

Prepared on behalf of

Mr & Mrs Keith Hollins

FLOOD RISK ASSESSMENT

**Proposed Ancillary Leisure Development
The Watermill, Ings Lane, Little Houghton, Barnsley, S72 0HR**

Flood Risk Assessment

Acknowledgements:

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The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

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Received Development and Location Plans

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1 Introduction

- 1.1 Sanderson Associates (Consulting Engineers) Ltd have been appointed to undertake a Flood Risk Assessment for a proposed redevelopment and change of use of an existing outbuilding located at The Watermill, Ings Lane, Little Houghton, Barnsley, S72 0HR.
- 1.2 The assessment discusses the flood risk to the site, using a risk based approach and reference to the Sequential and Exception Test where appropriate.
- 1.3 This assessment of flood risk has been undertaken taking into account the National Planning Policy Framework, March 2012 (NPPF) and associated Planning Practice Guidance, 2014 (PPG,14).
- 1.4 Direct consultation with the Environment Agency (EA) has taken place to obtain flood data for the area, which is discussed within the report and contained within Appendix B. The Department for Environment, Food and Rural Affairs (DEFRA) and British Geological Survey (BGS) has also been used in production of this report.

2 Existing and Proposed Situation

2.1 Existing Site Descriptions

- 2.1.1 The development site is located on a parcel of land to the south of and associated with an existing residential property called The Watermill which is located to the west of Ings Lane, Little Houghton, Barnsley. A postcode for the site is S72 0HR and an O.S. Reference is 441940,405678. A location plan is contained within Appendix A of this report.
- 2.1.2 The site is currently a single storey outbuilding that is located to the south of the existing residential property at The Watermill.
- 2.1.3 A section through the site shows that levels range from 28.656m AOD to 28.660m AOD. The received section is contained within Appendix A of this report.
- 2.1.4 The nearest main watercourse is the River Dearne which is located beyond the western boundary of the Watermill site and approximately 70m to the west of the building that is proposed to be converted.

2.2 *Site Proposals*

- 2.2.1 It is proposed the existing onsite building is redeveloped/made good and will maintain the same footprint as existing building. The property will be a single story ancillary facility for the existing property.
- 2.2.2 Currently there are no detailed layout plans but this report will offer advice and mitigation that should be included in the development in response to the flood risk in the area, these are contained in the mitigation measures section of the report.
- 2.2.3 Access to the property will be taken from the north off Ings Lane as per the existing arrangement for the Watermill. As the developed building will still be owned by the residents of the Watermill there will be no separate access formed as part of the proposed works.
- 2.2.4 Preliminary proposed plans are contained within Appendix A.

3 Background Data

- 3.1.1 The Environment Agency Generalized Flood Model shows that the site is located within Flood Zone 2. Flood Zone 2 is land deemed as having between a 1 in 100 and 1 in 1000 annual probability of fluvial flooding.
- 3.1.2 DEFRA groundwater mapping confirms that the site lies within a Secondary A superficial (drift) aquifer, these are strata that have a level of water storage/void capacity and can support base river flow on a local scale.
- 3.1.3 The underlying bedrock strata is classed as a Secondary A Aquifer. These are described as strata that have a level of void permeability and can support base river flow on a local rather than strategic basis.
- 3.1.4 DEFRA groundwater mapping confirms the site is not located within a receptor sensitive Groundwater Source Protection Zone. Ground Water Protection Zones are areas around a sensitive aquifer or groundwater source such as wells, boreholes and springs, used for abstraction which are at risk from pollutants leeching into the source.

4 Sequential Approach

- 4.1 The development site is shown on the Environment Agency Generalized Flood Mapping to be located within fluvial Flood Zone 2.
- 4.2 The site currently contains an outbuilding. In accordance with Table 2 of PPG, 14 its current use is classed as being 'Less Vulnerable' in terms of flood risk.
- 4.3 The proposed ancillary use of the site, in accordance Table 2 of PPG, 14 is classed as being 'Less Vulnerable' in terms of flood risk.
- 4.4 In accordance with guidance tables contained in PPG,14 a 'Less Vulnerable' development in Flood Zone 2 is an appropriate development in terms of flood risk, therefore the Sequential and Exception Tests would not be required as part of a planning application for this development.

5 Assessment of Flood Risk

5.1 Surface Water

- 5.1.1 The main risk of flooding from overland flow comes from water channelled in the local highway network, impermeable areas within the vicinity of the site and land at a higher elevation.
- 5.1.2 Environment Agency surface water mapping has been reviewed which shows areas at an elevated risk of surface water flooding for differing storm return periods.
- 5.1.3 EA surface water mapping shows that the development area of the site, in general, is modelled to have a 'Very Low' risk of surface water flooding. A very low risk area is land deemed to have less than a 1 in 1000 annual probability of being effected by surface water flooding. A 'Very Low, risk is the lowest risk delineation for surface water in accordance with Environment Agency mapping.
- 5.1.4 An isolated area shown to the west of development site is shown to be at a 'Medium' (between 1 in 30 and 1 in 100 annual probability) to 'Low' (between 1 in 100 and 1 in 1000 annual probability) risk. The area does not form an element of a network of flow paths suggesting it is a relative low point in the local topography where surface water accumulates during low probability storm events.
- 5.1.5 Mitigation Measures specified in relation to the fluvial risk in the area will also be suitable for the surface water risk.

5.2 *Flooding from Rivers/Watercourses*

- 5.2.1 The nearest main watercourse is the River Dearne which is located beyond the western boundary of the Watermill site and approximately 70m to the west of the building that is proposed to be converted.
- 5.2.2 Level data shows that levels range from 28.656m AOD to 28.660m AOD. The received section is contained within Appendix A of this report.
- 5.2.3 The Environment Agency were consulted regarding flooding relating to the above watercourse and they have provided return period flood levels that are site specific model outputs, along with historic flood data. The consultation response is contained within Appendix B of this report.
- 5.2.4 Historic flood data provided by the EA show events occurred in 1947, 1982, 2000, 2007, 2019 and 2020. The site is only shown in the 1947 and 2007 flood envelope.
- 5.2.5 For the purpose of this assessment flood data at node 'DRN01_14055' will be used as this is the first node upstream of the site. At this node a 1 in 100 year flood level has been given at 28.30m AOD, a 1 in 100 year + 30% flood level has been given at 28.60m AOD and a 1 in 1000 year level has been given at 28.93m AOD.
- 5.2.6 When comparing the above return period flood levels to site level data it can be seen that for the 1 in 100 year flood level the site is outside the limits of flooding. For the 1 in 100 year + 30% the site is shown to be located above this level. For the 1 in 1000 year event depth range from 274mm to 270mm.
- 5.2.7 For the purpose of setting a ground floor finished floor level for the property, in line with a flood design level, the 1 in 100 year + 30% level of 19.27m AOD will be used and a freeboard growing of 0.3m applied in line with Environment Agency requirements. Therefore a proposed ground floor finished floor level should be set at a minimum level of 28.90m AOD.

5.2.8 Further mitigation measures have also been proposed in section 6 of this report which should be included in the proposed development.

5.3 *Flooding from Sewers*

5.3.1 If any of the sewers/drainage apparatus adjacent to the site were to surcharge and flood, it is likely that any floodwaters would be shallow, relatively slow moving and constrained within the limits of the carriageway. It is likely that sewer flooding would have a similar extents to that assessed for surface water, where storm water inundation exceeds the apparatus capacity causing surface water to surcharge, flood and flow on the surface.

5.3.2 At the time of writing the report there was no evidence available to suggest the site has been directly affected from flooding from overloaded sewers/drainage apparatus in the past; therefore the risk of flooding from sewers would be considered low.

5.3.3 The developments drainage should be designed and implemented in line with current guidance, advice and the requirements of the local authority and local water authority to ensure suitable measures are introduced to restrict and manage surface water discharge this will reduce the risk from flooding sewers by ensuring the proposed system has capacity to accommodate overburden.

5.4 *Flooding from Groundwater*

5.4.1 The potential for groundwater flooding has been assessed with the aid of groundwater mapping from the Environment Agency, British Geological Survey records.

5.4.2 DEFRA groundwater mapping confirms that the site lies within a Secondary A superficial (drift) aquifer, these are strata that have a level of water storage/void capacity and can support base river flow on a local scale.

-
- 5.4.3 The underlying bedrock strata is classed as a Secondary A Aquifer. These are described as strata that have a level of void permeability and can support base river flow on a local rather than strategic basis.
- 5.4.4 The British Geological Survey geological map of the UK has been reviewed and confirms a superficial strata of Alluvium and a bedrock formation of The Pennine Lower Coal Measures Formation.
- 5.4.5 The British Geological Survey hold a borehole record for the area, the closest being 300m to the north in the same geological group. The reviewed borehole record show a superficial strata of made ground to a depth of 3.2m bgl (below ground level) underlain by stiff silty clay to 4.8m bgl followed by sandstone to a depth of 6.7m bgl. The records notes that groundwater was not encountered during excavation. The aquifer designations, geological grouping and borehole records are generally consistent across the reviewed records.
- 5.4.6 From reviewed evidence, although there is a potential level of water bearing capacity in the underlying strata in proximity to the site (aquifer designations), no subsurface structures are proposed, outside of foundation and drainage works as part of the development. Therefore groundwater is unlikely to be an issue at this location with the implementation of suitable mitigation.
- 5.4.7 The mitigation measures proposed for the development as discussed in section 6 will also protect against any flooding from this source should the risk increase over the lifetime of the development.

5.5 *Flooding from Reservoir Failure*

- 5.5.1 The site is shown on the EA online mapping to be outside of an area at risk of reservoir flooding from the catastrophic failure of a water storage body. The closest area is beyond the wider watermill sites western boundary.

5.5.2 It should be noted that raised water bodies are inspected yearly under the provisions of the 1975 Reservoirs Act to ensure they remain fit for purpose and to ensure maintenance takes place where required this brings the residual risk from this source to a very low level.

5.6 *Flooding from Climate Change*

5.6.1 It is generally considered that the intensity of rainfall will increase by up to 30% by the year 2085 and that winter months will become proportionately wetter.

5.6.2 These factors have been considered in the assessment of flood risk from all sources including watercourses.

6 Mitigation Measures

- 6.1 Below is a list of mitigation measures that will assist in protecting the development.
- 6.2 The proposed ground floor finished floor level is to be set no lower than 28.90m AOD, which is 300mm above the provided 1 in 100 year + 35% flood level.
- 6.3 Footway areas should be constructed to naturally fall towards and into garden/green areas to encourage the informal percolation of surface water runoff. If feasible permeable paving could be specified for lightly traffic or un-trafficked hardstanding.
- 6.4 Internal ground floor walls if plastered, should be plastered using a lime based plaster which is much more resistant to damage from water and dries out much quicker than Gypsum based plaster (Gypsum plaster is significantly more susceptible to water damage).
- 6.5 The replacement of any ground floor chipboard / reconstituted wood fixtures and fittings with plastic or steel fittings should be considered to decrease the need for replacement after a flood event.
- 6.6 External surfaces should fall away from the properties external interface and the ground floor should have a finished floor level higher than external levels to prevent localised surface water flooding/accumulation.
- 6.7 Any new water using appliances within the proposed development should have a robust water efficiency rating to minimise water usage.

7 Conclusion

- 7.1 This report serves to review and assess the sources of potential flooding to the site and the impact of the proposed development in accordance with NPPF.
- 7.2 Sequential and Exception Tests have been assessed in accordance with NPPF and it is concluded that the development is suitable for this location.
- 7.3 The flood risk to the site from a number of sources of flooding have been assessed, suitable mitigation measures have been recommended in response to the assessed risk.
- 7.4 This report concludes that the site can be developed without increasing flood risk to the site itself and other sites in the vicinity with the implementation of suitable mitigation measures.

APPENDIX A – Plans

Received Development and Location Plans

442 1000m

442000m

441500m

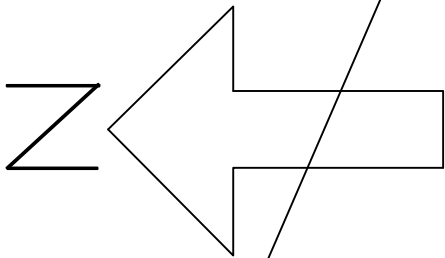
405900m

405800m

405700m

405600m

405500m



Drain

PARK SPRING ROAD

ETL

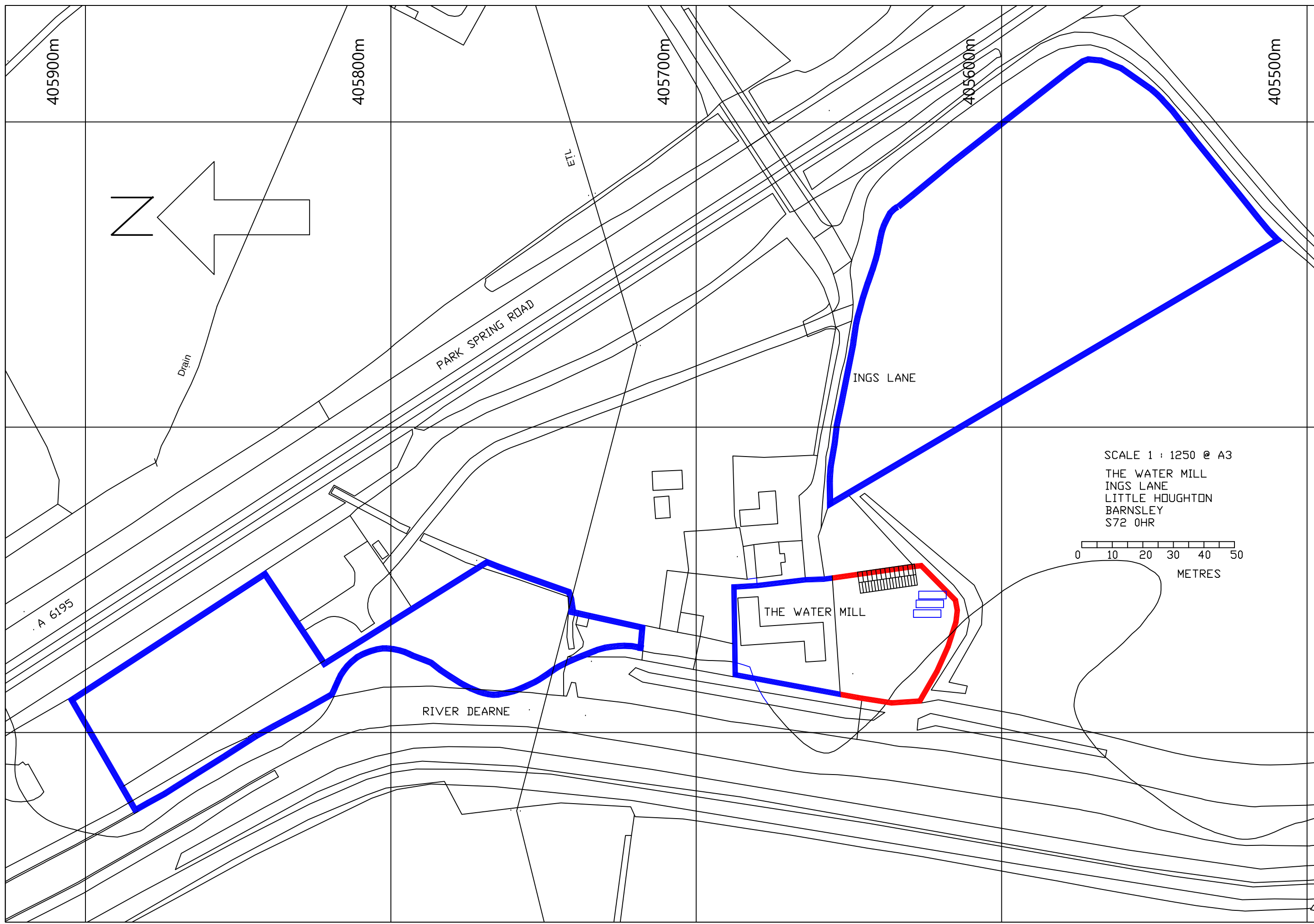
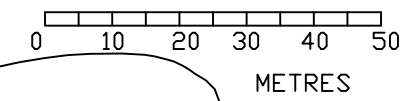
INGS LANE

A 6195

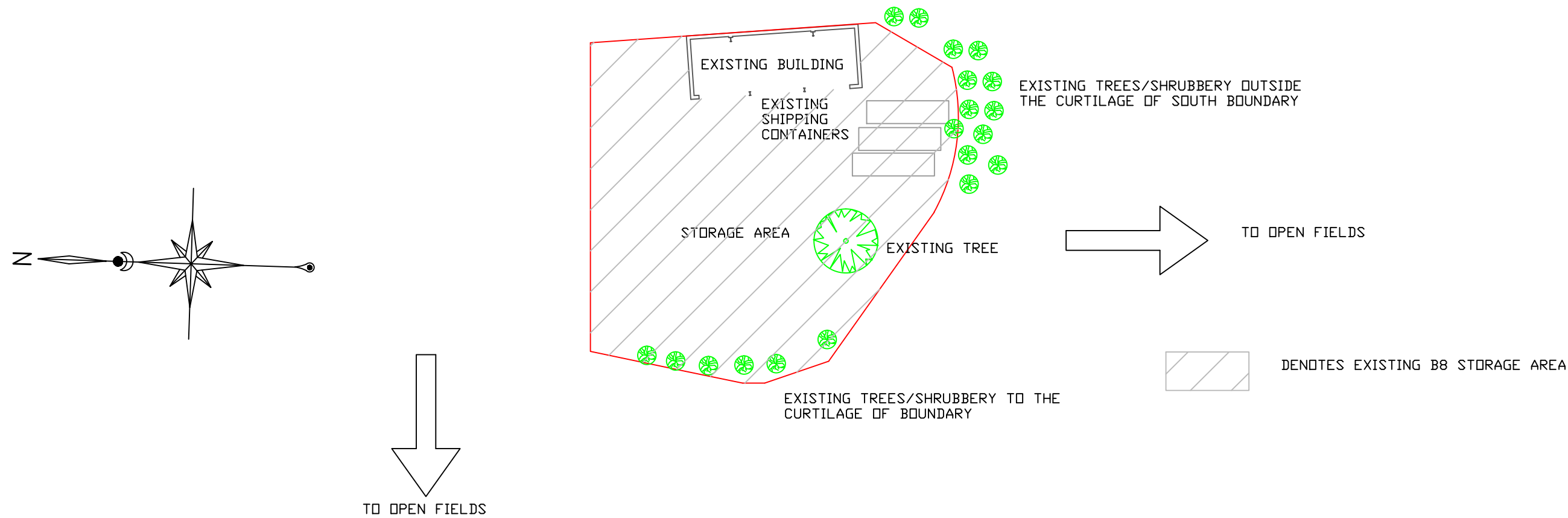
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THE WATER MILL

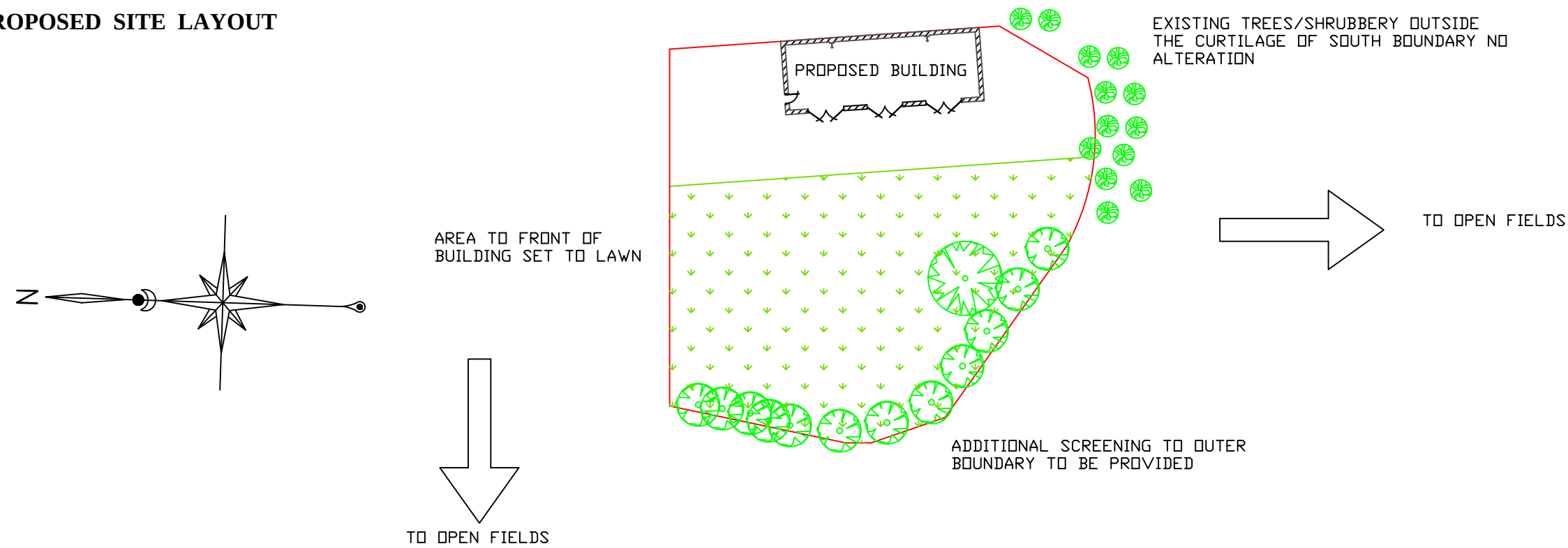
SCALE 1 : 1250 @ A3
THE WATER MILL
INGS LANE
LITTLE HOUGHTON
BARNSELY
S72 0HR



EXISTING SITE LAYOUT



PROPOSED SITE LAYOUT

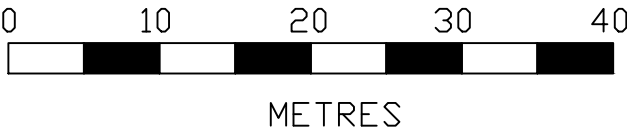


CLIENT

MR & MRS K HOLLINS

TITLE

DRAWING SHOWING EXISTING & PROPOSED SITE LAYOUTS



DRAWN

AD

SCALE 1:500 @ A3

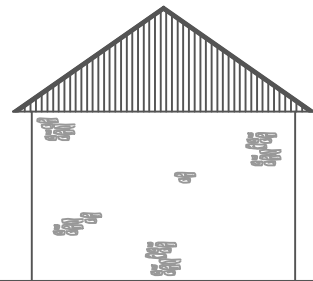
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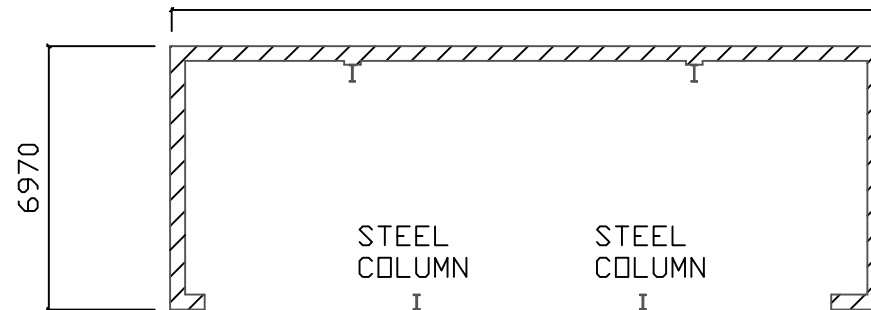
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FACING OPEN FIELDS

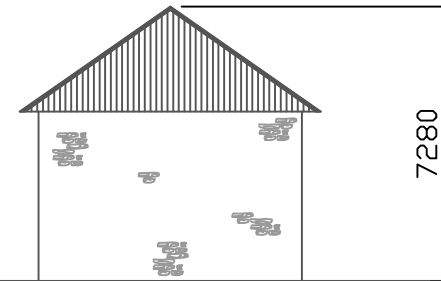
STEEL
COLUMN

18809



6970

FACING THE WATER MILL

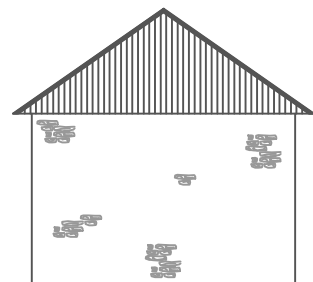


7280

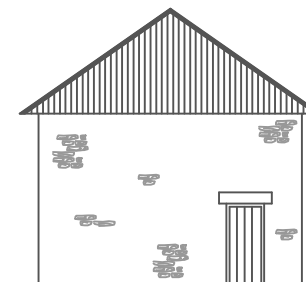
ALL ELEVATIONS CONSTRUCTED OF SANDSTONE
ROOF COVERING IN GREEN INDUSTRIAL SHEETING
TRIANGLE TO GABLE TIMBER YORKSHIRE BOARDING

EXISTING ELEVATIONS OPEN FRONTED BUILDING

FACING OPEN FIELDS



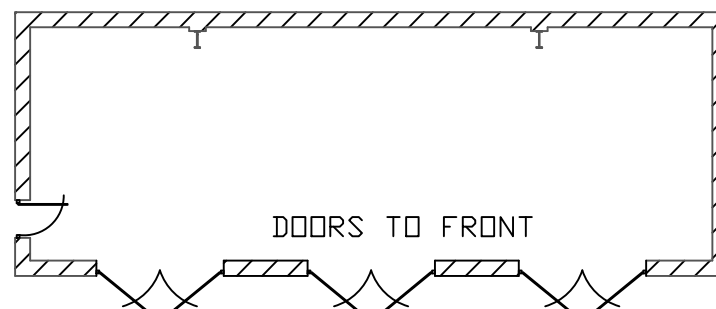
FACING THE WATER MILL



SIDE ACCESS DOOR

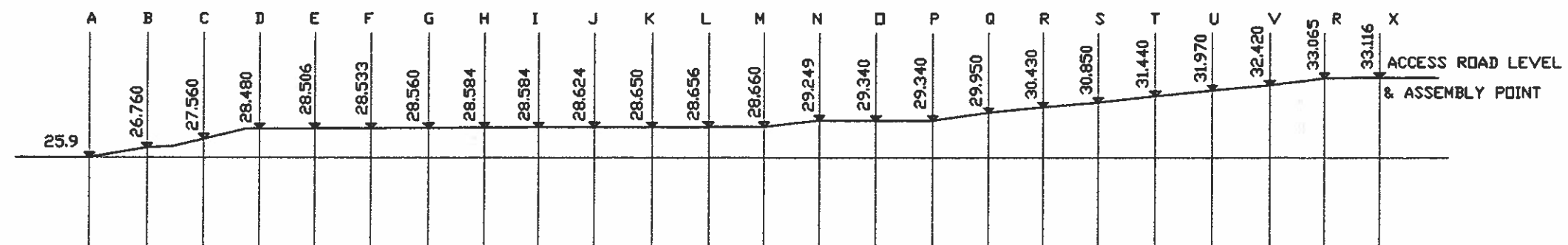
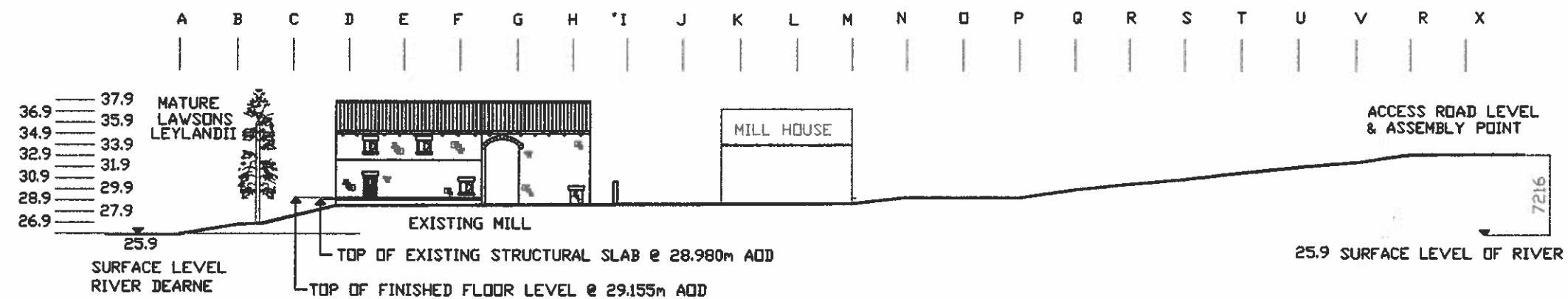
RETAIN ALL ELEVATIONS IN SANDSTONE
3No STONE ARCHES TO MATCH THE EXISTING
WATER MILL TO BE CONSTRUCTED TO FRONT
ELEVATION

PROPOSED ELEVATIONS CLOSED FRONTED BUILDING



DOORS TO FRONT

CLIENT MR & MRS K HOLLINS	TITLE DRAWING SHOWING ELEVATIONS AND PLAN LAYOUT OF EXISTING BUILDING AND PROPOSED	SCALE 1:200 @ A3	REV						
		DATE 08/10/2020	DRG No 20/002						



CLIENT
MR K HOLLINS
THE MILL
INGS LANE, LITTLE HOUGHTON

TITLE
DRAWING SHOWING SECTION THROUGH SITE WITH
LEVELS

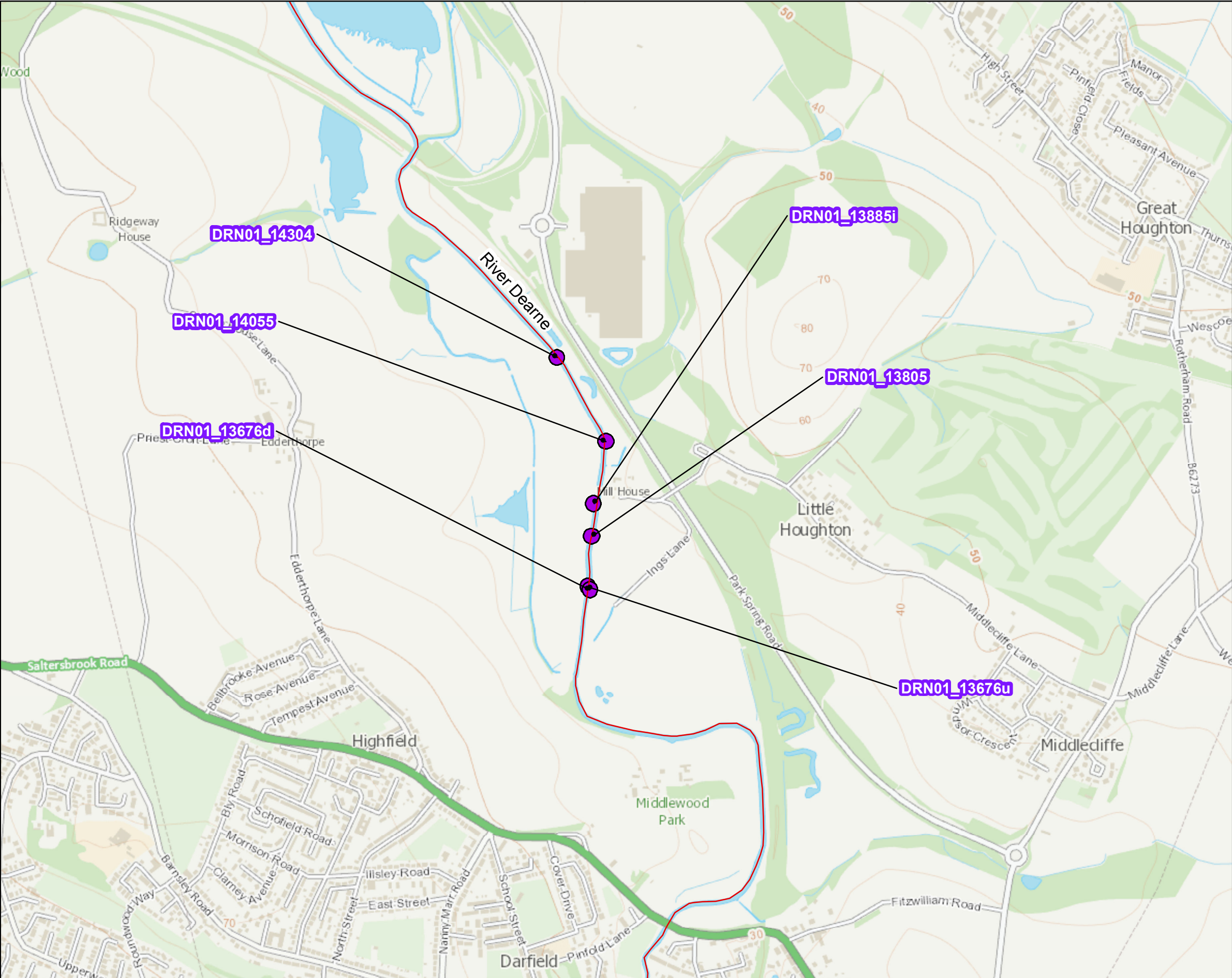
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DRG No CAD/QA/1311	

Appendix B– Environment Agency Consultation

RFI/2021/200986 Node Point Map Centred on The Watermill, Ings Lane, Little Houghton, Barnsley, S72 0HR



www.environment-agency.gov.uk

Scale: 1:10,000

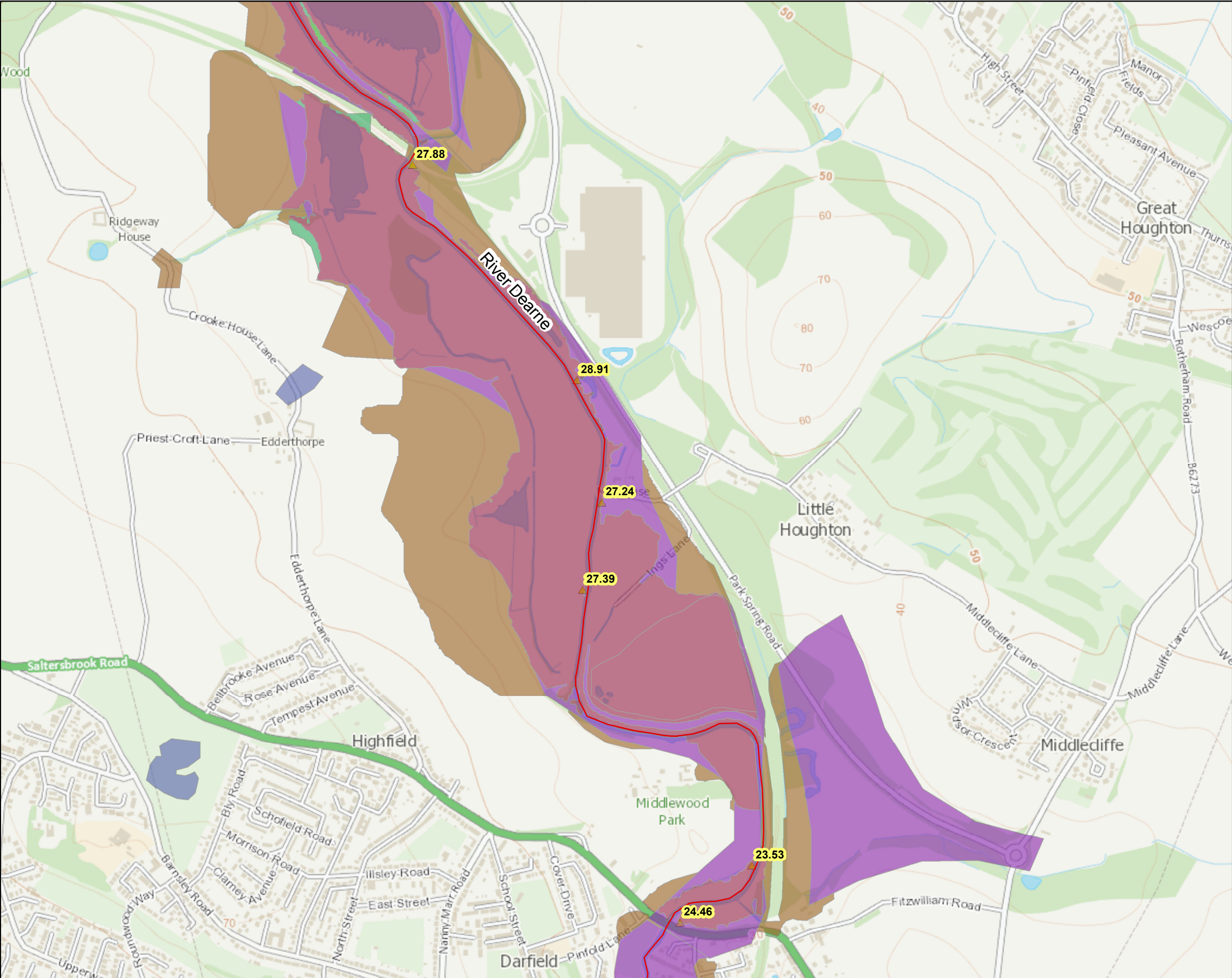
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LEGEND

- Main River
- 2018 Lower and Middle Don Node Points

RFI/2021/200986 Flood History Map Centred on The Watermill, Ings Lane, Little Houghton, Barnsley, S72 0HR



www.environment-agency.gov.uk

Scale: 1:10,000

when reproduced @ A3



LEGEND

- Main River
- 2020 February Flood Incident - Storm Dennis
- 2020 February Flood Incident - Storm Ciara
- 2019 November Flood Incident
- June 2007 Flood Event (Ridings Area)
- June 2007 Surface Water Flooding Yorkshire
- 123 Autumn 2000
- 123 January 1982 - Dearne Houghton
- 123 March 1947
- Autumn 2000 Flood Level (mAOD)

2018 Lower and Middle Don Model Results - RFI/2021/200986 (Level - mAOD, Flow - m³/s)

Node Point	Return Period	Level	Flow	Node Point	Return Period	Level	Flow	Node Point	Return Period	Level	Flow
DRN01_13885i	2	26.83	26.86	DRN01_14304	2	26.98	26.85	DRN01_14055	2	26.88	26.86
DRN01_13885i	10	27.08	42.11	DRN01_14304	10	27.3	38.92	DRN01_14055	10	27.17	38.95
DRN01_13885i	20	27.18	58.21	DRN01_14304	20	27.49	48.04	DRN01_14055	20	27.34	48.1
DRN01_13885i	30	27.34	66.84	DRN01_14304	30	27.61	52.26	DRN01_14055	30	27.49	52.39
DRN01_13885i	50	27.76	94.39	DRN01_14304	50	28.09	62.25	DRN01_14055	50	28.01	63.77
DRN01_13885i	75	27.83	107.64	DRN01_14304	75	28.2	66.77	DRN01_14055	75	28.12	69.45
DRN01_13885i	100	27.91	126.14	DRN01_14304	100	28.42	73.5	DRN01_14055	100	28.33	76.76
DRN01_13885i	100 + 20%CC	28	142.61	DRN01_14304	100 + 20%CC	28.58	76.57	DRN01_14055	100 + 20%CC	28.51	81.04
DRN01_13885i	100 + 30%CC	28.05	151.17	DRN01_14304	100 + 30%CC	28.67	77.28	DRN01_14055	100 + 30%CC	28.6	82.01
DRN01_13885i	100 + 50%CC	28.14	165.03	DRN01_14304	100 + 50%CC	28.8	79	DRN01_14055	100 + 50%CC	28.75	84.44
DRN01_13885i	200	28.04	148.93	DRN01_14304	200	28.65	75.5	DRN01_14055	200	28.58	79.78
DRN01_13885i	1000	28.24	181.93	DRN01_14304	1000	28.94	81.44	DRN01_14055	1000	28.93	85.97
DRN01_13885i	1000 + 20%CC	28.38	204.7	DRN01_14304	1000 + 20%CC	29.07	127.08	DRN01_14055	1000 + 20%CC	29.14	86.25
Node Point	Return Period	Level	Flow	Node Point	Return Period	Level	Flow	Node Point	Return Period	Level	Flow
DRN01_13805	2	26.82	26.87	DRN01_13676u	2	26.76	26.86	DRN01_13676d	2	24.31	26.86
DRN01_13805	10	27.06	41.28	DRN01_13676u	10	27.01	35.9	DRN01_13676d	10	24.61	35.9
DRN01_13805	20	27.15	55.2	DRN01_13676u	20	27.12	41.01	DRN01_13676d	20	24.78	41.01
DRN01_13805	30	27.36	62.7	DRN01_13676u	30	27.26	47.83	DRN01_13676d	30	24.96	47.83
DRN01_13805	50	27.86	88.15	DRN01_13676u	50	27.67	73.47	DRN01_13676d	50	25.56	73.47
DRN01_13805	75	27.94	100.16	DRN01_13676u	75	27.76	78.2	DRN01_13676d	75	25.83	78.2
DRN01_13805	100	27.99	115.54	DRN01_13676u	100	27.9	85	DRN01_13676d	100	26.34	85
DRN01_13805	100 + 20%CC	27.99	132.14	DRN01_13676u	100 + 20%CC	28.01	90.5	DRN01_13676d	100 + 20%CC	26.62	90.5
DRN01_13805	100 + 30%CC	27.99	145.01	DRN01_13676u	100 + 30%CC	28.07	93.44	DRN01_13676d	100 + 30%CC	26.78	93.44
DRN01_13805	100 + 50%CC	28	164.07	DRN01_13676u	100 + 50%CC	28.18	97.17	DRN01_13676d	100 + 50%CC	27.13	97.17
DRN01_13805	200	28.01	141.77	DRN01_13676u	200	28.05	92.72	DRN01_13676d	200	26.74	92.72
DRN01_13805	1000	28.03	184.46	DRN01_13676u	1000	28.32	99.77	DRN01_13676d	1000	27.63	99.77
DRN01_13805	1000 + 20%CC	28.03	208.68	DRN01_13676u	1000 + 20%CC	28.52	101.92	DRN01_13676d	1000 + 20%CC	28.16	101.92