 first, then Zone 2, and then Zone 3;
- b. flood risk assessment requirements; or
- c. the policy aims for each flood zone.

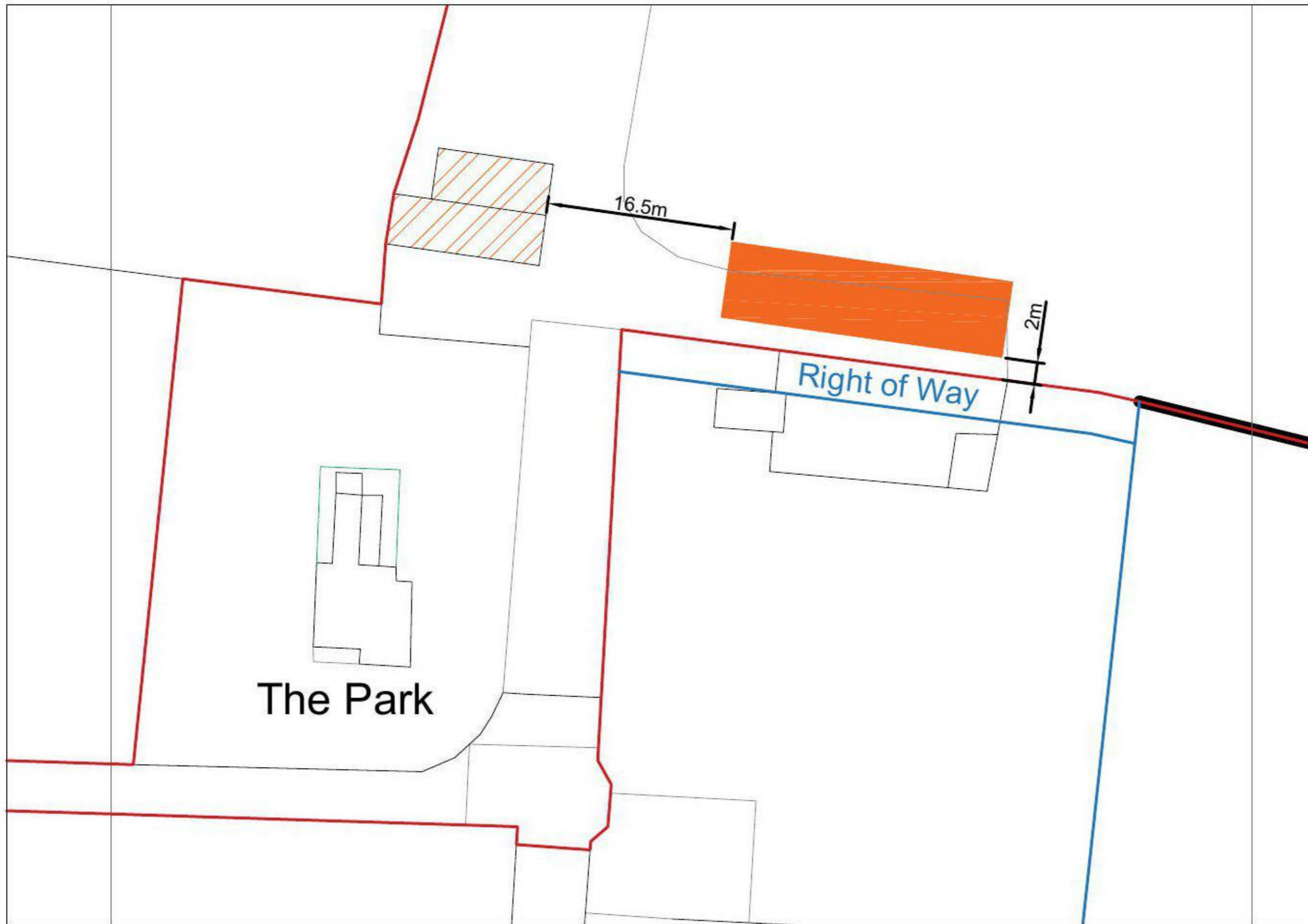
Appendix B

Surveys



Floor Plan

Items in **RED** are yet to be added

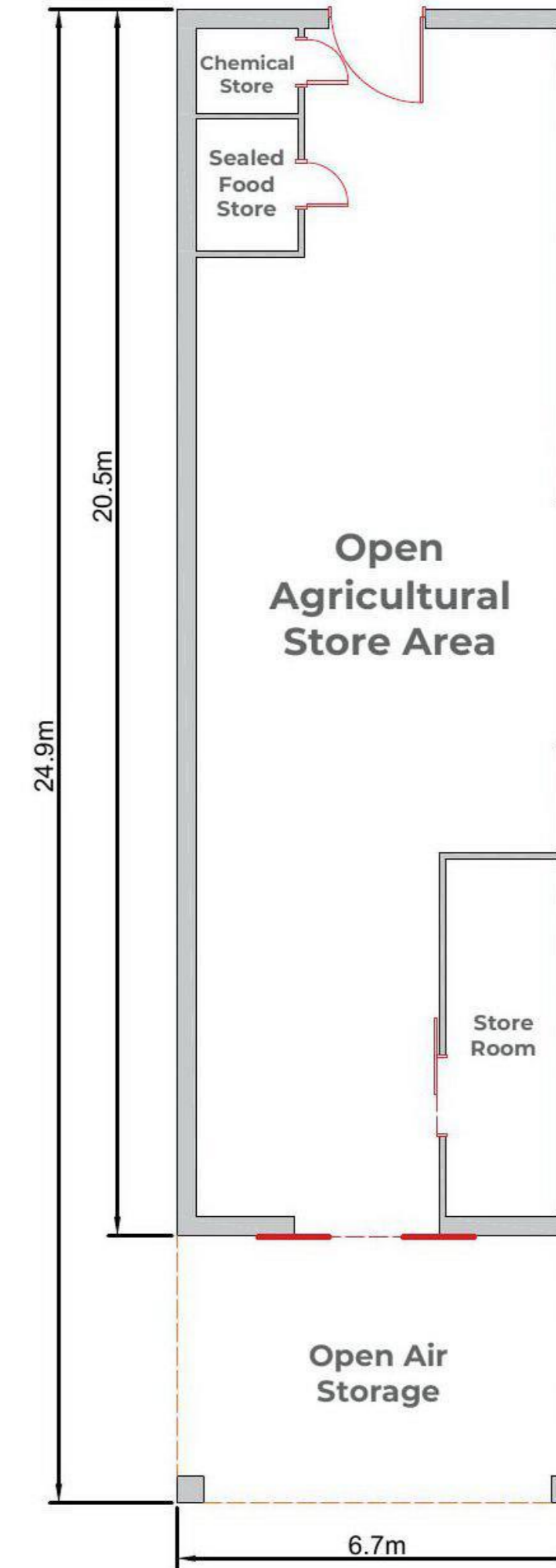


Site Plan

Scale: 1:500

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Do not scale this drawing. Any discrepancies should be reported to the designer. All units are in meters unless stated otherwise. Prior to the commencement of work the contractor and client are to check all exterior dimensions on-site, setting out positions, boundary positions and verify and agree on any details. Any errors, omissions or design changes need to be reported immediately. Amended plans can then be prepared and reapproved.

The position of any site boundaries indicated on this drawing are approximate. The client is responsible for confirming the legal position of all the relevant site boundaries and confirm ownership and/or responsibility for any boundary partitions likely to be affected by the works detailed in this drawing. The client must agree on all boundary related issues with neighboring property owners prior to the commencement of work. The "Party Wall Act" (1996) will apply to certain projects. The "Building Owner" will need to inform in writing (including copies of the plans) and agree with "Adjoining Owner(s)" if the proposed work affects the party wall, if it is within 3m of the boundary or require excavation near or below the foundations of the nearby building(s) on their property. This is required to be done 2 months before the commencement of any work. If an agreement can not be made then surveyor(s) must be appointed to agree upon a "Party Wall Award". ProDesign does not take any responsibility in this.

Approvals granted by the local authority only relate to permissions under; the Town & Country Planning Act (1990) and/or Building Regulations (2000). The client is responsible for ensuring that this drawing does not contravene any other legislation relating to the property, including; property title deeds, covenants, land ownership/tenancy, site boundaries, boundary encroachment & rights of way, etc.

All work is to comply with "The Construction (Design and Management) Regulations" (2015). Where multiple contractors are used on the same project, the principle contractor must take on the legal duties of the client in addition their own as the principle contractor. If the client does not appoint a principle contractor, the clients duties must be carried out by the contractor in control of the construction work.

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Revision: 00 Revision History:

Rev:	Date:	Notes:
00	25/04/2021	Initial Drawing

Drawn by:

Declan Hutchinson

Client:

Sandy Johal-Gill

Project:

New Dev. - Agricultural Building - Retrospec.
The Park, Lowdham Rd, Gunthorpe, NG14 7ES

Drawing Title:

DH/N/AG/RET

Date:

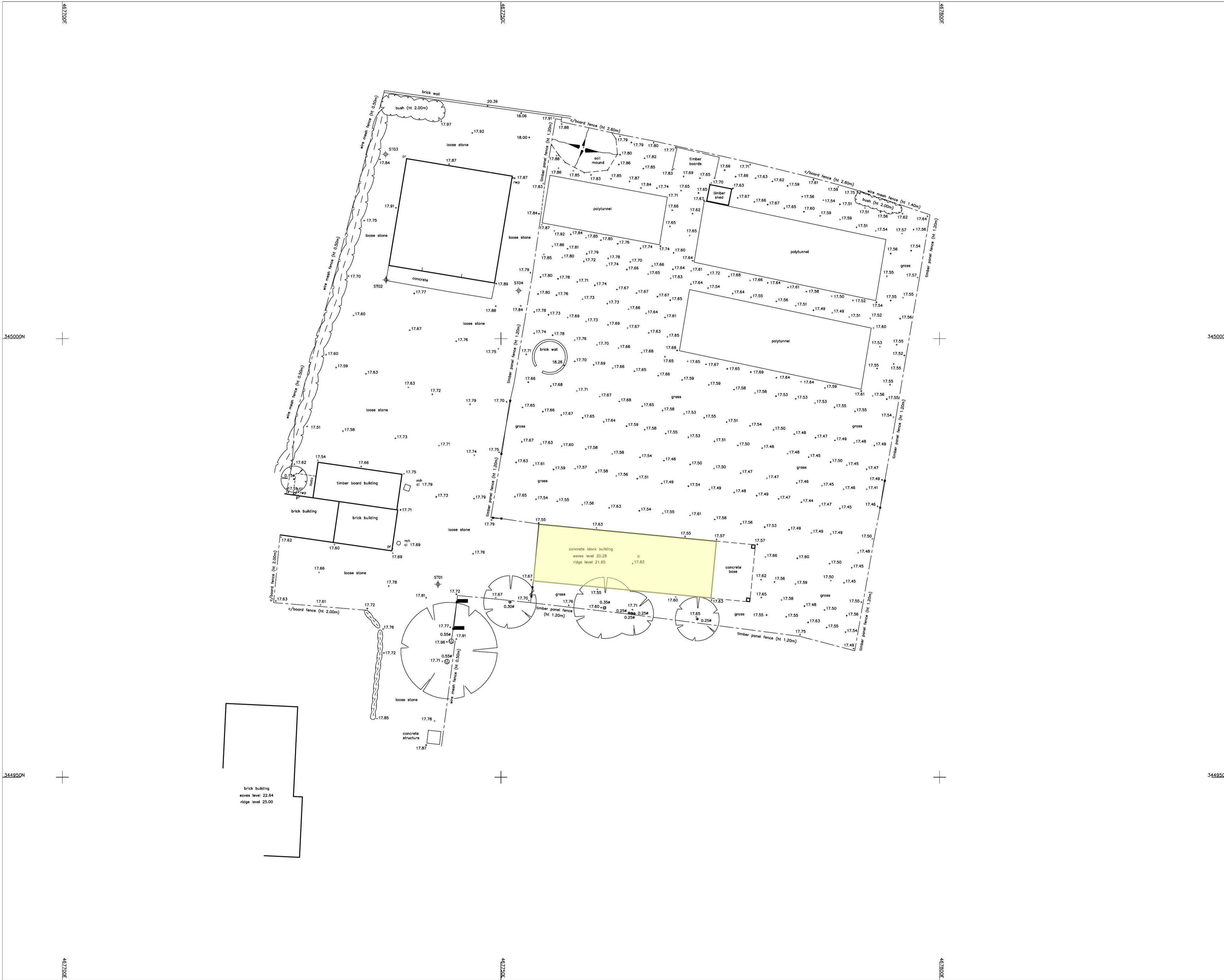
25/04/2021

Scale @ A3:

1:500, 1:125

Sheet:

2 of 4



NOTES

GENERAL NOTES :-
 ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.
 GRID COORDINATES ARE ORDNANCE SURVEY NATIONAL GRID DERIVED FROM GPS TRANSFORMATION.
 GPS COORDINATES AND LEVELS SET AT ST01 (NO SCALE FACTOR APPLIED)
 THIS DRAWING HAS BEEN PRODUCED WITH A PLOT SCALE ACCURACY OF 1:200
 SERVICE COVERS INDICATED WHERE VISIBLE. PIPE INVERTS / DETAILS SURVEYED FROM SURFACE INSPECTION ONLY. GENERALLY DAMAGED COVERS AND COVERS WITHIN HIGHWAYS WILL NOT BE LIFTED
 TREE SPECIES SHOULD BE CONFIRMED BY TREE SPECIALIST IF CRITICAL.
 OVERHEAD CABLES ARE INDICATED USING REMOTE SURVEY METHODS AND ARE SUBJECT TO SEASONAL VARIATION AND SHOULD BE TREATED AS APPROXIMATE.
 SERVICE COVERS LOCATED UNDER PARKED VEHICLES/MOBILE STRUCTURES MAYBE OMITTED.
 BURIED SERVICE COVERS WILL NOT BE INDICATED.

TOPOGRAPHICAL SURVEY/UTILITY KEY :-

(ht) = height	mh = manhole cover
Ø = diameter	mr = marker
a/r = assumed route	a/h = over head
av = air valve	oi = off set
bb = belisha beacon	osa = off survey area
bd = back drop	OSBM = ordnance survey bench mark
bol = bollard	p & r = fence - post & rail fence
bot = bottom of shaft	re = rodding eye
bt = telecom	ret wall = retaining wall
c/b fence = closeboard fence	rs = road sign
c/box = control box	rw/p = rain water pipe
cstv = cable television	s/catch = silver birch
cl = cover level	s/p = safety paving
con = concrete	asp = asphalt
cr = cable riser	sec fence = security fence
cwc = combined water sewer	sfc = soil filled chamber
c/chan = drainage channel	sl = soil pipe
dp = depth	sl = slop top
elb = electric junction box	sv = stop valve
elec = electric	svp = soil vent pipe
end = end of trace	s/w = storm water sewer
ep = electric pole	TBM = temporary bench mark
er = earth rod	tfr = taken from records
fl = floor level	tl = threshold level
fh = fire hydrant	top = top of cop
fi = floor level	top = top of pipe
fs = fire switch	tot = top of tank
fw = foul water chamber	tp = telecom pole
fw = foul water sewer	ts = traffic signal
g = gully	u/s = underside
g/run = gully run	ur = unable to lift
gr = gas riser	ur = unable to rod
h/chestnut = horse chestnut	ur = unable to survey
h/thorn = hawthorn	ur = unable to trace
ic = inspection cover	ur = unable to trace
il = invert level	ur = unable to trace
il = illuminated	ur = unable to trace
int = interconnector	ur = unable to trace
ip = lamp post	ur = unable to trace

SURVEY CONTROL :-

STATION	EASTINGS	NORTHINGS	LEVEL
ST01	467742.825	344971.997	17.810
ST02	467736.895	345006.711	17.928
ST03	467736.855	345021.019	17.773
ST04	467752.026	345005.477	17.913



UTILITY SURVEY KEY :-

	HATCHED AREA		ELECTRIC CABLE
	BORHOLE		WATER PIPE
	CPT		FOUL SEWER
	TRIAL PIT		STORM SEWER
	HAND PIT		COMBINED SEWER
	WINDOW SAMPLE		DUCTS
			CABLE TELEVISION
			DATA CABLE
			TELECOM CABLE
			GAS PIPE
			UNIDENTIFIED SERVICE
			OTHER
			CCTV
			TRAFFIC LIGHT
			OFFSET FILL
			VENT
			FUEL PIPE
			GAUGE LINES
			PIPE
			ASSUMED ROUTE
			TAKEN FROM RECORDS

DISCLAIMER :-
 Electromagnetic techniques have been used in the location of underground services. The results are not infallible and trial excavations should be carried out to confirm service identification, positions and particularly depths, where these are critical. The completeness of the underground services information cannot be guaranteed.
 This method of survey does not differentiate between live and dead services, and as such all services should be treated as live. This drawing may not include the location of all public services that may cross the site, therefore the relevant service drawings should be obtained from the appropriate utility company and used in conjunction with this drawing.
 Private service signs and cables in highways are not shown, but their presence should be anticipated.
 Additional ground structures or obstructions not shown on this drawing may be present. Reference should be made to historical plans and as-built drawings. Locations in the vicinity of services should be carried out with due diligence ref: HSC47 document avoiding dangers from underground services

UTILITY NOTES

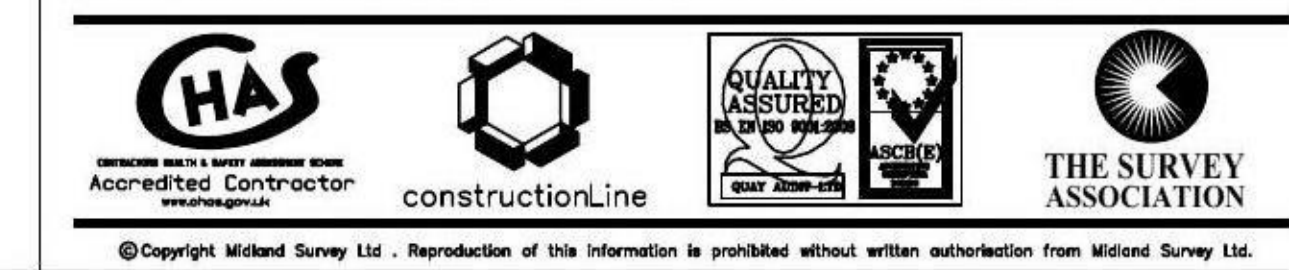


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www.midlandsurvey.co.uk

Client	IAN PATON
Project	4178, LINDHAM ROAD, GUNTHORPE
Title	TOPOGRAPHICAL SURVEY
Date	NOVEMBER 2021
Scale	1:200@A1
Dwg No	40421/1
Surveyor	J.D
Checked	L.R

TOPOGRAPHICAL (LAND) SURVEYORS / UTILITY SURVEYORS
 BUILDING MEASUREMENT SURVEYORS / 3D LASER SCANNING



Appendix C

Flood Information

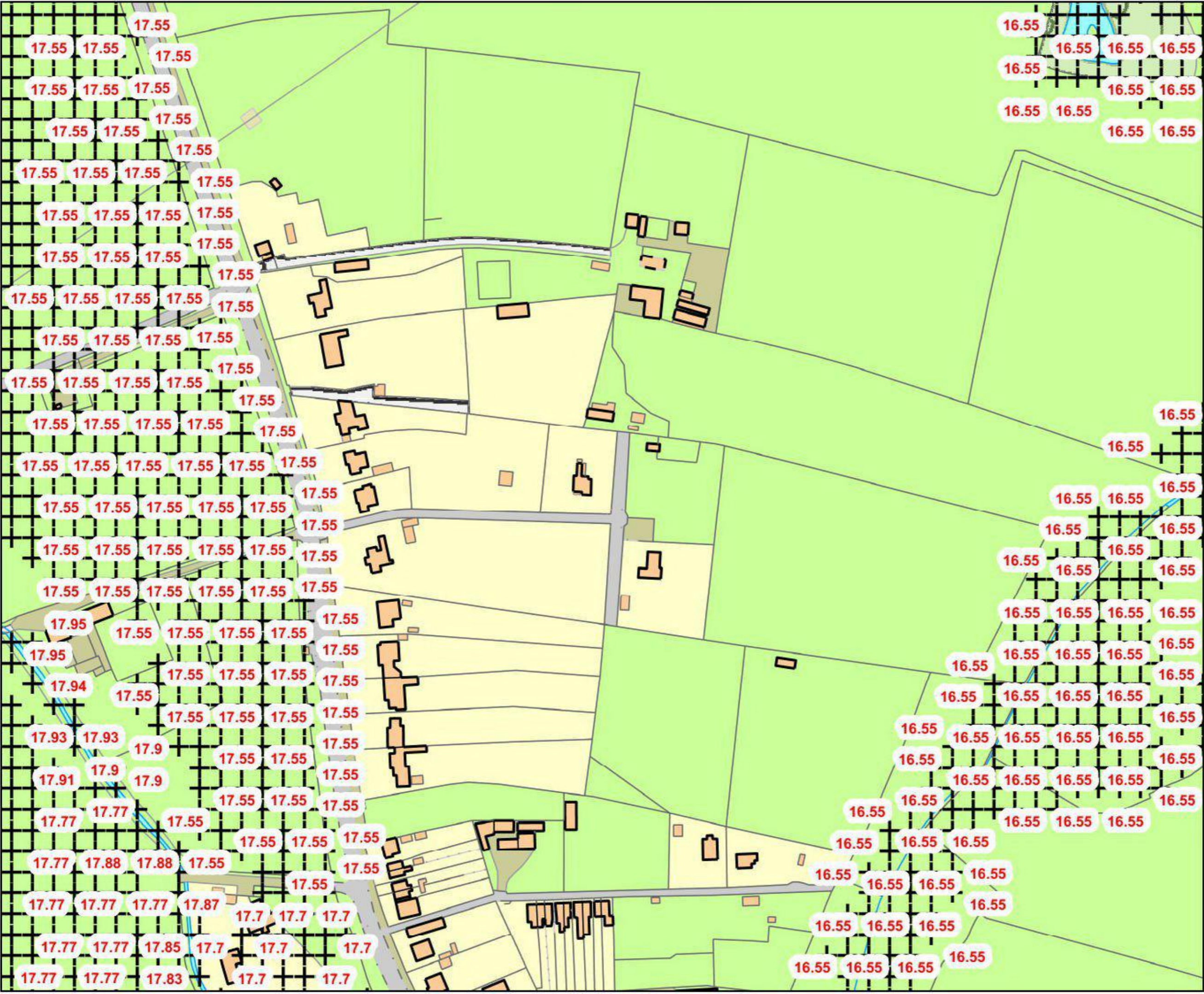
Floodplain Height Map centred on The Park, Lowdham Road, Gunthorpe

Ref: [EMD237573]



Scale 1:2,500
Date created: 29 October 2021

Legend
+ 1 in 100 year extent



Source:
Nottingham Tributaries SFRM,
JBA, January 2014

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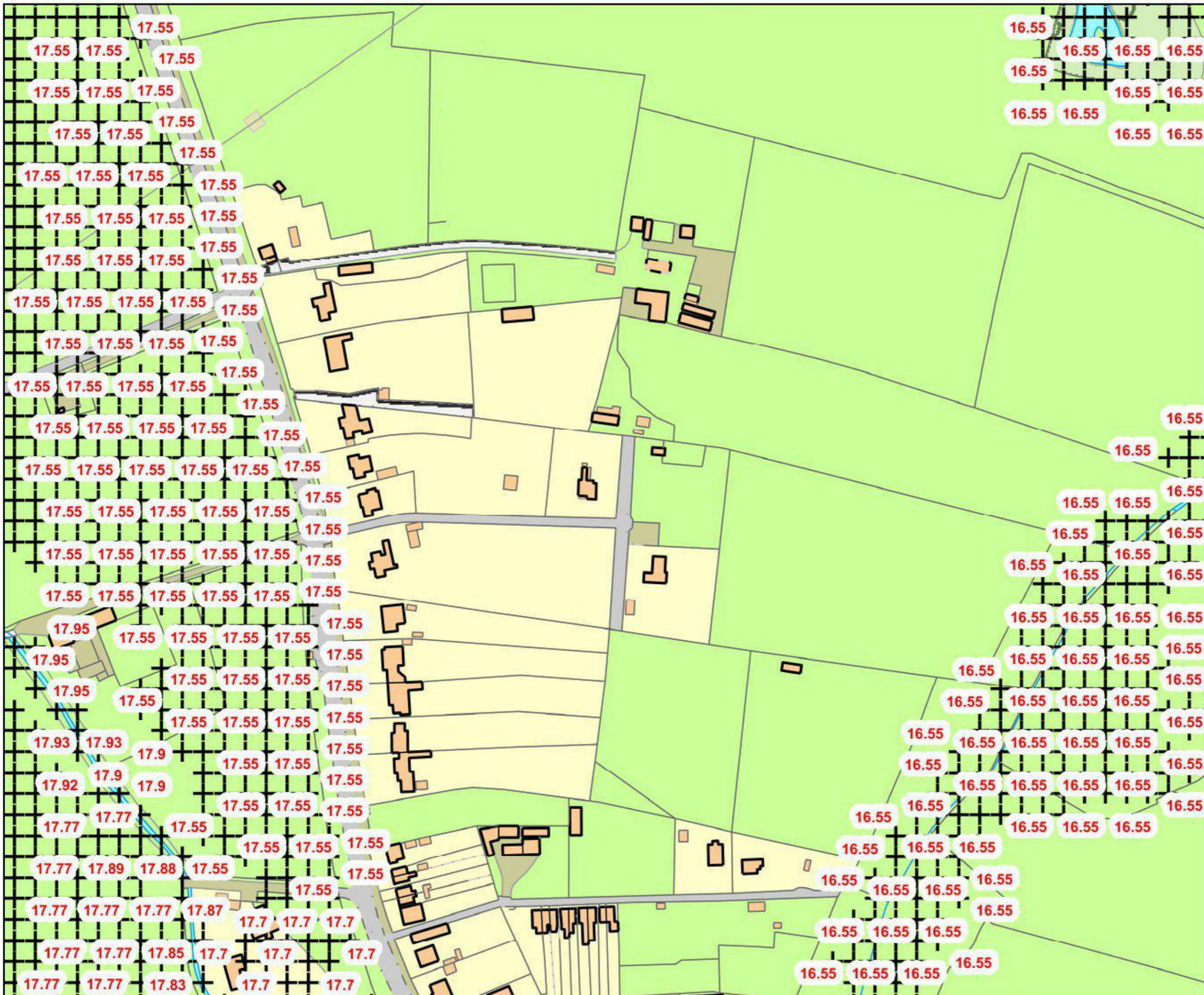
Floodplain Height Map centred on The Park, Lowdham Road, Gunthorpe

Ref: [EMD237573]



Scale 1:2,500
Date created: 29 October 2021

Legend
+ 1 in 100 year +CC height



Source:
Nottingham Tributaries SFRM,
JBA, January 2014

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Floodplain Height Map centred on The Park, Lowdham Road, Gunthorpe

Ref: [EMD237573]

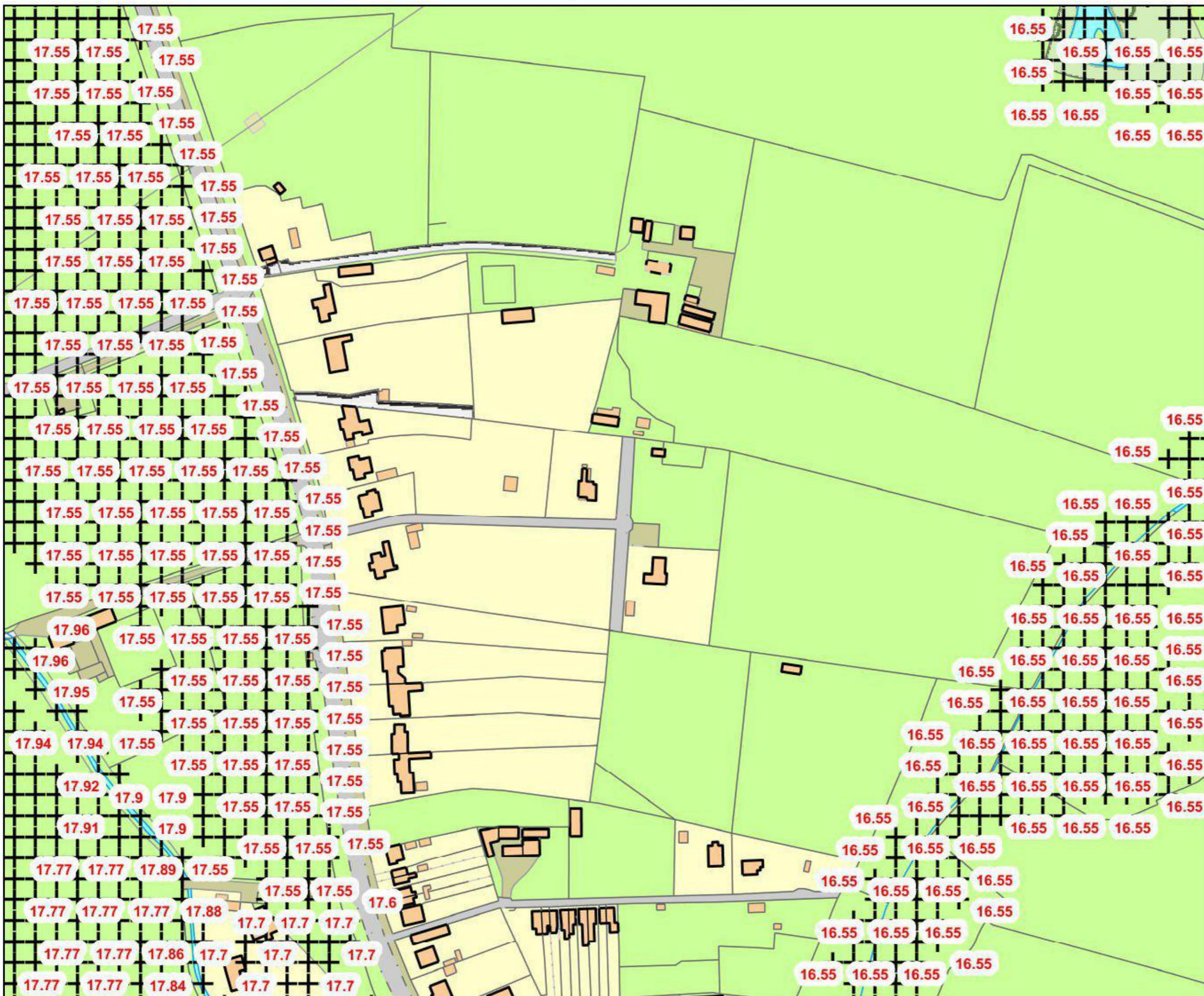


Scale 1:2,500

Date created: 29 October 2021

Legend

+ 1 in 1000 year height



Source:
Nottingham Tributaries SFRM,
JBA, January 2014

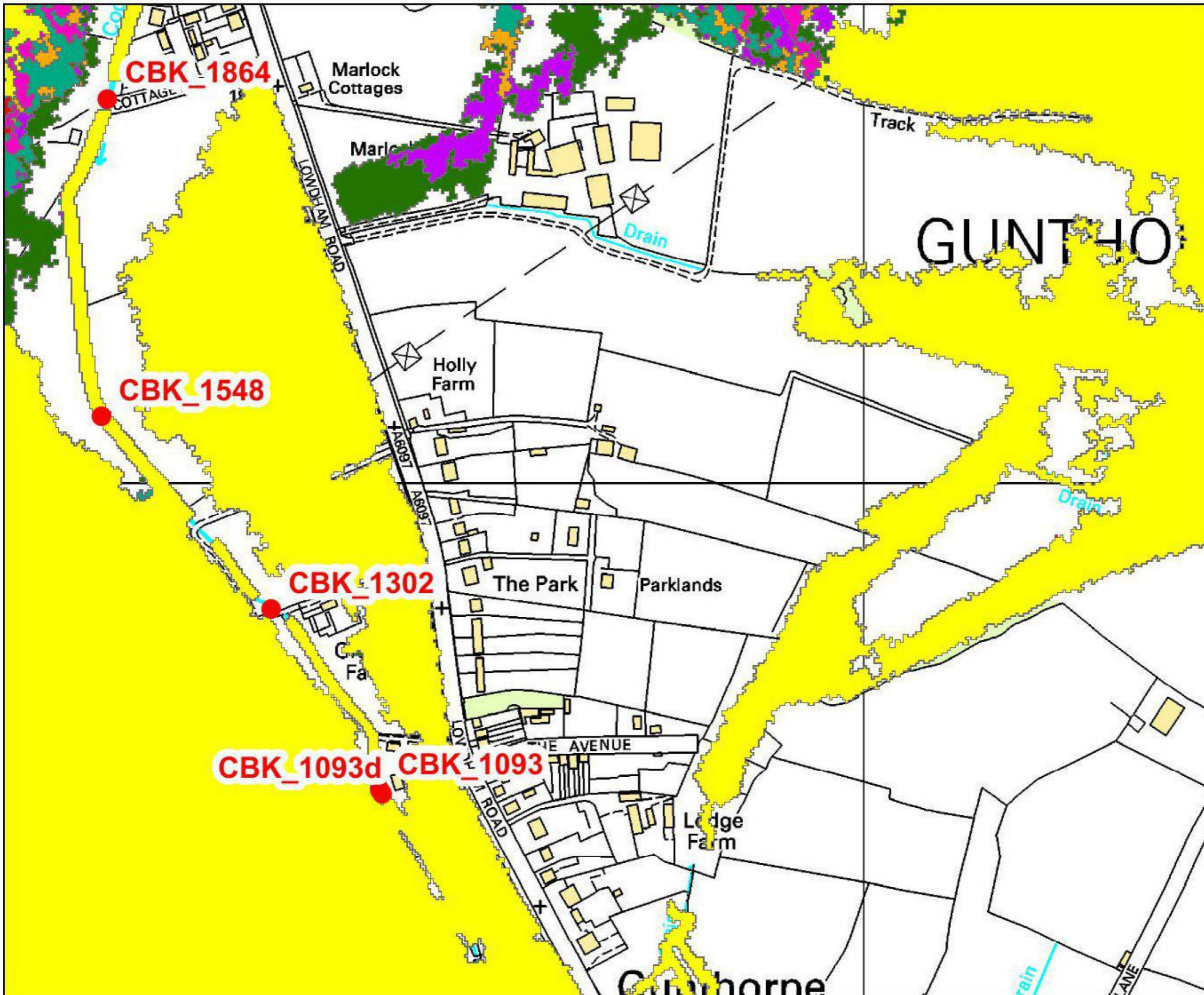
Modelled Flood Extents Map centred on The Park, Lowdham Road, Gunthorpe
Ref: [EMD237573]



Scale 1:5,000
 Date created: 29 October 2021

Legend

- Modelled Node Location and Reference (Trib)
- 1 in 5 year extent
- 1 in 10 year extent
- 1 in 20 year extent
- 1 in 50 year extent
- 1 in 75 year extent
- 1 in 100 year extent
- 1 in 100 year +CC extent
- 1 in 200 year extent
- 1 in 1000 year extent



Source:
 Nottingham Tributaries SFRM,
 JBA, January 2014

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Floodplain Heights Map centred on The Park, Lowdham Road, Gunthorpe

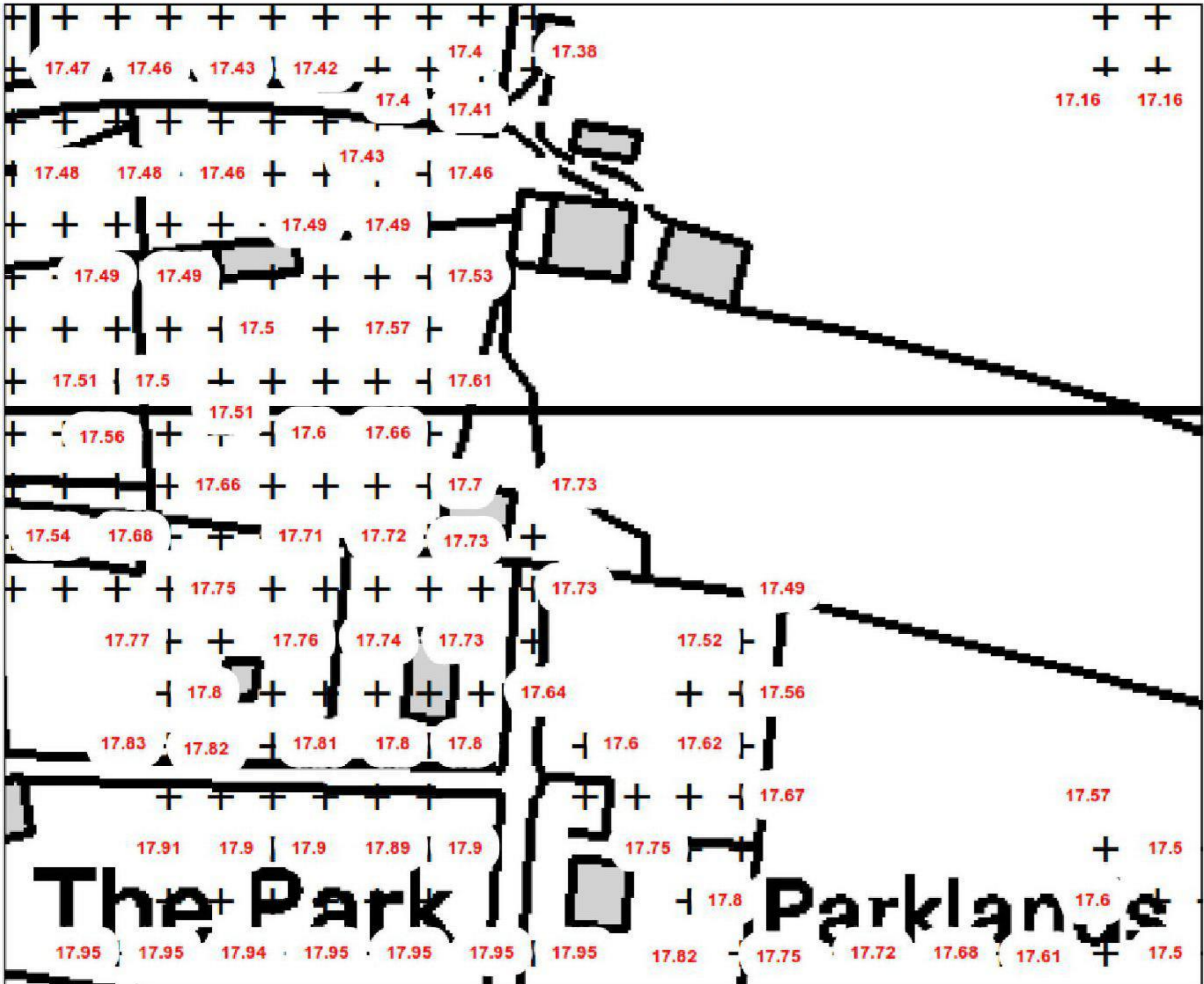
Ref: [EMD237573]



Scale 1:1,000
Date created: 01 November 2021

Legend

1 in 20 year height (Trent)



Source:
Trent and Tributaries
at Newark SFRM2,
Halcrow, July 2011

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Floodplain Heights Map centred on The Park, Lowdham Road, Gunthorpe

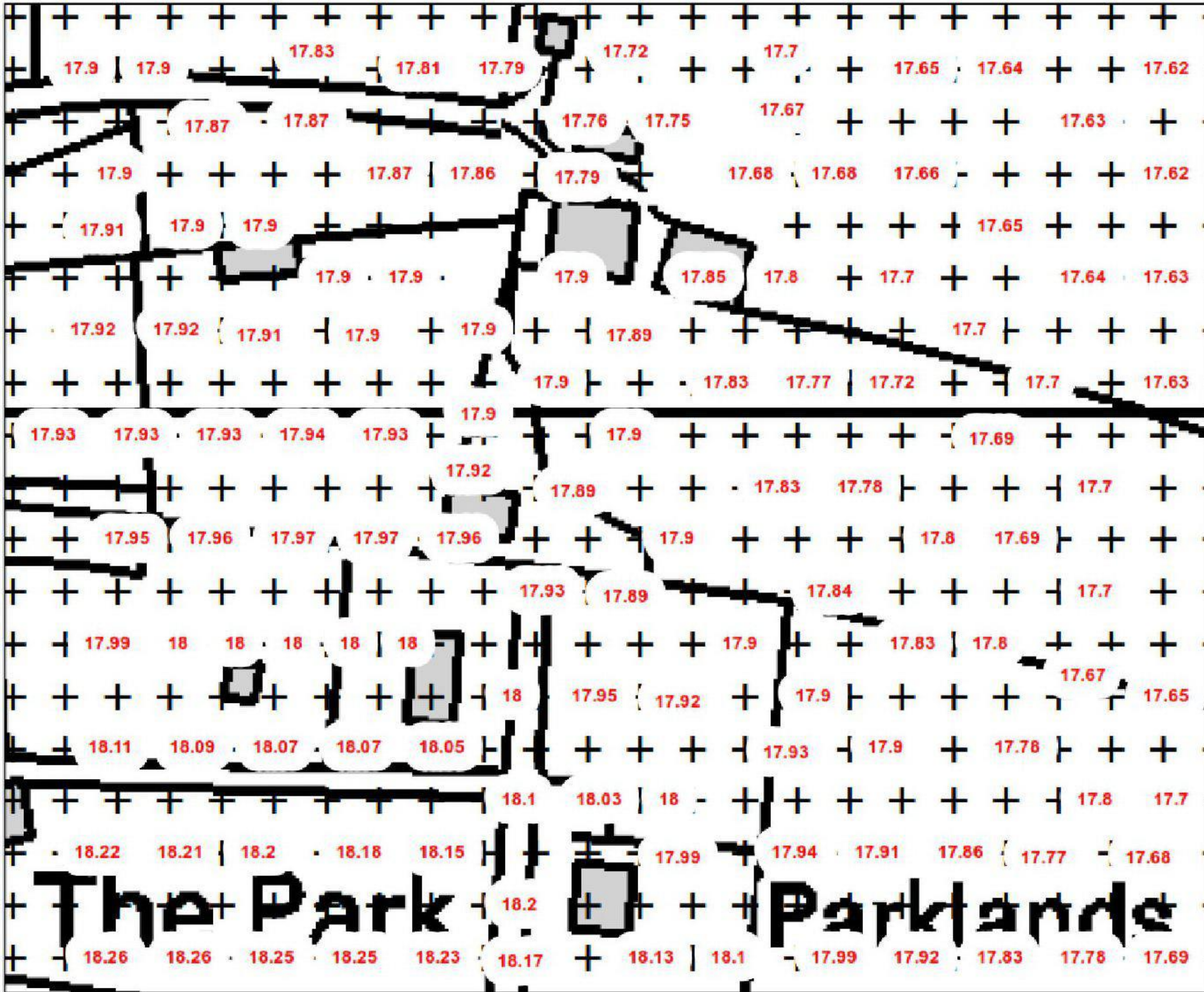
Ref: [EMD237573]



Scale 1:1,000
Date created: 01 November 2021

Legend

1 in 100 year height (100yr)



Source:
Trent and Tributaries
at Newark SFRM2,
Halcrow, July 2011

Floodplain Heights Map centred on The Park, Lowdham Road, Gunthorpe

Ref: [EMD237573]

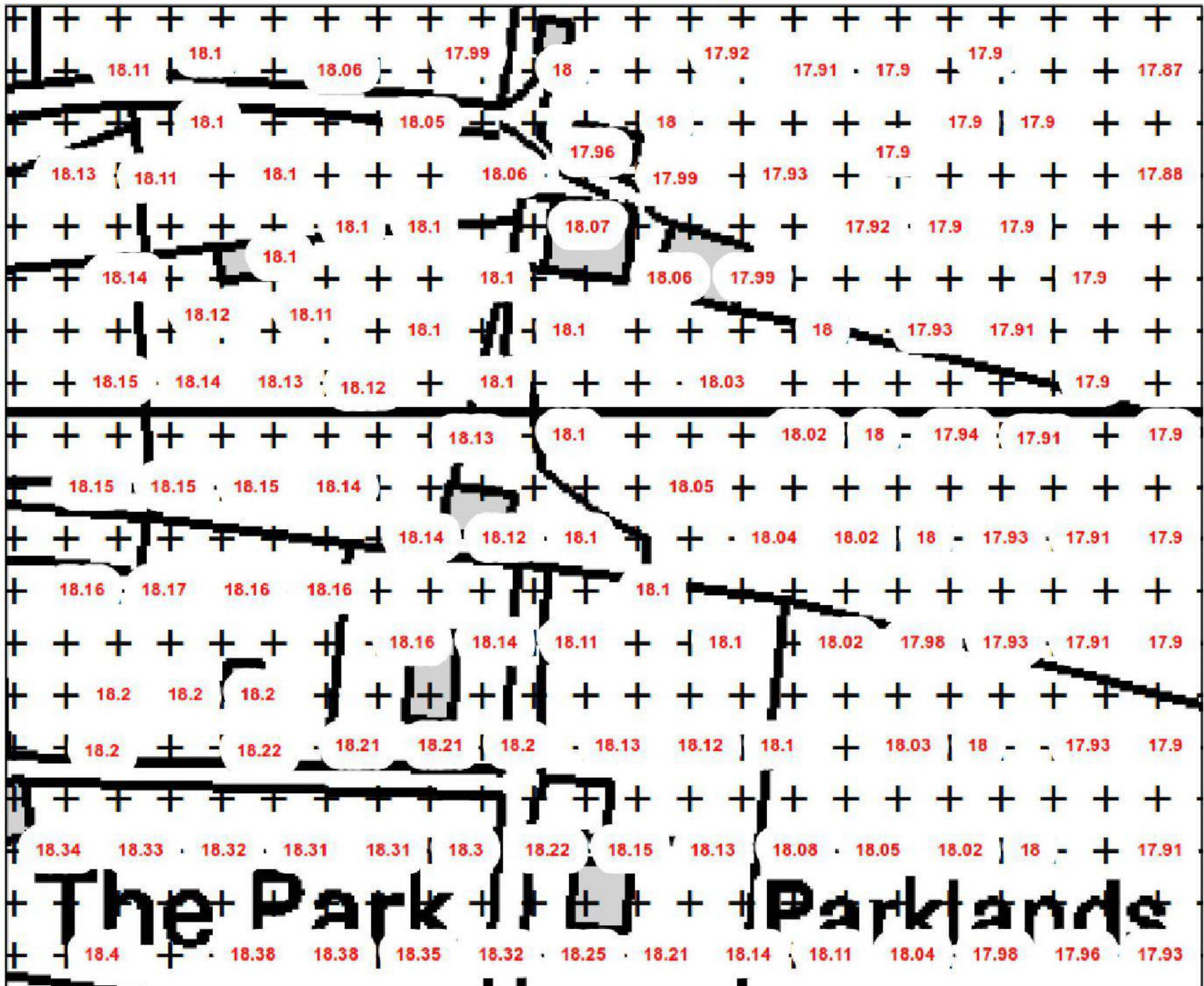


Scale 1:1,000

Date created: 01 November 2021

Legend

1 in 100 year +CC height (Trent)



Source:
Trent and Tributaries
at Newark SFRM2,
Halcrow, July 2011

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Floodplain Heights Map centred on The Park, Lowdham Road, Gunthorpe

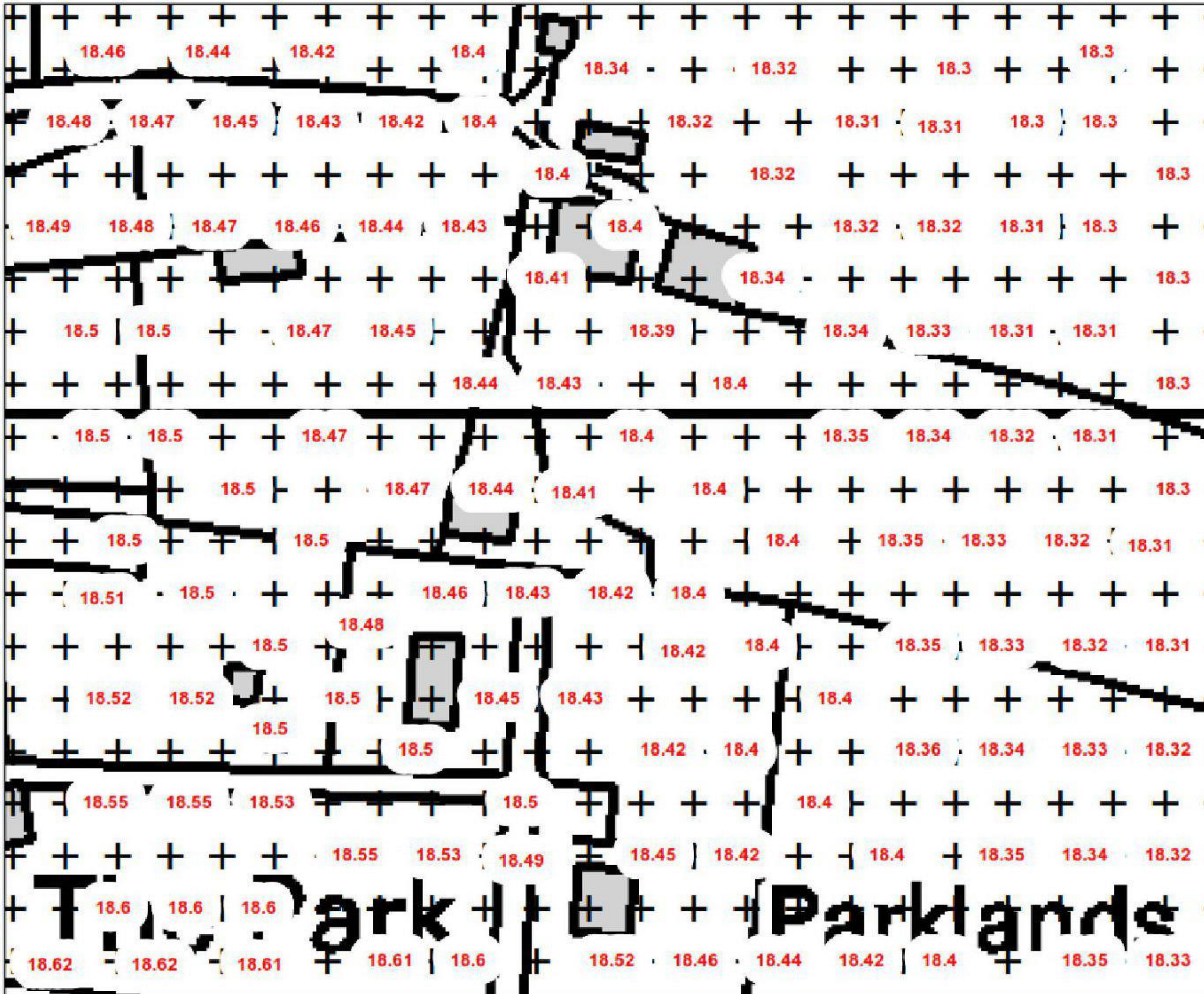
Ref: [EMD237573]



Scale 1:1,000
Date created: 01 November 2021

Legend

1 in 1000 yr (Trent)



Source:
Trent and Tributaries
at Newark SFRM2,
Halcrow, July 2011

Modelled Nodes Map centred on The Park, Lowdham Road, Gunthorpe

Ref: [EMD237573]



Scale 1:20,000
Date created: 29 October 2021

Legend

- Modelled Node Location and Reference (Trent)



Source:
Trent and Tributaries
at Newark SFRM2,
Halcrow, July 2011

EMD 237573

Flood Map for Planning

The Flood Map for Planning is now classed as Open Data. As such it can be downloaded free of charge under an open data licence from the following address: <https://data.gov.uk/publisher/environment-agency>

Alternatively it can be viewed at the following address: <https://flood-map-for-planning.service.gov.uk/>

Modelled Information

- Nottingham Tributaries SFRM, JBA, January 2014
- Trent and Tributaries at Newark SFRM2, Halcrow, July 2011

Node point reference	Location	50% (1 in 2 year) modelled level (mAOD)	50% (1 in 2 year) modelled flow (m³/s)	20% (1 in 5 year) modelled level (mAOD)
CBK_1093	SK 67538 44707	17.82	3.24	17.82
CBK_1548	SK 67273 45063	18.17	6.10	18.18
CBK_1864	SK 67278 45366	18.75	6.06	18.77
CBK_1302	SK 67434 44880	17.93	3.21	17.94
CBK_1093d	SK 67540 44703	17.81	3.24	17.81

Source: Nottingham Tributaries SFRM, JBA, January 2014

Node point reference	Location	20% (1 in 5 year) modelled flow (m ³ /s)	10% (1 in 10 year) modelled level (mAOD)	10% (1 in 10 year) modelled flow (m ³ /s)
CBK_1093	SK 67538 44707	3.26	17.82	3.26
CBK_1548	SK 67273 45063	6.29	18.18	6.32
CBK_1864	SK 67278 45366	6.23	18.78	6.24
CBK_1302	SK 67434 44880	3.23	17.94	3.23
CBK_1093d	SK 67540 44703	3.26	17.81	3.26

Source: Nottingham Tributaries SFRM, JBA, January 2014

Node point reference	Location	5% (1 in 20 year) modelled level (mAOD)	5% (1 in 20 year) modelled flow (m ³ /s)	2% (1 in 50 year) modelled level (mAOD)
CBK_1093	SK 67538 44707	17.82	3.27	17.82
CBK_1548	SK 67273 45063	18.18	6.35	18.18
CBK_1864	SK 67278 45366	18.78	6.24	18.79
CBK_1302	SK 67434 44880	17.94	3.23	17.94
CBK_1093d	SK 67540 44703	17.81	3.27	17.81

Source: Nottingham Tributaries SFRM, JBA, January 2014

Node point reference	Location	2% (1 in 50 year) modelled flow (m ³ /s)	1.33% (1 in 75 year) modelled level (mAOD)	1.33% (1 in 75 year) modelled flow (m ³ /s)
CBK_1093	SK 67538 44707	3.28	17.82	3.28
CBK_1548	SK 67273 45063	6.43	18.19	6.48
CBK_1864	SK 67278 45366	6.39	18.79	6.43
CBK_1302	SK 67434 44880	3.24	17.94	3.24
CBK_1093d	SK 67540 44703	3.28	17.81	3.28

Source: Nottingham Tributaries SFRM, JBA, January 2014

Node point reference	Location	1% (1 in 100 year) modelled level (mAOD)	1% (1 in 100 year) modelled flow (m ³ /s)	0.5% (1 in 200 year) modelled level (mAOD)
CBK_1093	SK 67538 44707	17.82	3.29	17.82
CBK_1548	SK 67273 45063	18.19	6.52	18.19
CBK_1864	SK 67278 45366	18.80	6.45	18.80
CBK_1302	SK 67434 44880	17.95	3.24	17.95
CBK_1093d	SK 67540 44703	17.81	3.29	17.81

Source: Nottingham Tributaries SFRM, JBA, January 2014

Node point reference	Location	0.5% (1 in 200 year) modelled flow (m ³ /s)	0.1% (1 in 1000 year) modelled level (mAOD)	0.1% (1 in 1000 year) modelled flow (m ³ /s)
CBK_1093	SK 67538 44707	3.30	17.83	3.33
CBK_1548	SK 67273 45063	6.58	18.20	6.76
CBK_1864	SK 67278 45366	6.48	18.82	6.52
CBK_1302	SK 67434 44880	3.24	17.96	3.24
CBK_1093d	SK 67540 44703	3.30	17.81	3.33

Source: Nottingham Tributaries SFRM, JBA, January 2014

Node point reference	Location	1% + 20% flow (1 in 100 year plus climate change) modelled level (mAOD)	1% + 20% flow (1 in 100 year plus climate change) modelled flow (m ³ /s)
CBK_1093	SK 67538 44707	17.82	3.30
CBK_1548	SK 67273 45063	18.19	6.59
CBK_1864	SK 67278 45366	18.80	6.48
CBK_1302	SK 67434 44880	17.95	3.25
CBK_1093d	SK 67540 44703	17.81	3.30

Source: Nottingham Tributaries SFRM, JBA, January 2014

Node point reference	Location	20% (1 in 5 year) modelled level (mAOD)	20% (1 in 5 year) modelled flow (m ³ /s)	10% (1 in 10 year) modelled level (mAOD)
403559620	SK 69281 44330	16.59	656.61	16.78
403559880	SK 69182 44061	16.68	656.96	16.86
403560570	SK 67527 43690	17.67	551.24	17.94
403560050	SK 68015 43703	17.46	659.32	17.69
4035510140	SK 69016 43888	16.75	657.00	16.95
4035510480	SK 68737 43658	17.11	658.98	17.32
4035510950	SK 68280 43666	17.32	614.07	17.57

Source: Trent and Tributaries at Newark SFRM2, Halcrow, July 2011

Node point reference	Location	10% (1 in 10 year) modelled flow (m ³ /s)	5% (1 in 20 year) modelled level (mAOD)	5% (1 in 20 year) modelled flow (m ³ /s)
403559620	SK 69281 44330	731.04	16.96	761.01
403559880	SK 69182 44061	736.32	17.03	776.53
403560570	SK 67527 43690	563.06	18.12	564.85
403560050	SK 68015 43703	740.80	17.85	794.41
4035510140	SK 69016 43888	736.42	17.11	786.17
4035510480	SK 68737 43658	740.51	17.48	794.16
4035510950	SK 68280 43666	659.05	17.74	694.34

Source: Trent and Tributaries at Newark SFRM2, Halcrow, July 2011

Node point reference	Location	2% (1 in 50 year) modelled level (mAOD)	2% (1 in 50 year) modelled flow (m ³ /s)	1.33% (1 in 75 year) modelled level (mAOD)
403559620	SK 69281 44330	17.18	782.04	17.27
403559880	SK 69182 44061	17.24	812.28	17.32
403560570	SK 67527 43690	18.33	566.51	18.42
403560050	SK 68015 43703	18.04	855.97	18.11
4035510140	SK 69016 43888	17.30	841.52	17.37
4035510480	SK 68737 43658	17.66	854.49	17.73
4035510950	SK 68280 43666	17.93	735.56	18.01

Source: Trent and Tributaries at Newark SFRM2, Halcrow, July 2011

Node point reference	Location	1.33% (1 in 75 year) modelled flow (m ³ /s)	1% (1 in 100 year) modelled level (mAOD)	1% (1 in 100 year) modelled flow (m ³ /s)
403559620	SK 69281 44330	794.36	17.38	809.23
403559880	SK 69182 44061	827.73	17.42	844.49
403560570	SK 67527 43690	567.57	18.51	568.75
403560050	SK 68015 43703	881.50	18.20	910.25
4035510140	SK 69016 43888	864.00	17.46	887.09
4035510480	SK 68737 43658	878.53	17.82	904.26
4035510950	SK 68280 43666	753.72	18.09	773.87

Source: Trent and Tributaries at Newark SFRM2, Halcrow, July 2011

Node point reference	Location	0.5% (1 in 200 year) modelled level (mAOD)	0.5% (1 in 200 year) modelled flow (m ³ /s)	0.1% (1 in 1000 year) modelled level (mAOD)
403559620	SK 69281 44330	17.51	822.23	18.05
403559880	SK 69182 44061	17.54	858.87	18.08
403560570	SK 67527 43690	18.62	570.63	19.07
403560050	SK 68015 43703	18.30	941.49	18.72
4035510140	SK 69016 43888	17.58	909.46	18.10
4035510480	SK 68737 43658	17.93	929.34	18.39
4035510950	SK 68280 43666	18.20	800.83	18.65

Source: Trent and Tributaries at Newark SFRM2, Halcrow, July 2011

Node point reference	Location	0.1% (1 in 1000 year) modelled flow (m ³ /s)	1% + 20% flow (1 in 100 year plus climate change) modelled level (mAOD)	1% + 20% flow (1 in 100 year plus climate change) modelled flow (m ³ /s)
403559620	SK 69281 44330	906.81	17.65	839.57
403559880	SK 69182 44061	935.56	17.68	875.32
403560570	SK 67527 43690	624.66	18.73	572.10
403560050	SK 68015 43703	1,093.90	18.41	977.31
4035510140	SK 69016 43888	998.18	17.71	931.83
4035510480	SK 68737 43658	1,017.89	18.04	952.49
4035510950	SK 68280 43666	877.68	18.31	820.53

Source: Trent and Tributaries at Newark SFRM2, Halcrow, July 2011

Please note: The flows provided represent **in channel flow only** and do not take into account flow on the floodplain.

Updated Climate Change Guidance

On 19th February 2016, the [Flood risk assessments: climate change allowances](#) was published on www.gov.uk website. It has replaced previous guidance [Climate Change Allowances for Planners](#).

The climate change guidance can be found at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>
 If your RFI is to assist with a Flood Risk Assessment (FRA) for a future planning application, please review this guidance to consider which allowances should be used for your site. The climate change allowance provided with this RFI is a 20% increase in the peak river flow for the 1% Annual Exceedance Probability (1 in 100 year) scenario.

Defence Information

There are no Environment Agency maintained raised defences in this area.

Historic Information

We have records of historic fluvial flooding at this location in **1932, 1947, 1977, and 2000**. Please note that we may or may not hold the original records in question. We do not make any claim as to the reliability of recorded flood extents or that all flood events in the area have been recorded. Please also be aware that flood defences may have been built subsequent to these historic flood events. Note - This information relates to the area the above named property is in, and is not specific to the property itself - it **does not** provide an indicator of flood risk **at individual property level**.

Open Data Information

The below datasets are now classed as Open Data and as such can be downloaded free of charge under an open data licence from the following address: <https://data.gov.uk/publisher/environment-agency>

- Risk of Flooding from Rivers and Sea (RoFRS) data
- LiDAR Data
- Flood Map for Planning (Rivers and Sea)
- Historic Flooding Data

Permitting Information

Under the Environmental Permitting (England and Wales) Regulations 2016, any permanent or temporary works in, over or under a designated main river will require an Environmental Permit for Flood Risk Activities from the Environment Agency. Any permanent or temporary works within 8 metres of the top of bank of a designated main river, or landward toe of a flood defence may require an Environmental Permit for Flood Risk Activities from the Environment Agency. In addition, any permanent or temporary works within the floodplain of a designated main river may also require an Environmental Permit for Flood Risk Activities. To find out whether your activity requires a permit or falls under a relevant exclusion, exemption or standard rule please follow the link below:

<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

Please note that a permit is separate to and in addition to any planning permission granted.

Product Information

Below is a brief overview of which Product is likely to be most appropriate for your needs. This information will only be provided where it is available as we do not hold detailed information on all watercourses.

Product 4 – Producing a Flood Risk Assessment (FRA) where you:

- Require mapped and tabulated outputs from an Environment Agency model *e.g flood levels for a range of events*
- Require information on local defences and historic flooding events
- Do not need to undertake additional hydraulic modelling

Product 6 – Producing a Flood Risk Assessment (FRA) where you:

- Require raw modelling results files
- Require modelling results in GIS format

Product 7 - Producing a Flood Risk Assessment (FRA) where you:

- Do need to undertake additional hydraulic modelling using an existing Environment Agency model

In most instances to supply Product 6 and Product 7 data a hard drive will need to be supplied due to the large file sizes associated with this information. Please note that this information will require specialist modelling software to view and run.

A Product 5 (Model Report) will be supplied with all Product 6 and 7 requests and can also be requested separately.