Melia Smith & Jones
Consulting Civil & Structural Engineers

Tel: 0113 230 6080
E-mail: admin@msj.co.uk
Website: www.msj.co.uk

Vinery Court, 58 Cardigan Lane
Leeds LS4 2LD

Project

Proposed Enclosure for Batching Plant

Title

Flood Risk Assessment

Client

Naylors Concrete

MSJ Job No 224033

Document No
224033 GEN 0002 – Flood Risk Assessment

Rev P1 Date 05/06/2024

Issue Record

Status	Rev	Description	By	Chk		Date
S2	P1	Initial FRA	DS	MH		05/06/2024

Contents

Introduction

Melia Smith & Jones have been instructed by Martin Walsh Architectural on behalf of Naylor Concrete to prepare a Flood Risk Assessment (FRA) in support of a Planning Application for the construction of a Proposed Batching Plant together with associated infrastructure at Naylor Concrete, Whaley Road, Barugh Green, S75 1HT

Scope

The site is classified as Zone 1 by the Environment Agency Flood Maps (low probability of river and sea flooding). The proposed site development area totals approximately 0.4 hectares, which is within the ownership of Naylor Concrete's site which covers an area of approximately 4.3Ha. Planning Practice Guidance ID7 Flood Risk and Coastal Change states that a site specific FRA is required for all proposals for new development in Flood Zone 1, of 1 hectare or greater. If there is risk of flooding from nearby sources, and FRA should be carried out regardless.

The FRA should consider vulnerability to flooding from other sources as well as from river and sea flooding, and also the potential for any increased risk of flooding elsewhere resulting from the development. As such a FRA is required in accordance with the National Planning Policy Framework (NPPF) and associated National Planning Practice Guidance (NPPG). This FRA also includes an assessment of surface water drainage requirements.

Site Location

The site is located at NGR Ref SE 32244 08112, to the West of Barnsley. It is located within a large Industrial Estate and is surrounded by roads and industrial units. The nearest housing is approximately 400m to the west and 450m to the south east. There is open rural area to the north east. The Barnsley branch railway line passes the north east side of the industrial estate boundary, some 50m from the edge of the proposed development site.

Refer to Appendix A for the site location plan.

Site Description

The proposed site development area totals approximately 0.4 hectares. The site due for development currently houses 3 polytunnel workshops, each approximately 52m long x 9.5m wide. Directly infront of the 3 polytunnels to the North/East is a concrete hardstanding that connects the polytunnel "parcel" of site to the access road.

Surrounding the polytunnels to the North and West is a greater unpaved hardstanding area that is used for Naylor Concrete product storage.

The land itself is relatively flat with only 300-400mm changes in level across the whole site, typically falling South to North and East to West. The site has a maximum level of approximately +72.740m AOD and a minimum level of +72.270m AOD.

An existing culverted watercourse (>50m long) passes the site approximately 300m to the north of the site. There is an abandoned canal 600m north beyond the rail lines and the River Dearne is approximately 1km north and east of the site.

There are Yorkshire Water surface water drains (falling West to East) to the immediate South of the site (see Appendix D). A nearby network of private drainage has also been installed. These sewers have been surveyed and it has been observed that this private network connects into the adopted

Yorkshire Water system East of the site via a flow control device, with oversized pipes being used for attenuation.

Development Proposals

It is proposed to construct a Batching plant in place of the existing 3no. Polytunnel workshops. The Batching plant is a single industrial building approximately 60m x 40m on plan and 10m high. Surrounding the structure of varying widths will be a new concrete hardstanding approximately 0.18Ha.

Refer to Appendix B & C

River & Tidal Flooding

Under PPS25, all new planning applications must undergo a Sequential Test. This test must be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals etc.) outside of the floodplain. The test refers to the EA Flood Zones noted below:-

Flood Zone	Probability	Explanation	Appropriate Land use
Zone 1	Low	Less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%)	All development types generally acceptable
Zone 2	Medium	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% 0.1%) in any year	Most development type are generally acceptable
Zone 3a	High	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	Some development types not acceptable
Zone 3b	'Functional Floodplain'	Land where water has to be flow or be stored in times of flood. SFRAs should identify this zone (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, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes)	Some development types not acceptable

Reference to published EA flood maps for this locality shows the whole site to be within Zone 1. In accordance with the Sequential test described under PPS 25, all development types are compatible with this zone. The Exception test is not required in this case, and the proposed development is suitable in terms of river & tidal flood risk.

Refer to Appendix D

Surface Flooding

Historic information has been obtained from the Environmnt Agency which shows a surface flooding event from 2019 occuring off site on Claycliffe Lane. This is approximately 0.5km away from the site and is not considered to present a surface flooding risk. There is no flood risk generated from artificial water bodies and reservoirs. See Appendix E.

The area to the North of the proposed site, whilst unpaved, is used as a storage area and is likely to be compacted. Surface water during heavy rainfall could make its way towards the building. There is therefore a moderate risk that surface water from this area could travel towards the proposed building. Intercepting drains, appropriate ground contouring and raised finished floor levels could minimize this risk.

Groundwater

The Groundsure Map shows the site to be located in an area at negligible risk of groundwater flooding

The risk of flooding from ground water sources is considered to be low.

See Appendix F

Existing Sewers

There are Yorkshire Water surface water drains (falling West to East) to the immediate South of the site (see Appendix G). A nearby network of private drainage has also been installed. These sewers have been surveyed and it has been observed that this private network connects into the adopted Yorkshire Water system East of the site via a flow control device, with oversized pipes being used for attenuation. Whilst it is reasonable to assume that these sewers have been designed to accommodate storms with a return period of 30 years without flooding, storms with a return period in excess of this may cause flooding to occur.

The development site sits high relative to the surrounding industrial site and nearby concrete access road and car park to the North. Steep banks down to the rest of site are present to the North and North/East of the plot. Flood risk from existing sewers is therefore considered to be low.

Surface Water Run-Off

PPS25 recommends that surface water generated from a development site should be managed in a sustainable manner to closely resemble the surface water flows generated by the site prior to development.

A surface water management strategy for the development will be required to manage and reduce the flood risk posed by the surface water runoff from the site. The developer will be required to ensure that any scheme for surface water should build in sufficient capacity for the entire site.

There are three possible options to discharge the surface water runoff in accordance with requirement H3 of the English Building Regulations 2000 rainwater must discharge to one of the following, listed in order of priority:

- An adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable;
- A watercourse; or where that is not reasonably practicable;
- A sewer.

An assessment of the surface water runoff rates has been undertaken in order to determine the surface water options and attenuation requirements for the Site.

The surface water drainage arrangements for any development site should be such that the volume and peak flow rates of surface water leaving a developed Site are no greater than the rates prior to the proposed development, unless specific off-site arrangements are made and result in the same net effect.

Existing Run-Off

The existing surface water network in the immediate vicinity of the site consists of 2 drainage channels (between the polytunnels) and a land drain nearby. Via these elements, water from the site (Polytunnels & Hardstanding) enters a private network (on site) and eventually connects into the oversized private attenuation pipe to the East. Refer to Appendices H & I.

It is important to note that the drainage from the Naylor site connects into the wider private network at an unrestricted rate.

The broader private surface water system (within the road and rest of site) discharges off site and into the Yorkshire Water network via a flow control (15l/s sec). Attenuated flow is stored in an oversized pipe located in the access road adjacent to the existing Naylor factory.

An analysis of the existing system surrounding the polytunnels (Appendix A). Based on the areas highlighted in Appendix D (1931m²) and the sites location, it has been approximated that the expected unrestricted run/off from site at present is 25.04l/sec (based on a value of 0.018l/sec/m² in accordance with Building Regs Doc H)

Proposed Run-Off

100% of the proposed development will be drained buildings and external hardstanding.

As far as surface water is concerned, use of Suds components, such as soakaways should be given priority over disposal off site to sewer. The performance of Suds components rely on favourable ground conditions to enable them to work effectively. Soakaway tests on the adjacent site have been carried out (see Appendix K) and infiltration rates proved that soakaways were not viable.
For the purpose of this FRA, it is assumed that off site surface water disposal is the only viable method of draining the site.

It is proposed to limit flow rates ff site to IH124 Greenfield runoff rates. The table below suggests these rates based on a proposed impermeable developed area of 0.4Ha.

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 1	2.0	2.0	1.7	3.7	4.8

The rate of restriction for the 0.4ha drained area should be 3.0 l/sec as a conservative approach.

In accordance with DEFRA document Non-Statutory Technical Standards for Sustainable Drainage Systems, flows for previously developed sites should be restricted (as close to as reasonably practicable) to the Greenfield run off rate. Peak flow will therefore be restricted to Greenfield run/off for 1:1 year rainfall events. As the existing site currently discharges at an unrestricted rate, this is a significant improvement.

It is likely that the attenuated surface water will be held in some form of underground tank on site. For a storm with a return period of 100 years, approximately 256m^3 would be required. The surface water system has been designed so that:

- No surcharging occurs for 1 year return period storms
- Surcharging (but no flooding) occurs for 30year + 40% Climate Change return period storms
- No flooding occurs for 100 year + 40% Climate Change return period storms. This is because, due to the existing topo it is unlikely that floodwater will be contained on site.

See Appendix J

Designed this way, the risk of flooding off site as a result of the development will not be increased.

Conclusion

This FRA has identified that the whole of the development site is located within an area designated as Zone 1 as defined by the EA Flood Map and is therefore in a location which has less than a 1:1000 annual probability of river flooding, which is a low risk. The site is also considered to be at low risk from ground water flooding and from other off site sources.

Off site flows will be restricted to 3.0l/sec which whilst is nominally higher than the 1 year greenfield rate, and will reduce and positively improve off site flood risk for the 30 and 100 year events.

APPENDIX A

Site Location

APPENDIX B

Rev	Description	Drawn	Checked	Date
P2	Building Repositioned	RL	MR	18.04.24
P1	FIRST ISSUE	MJR	RL	16.04.24

Document Status : **S2**

Purpose of Issue: **FOR INFORMATION**

MARTIN WALSH ARCHITECTURAL

Firth Buildings, 99 - 103 Leeds Rd, Dewsbury, WF12 7BU t: 01924 464342
e: info@martinwalsh.co.uk w: www.martinwalsh.co.uk

Project
Proposed Enclosure for Batching Plant
Whaley Road, Barugh Green, Barnsley

Title
Proposed Site Plan

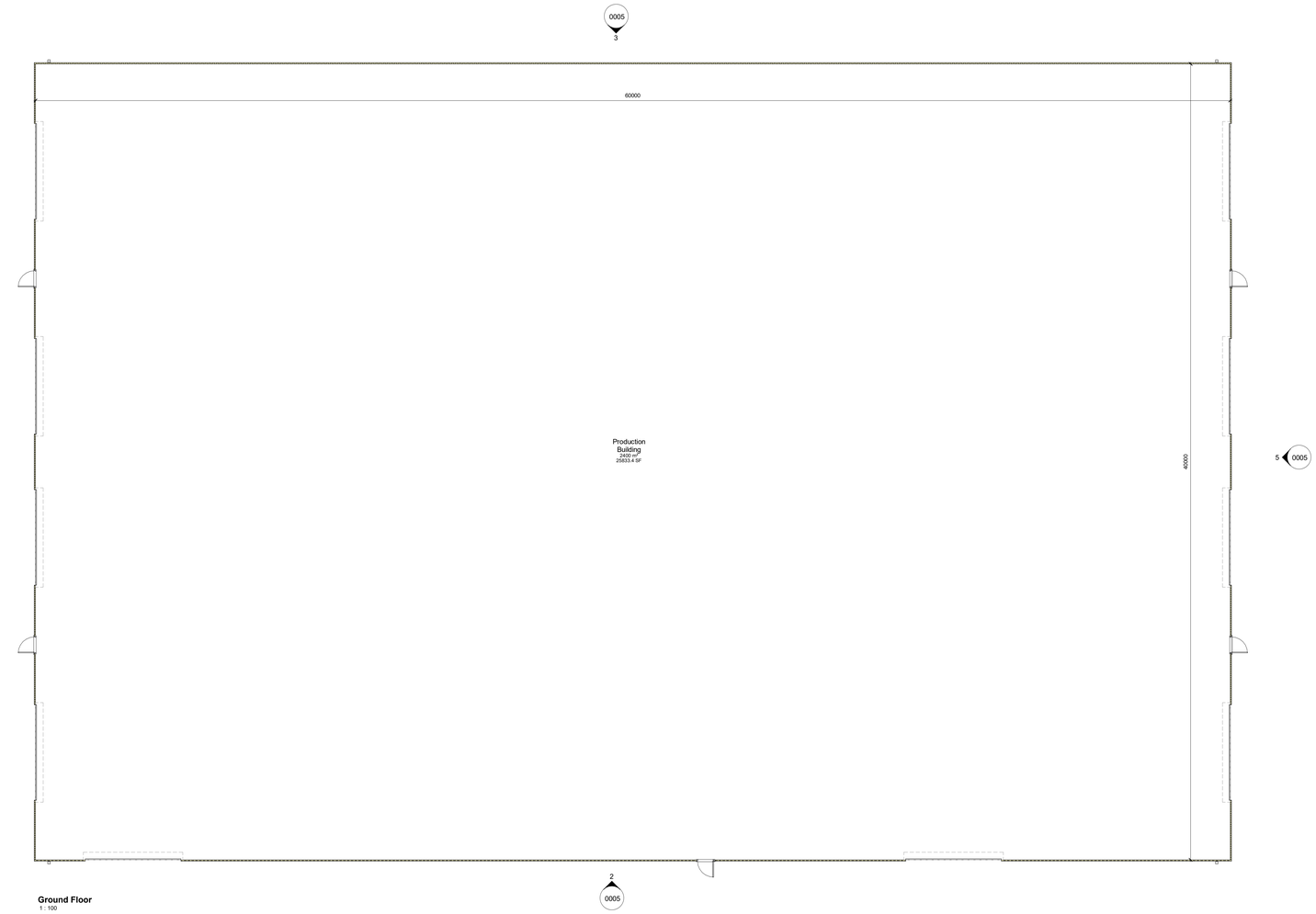
Client
Naylors Concrete

MWA Project	Scale	Original Paper Size	Paper Orientation	Drawn
6606	1 : 200	@A0	Landscape	MJR

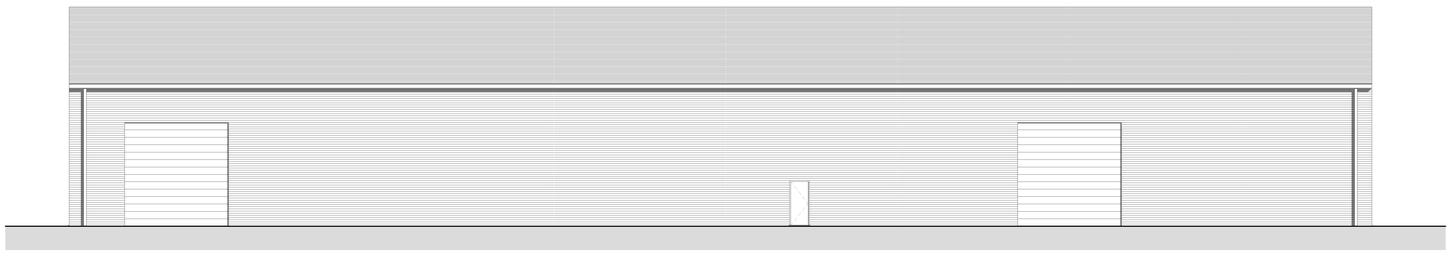
File Identifier

Project	Originator	Volume	Level	Type	Role	Number	Revision
NCBG -	MWA -	XX -	XX -	DR -	A -	0003	P2

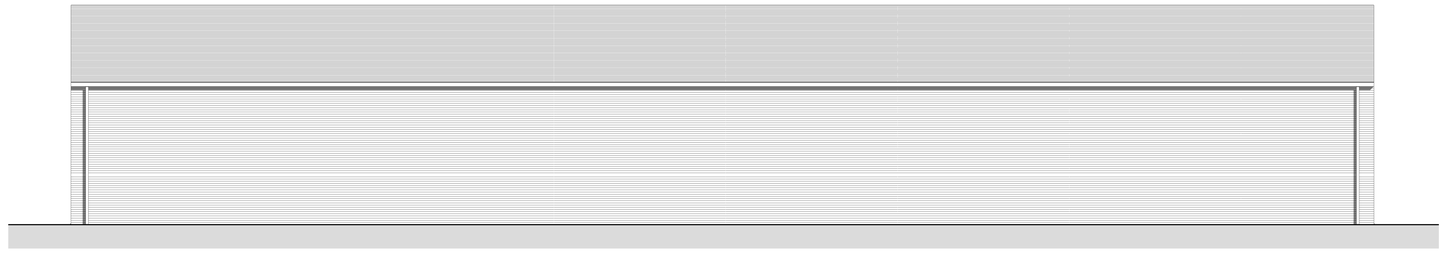
APPENDIX C



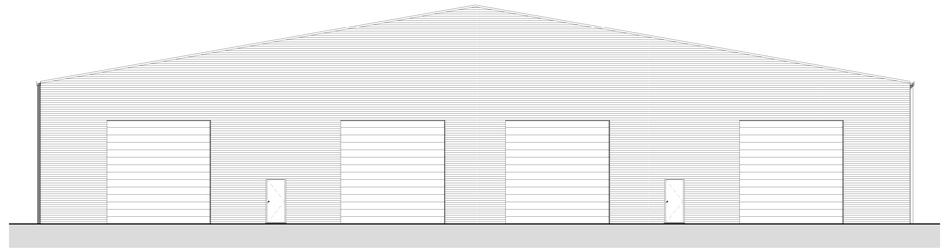
Ground Floor
1 : 100



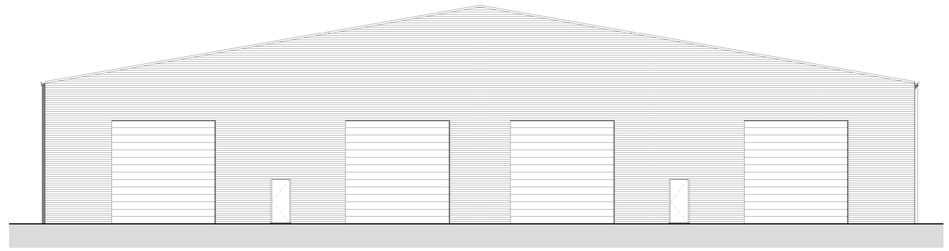
2 **North West**
1 : 100



3 **South East**
1 : 100



4 **North East**
1 : 100



5 **South West**
1 : 100

Rev	Description		Drawn	Checked	Date
P2	Gamma Amendment		RL	MJR	19.04.24
P1	FIRST DRAFT		MJR	RL	19.04.24

Document Status - Purpose of Issue
S2 **FOR INFORMATION**

MARTIN WALSH ARCHITECTURAL
Firth Buildings, 99 - 103 Leeds Rd, Dewsbury, WF12 7BU t: 01924 464342
e: info@martinwalsh.co.uk w: www.martinwalsh.co.uk

Project
Proposed Enclosure for Batching Plant
Whaley road, Barugh Green, Barnsley

Title
Proposed Plans and Elevations

Client
Naylors Concrete

MWA Project	Scale	Original Paper Size	Paper Orientation	Drawn
6606	1 : 100	@A0	Landscape	MJR

File Identifier

Project	Originator	Volume	Level	Type	Role	Number	Revision
NCBG -	MWA -	XX -	XX -	DR -	A -	0005	P2

APPENDIX D

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**432245/408111**	**21 May 2024 15:13**

Your selected location is in flood zone 1, an area with a low probability of flooding.

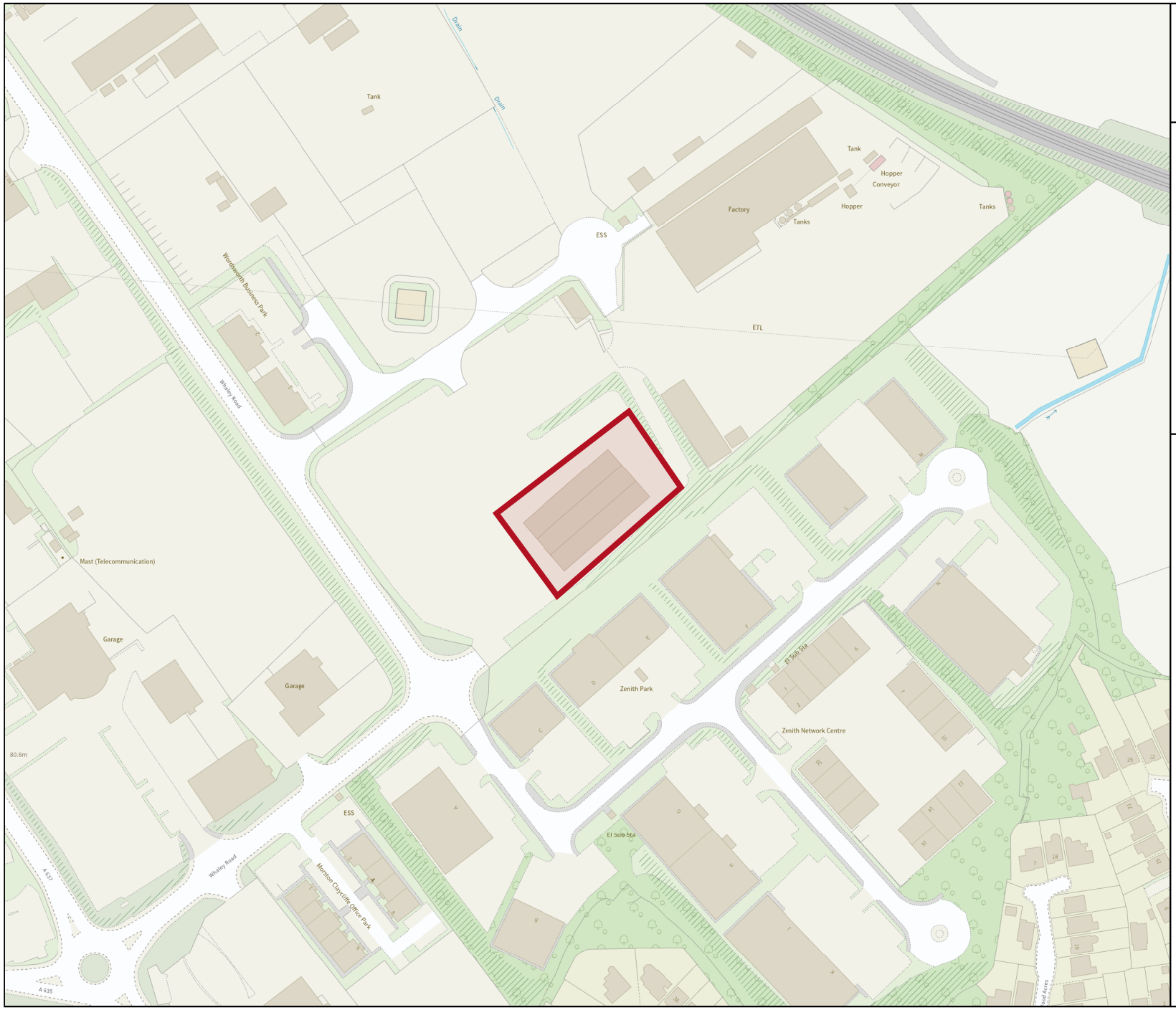
You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.



Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
432245/408111

Scale
1:2500

Created
21 May 2024 15:13

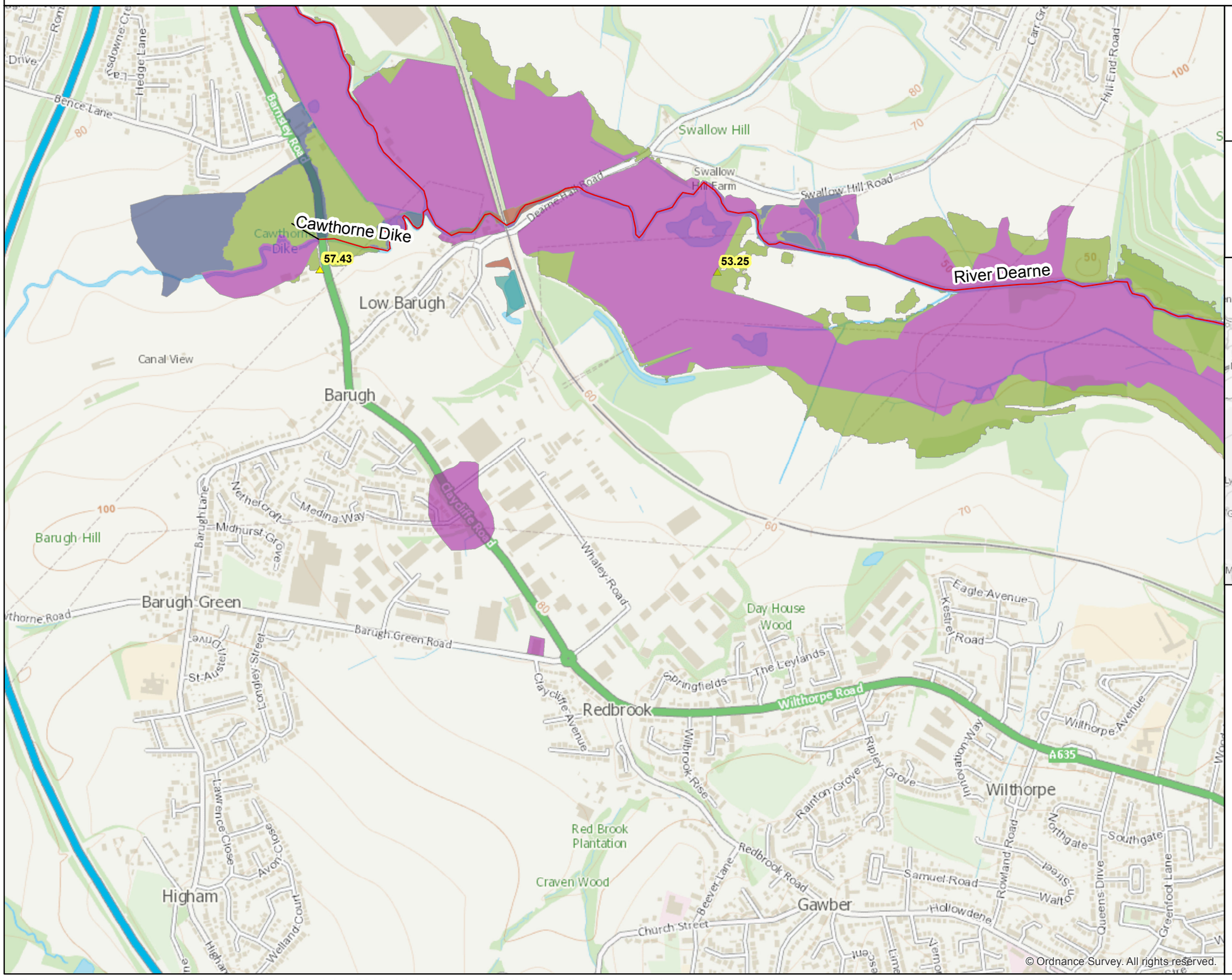
- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m

APPENDIX E

RFI/2021/228165 Flood History Map Centred on Your Site at Barugh Green, Barnsley

Date created: 29/09/2021

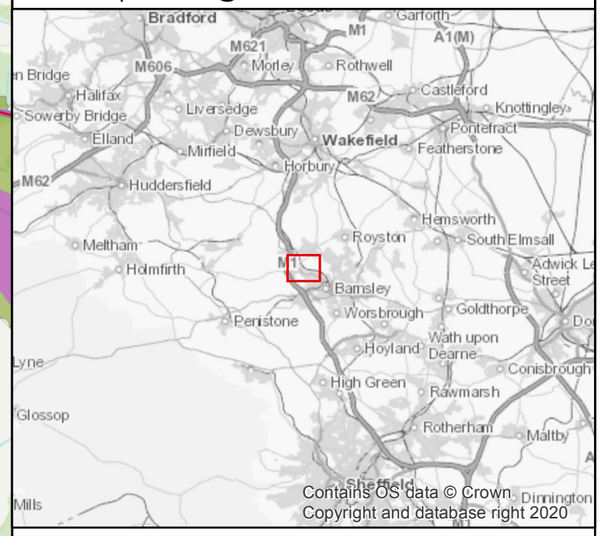


Environment Agency

www.environment-agency.gov.uk

Scale: 1:10,000

when reproduced @ A3



LEGEND

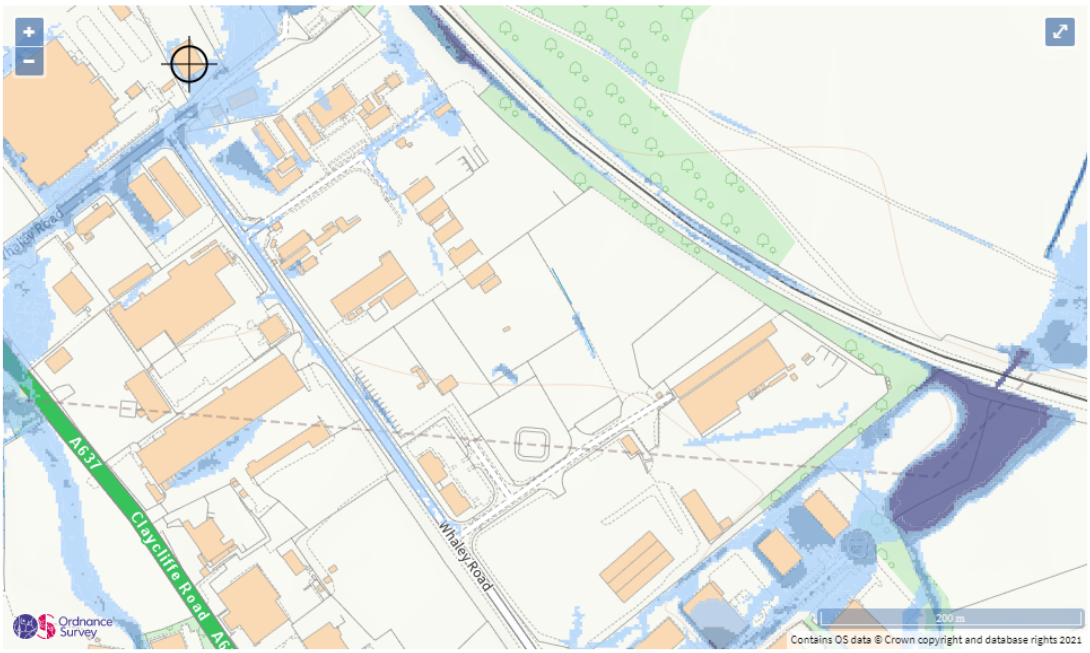
- Main River

RECORDED FLOOD OUTLINES

- 2019 November Flood Incident
- June 2007 Flood Event (Ridings Area)
- June 2007 Surface Water Flooding Yorkshire
- 123 Autumn 2000
- 123 March 1947

Autumn 2000 Flood Level (mAOD)

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506(Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk



Surface water flood risk: water depth in a low risk scenario

Flood depth (millimetres)

Over 900mm | 300 to 900mm | Below 300mm | Location you selected

APPENDIX F

9 Groundwater flooding

Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

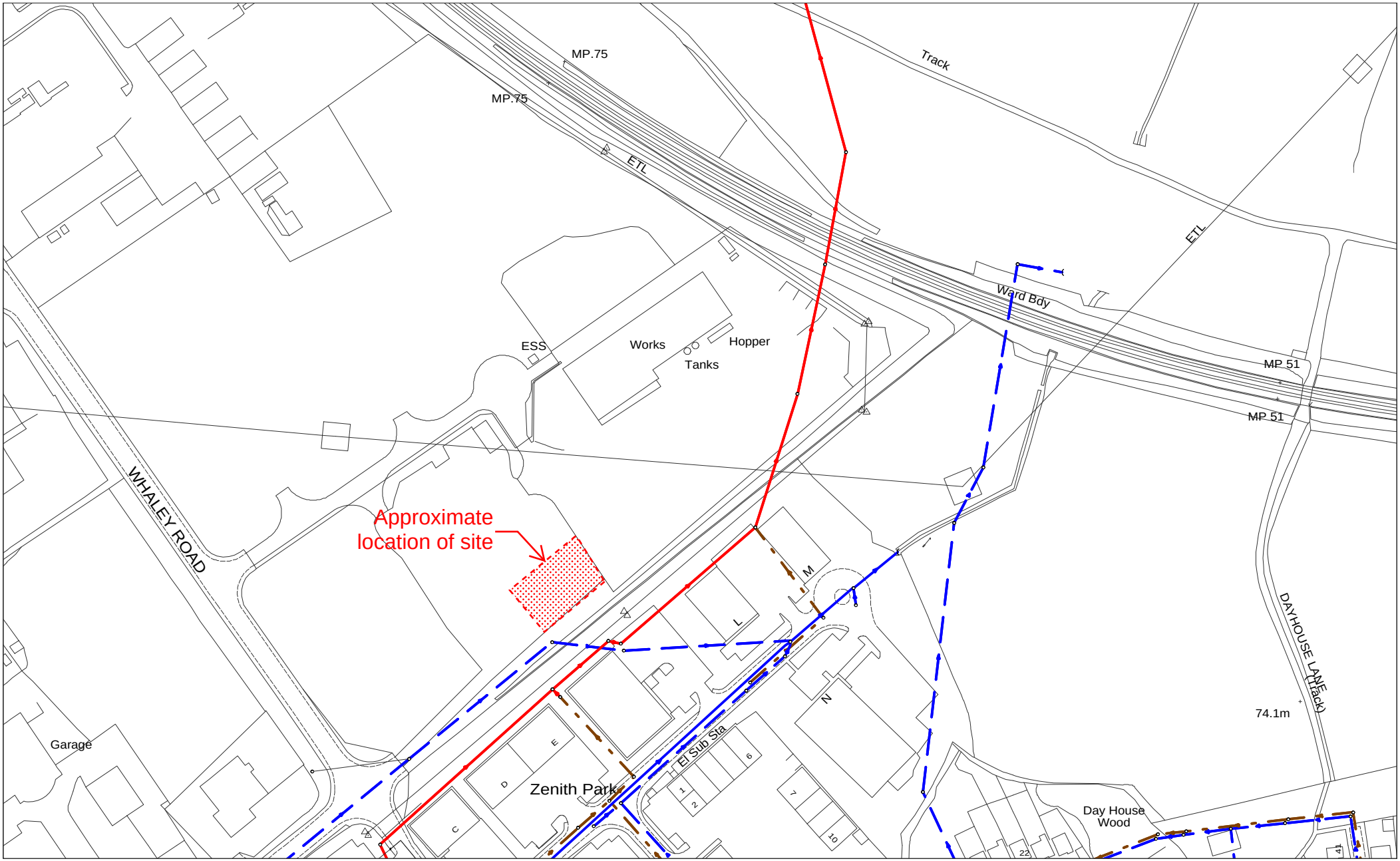
Highest risk on site	**Negligible**
Highest risk within 50m	**Negligible**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 61**

This data is sourced from Ambiental Risk Analytics.

APPENDIX G



Date Requested : 03/11/2014, 12:24:16

Date Generated : 03/11/2014, 12:24:19

Scale : 1:2500

The position and depth of any YW apparatus shown on this map are approximate only.

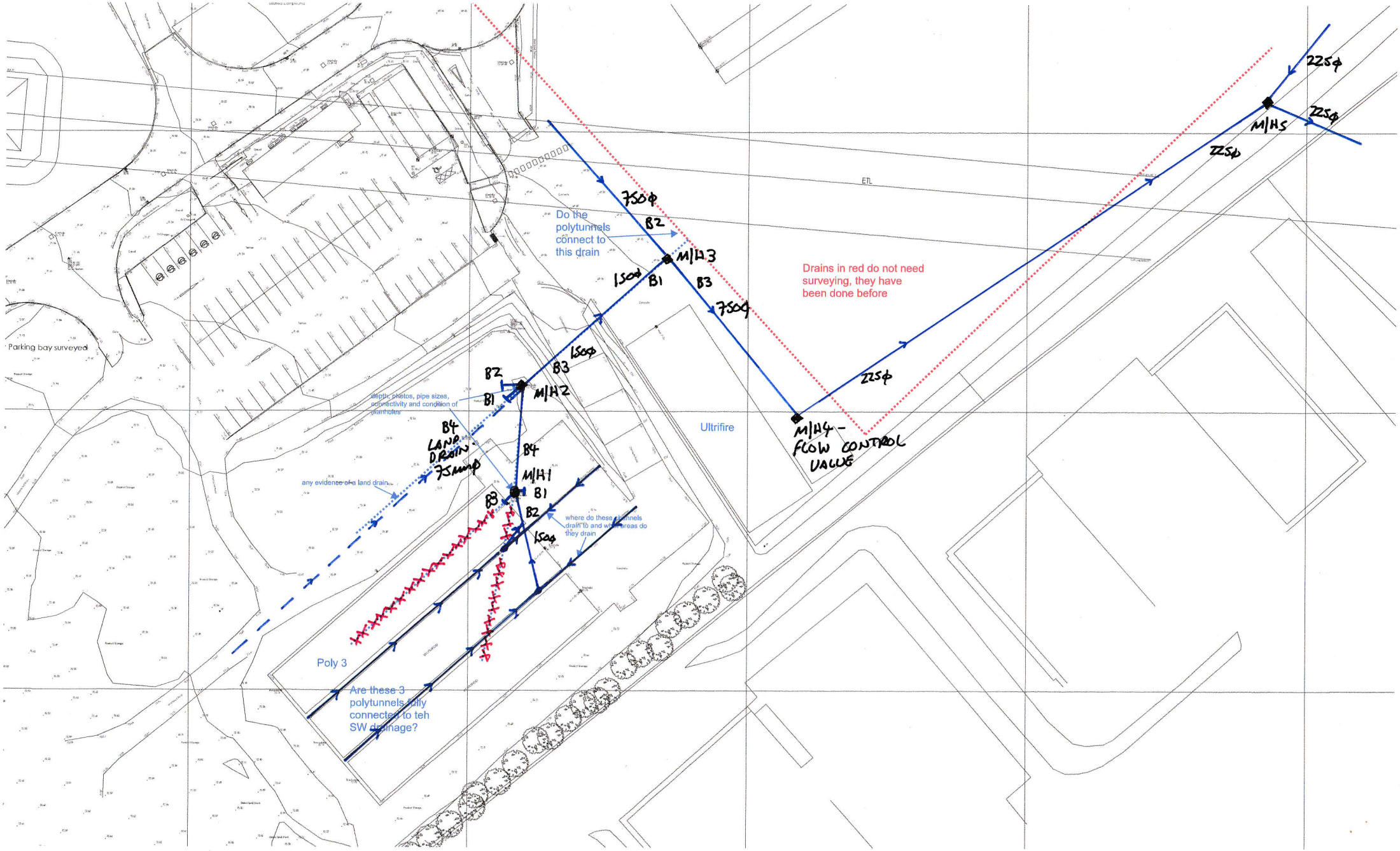
UPN: Undefined

Originator: Z FAYYAZ, Appraisals, 01274 692645

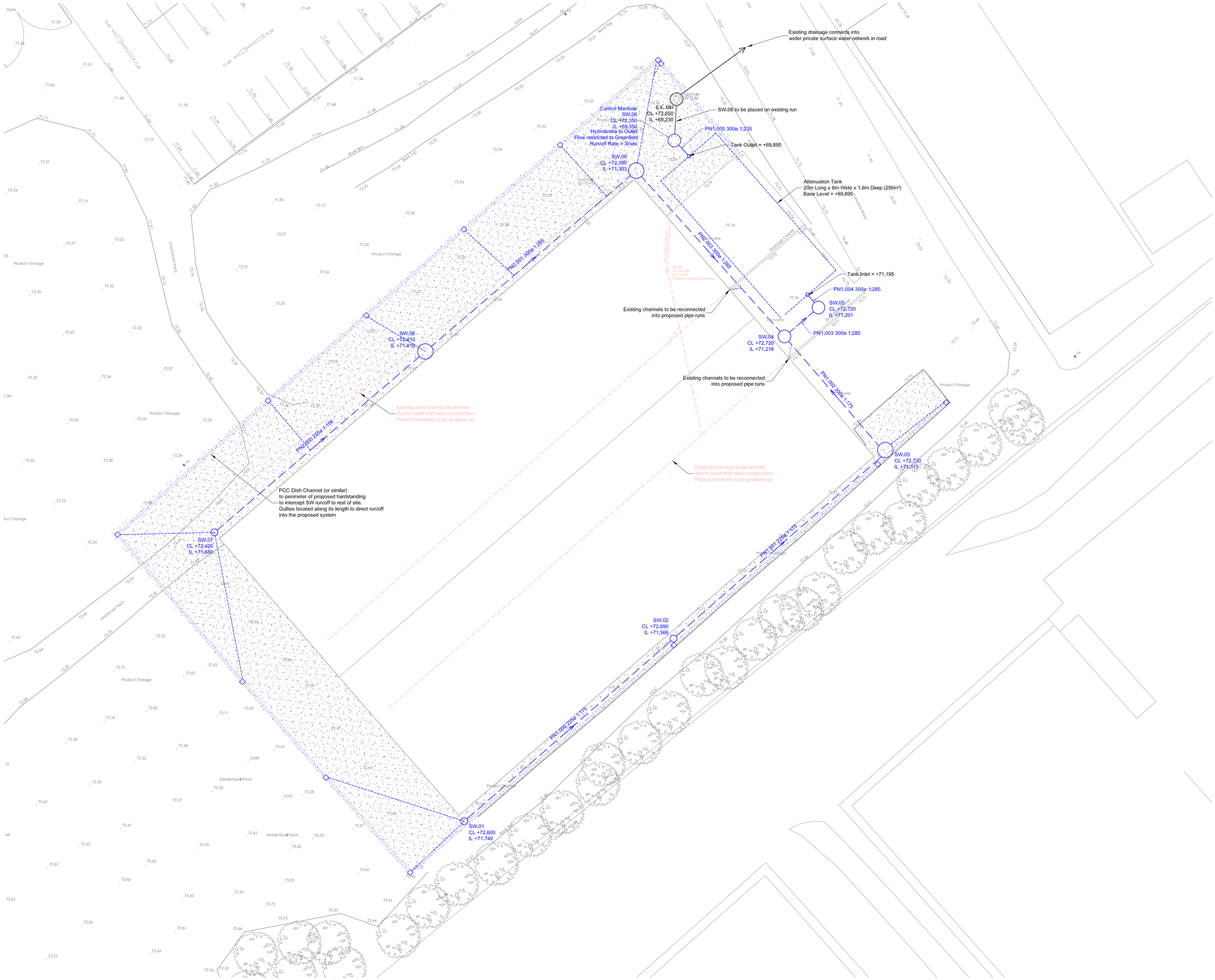
APPENDIX H

SITE BOUNDARY
Area 268m²
Surface Water run/off unconnected but will eventually enter existing system via nearby land drain
Area 1095m²
Drains via existing existing network in ground
Area 568m²
Concrete hardstanding drains via drainage channels
Area 268m²
Surface Water run/off unconnected
Total Drained Area of Existing Development = 1931m²
Estimated Runoff = 25.04l/sec (based on 0.018l/sec/m² in accordance with Building Regs Doc H)
Tarmac
Product Storage
Manhole
Concrete
Workshop
Unsurfaced Track
Debris/Spoil Stock
Concrete Road
Drainage Channel

APPENDIX I


Parking bay surveyed
Do the polytunnels connect to this drain
Drains in red do not need surveying, they have been done before
Ultrifire
depth, photos, pipe sizes, connectivity and condition of manholes
any evidence of a land drain
where do these polytunnels drain to and what areas do they drain
Poly 3
Are these 3 polytunnels fully connected to teh SW drainage?
M/H1
M/H2
M/H3
M/H4 - FLOW CONTROL VALVE
M/H5
B1
B2
B3
B4
LAND DRAIN 75mmΦ
150Φ
750Φ
225Φ

APPENDIX J



General Notes

1. This drawing is to be read in conjunction with all other relevant Melia Smith & Jones and Architect's drawings and specifications.

Drainage Notes

1. Underground drains for surface water drainage shall conform to BS5955 Part 6
2. Manhole covers to be as follows:-
   D400 in parking areas
   A15 in non-parking areas
3. All branches to main drain to be 135°.
4. Rainwater and foul outlet positions to be confirmed by Architect.
5. Drains passing through manhole walls to be built in, A flexible joint shall be provided within 150mm of the face of the wall with a further flexible joint within 600mm of the first joint.
6. All gullies, rest bends, drainage channels, rodding eyes and attachments are to be installed strictly in accordance with the manufacturers printed instructions.
7. The drainage shall be installed and tested strictly in accordance with the manufacturers printed instructions, BS 8000, BS 8301 and Local Authority byelaws.
8. All existing manhole positions, invert levels & pipe sizes are to be confirmed on site by the contractor prior to commencement of work on site and be reported to MSJ.
9. All in-situ concrete to comply with BS 8500.
10. All precast concrete items to comply with BS 5911;PART 200.
11. Sulphate resisting cement (C20-DC2) and pre-cast concrete products must be used or a laboratory report provided proving that such measures are not necessary.
12. All private drainage works to comply with Approved Document `H' of the Building Regulations.
13. All gullies and rainwater outlets are to be trapped.

CDM Regulations - Drainage

1. All design work has been carried out with health & safety aspects given full consideration. Wherever possible risks have been eliminated from the design, however due to the nature of this type of work it is not possible to remove all risk.

The contractor shall provide satisfactory responses via suitable method statements as to the manner in which they propose to carry out the work and deal with any highlighted risk, in particular the following :-

- All trench excavations, regardless of depth.
- Guarding to edges of excavations to prevent injury.
- Guarding of the works outside normal working hours.
- Undermining of adjacent roads or structures.
- Confined spaces operations.
- Dealing with existing services.
- Traffic management on existing highways.
- Procedures to be followed in the event of an emergency.
- Methods of working where ground contamination may be present.
- Dealing with existing sewer flows.

The above list is by no means exhaustive, but does highlight operations that present a risk to both contractors and the general public.

Rev	Revision	By	Chk	Date
P1	First Issue	DS	MH	31.05.24

SCALE @ A1	ISSUING OFFICE	MSJ PROJECT NUMBER
1:200	Leeds	224033

STATUS	PURPOSE OF ISSUE
S3	Review & Comment

Melia Smith & Jones
Consulting Civil & Structural Engineers
Vinery Court
58 Cardigan Lane
Leeds LS4 2LD
0113 2306080
www.msj.co.uk

PROJECT

Naylors Concrete Proposed Batching Plant

TITLE

Proposed Surface Water Drainage Layout

CLIENT

Martin Walsh Architectural

DRAWING NUMBER	REV
224033-MSJ-ZZ-XX-DR-D-4000	P2

APPENDIX K

10.7 Drainage

Further settlements in the madeground deposits are possible and therefore measures should be incorporated into the design of the drainage to deal with this possibility.

All pipes should be flexible with flexible and watertight joints. In order to make allowance for future settlement, the design gradients should be steeper than the minimum allowed for the flow rate and pipe size.

In addition to the above, it is recommended that trenches are over-excavated to a depth of 600mm and backfilled with compacted granular material prior to pipe laying."

10.8 Soakaways

Soakaways were undertaken on this site in accordance with BRE365; however, the 2 No. tests failed on the initial run of three. It is not considered appropriate for soakaways to be adopted for the discharge to ground of surface water.

It should be noted that no slope stability assessment has been carried out on the cutting which forms the north-eastern boundary of the site. The cutting is circa 5m to 8m in height, with a railway at the base. It is considered prudent to divert where possible surface water from entering the slope. Gradients for hardstanding should shed surface water away from the slope where possible.

10.9 Road Design

Based on the types of near surface material encountered, it is recommended for preliminary design purposes a CBR value = 2% is adopted. Based on the types of near surface material encountered during the investigation, the likely subgrade material will comprise madeground. A CBR value of 1-2% is therefore recommended for preliminary design purposes.

Consideration should also be given to the use of geotextiles to allow reduction of capping thickness. The advice of a suitable contractor should be sought as to the most appropriate type of geotextile to use in the ground conditions encountered at this site.

It should be noted that the type of construction will depend on proposed finished pavement levels across the site and it is recommended the pavement design is reviewed once these levels are known. In this context, it is essential that further in situ CBR testing is carried out once formation levels are known to confirm design CBR values and reference should be made to the 'Design Guidance for Road Pavement Foundations', Interim Advice Note 73/06, Revision 1 (2009), when considering the CBR value appropriate for use.

Infiltration Test Report

BYRNELOOBY

Carried out by:	Date:	Method:				Trial pit dimensions:	Before:	After:	Location:	Grid: OSGB
HW	09/11/21	BRE Digest DG 365: 2016 & BS6297:2007+A1:2008				Length (m):	1.30	1.30	mE:	432157.00
Chkd by:	Test no:	Granular infill:	Datum height (m agl):	Depth to water: Start:	End:	Width (m):	0.60	0.60	mN:	408348.00
JT	1	No	0.00	1.19	1.70	Depth (m):	2.50	2.50	m OD:	-

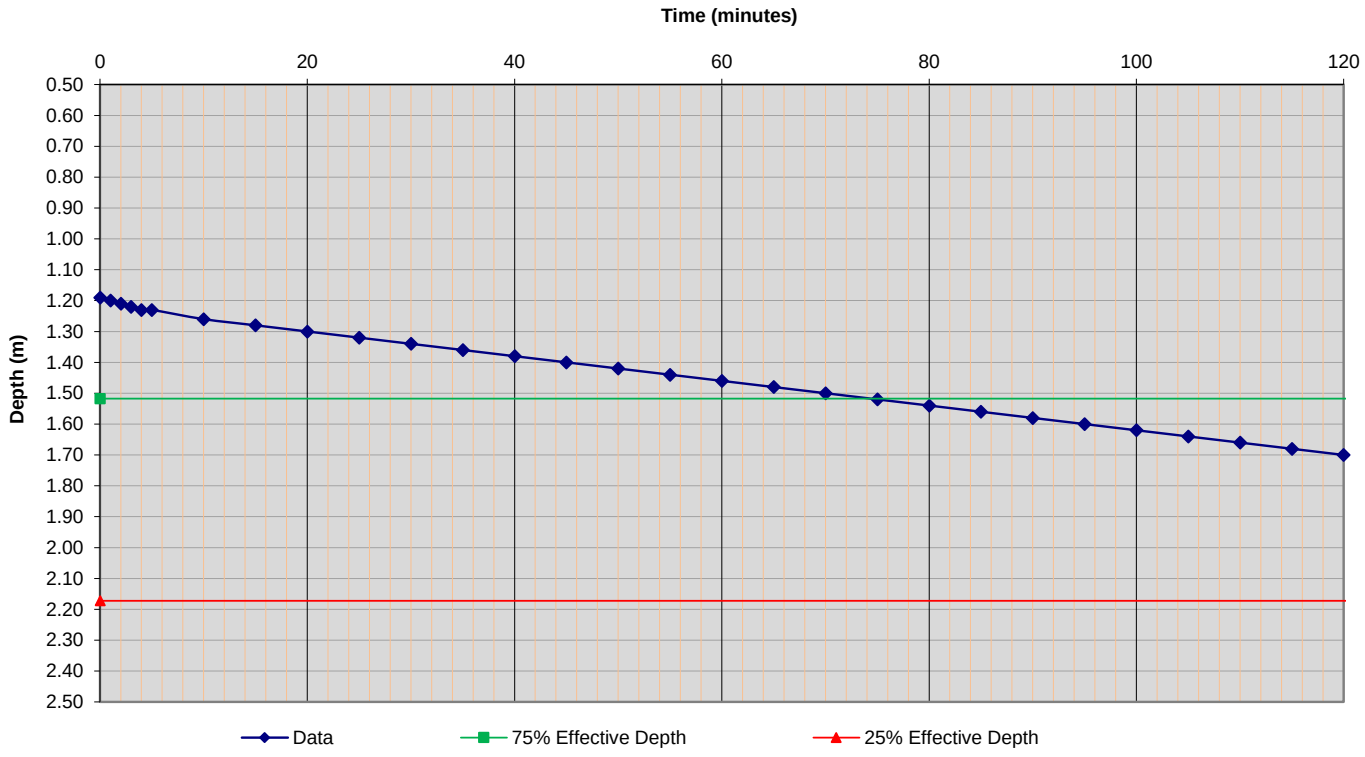
Elapsed time (mins):	Water depth (m below datum):	Elapsed time (mins):	Water depth (m below datum):
0	1.19	95	1.60
1	1.20	100	1.62
2	1.21	105	1.64
3	1.22	110	1.66
4	1.23	115	1.68
5	1.23	120	1.70
10	1.26		
15	1.28		
20	1.30		
25	1.32		
30	1.34		
35	1.36		
40	1.38		
45	1.40		
50	1.42		
55	1.44		
60	1.46		
65	1.48		
70	1.50		
75	1.52		
80	1.54		
85	1.56		
90	1.58		

Effective depth (m):		Elapsed time (mins) (from graph):	
75%	1.52	75%	35.00
50%	1.85	50%	100.00
25%	2.17	25%	190.00

Base area of pit	0.78	m^2
Mean surface area through which outflow occurs	3.27	m^2
Volume outflow between 75 and 25% effective depth	0.51	m^3

Soil infiltration rate, f	1.68E-05	$m^3/m^2/s$
Soil infiltration rate, f	6.05E-02	m/hr
Percolation Value, vp	1.42E+01	s/mm

Notes: Coordinates are approximate
Located at TP04



AGS

Notes: For explanation of symbols and abbreviations see Key Sheet.
All depths in meters.

Issue: FINAL

Project: WHALEY ROAD, BARUGH GREEN, BARNS
Proj. No: 14-K0030
Client: Melia Smith & Jones Limited

Test reference: **SA01**

Infiltration Test Report

BYRNELOOBY

Carried out by:	Date:	Method:				Trial pit dimensions:	Before:	After:	Location:	Grid: OSGB
HW	09/11/21	BRE Digest DG 365: 2016 & BS6297:2007+A1:2008				Length (m):	0.60	0.60	mE:	432202.00
Chkd by:	Test no:	Granular infill:	Datum height (m agl):	Depth to water: Start:	End:	Width (m):	1.50	1.50	mN:	408386.00
JT	1	No	0.00	1.46	1.47	Depth (m):	2.50	1.25	m OD:	-

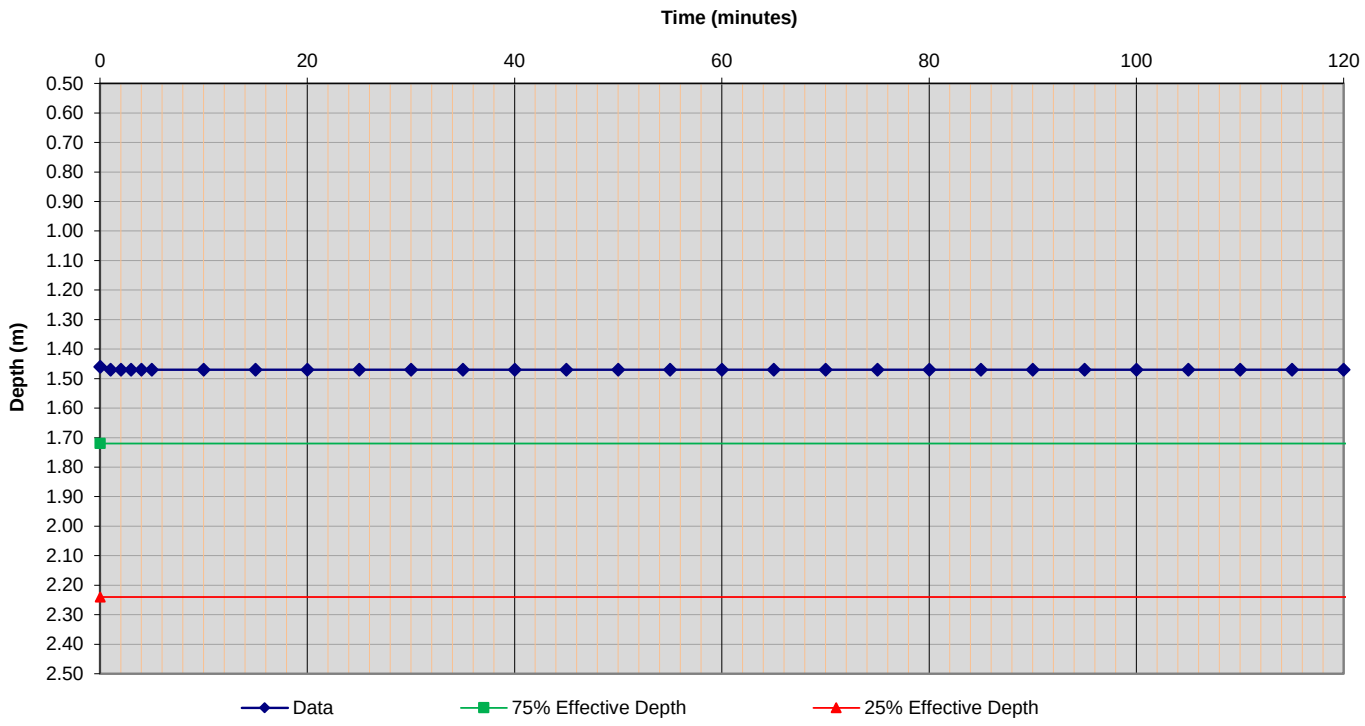
Elapsed time (mins):	Water depth (m below datum):	Elapsed time (mins):	Water depth (m below datum):
0	1.46	95	1.47
1	1.47	100	1.47
2	1.47	105	1.47
3	1.47	110	1.47
4	1.47	115	1.47
5	1.47	120	1.47
10	1.47		
15	1.47		
20	1.47		
25	1.47		
30	1.47		
35	1.47		
40	1.47		
45	1.47		
50	1.47		
55	1.47		
60	1.47		
65	1.47		
70	1.47		
75	1.47		
80	1.47		
85	1.47		
90	1.47		

Effective depth (m):		Elapsed time (mins) (from graph):	
75%	1.72	75%	12.00
50%	1.98	50%	40.00
25%	2.24	25%	75.00

Base area of pit	0.90	m^2
Mean surface area through which outflow occurs	3.08	m^2
Volume outflow between 75 and 25% effective depth	0.47	m^3

Soil infiltration rate, f	4.01E-05	$m^3/m^2/s$
Soil infiltration rate, f	1.45E-01	m/hr
Percolation Value, vp	7.27E+00	s/mm

Notes: Coordinates are approximate
Located at TP05



AGS

Notes: For explanation of symbols and abbreviations see Key Sheet.
All depths in meters.

Issue: FINAL

Project: WHALEY ROAD, BARUGH GREEN, BARNS
Proj. No: 14-K0030
Client: Melia Smith & Jones Limited

Test reference:

SA02