HL Structural Engineers

SUSTAINABLE DRAINAGE STRATEGY & FLOOD RISK ASSESSMENT REPORT

PROJECT: BARNSLEY YOUTH ZONE

CLIENT: BARNSLEY YOUTH ZONE

JOB NO: 777

REPORT REFERENCE: BAR-HLE-XX-XX- RP-C-00001

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INTRODUCTION

This Sustainable Drainage Strategy and Flood Risk Assessment Report has been prepared in support of the planning application for the proposed Barnsley Youth Zone.

The document will be used for discussions with the Local Planning Authority, Lead Local Flood Authority, the Local Water and Drainage Authority and the Environment Agency as required.

Site Location

The development is approximately 0.64 hectares, it is located in Barnsley, South Yorkshire and accessed off Schwabisch Gmund Way. The nearest postal address is S71 1AY. The approximate National Grid reference is **SE 34785 06612**. The approximate location of the site is shown on **Figure 1** below.

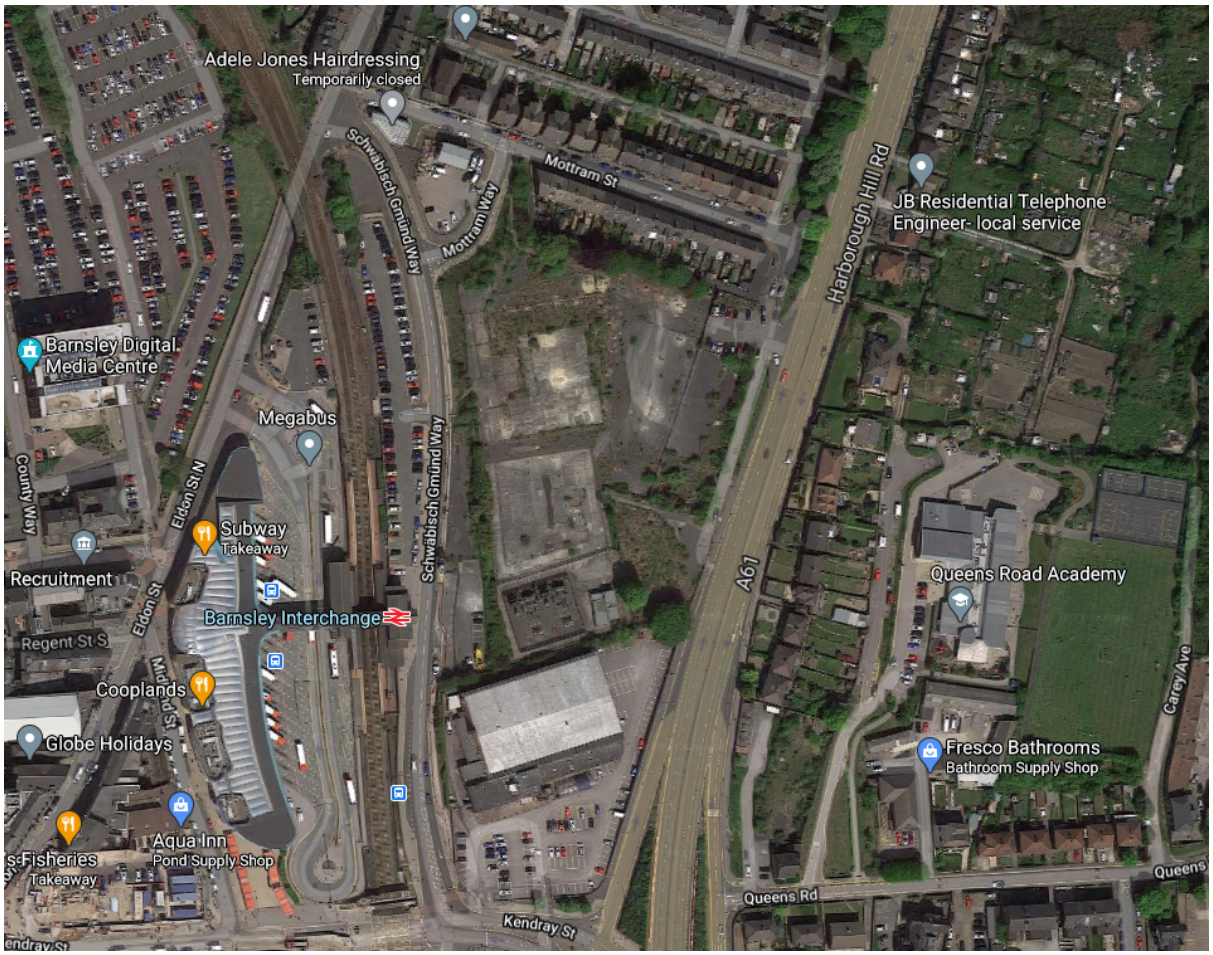


FIGURE 1 – AERIAL PHOTOGRAPH OF SITE

Site Current Use

The site currently unoccupied and is predominantly hard paved with concrete paving, asphalt with a small amount of soft landscaping adjacent to the boundary.

A copy of the existing site layout (Topo Survey) can be found in **Appendix G**.

Flood Zone Classification

The Flood Zone classification for the site has been obtained from the Environment Agency (EA) website and online map tool which is shown in **Appendix B**.

The EA Flood Map for Planning shows that the site is wholly located in Flood Zone 1.

DEVELOPMENT PROPOSALS

The proposed Youth Zone development will comprise of the following:

- Youth Zone building with sports and leisure facilities
- Service yard and accessible parking
- New dedicated site entrance off Schwabisch Gmund Way (existing car park entrance)

The proposed site plan can be found in **Appendix C**.

Vulnerability

The vulnerability classification for the proposed use of the site is **"More Vulnerable"** (Table 2 of the Technical Guidance to the NPPF).

Table 8-4 Flood Risk Vulnerability and Flood Zone 'Compatibility' (PPG, 2014)

Flood Risk Vulnerability Classification		Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	Exception test Required	✓	✓	✓
	3a	Exception Test Required	×	Exception Test Required	✓	✓
	3b *1	Exception Test Required*	×	×	×	✓*

✓ - Development is appropriate × - Development should not be permitted

FIGURE 2 – TABLE 8-4 OF THE FLOOD RISK VULNERABILITY AND FLOOD ZONE COMPATIBILITY (PPG 2014)

As the site is located in **Flood Zone 1**, Table 8-4 of the Flood Risk Vulnerability and Flood Zone Compatibility (PPG 2014) states the development is appropriate.

Development Design Life

The expected lifetime of the buildings on the site is to be 60 years.

Planning Application

The development currently does not have planning permission. This report has been prepared to support the full planning application for the project.

SEQUENTIAL TEST

Development is wholly in Flood Zone 1, therefore it is not subject to the Sequential Test.

EXCEPTION TEST

Development is wholly in Flood Zone 1, therefore it is not subject to the Exception Test as per the guidance set out in the National Planning Policy Framework.

CLIMATE CHANGE

Climate change allowances can be found in the Environment Agency guidance "Flood risk assessments: climate change allowances" (link) in the government website. Table 2 of the guidance provides information on peak rainfall intensity allowance in small catchments (less than 5km2).

Based on a typical lifespan for this type of development of up to 60 years the above guidance recommends an allowance of **40%** for increase in rainfall intensity.

SITE SPECIFIC FLOOD RISK

Flood Risk from Rivers or Sea (Including Tidal)

The EA 'Long Term Flood Risk' maps for England (see **Appendix D**) show that the site is located in an area of **"Very Low"** Risk of flooding from Rivers or Sea.

"Very low" means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

Flood Risk from Surface Water (Land)

The EA 'Long Term Flood Risk' maps for England (see **Appendix D**) show that the majority of the site is located in an area of **"Very Low"** Risk of flooding from Surface Water Drainage.

"Very low" means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

Flood Risk from Reservoirs, Canals & Artificial Sources

The EA 'Long Term Flood Risk' maps for England show that the site is located in an area of **"Very Low"** risk of flooding from reservoirs.

"Very low" means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

EXISTING DRAINAGE

A copy of the Yorkshire Water public sewer records can be found in **Appendix E** which show the following assets:

- 225mm diameter surface water sewer on A61 to the East of the site
- 225mm diameter foul water sewer on A61 to the East of the site
- 225mm diameter foul water sewer to the North (running along the back of the existing terrace houses)

A copy of the Barnsley City Council Highways Drainage * can be found in **Appendix E** which show the following assets:

- 150mm diameter surface water pipe (and manhole) on the site connected to the SYPTE drainage network beyond Schwabisch Gmund Way
- 225mm diameter surface water pipe (and manhole) on the site connected to the Public Sewer network on Mottram Way
- 150mm diameter foul water pipe (and manhole) on the site connected to the Public Sewers on Mottram Way

** Drawing provided by the Lead Local Flood Authority who confirmed that this is a Design Drawing and information contained in it may not represent what was constructed. To be confirmed with Drainage Survey*.

A CCTV drainage survey was carried out in November 2021 to confirm the presence of the existing drainage system and to confirm the extent of existing drainage which needs to be diverted and/or abandoned as well as identification of potential points of connection. The CCTV Survey plan and report can be found in **Appendix L**. This survey and subsequent liaison with Yorkshire Water confirmed that the 150mm diameter foul water pipe in Mottram Way is an unrecorded public foul sewer. Yorkshire Water also confirmed that the 225mm diameter surface water pipe in Mottram Way is probably an unrecorded public sewer but they have requested further survey work to confirm this drain connects to the recorded surface water sewer in Eldon Street North. This additional survey work is to be completed in the next stage of the project.

SURFACE WATER MANAGEMENT

The National Planning Policy Framework (NPPF) and accompanying Technical Guidance indicate that surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management.

Consideration should therefore firstly be given to using sustainable drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2015) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach.

Pre-Development Surface Water Run-off

The development is sub-divided into two catchments. The Development Site (BYZ) and a Car Park that will be managed by third party.

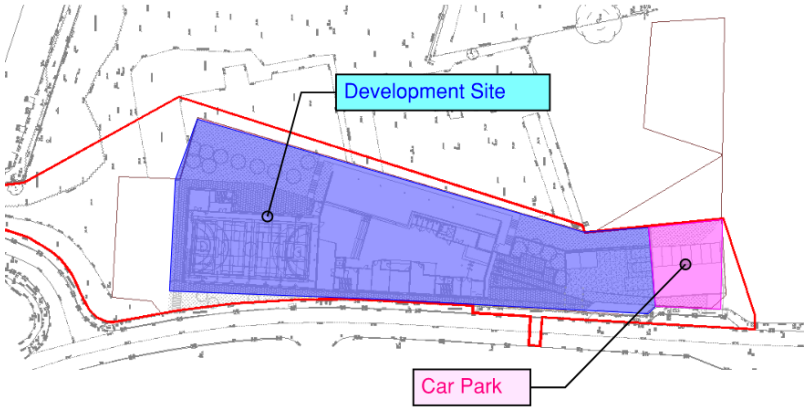


FIGURE 2 – AERIAL PHOTOGRAPH OF SITE

The existing surface water runoff flow has been calculated in accordance with the Wallingford Procedure. Results are summarised in Table 1 below.

Catchment:		Brown field Rate (existing)		
	Sub-Catchment (m2)	1:2 Year 15min (l/s)	1:30 Year 15min (l/s)	1:100 Year 15min (l/s)
Development Site	3775	39	74	96
Car Park	400	4	8	10

TABLE 1 – PRE-DEVELOPMENT BROWNFIELD SURFACE WATER RUNOFF RATES

Post-Development Surface Water Run-off

The Lead Local Flood Authority (LLFA) confirmed that development on previously developed (brownfield) land must reduce the rate of unattenuated runoff by 30%. Yorkshire Water confirmed that this would be subject to confirmation of existing surface water runoff.

Surface water discharge will be restricted to a maximum of 67 l/s in accordance with LLFA requirement. This provides 30% reduction over existing brownfield runoff which are summarised in Table 2.

Catchment:		Discharge Flow Rates		
	Sub-Catchment (m2)	1:2 Year 15min (l/s)	1:30 Year 15min (l/s)	1:100 Year 15min (l/s)
Development Site	3775	27	52	67
Car Park	400	2.8	5.6	7

TABLE 2 – POST DEVELOPMENT SURFACE WATER RUNOFF RATES

Sustainable Drainage Systems (SuDS)

Sustainable Drainage Systems (SuDS) have the ability to address four core objectives: water quantity, water quality, amenity and biodiversity. In accordance with the National Planning Policy Framework, the Non-Statutory Technical Standards for Sustainable Drainage Systems (2018) and the SuDS Manual (CIRIA 753) SuDS should be specified wherever possible to manage surface water run-off generated onsite.

Consideration should therefore firstly be given to using sustainable drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2015) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach.

Methods of Surface Water Management

There are three methods that have been reviewed for the management and discharge of surface water which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed.

- Rainwater Harvesting
- Discharge via infiltration
- Discharge to watercourse
- Discharge to public sewerage system

Rainwater Harvesting

The only notable opportunity for water storage/recycling is for use in WC's as there is no significant water demand for other suitable purposes in the proposed development and the site is almost all hard paved meaning minimal need for vegetation watering. Whilst Rainwater harvesting is technically

viable, its' adoption has not been proposed principally due to the relatively low water use of the facilities combined with the high capital costs and ongoing maintenance costs.

Considering the payback period on the rainwater harvesting system, it is not considered to be a commercially viable installation given the value of water used. Additionally, there are operational considerations, with specific reference to the common issues associated with grey water such as dirty water staining and odours that create a negative perception of the facility; this perception is critical to the operation youth zone as it is a charity which exists to provide and attractive space for young adults to attend.

Infiltration

Infiltration tests were carried out on site as part of the Phase 2 Site Investigation ref. P18-01848. The testing concluded that soakaway drainage is NOT considered suitable for the proposed development.

The coefficient of permeability was calculated as 2.98x10-6, therefore it was determined that this value is too low for soakaways to be viable for the proposed development.

A copy of Site Investigation Report can be found in **Appendix J**

Watercourse

The next method in the hierarchical approach is discharge to watercourse.

There is no watercourse within the vicinity of the site to make a gravity connection to, therefore a watercourse as a means of discharging surface water is deemed to be not viable.

Public Sewer

There are numerous existing surface water drains on and adjacent to the proposed site. The site currently drains to these unrestricted, as confirmed via the CCTV drainage survey included in **Appendix L**.

As infiltration is not viable and there is no open or culverted watercourses within the vicinity to connect to, it is proposed to discharge surface water runoff to the existing public sewer network.

Surface Water Storage Requirements

The existing ground conditions for the site were found not to be suitable for infiltration as a means of discharging surface water, this means disposal of said water off site is required at a restricted maximum rate. When rates are restricted during storm events, attenuation is required to store the water that backs up in the drainage network.

Open storage structures such as ponds and basins have been discounted for this site due to the topography and potential risk to children using the site.

Attenuation will be provided within an online below ground storage (cellular tank or large diameter pipes) located below the external ground. A preliminary calculation estimate that the attenuation required for the development site will be split into a below ground attenuation tank of **100m³** approximately, and a Blue Roof (Kick Pitch) with capacity for **30m³** approximately. A copy of the network design and simulation results can be found in **Appendix A.** The Car Park drainage will require an attenuation tank of **10m³** approximately.

Surface Water Drainage Strategy

Following the surface water discharge hierarchy, it is proposed to discharge surface water flows from the development site to the existing surface water drains within the site. Ownership of these drains are yet to be confirmed as these are not shown on Yorkshire Water Sewer Maps but are shown on Highway Drainage Drawing.

It is proposed to split the site into two sub-catchments with one outfall each.

- The smaller car park which will be owned by Network Rail at the south of the site will have its own drainage network/storage and outfall to the SYPTE drain.
- The rest of the development site will connect to the existing surface water drainage to the north

The majority of the attenuation storage required will be provided in an underground cellular tank / large diameter pipe below the external ground and roof top blue roof.

A copy of the Proposed Drainage Strategy Layout can be found in **Appendix F**.

OCCUPANTS AND USERS OF THE DEVELOPMENT

The construction of the new Youth Zone will increase the number of occupants and users of the development.

The vulnerability classification of the site is 'More Vulnerable' and this demonstrates a level of flood risk to the people using this development but as they will be not be residing here overnight this risk is considered low.

As the site is located in Flood Zone 1 and is not known to be subject to any other forms of flooding, the residual flood risk to the occupants and users is considered to be very low and acceptable.

OVERLAND FLOW ROUTES AND EXEEDANCE PATH

Overland flow routes have been assessed and shown on Figure 3 below and demonstrate that no flooding of building will occur in the event of a failure of the drainage network.

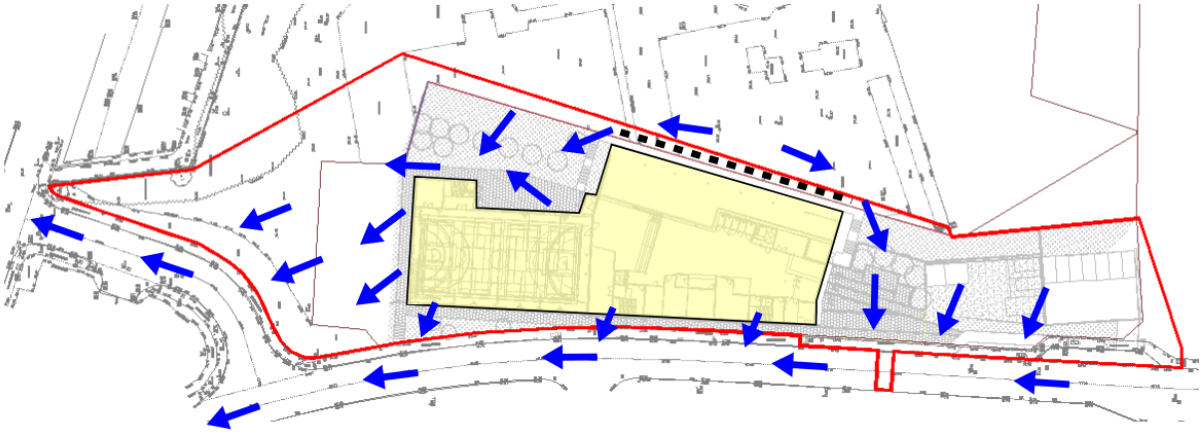


FIGURE 3 – OVERLAND FLOW ROUTES

RESIDUAL FLOOD RISK

The proposed below ground surface water sewer network has been designed to ensure there is no flooding in the 1 in 30 year storm event and no internal flooding in a 1 in 100 year event, inclusive of an additional 40% climate change allowance providing a significant reduced in the pre-development condition. The residual flood risk is in related to storm events above the 1 in 100 year return period or the risk of blockage within the drainage system. The risk is considered to be low.

FOUL WATER MANAGEMENT

Foul Water Drainage Strategy

It is proposed to discharge foul water flows from the development to the nearest foul water public sewer located in the adjacent car park to the north, subject to approval from Yorkshire Water.

The intention is to discharge via a gravity system should existing sewer levels allow, if this is not possible, a private packaged pumping station located within the site boundary will be constructed, pumping flows through a rising main to a new manhole and connection to said public foul manhole.

DRAINAGE MANAGEMENT PLAN

The proposed drainage will be operated and maintained by the maintenance staff at the Youth Zone.

A drainage maintenance plan can be found in **Appendix K** which contains information on the proposed drainage networks, operation and maintenance of these networks and who will undertake these works for the lifetime of the development.

CONSULTATION

Water Authority (Anglian Water)

A pre-development enquiry was submitted to Yorkshire Water in February 2021, a copy of their response can be found in **Appendix I.**

Lead Local Flood Authority (Essex County Council)

A LLFA pre-planning enquiry was submitted to Barnsley Council in February 2021, a copy of their response can be found in **Appendix H**.

BREEAM

The table below lists the target drainage credits where supporting information has been requested by the BREEAM assessor from HL Structural Engineers and summarises our responses and comments.

Credit	Information Requested by the BREEAM Assessor	HL Information Provided / Responses and Comments
Pol 3 – Flood and Surface Water Management	<u>Flood resilience</u> The document to address the risk of flooding from the following sources: • Tidal • Sewers: combined, foul or surface water sewers (this has been mentioned but no confirmation of flood risk level from this source) <u>Surface Water Run Off- Rate</u> To be able to achieve this credit, the report to confirm the following; • For brownfield sites, drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal)	Refer to Site 'Specific Flood Risk' section on page 5 of this report for assessment of risk associated with tidal & sewer flooding. Also refer to Appendix D for EA Long Term Flood Risk Maps and Appendix K for the Surface Water Management Plan showing site as at low or very low risk. Refer to Table 1 and 2 in this report which show proposed 30% improvement. Also refer to Appendix A for Existing Brownfield Runoff Calculations & Proposed Surface Water Network Simulation Calculations.

	shows a <u>30% improvement</u> for the developed site compared with the predeveloped site. This should comply at the 1-year and 100-year return period events. • Micro-Drainage calculations sheets to be provided showing the allowance for climate change, attenuation calc and size. • Confirmation that the relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Sustainable Drainage Systems (SuDS) are in place.	Refer to Appendix A for Proposed Surface Water Network Simulation Calculations which show an allowance of 40% for future climate change, sizes of attenuation structures and simulation results. Please refer to Report BAR-HLE-XX-XX-RP-C-00002 – Drainage Maintenance Plan which can be found in Appendix K.
	<u>Surface Water Run Off- Volume</u> • Justification that the post development run-off volume cannot be lower than pre-development site.	Ground conditions are such that infiltration systems are not technically viable on this site. The proposed discharge flow are being reduced by 30% compared to the pre-development flow rates including the 1 year return period event.
	• The report has to confirm that ' Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance)'.	Please refer to Figure 3 for the Overland Flows diagram which confirms no flooding of building will occur in the event of a failure of the drainage network.

CONCLUSION

Development is in Flood Zone 1 and at risk of any other sources of surface water flooding.

The site is not subject to the Sequential or Exception Test.

The site is not suitable for infiltration or connection to a watercourse as a means of discharging surface water.

Subject to further consents and design development, surface water flows are to discharge to the existing public surface water sewer at a maximum rate of 67l/s for the 1 in 100 year storm event.

Surface water attenuation will be provided to ensure no flooding occurs for all storms up to and including the 1 in 100 year storm event with a 40% additional allowance for future climate change.

The setting of proposed levels and existing topography conclude that flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance).

Foul water is to discharge to the public foul sewer to the north.

APPENDIX A – CALCULATIONS

APPENDIX A – CALCULATIONS

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **19.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.62**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min$ = **11.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.79**
Rainfall for 15min storm with 2 year return period	$M2\_15min = Z2 \times M5\_15min_i$ = **9.3** mm
Design rainfall intensity	I_{max} = M2_15min / D = **37.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **3775** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **39.2** l/s

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **30** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **19.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.62**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min$ = **11.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.50**
Rainfall for 15min storm with 30 year return period	$M30\_15min = Z2 \times M5\_15min_i$ = **17.7** mm
Design rainfall intensity	I_{max} = M30_15min / D = **70.8** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **3775** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **74.3** l/s

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **19.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.62**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min$ = **11.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.94**
Rainfall for 15min storm with 100 year return period	$M100\_15min = Z2 \times M5\_15min_i$ = **22.8** mm
Design rainfall intensity	I_{max} = M100_15min / D = **91.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **3775** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **95.8** l/s

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **2** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **19.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.62**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min$ = **11.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **0.79**
Rainfall for 15min storm with 2 year return period	$M2\_15min = Z2 \times M5\_15min_i$ = **9.3** mm
Design rainfall intensity	I_{max} = M2_15min / D = **37.4** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **400** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **4.2** l/s

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **30** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **19.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.62**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min$ = **11.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.50**
Rainfall for 15min storm with 30 year return period	$M30\_15min = Z2 \times M5\_15min_i$ = **17.7** mm
Design rainfall intensity	I_{max} = M30_15min / D = **70.8** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **400** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **7.9** l/s

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Other
Storm duration	D = **15** min
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.360**
5-year return period rainfall of 60 minutes duration	M5_60min = **19.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %
Factor Z1 (Wallingford procedure)	Z1 = **0.62**
Rainfall for 15min storm with 5 year return period	$M5\_15min_i = Z1 \times M5\_60min$ = **11.8** mm
Factor Z2 (Wallingford procedure)	Z2 = **1.94**
Rainfall for 15min storm with 100 year return period	$M100\_15min = Z2 \times M5\_15min_i$ = **22.8** mm
Design rainfall intensity	I_{max} = M100_15min / D = **91.3** mm/hr

Maximum surface water runoff

Catchment area	A_{catch} = **400** m^2
Percentage of area that is impermeable	p = **100** %
Maximum surface water runoff	$Q_{max} = A_{catch} \times p \times I_{max}$ = **10.1** l/s

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SW1.0	15 Winter	2	+40%	100/15 Summer				92.706
S1.001	SW1.1	15 Winter	2	+40%	30/15 Summer				92.478
S1.002	SW1.2	15 Winter	2	+40%	30/15 Summer				92.347
S1.003	SW1.3	15 Winter	2	+40%	30/15 Winter				92.116
S1.004	SW1.4	15 Winter	2	+40%	30/15 Summer				91.506
S2.000	SW2.0	15 Winter	2	+40%					95.419
S2.001	SW2.1	15 Winter	2	+40%	30/15 Summer				91.512
S2.002	SW2.2	15 Winter	2	+40%	30/15 Summer				91.247
S2.003	SW2.3	15 Winter	2	+40%	30/15 Summer				91.019
S3.000	SW3.0	15 Winter	2	+40%	100/15 Summer				91.498
S1.005	SW1.5	60 Winter	2	+40%	30/15 Summer				90.827
S1.006	SW1.6	60 Winter	2	+40%	2/15 Winter				90.811

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SW1.0	-0.169	0.000	0.14			8.4	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	SW1.1	-0.091	0.000	0.65			28.9	OK	
S1.002	SW1.2	-0.095	0.000	0.62			29.3	OK	
S1.003	SW1.3	-0.123	0.000	0.42			40.0	OK	
S1.004	SW1.4	-0.118	0.000	0.68			53.6	OK	
S2.000	SW2.0	-0.131	0.000	0.04			3.8	OK	
S2.001	SW2.1	-0.088	0.000	0.35			7.5	OK	
S2.002	SW2.2	-0.088	0.000	0.35			7.5	OK	
S2.003	SW2.3	-0.051	0.000	0.76			15.8	OK	
S3.000	SW3.0	-0.052	0.000	0.45			3.4	OK	
S1.005	SW1.5	-0.064	0.000	0.44			44.5	OK	
S1.006	SW1.6	0.087	0.000	0.27		36	17.2	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SW1.0	15 Winter	30	+40%	100/15 Summer				92.817
S1.001	SW1.1	15 Winter	30	+40%	30/15 Summer				92.789
S1.002	SW1.2	15 Winter	30	+40%	30/15 Summer				92.563
S1.003	SW1.3	15 Winter	30	+40%	30/15 Winter				92.250
S1.004	SW1.4	15 Winter	30	+40%	30/15 Summer				91.816
S2.000	SW2.0	15 Winter	30	+40%					95.428
S2.001	SW2.1	15 Winter	30	+40%	30/15 Summer				91.650
S2.002	SW2.2	15 Winter	30	+40%	30/15 Summer				91.547
S2.003	SW2.3	15 Winter	30	+40%	30/15 Summer				91.462
S3.000	SW3.0	15 Winter	30	+40%	100/15 Summer				91.523
S1.005	SW1.5	60 Winter	30	+40%	30/15 Summer				91.243
S1.006	SW1.6	60 Winter	30	+40%	2/15 Winter				91.220

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SW1.0	-0.058	0.000	0.26			15.6	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	SW1.1	0.220	0.000	1.31			58.7	SURCHARGED	
S1.002	SW1.2	0.121	0.000	1.25			58.6	SURCHARGED	
S1.003	SW1.3	0.011	0.000	0.85			80.5	SURCHARGED	
S1.004	SW1.4	0.192	0.000	1.38			109.1	SURCHARGED	
S2.000	SW2.0	-0.122	0.000	0.08			7.2	OK	
S2.001	SW2.1	0.050	0.000	0.69			15.0	SURCHARGED	
S2.002	SW2.2	0.212	0.000	0.61			13.1	SURCHARGED	
S2.003	SW2.3	0.392	0.000	1.35			28.2	SURCHARGED	
S3.000	SW3.0	-0.027	0.000	0.86			6.5	OK	
S1.005	SW1.5	0.352	0.000	0.84			84.2	SURCHARGED	
S1.006	SW1.6	0.496	0.000	0.41		44	25.8	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.355
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	40, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SW1.0	15 Winter	100	+40%	100/15 Summer				93.356
S1.001	SW1.1	15 Winter	100	+40%	30/15 Summer				93.322
S1.002	SW1.2	15 Winter	100	+40%	30/15 Summer				93.019
S1.003	SW1.3	15 Winter	100	+40%	30/15 Winter				92.599
S1.004	SW1.4	15 Winter	100	+40%	30/15 Summer				91.987
S2.000	SW2.0	15 Winter	100	+40%					95.432
S2.001	SW2.1	15 Winter	100	+40%	30/15 Summer				92.053
S2.002	SW2.2	15 Winter	100	+40%	30/15 Summer				91.901
S2.003	SW2.3	15 Winter	100	+40%	30/15 Summer				91.782
S3.000	SW3.0	60 Winter	100	+40%	100/15 Summer				91.668
S1.005	SW1.5	60 Winter	100	+40%	30/15 Summer				91.654
S1.006	SW1.6	60 Winter	100	+40%	2/15 Winter				91.626

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SW1.0	0.481	0.000	0.34			21.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.001	SW1.1	0.753	0.000	1.51			67.4	SURCHARGED	
S1.002	SW1.2	0.577	0.000	1.46			68.8	SURCHARGED	
S1.003	SW1.3	0.360	0.000	0.99			93.6	SURCHARGED	
S1.004	SW1.4	0.363	0.000	1.62			128.0	SURCHARGED	
S2.000	SW2.0	-0.118	0.000	0.10			9.3	OK	
S2.001	SW2.1	0.453	0.000	0.75			16.1	SURCHARGED	
S2.002	SW2.2	0.566	0.000	0.74			15.8	SURCHARGED	
S2.003	SW2.3	0.712	0.000	1.61			33.5	SURCHARGED	
S3.000	SW3.0	0.118	0.000	0.61			4.6	SURCHARGED	
S1.005	SW1.5	0.763	0.000	1.03			104.1	SURCHARGED	
S1.006	SW1.6	0.902	0.000	0.51		52	32.1	SURCHARGED	

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APPENDIX B – EA Flood Zone Map For Planning

Flood map for planning

Your reference	Location (easting/northing)	Created
BAR	**434795/406493**	**25 Feb 2021 22:43**

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

This means:

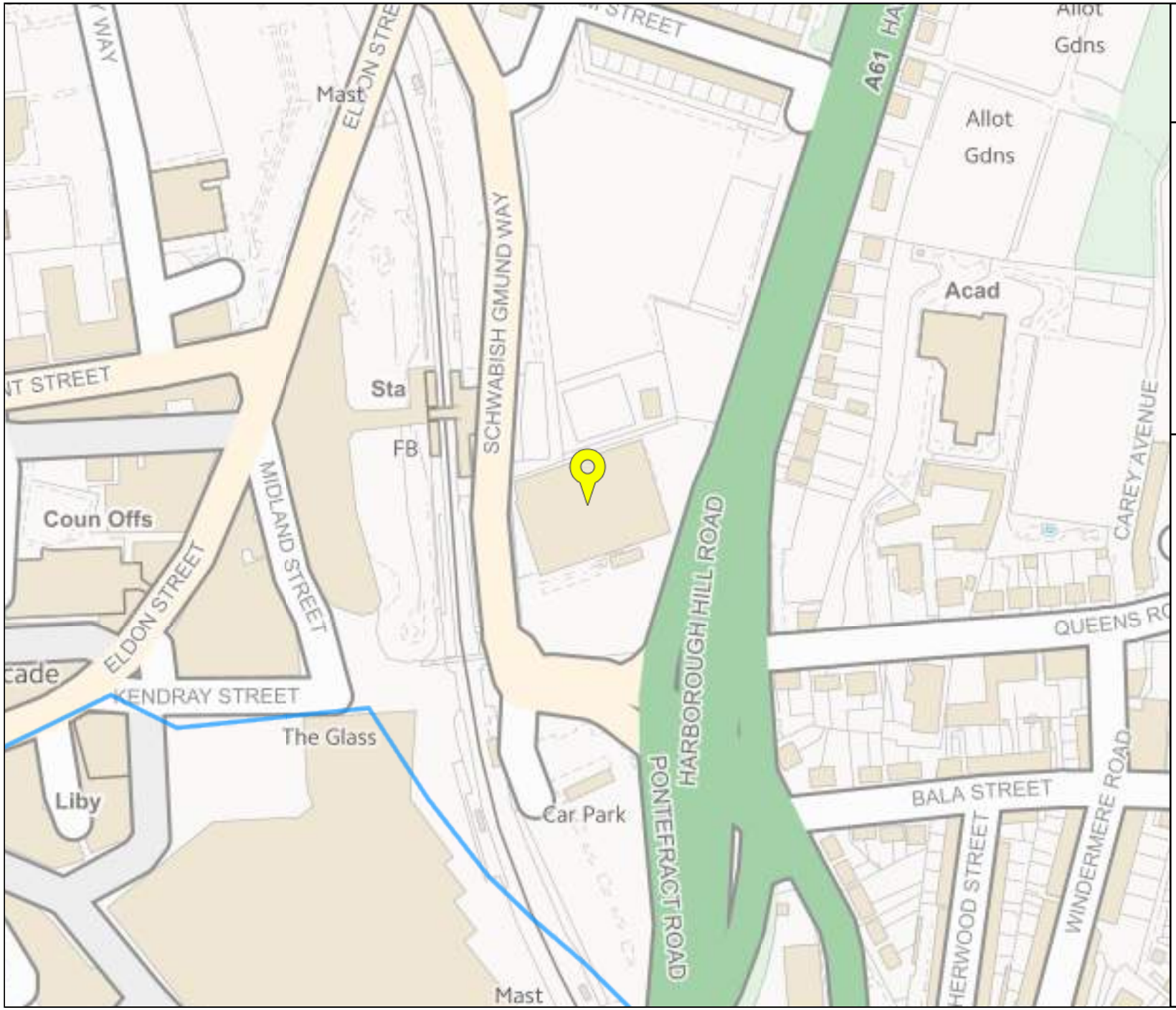
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

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.

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Environment Agency

Flood map for planning

Your reference
BAR

Location (easting/northing)
434795/406493

Scale
1:2500

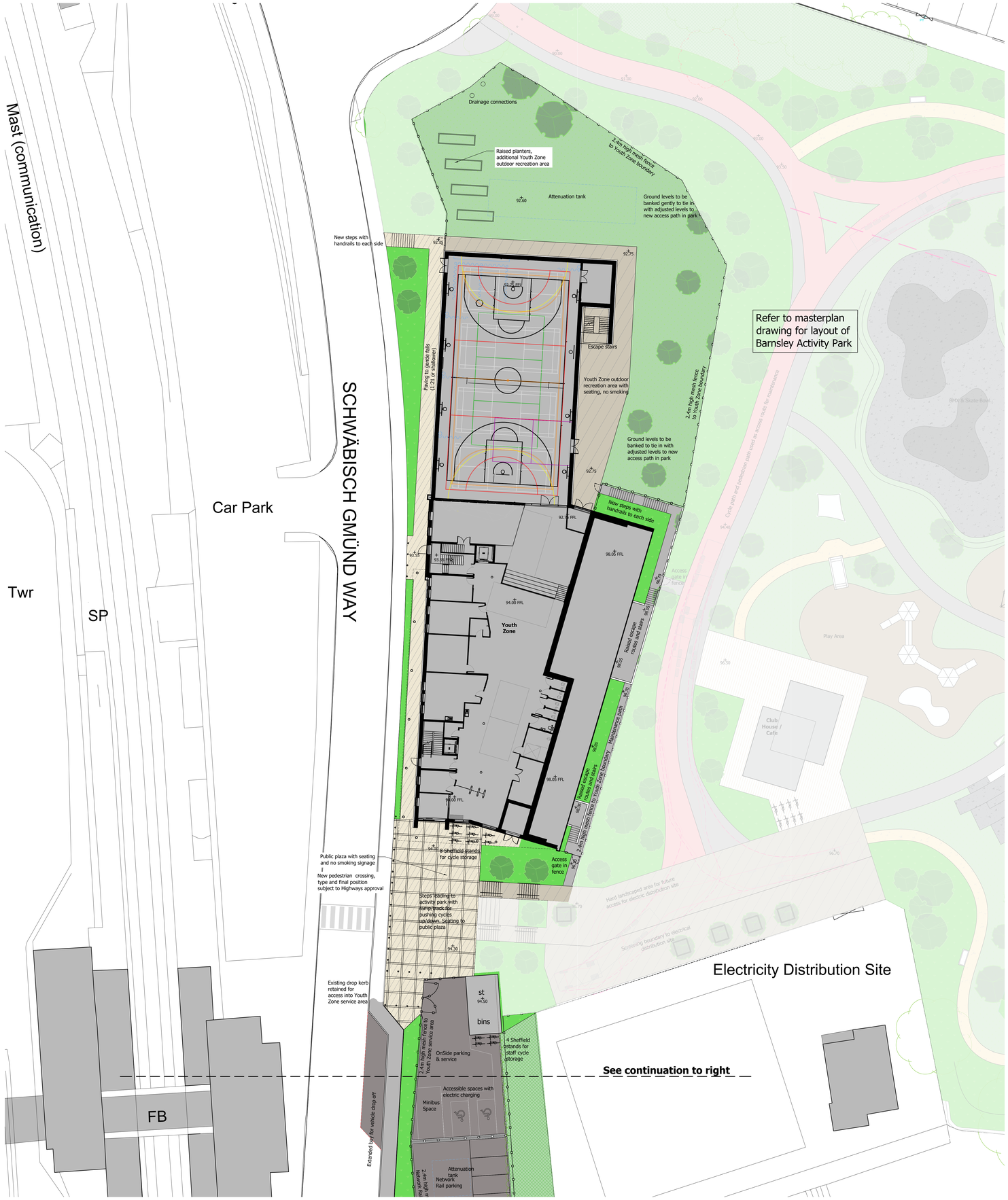
Created
25 Feb 2021 22:43

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

0 20 40 60m

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APPENDIX C – Proposed Site Layout



Tarmac (vehicular loadings)
On sub-base to Engineers details, generally half battered PC concrete kerbs, coloured tarmac to cycleway

Tarmac (vehicular loadings to Activity Park)
On sub-base to Engineers details, generally half battered PC concrete kerbs to roads and 50mm flat top kerbs to edges

Paving
Block laying pattern and unit sizes to Landscape Architects details on sub-base to engineers details

Existing Landscaping / Banking
Enhance and extend existing soft landscpaing with native species in accordance with Ecologist / Landscape Architects details

Soft Landscaping
Subject to detail design by Landscape Architects, indicates low level species rich grassland, such as wild flowers

Soft Landscaping
Subject to detail design by Landscape Architects, shrub and herbaceous planting which is native wildlife friendly

Gravel Perimeter to Building
300mm maintenance strip to Landscape Architects details on weed suppressant membrane adjacent to building and soft landscaping

Existing object to be demolished / removed

Existing Tree - Retained

Proposed new trees

92.60 / 92.75 FFL — Proposed levels, FFL indicates internal floor level

Bollards
1.2m high bollards to provided vehicular and pedestrian separation

Continued Site Plan

N

0m 2m 4m 6m 8m 10m 1:200

Revision

Project
Barnsley Youth Zone
Land Off Schwäbisch Gmünd Way, Barnsley

Drawn
DC

Date
04.04.2022

Scale(s) @ A0
1:200

Status
Planning Issue

Client
OnSide

Sheet Title
Proposed Youth Zone Site Plan

Project No.
83-18

Rev

Dwg No.
BAR-HBA-V1-00-DR-A-P54

hb architects
The Old Telephone Exchange, Albert Street, Rugby, Warks, CV21 2SA
|info@hb-architects.co.uk | www.hb-architects.co.uk | 01788 576137

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APPENDIX D – EA Long Term Flood Risk Maps



Extent of flooding from surface water

High Medium Low Very low Location you selected

APPENDIX E – Existing Drainage Records

Public Sewer Records

YORKSHIRE WATER
PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the ***general*** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0845 124 24 24 for both water and sewerage.

2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.

3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will ***generally*** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will ***generally*** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.

4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.

5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45o and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter *(see illustration below)*. Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.

6. All excavation works near to YW apparatus should be by hand digging only.

7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.

8. Adequate support must be provided where any works pass under YW apparatus.

9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.

10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0845 124 24 24.

11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.

12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.

13. ***Under no circumstances*** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.

14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversionary Works).

15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.

16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.

17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available*" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.

18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011.

Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).

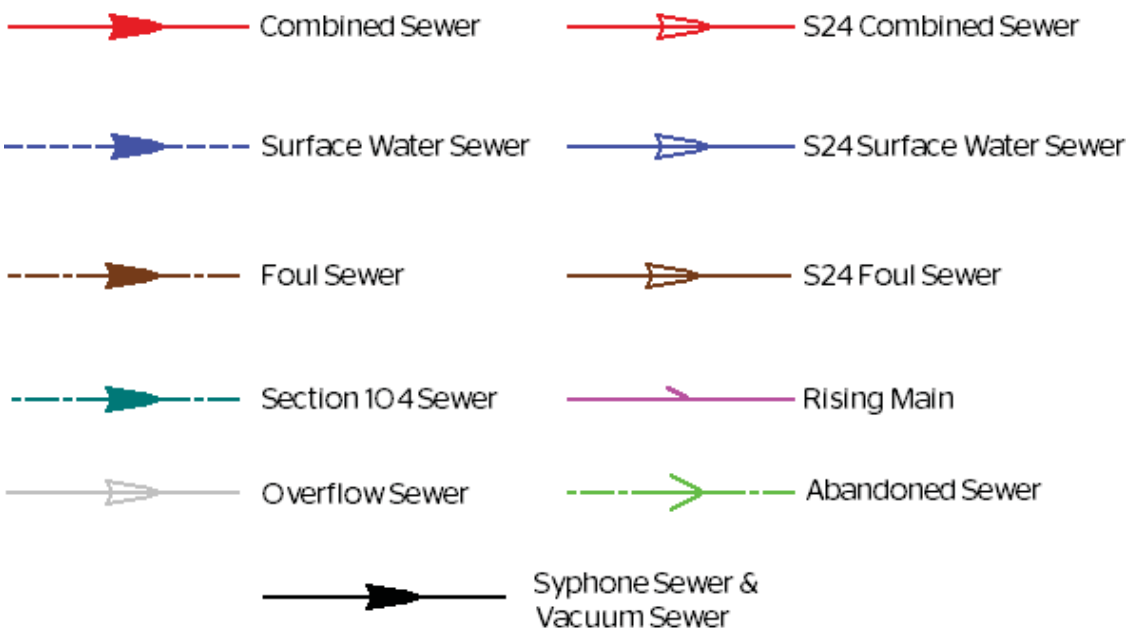
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20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trail holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0845 124 24 24.

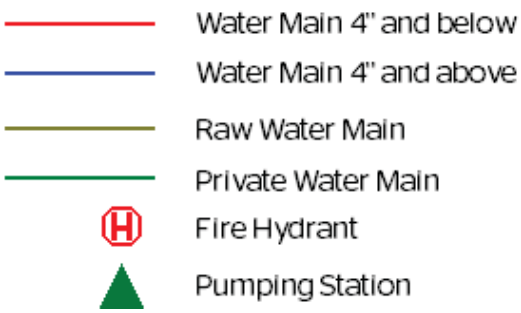
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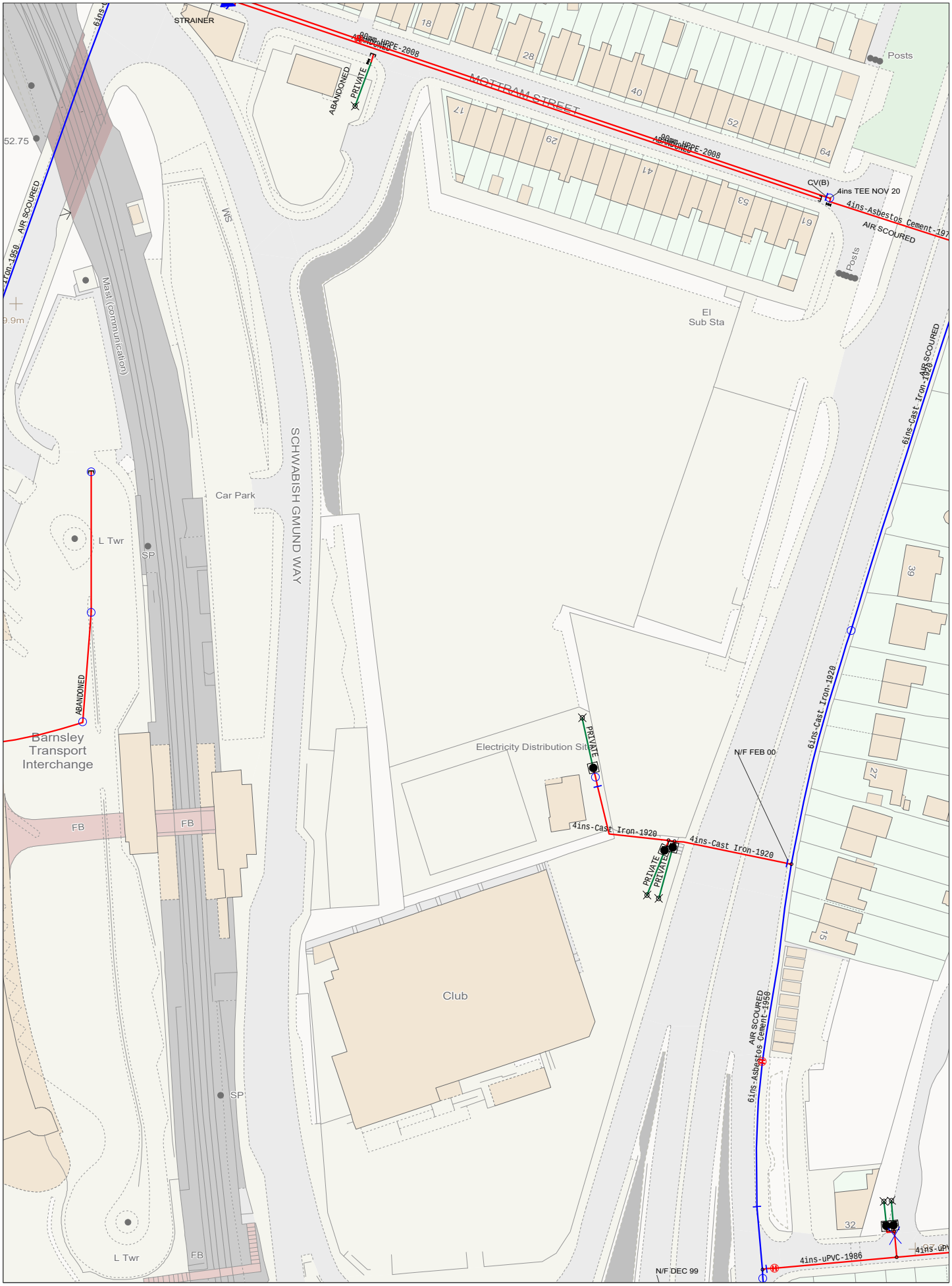


Sewer Legend



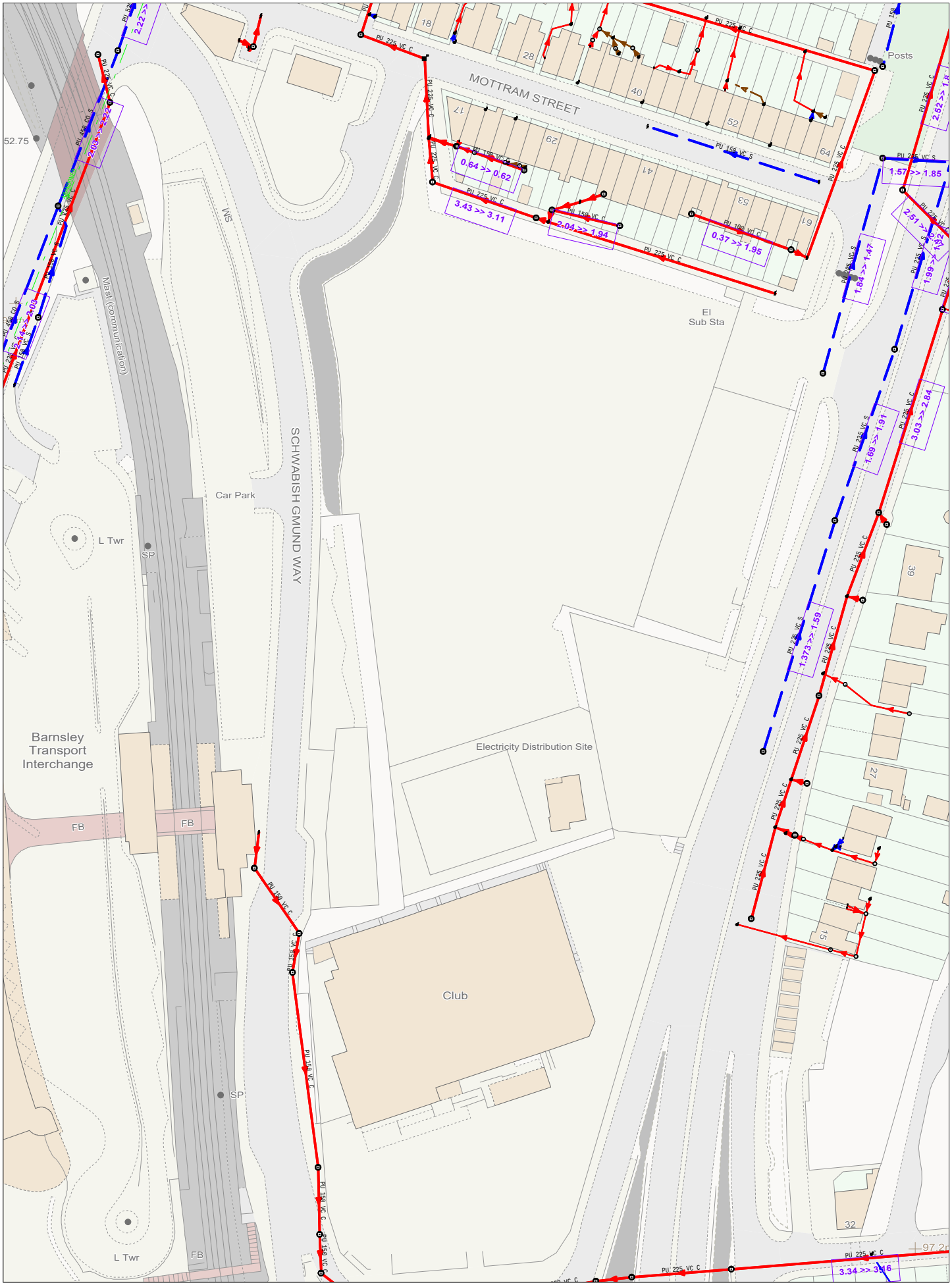
Water Legend





Date Requested : 01/02/2021, 10:38:35

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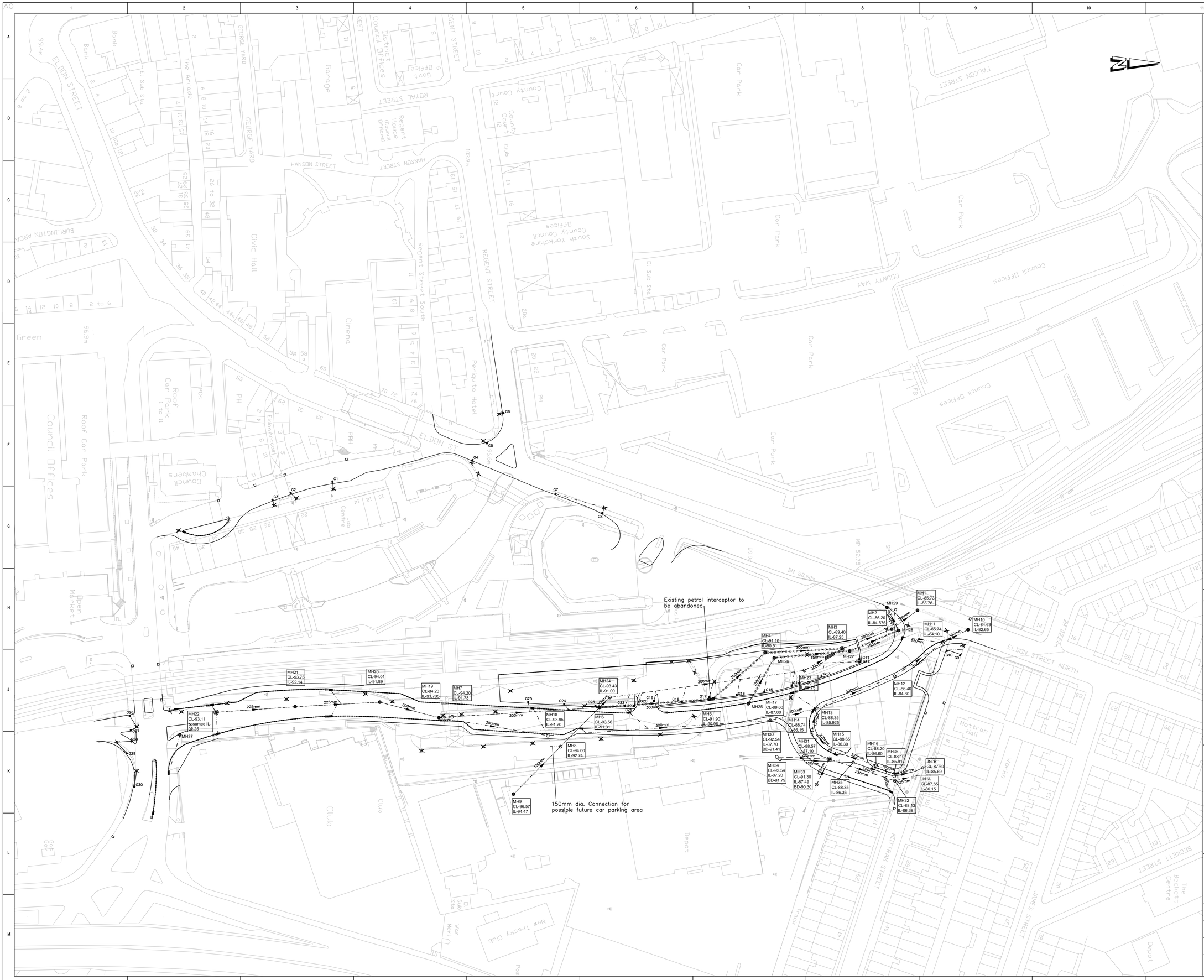


Date Requested : 01/02/2021, 10:37:59

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Existing Highway Drainage

* Drawing provided by the Lead Local Flood Authority who confirmed that this is a Design Drawing and information contained in it may not represent what was constructed. To be confirmed with Drainage Survey on future design stages



Do not scale from this drawing. The Contractor is to check all dimensions on site and report discrepancies to the Originator. All rights described in Chapter IV of the Copyright, Designs and Patents Act 1988 have been generally asserted ©

NOTES:

- Proposed highway drain
- Proposed private SYPTE drain
- Proposed Surface Water drain diversion
- Proposed Foul drain diversion
- Existing drain
- Existing drain to be abandoned
- Proposed mini beany blocks or equal approved kerb drains
- Proposed manhole
- Proposed manhole on site of existing rodding eye or Manhole
- Existing manhole
- Proposed gully
- Existing gully
- Existing gully to be abandoned
- Proposed beany outlet
- Proposed beany access unit
- Proposed petrol interceptor

1. Petrol interceptor to be Klargester unit ref. no. NSB10 or equal approved

2. Concrete surround required to petrol interceptor

3. No alarm facility required to petrol interceptor

4. Longitudinal sections of the drains can be found on drawing H-HW-104.2

5. All levels relate to station No 1, value 84.97 m, located in Eldon Street, opposite Mottram Street.

6. Where combined drainage and kerb blocks are to continue through a pedestrian crossing point, base units are to be plated over and taper/drop kerbs for crossing are to be laid on top of plate.

7. Drain lengths MH30 to JN 'A' and MH34 to JN 'B' may be laid in dual pipe trench.

Rev	Date	Drawn/ Design	Description	Chkd	Aprd (CRE)	Revwd (CRE)

Consultants

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JS@ Jefferson Sheard EGS

BARRACLOUGH & ENGLISH & WRIGHT CHARTERED QUANTITY SURVEYORS PROJECT MANAGERS PLANNING SUPERVISORS

BARNSLEY Metropolitan Borough Council

Client

SOUTH YORKSHIRE PASSENGER TRANSPORT EXECUTIVE

Project

BARNSLEY TRANSPORT INTERCHANGE

Drawing Status

PRELIMINARY LAYOUT

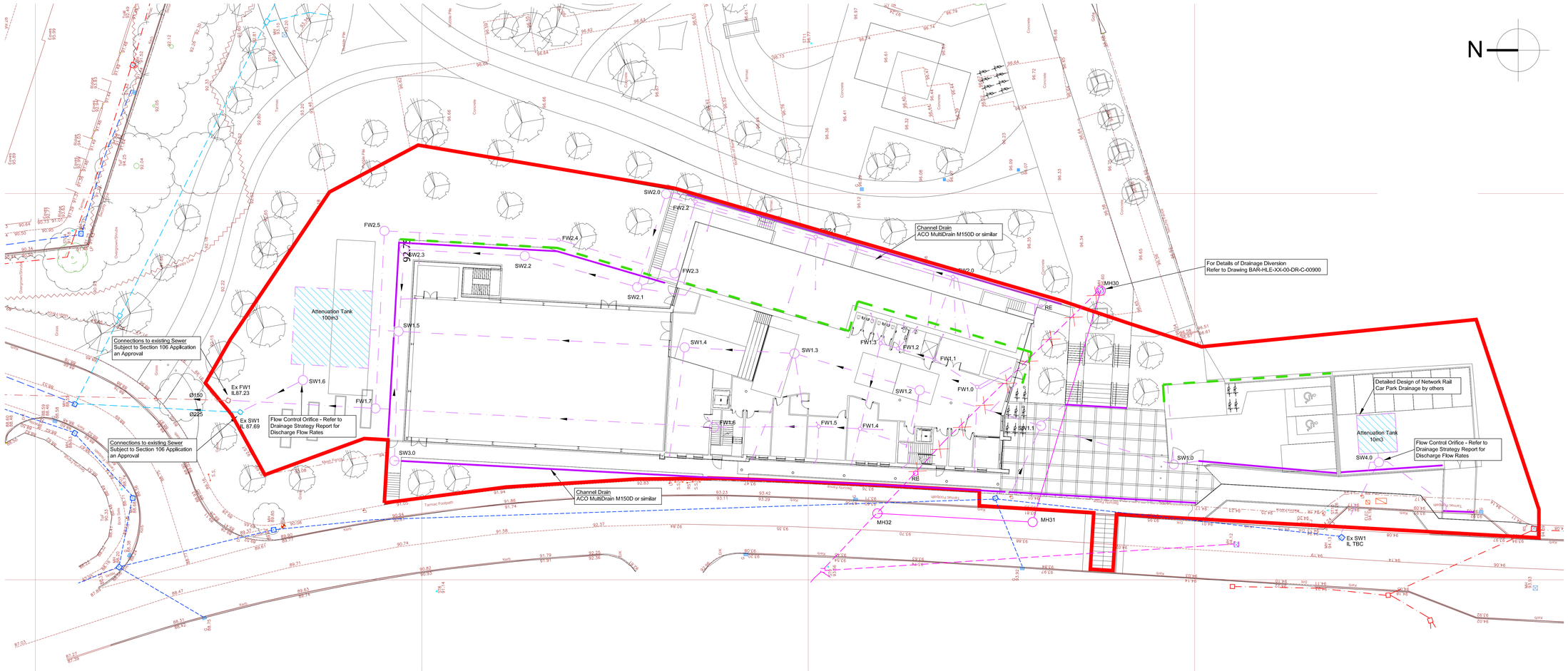
Drawing Title

DRAINAGE LAYOUT

Drawn/ Designed By	Date	Checked By	Date
W.A.	JULY 2004	D.L.	JULY 2004
Approved By Designer (CRE)	Date	Project Reference	
Scale		Sheet Size	
1:500		A0	
Originator	Drawing No		Revision
BMBC	H-HW-104.1		

APPENDIX F – PROPOSED DRAINAGE STRATEGY LAYOUT

Manhole Ref	Cover Level (mOD)	Invert Level (mOD)	MH Depth (m)	Manhole Type	Manhole Size (mm)	Pipe Out Ref	Pipe Out Diameter (mm)	Pipes In Ref.	Pipes In Invert Level (mOD)	Pipes In Diameter (mm)	Pipes In Backdrop (mm)	Notes
FW1.0	94.00	92.80	1.20	Type 3	450	F1.000	100					
FW1.1	94.00	92.75	1.26	Type 3	450	F1.001	100	F1.000	92.75	100		
FW1.2	94.00	92.72	1.28	Type 3	450	F1.002	100	F1.001	92.72	100		
FW1.3	94.00	92.69	1.31	Type 3	450	F1.003	100	F1.002	92.69	100		
FW1.4	92.75	91.45	1.30	Type 3	450	F1.004	100	F1.003	91.45	100		
FW15	92.75	91.38	1.37	Type 2	1200	F1.005	100	F1.004	91.38	100		
FW1.6	92.75	91.21	1.54	Type 2	1200	F1.006	100	F1.005	91.21	100		
FW2.0	96.70	95.40	1.30	Type 2	1200	F2.000	100			100		
FW2.1	96.70	95.16	1.54	Type 2	1200	F2.001	100	F2.000	95.16	100		
FW2.2	96.70	94.95	1.75	Type 3	450	F2.002	100	F2.001	94.95			
FW2.3	92.90	91.60	1.30	Type 3	450	F2.003	100	F2.002	91.60	100		
FW2.4	92.90	91.40	1.50	Type 3	450	F2.004	100	F2.003	91.40	100		
FW2.5	92.90	91.11	1.79	Type 2	1200	F2.005	100	F2.004	91.11	100		
FW1.7	92.75	90.67	2.08	Type 2	1200	F1.007	150	F1.006	90.72	100		
								F2.005	90.72	100		
Ex FW1	92.53	87.23	5.30	Existing Manhole		Ø150 Sewer		F1.007	90.42	150		Connection to Sewer (Section 106)
SW1.0	94.00	92.65	1.35	Catch-Pit	1200	S1.000	225					
SW1.1	94.00	92.34	1.66	Catch-Pit	1200	S1.001	225	S1.000	92.34	225		
SW1.2	94.00	92.22	1.78	Type 2	1200	S1.002	225	S1.001	92.22	225		
SW1.3	94.00	92.01	1.99	Type 2	1200	S1.003	225	S1.002	92.01	225		
SW1.4	92.75	91.32	1.43	Type 2	1200	S1.004	300	S1.003	91.40	225		
SW2.0	96.70	95.40	1.30	Type 2	1200	S2.000	150					
SW2.1	92.75	91.45	1.30	Catch-pit	1200	S2.001	150	S2.000	91.45	150		
SW2.2	92.75	91.19	1.57	Type 2	1200	S2.002	150	S2.001	91.19	150		
SW2.3	92.75	90.92	1.83	Catch-Pit	1200	S2.003	150	S2.002	90.92	150		
SW3.0	92.75	91.45	1.30	Type 2	1200	S3.000	100					
SW1.5	92.75	90.59	2.16	Type 2	1200	S1.005	300	S1.004	91.10	300	512	
								S2.003	90.74	150		
								S3.000	91.16	100	370	
SW1.6	92.50	90.42	2.08	Catch-Pit	1500	S1.006	300	S1.005	90.42	300		Flow Control Device. Overflow IL TBC
Ex SW 1	92.59	87.69	4.90	Exisitng Manhole		Ø255 Sewer		S1.006	90.36	300		Connection to Sewer (Section 106)
SW4.0	94.50	93.15	1.35	Catch-Pit	1500	S4.000	150					Flow Control Device. Overflow IL TBC
Ex SW 2	94.13	TBC	2.23	Exisitng Manhole		Sewer		S1.006	90.36	300		Connection to Sewer (Section 106)



Notes

1. All dimensions are in meters and all levels are in mOD.
2. The existing levels are based on Topographical Survey Ref. 21C119 dated Nov 2021.
3. The Layout Plan shown on the drawing is based on Architects drawing BAR-HBA-XX-XX-DR-A-P3
4. This drawing does not capture impact of development of existing utilities. Refer to MEP design for information regarding existing/proposed utilities.
5. The design information shown on this drawing is preliminary for the purposes of Work Stage 3 Report.
6. The existing drainage shown on this drawing is based on Drainage CCTV Survey Ref. 14429 dated 2/11/2021 by Underground Surveys and Utility and Trace Survey ref:21J233 dated Nov/2021 by Survey Operations. Where survey information was is not available the information included on a Highways Drainage Drawing provided by Barnsley Lead Local Flood Authority ref. H-HW-104.1 dated July 2004 has been used. It is noted that this is a "Design Drawing" and may not accurately reflect as-built information.
7. Private sewers and lateral drains that were connected to the public sewer before 1 July 2011 were transferred to water companied ownership on 1 October 2011. The drainage information shown on Highways Drainage Drawings is not shown on Yorkshire Water.Public Sewers map but they may be adopted. An ongoing enquiry with Yorkshire Water will confirm ownership.
8. Preliminary Drainage Layout. Final Layout subject to coordination with above ground drainage design.

Key (Plan)

- Planning Application Boundary

Existing Drainage

- Highways (BMBC) Drainage
- Private SW Drainage
- Private FW Drain
- SW Public Sewer (Subject to Confirmation by YW)
- CW Public Sewer (Subject to Confirmation by YW)
- Private South Yorkshire Public Transport Executive (SYPE) Combined Drain

Proposed Drainage

- Proposed SW Routes
- Proposed FW Routes
- SW Drain diversion
- SW Slot Drain
- SW Filter Drain

Revision

Issue	Date	By	Chkd	Appd
P1	30/12/21	NH	CL	CL
RIBA Stage 3 Issue				
P2	12/04/22	NH	CL	CL
RIBA Stage 3 Issue (Updated to suit Activity Park)				

HL Structural Engineers
HL Structural Engineers Ltd.
Liverpool Science Park, 131 Mount Pleasant
Liverpool, L3 5TF
t: +44 (0)151 440 2185
w: www.HLengineers.co.uk

Client
Barnsley Youth Zone

Job Title
Barnsley Youth Zone

Drawing Title
Civil Engineering
Proposed Drainage Layout and Schedules

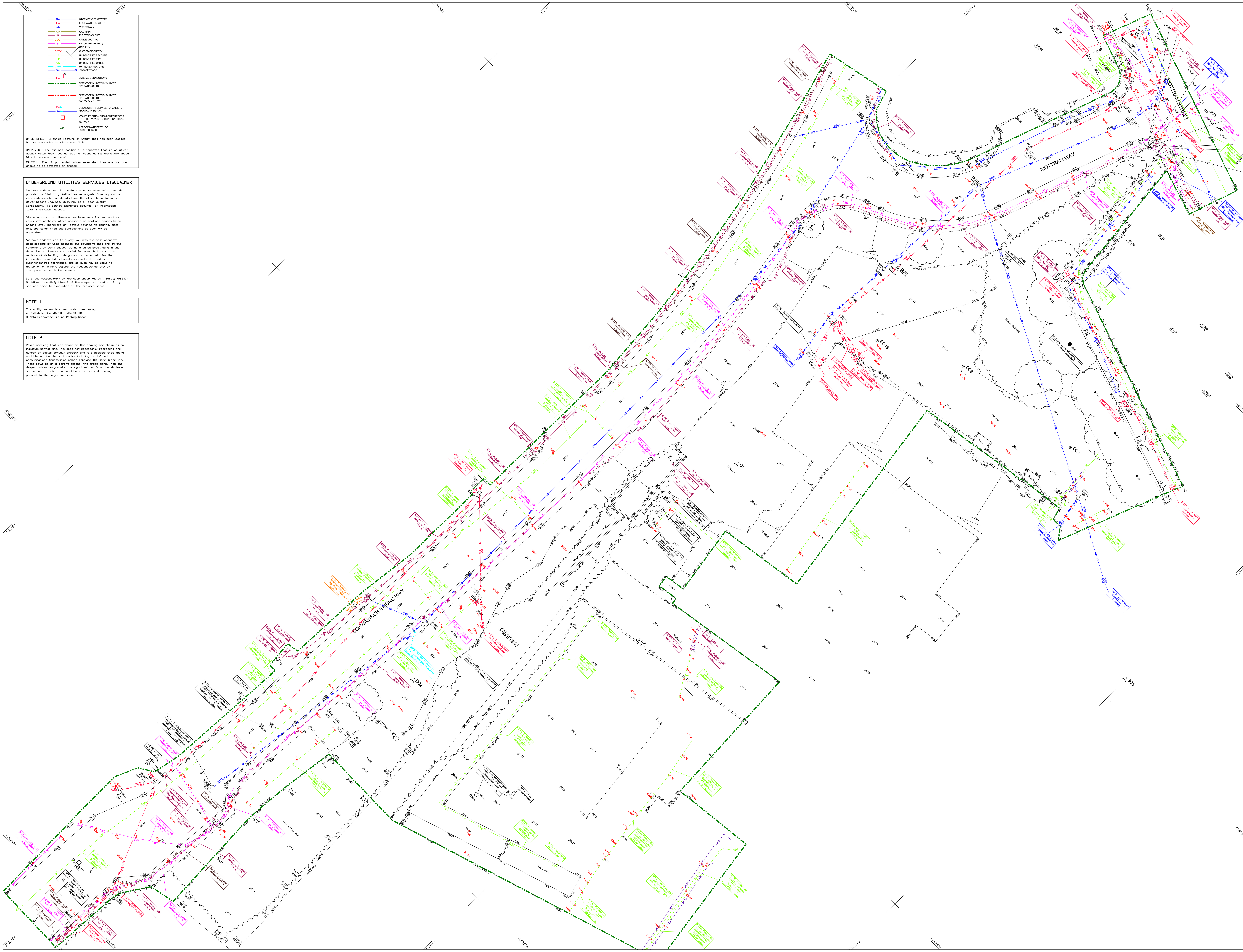
Scale at A0
1:200

Drawing Status
Preliminary

Job No	Drawing No	Issue
777	BAR-HLE-XX-00-DR-C-00300	P2

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APPENDIX G – Topographical Survey



SW	STORM WATER SEWERS
FW	FOUL WATER SEWERS
WM	WATER MAIN
GM	GAS MAIN
EL	ELECTRIC CABLES
DUCT	CABLE DUCTING
BT	BT (UNDERGROUND)
	CABLE TV
CCTV	CLOSED CIRCUIT TV
UI	UNIDENTIFIED FEATURE
UP	UNIDENTIFIED PIPE
UC	UNIDENTIFIED CABLE
UNPR	UNPROVEN FEATURE
SW	END OF TRACE
FW	LATERAL CONNECTIONS
	EXTENT OF SURVEY BY SURVEY OPERATIONS LTD.
	EXTENT OF SURVEY BY SURVEY OPERATIONS LTD. (SURVEYED **** ****)
FW / SW	CONNECTIVITY BETWEEN CHAMBERS FROM CCTV REPORT
	COVER POSITION FROM CCTV REPORT - NOT SURVEYED ON TOPOGRAPHICAL SURVEY.
0.6d	APPROXIMATE DEPTH OF BURIED SERVICE

UNIDENTIFIED - A buried feature or utility that has been located, but we are unable to state what it is.

UNPROVEN - The assumed location of a reported feature or utility, usually taken from records, but not found during the utility trace (due to various conditions).

CAUTION - Electric pot ended cables, even when they are live, are unable to be detected or traced.

UNDERGROUND UTILITIES SERVICES DISCLAIMER

We have endeavoured to locate existing services using records provided by Statutory Authorities as a guide. Some apparatus were untraceable and details have therefore been taken from Utility Record Drawings, which may be of poor quality. Consequently we cannot guarantee accuracy of information taken from such records.

Where indicated, no allowance has been made for sub-surface entry into manholes, other chambers or confined spaces below ground level. Therefore any details relating to depths, sizes etc, are taken from the surface and as such will be approximate.

We have endeavoured to supply you with the most accurate data possible by using methods and equipment that are at the forefront of our industry. We have taken great care in the detection of pipework and buried features, but as with all methods of detecting underground or buried utilities the information provided is based on results obtained from electromagnetic techniques, and as such may be liable to distortion or errors beyond the reasonable control of the operator or his instruments.

It is the responsibility of the user under Health & Safety (HSG47) Guidelines to satisfy himself of the suspected location of any services prior to excavation of the services shown.

NOTE 1

This utility survey has been undertaken using:
A: Radiodetection RD4000 + RD4000 TIO
B: Mala Geoscience Ground Probing Radar

NOTE 2

Power carrying features shown on this drawing are shown as an individual service line. This does not necessarily represent the number of cables actually present and it is possible that there could be multi numbers of cables including HV, LV and communications transmission cables following the same trace line. These could be at different depths, the trace signal from the deeper cables being masked by signal emitted from the shallower service above. Cable runs could also be present running parallel to the single line shown.

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Note:

The survey is plotted on a plane local Grid. Orientation to National Grid. All levels relate to Ordnance Datum, achieved using the OS National GPS Network.

Survey Control Markers established for Mapping purposes only and should not be used for Construction without the written approval of Survey Operations Ltd.

Drainage information must be verified with local authority records before use

Survey Operations Dwg 21J233 added to Survey Operations Dwg 21C119.

UNPROVEN ELEC
UNPROVEN BT
UNPROVEN GAS
UNPROVEN WATER
UNPROVEN SURFACE
UNPROVEN FOUL

All unproven lines without additional notes on drawing show the approximate location of a reported utility or feature as indicated on available stat records.

SURVEY STATIONS

Name	Easting	Northing	Height
DC1	434815.30	406674.96	92.53
DC2	434766.10	406567.88	94.11
DC3	434792.86	406671.55	92.55
DC4	434815.32	406687.16	91.45
SO3	434897.96	406660.51	93.85
SO4	434795.19	406695.18	91.18
SO5	434849.83	406654.29	93.79
SO6	434790.46	406731.23	87.81
SO7	434761.73	406688.84	88.72
SO8	434748.52	406648.07	91.12
SO9	434751.68	406597.43	93.54
SO10	434758.98	406532.78	94.24
SO13	434779.62	406664.19	92.97
C1	434778.03	406632.59	95.70
C2	434787.81	406599.93	96.66

STANDARD REFERENCE & ABBREVIATIONS

(AR).........Assumed Route	IL..........Invert Level
AB..........Air Brick	IP..........Inlet Pipe
AV..........Air Valve	KO..........Kerb Outlet
B/W.........Barbed Wire	LB..........Letter Box
BAR.........Barrier	LP..........Lamp Post
BB..........Belisha Beacon	MG..........Multi-Girth
BH..........Borehole	MH..........Manhole
BL..........Bed Level	MKR.........Marker
BOL.........Bollard	MP..........Mooring Point
BS..........Bus Stop	NP..........Street Name Plate
BT Box......British Telecom Box	O/H.........Overhead
BT..........British Telecom IC	O/P.........Open Paling
BRTW........Brick Retaining Wall	OE..........Overhead Electric Wire
BW..........Brick Wall	OP..........Outfall Pipe
C/B.........Close Boarded	OSBM........Ordnance Survey Bench Mark
C/I.........Corrugated Iron	OT..........Overhead Telecom Wire
C/P.........Chestnut Paling	P/C.........Post & Chain
CB..........Control Box	P/R.........Post & Rail
CBW.........Concrete Block Wall	P/W.........Post & Wire
CCTV........Closed Circuit TV	PAV.........Paving
CD..........Cable Duct	PB..........Pillar Box
CEL.........Cellar Light	PC..........Pedestrian Crossing
CH/L........Chain Link	PP..........Petrol Pump
CHY.........Chimney	PT..........Post or Pillar
CL..........Cover Level	RE..........Rodding Eye
CM..........Cable Marker	RS..........Road Sign
COL.........Column	RTW.........Retaining Wall
CONC........Concrete	RWP.........Rain Water Pipe
CP..........Catch Pit	SAP.........Sapling
CRTW........Concrete Retaining Wall	SL..........Sump Level
CTV.........Cable Television	SoL.........Soffit Level
CUL.........Culvert	SP..........Sign Post
CW..........Concrete Block Wall	SPL.........Springing Level
DC..........Drainage Channel	SRTW........Stone Retaining Wall
DPC.........Damp Proof Course	SV..........Stop Valve (unspecified)
DR..........Drain	SVP.........Soil Vent Pipe
DSW.........Dry Stone Wall	SW..........Stone Wall
ECP.........Electricity Cable Pit	TAC.........Tactile Paving
EIC.........Electricity Inspection Cover	TB..........Traffic Bollard
EJ..........Expansion Joint	TBM.........Temporary Bench Mark
EJB.........Electricity Junction Box	TCB.........Telephone Call Box
EL SUB STN..Electricity Sub Station	TFR.........Taken From Records
EL..........Eaves Level	TIE.........Anchor Point (Masts/Poles)
ELB.........Electricity Box	TL..........Traffic Light
EP..........Electricity Pole	TLB.........Traffic Light Control Box
ER..........Earth Rod	TM..........Ticket Machine
ETL.........Electricity Transmission Line	TMC.........Tarmac
FB..........Flower Bed	TP..........Telecommunications Pole
FH..........Fire Hydrant	TPIT........Trial Pit
FL..........Floor Level	TS..........Trash Screen
FP..........Flagpole	U/C.........Under Construction
G*.*........Girth (of tree)	U/G.........Underground
G...........Gulley	UTL.........Unable to Lift (MH,IC etc)
GAB.........Gabion	UTS.........Unable to Survey
GIP.........Gas Inlet Pipe	VDP.........Vehicle Detector Pad
GMKR........Gas Marker	VP..........Vent Pipe
GST.........Gas Stop Tap (Domestic)	W/M.........Wire Mesh
GSV.........Gas Stop Valve (Mains)	WL..........Water Level
HSE.........Housing	WM..........Water Meter
Ht..........Height	WO..........Wash Out
HV..........High Voltage	WP..........Waste Pipe
I/R.........Iron Railing	WST.........Water Stop Tap (domestic)
IC..........Inspection Cover	WSV.........Water Stop Valve (mains)

SurveY OPERATIONS

Smith Street, Skelmersdale, Lancs. WN8 8LN
Tel: 01695 725662 Fax: 01695 51816
Email: mail@survops.co.uk — www.survops.co.uk

Client
HL Structural Engineers

Drawing Title
Utility Survey of Land at:
Schwäbisch Gmünd Way
Barnsley

Scale(s)	1:200	Surveyor	CS
Date	Nov 21	Drawn	MP
Job Number	21J233	Checked	SO

Sheet Size & Drg Number & Revision
A0 21J233/001

APPENDIX H – Lead Local Flood Authority Pre-Planning Enquiry Response

Consultation (dated 2nd Feb 2021):

Could you please confirm:

1. If you have any comments / concerns in relation to the Surface Water Drainage or Flood Risk on this site or the area surrounding the site that we should consider in the preparation of the Drainage design?

LLFA Response: I have no concerns regarding flood risk or surface water drainage from the existing site

2. The existing site is brownfield. Can you please confirm if the above assessment of allowable discharge rates is acceptable in principle (30% reduction to the existing Brownfield rate);

LLFA Response: These calculations are acceptable in principle to the LLFA, however they should be agreed with Yorkshire Water

3. The above figures are based on development area being 6,000m2 and will be re-calculated again (adopting the principles of point 3 above) once development site plan is available and drainage design is developed.
4. If you have any information related to the Flood Risk in this area, for example:
    a. Any historical flood event information in the area

LLFA Response: I am not aware of any historical flooding associated with the site

    b. Drainage Issues in the area

LLFA Response: I am not aware of any drainage issues in the area of the site

    c. Any other information you feel may be beneficial in assessing the flood risk to or from a development on the site.

N/A

APPENDIX I – Yorkshire Water Pre-Planning Enquiry Response

YorkshireWater

Mr A Rocha
HL Engineering
The Liverpool Science Park Ltd
Innovation Centre
131 Mount Pleasant
Liverpool
L3 5TF
rochacivil@gmail.com

Yorkshire Water Services
Developer Services
Pre-Development Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482
Fax:

Email:
technical.sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

Your Ref:
Our Ref: X003801

18th March 2021

Dear Mr Rocha,

Barnsley Youth Zone, Schwabish Gmund Way, S71 1AY – Pre-Planning Sewerage Enquiry U159116

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

Foul Water

Foul water domestic waste can discharge to the 300 mm diameter public combined sewer recorded in Don Street North, at a point to the north west of the site.

Foul water from kitchens and/or food preparation areas of any restaurants and/or canteens etc. must pass through a fat and grease trap of adequate design before any discharge to the public sewer network.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

It is noted that the site has been derelict since at least 2011 in order to agree a rate

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f other methods of surface water disposal are not viable and subject to providing satisfactory evidence as to why they have been discounted, curtilage surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site less a 30% reduction in the existing discharge. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage, based on a 1 in 1 year storm, to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense.

To do this, Yorkshire Water requires to see existing and proposed drainage layouts with pipe sizes, gradients, gullies, downpipes and connection points, measured impermeable areas of the present and proposed use of the site, along with the calculations that show the existing and proposed discharge rate from the site to the public sewer.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Surface water run-off from communal parking (greater than 800 sq metres or more than 50 car parking spaces) and hardstanding must pass through an oil, petrol and grit interceptor/separator of adequate design before any discharge to the public sewer network. Roof water should not pass through the traditional 'stage' or full retention type of interceptor/separator. It is good drainage practice for any interceptor/separator to be located upstream of any on-site balancing, storage or other means of flow attenuation that may be required.

Under the provisions of section 111 of the Water Industry Act 1991 it is unlawful to pass into any public sewer (or into any drain or private sewer communicating with the public sewer network) any items likely to cause damage to the public sewer network interfere with the free flow of its contents or affect the treatment and disposal of its contents. Amongst other things this includes fat, oil, nappies, bandages, syringes, medicines, sanitary towels and incontinence pants. Contravention of the provisions of section 111 is a criminal offence.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply on line or obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0345 120 84 82.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply on line or obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0345 120 84 82.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith.

nick

From: nick
Sent: 08 March 2022 08:01
To: 'technical.sewerage@yorkshirewater.co.uk'
Cc: mike.woods
Subject: RE: Barnsley Youth Zone - Pre-Planning Enquiry U159116 F.A.O. Chris Roberts
Attachments: H-HW-104-1.pdf

Hi Chris,

Thanks for your reply below.

We will recommend that our Client commissions further survey work for the surface water sewer up to the point where it connects to the 525mm surface water sewer in Eldon Street North as requested.

With regards to the date when the drainage was in the ground. We have been provided the attached drawing by Barnsley Council's highways team from when Barnsley Interchange and the roads in the area were altered which shows alterations to the drainage in the area. That included the mapped drainage.

From a review of historic imagery on Google Earth the works were completed at some point between December 2003 and September 2008 (the two satellite images from these dates being shown below). On that basis we can confirm that the mapped drainage was in the ground before September 2011.

Kind Regards,

Nick





Nick Holt
Structural Engineer - Director
MEng MBA CEng MICE MIStructE

HL Structural Engineers,
Liverpool Science Park, 131 Mount Pleasant, Liverpool, L3 5TF

t: 0151 440 2185
m: 07739 830 405
e: Nick@HLengineers.co.uk
w: www.HLengineers.co.uk

-----Original Message-----
From: Chris.Roberts@yorkshirewater.co.uk <Chris.Roberts@yorkshirewater.co.uk> On Behalf Of technical.sewerage@yorkshirewater.co.uk
Sent: 03 March 2022 12:04
To: nick <nick@hlengineers.co.uk>
Subject: Barnsley Youth Zone - Pre-Planning Enquiry U159116 F.A.O. Chris Roberts

Hi NIck,

I've been in discussion with our asset mapping team and they have asked a couple more questions before they will accept the sewer meets the transfer criteria.

1. Can you confirm the mapped drainage was in the ground prior to September 2011.

2. The surface water sewer would need to be surveyed up to the point it enters the mapped surface water sewer network which we believe would be the
525 mm surface water sewer in Eldon Street North.

(See attached file: roberts4_rad711F3.PDF)

Kind Regards

(Embedded image moved to file: pic07882.gif)
*** Please note, all correspondence must be sent to technical.sewerage@yorkshirewater.co.uk and will be responded to within 10 working days ***

From: nick <nick@hlengineers.co.uk>
Sent: Monday, February 21, 2022 7:37:19 PM
To: Chris Roberts <Chris.Roberts@yorkshirewater.co.uk>
Subject: RE: Barnsley Youth Zone - Pre-Planning Enquiry U159116 F.A.O.
Chris Roberts

Hi Chris,

Further to your liaison below with my colleague Mark (who has now left our
company) we commissioned further CCTV drainage survey work to check the extent of sewers around the site (which we suspected were un-recorded public sewers at the time we submitted our pre-development enquiry).

We believe that the two manholes (clouded on the attached drawing called 21J233_MARK UP) are the adopted manholes as these collect drainage from multiple sites. Please can you review and confirm if you agree and if you need any further specific survey information to add these to your records of the YW network.

For our proposed development (subject to your approval when we make a formal S106 application) we propose to re-use the two existing connections to these manholes from our site. We assume these connections are private as they only serve our site. I attach our current site private drainage layout for your information (drawing BAR-HLE-XX-00-DR-C-00300).

If you would like to discuss anything please don't hesitate to contact me.

Kind Regards,

Nick

Nick Holt
Structural Engineer - Director
MEng MBA CEng MICE MIStructE

HL Structural Engineers,
Liverpool Science Park, 131 Mount Pleasant, Liverpool, L3 5TF

t: 0151 440 2185
m: 07739 830 405
e: Nick@HLengineers.co.uk
w: www.HLengineers.co.uk

YorkshireWater

Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

Chris Roberts
Development Services Technician

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Appendix J – Ground Investigation Report



www.metconsultancygroup.com

Met CONSULTANCY GROUP

NPS Property Consultants Limited

P18-01848

Harborough Hill Road, Barnsley

Supplementary Phase II Geo Environmental Site Assessment

Report by:

T White

Professional, Innovative, Practical Solutions

About Us

Part of Met Consultancy Group, Met Engineers provides a range of solutions and engineering consultancy services in the following key areas:

Drainage design, Highway design, Ground modelling, Structural appraisals, Foundations and superstructure design, Building Options analysis, Civil Engineering structures, Flood Risk assessment and Site investigation.

Taking time to understand you, the client, your project requirements and problems, is a crucial part of the way we work. It allows us to provide you with a tailored, reasoned and sensible solution followed by the delivery of a service that is flexible, of excellent quality and designed to cope with specific circumstance.

We provide a tailored solution to meet all your project needs.

Consulting with us at an early stage may allow you to consider a range of options that could affect the risk, costs and timescales of your project. We are here to provide assistance and advice to help your compliance, risk assessment, evaluation, design and management processes on any project you are undertaking.

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1. REVISION RECORD

Report Ref: P18-01848 / Phase II					
Rev	**Description**	**Date**	**Originator**	**Checked**	**Approved**
1	Initial Issue	22/03/19	TAW	AEC	IFL

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2. INTRODUCTION

2.1. GENERAL INTRODUCTION

This Report presents the findings of a Phase II Geo-environmental assessment of a site at Land off Harborough Hill Road/Schwabisch Gmund Way, Barnsley, S71 1BP (Grid Reference: 434824, 406629) for NPS Property Consultants Limited.

The Intrusive Site Investigation (Phase II) comprised of open hole rotary boreholes and trial pits to establish the sub surface strata and remove samples for contamination and geotechnical testing. The test results combined with the findings of the intrusions will then be used to make recommendations for any remedial works which may be necessary. A site plan including positions of the boreholes and trial pits can be found in Appendix I of this report.

2.2. OBJECTIVES

An initial Phase II site investigation was carried out by BWB Consulting Limited in September 2006 for the purpose of making recommendations for a proposed commercial development. This report was subsequently assessed by Hamson Barron Smith (HBS) with a residential end use in mind, and recommendations were made as to additional intrusive site investigation works which were required. This intrusive investigation was conducted to supplement the ground conditions summary carried out by HBS, and carry out the recommended intrusive works.

The review of the original Phase II report identified that no intrusive investigation had been carried out within the footprint of an existing building. Since the original intrusive works the building has been demolished, therefore it was recommended to carry out trial pits within the former building footprint in order to validate the ground conditions present, and remove samples for contamination testing.

It was also recommended to drill 3№ additional rotary boreholes in the eastern area of the site, to confirm that the shallow coal in this area is intact.

Furthermore it was recommended to carry out additional trial pitting in the north eastern area of the site, to determine the extent of the Made Ground identified within the original Phase II Site Investigation.

The original Site Investigation did not assess the viability of soakaway drainage for the proposed development, therefore infiltration testing was carried out in order to evaluate this.

The original site investigation identified elevated levels of Heavy Metals and PAH within the Made Ground identified in TP011, and no contamination testing was carried out on samples removed from TP012, therefore additional testing of the clinker Made Ground found from top depths of between 0.15m and 0.3mbgl in this area was recommended.

2.3. SCOPE OF WORKS

Based upon the recommendations of the Ground Conditions Report by HBS and a visual assessment of the sub-surface materials during the intrusive works, soil samples were taken for laboratory testing. CLEA Guidelines and recommendations given in Land Quality Management General Assessment Criteria have been applied to establish a risk based CLEA Model to assess the likely contamination issues and to comment on potential constraints for development of the site.

Judgement is based strictly on the findings of the specific boreholes, trial pits and soil samples tested and therefore may not be representative of the site as a whole. The findings of the intrusive investigation will also be used in conjunction with the findings of the Ground Conditions Report by HBS to establish parameters which may be used in formulating a foundation design.

2.4. LIMITATIONS OF THE REPORT

NPS Property Consultants Limited. (the Client) has requested that a Phase II Site Investigation, CLEA Conceptual Model and Risk Assessment be undertaken in order to assess the suitability of the site for redevelopment. The report is not a comprehensive site characterisation and should not be construed as such.

This report has been prepared for the sole internal use and reliance of NPS Property Consultants Limited. The report shall not be relied upon or transferred to any other parties without the express written authority of Met Engineers Limited. If any unauthorised third party comes into possession of the report, they rely on it at their own risk and Met Engineers Limited owes them no duty of care.

The findings and opinions conveyed via this report are based on information obtained from a variety of sources as detailed within this report and which Met Engineers Limited, believes are reliable. Nevertheless, Met Engineers Limited, cannot and does not guarantee the authenticity or reliability of the information it has relied upon. The information contained in this report is to the best of our knowledge accurate at the date of issue, however, sub-surface conditions, including ground water levels, may vary, especially with time.

In preparing this report it has been assumed that all past and present occupants and Third Parties have provided accurate information, especially relating to known or potential hazards. This report does not identify deficiencies or mistakes in the information provided by the user/owner, or from any other source, except where obvious in the light of other information.

This report is relevant at the date the report was written and should be read in the light of any subsequent changes in legislation, statutory requirement or industry practices.

The report represents the technical findings and opinions of Met Engineers Limited, and does not constitute any legal advice. As such, the advice of a Solicitor may also be required.

3. SITE HISTORY AND ENVIRONMENTAL SETTING

A detailed review of the published history, hydrological, geological and available environmental information was carried out by BWB in a Phase I Desk Study report dated September 2006, and subsequently summarised in a Ground Conditions Report by HBS in July 2018. The following is a brief summary of those findings.

The area of land referred to as 'The Site' within this document is indicated in Appendix I.

3.1. SITE DESCRIPTION

Site Name	Land off Harborough Hill Road/Schwabisch Gmund Way, Barnsley, S71 1BP
Location	Grid Reference: 434824, 406629
Setting	The site is irregular in shape and is approximately 1.6ha in size. The site is primarily covered with concrete and tarmac hardstanding, along with the reinforced concrete slab of the former building. There is a large mound of building/demolition rubble adjacent to the north of the existing concrete slab. The south eastern area of the site was previously developed with a club, and is currently covered with a large mound of building rubble following its demolition.
Site History	The site was developed with several small buildings and field/plantations until 1892, when Harborough Hill House is shown. The site remained unchanged until 1930 when the site was occupied by allotment gardens and a club. By 1961 the site had been developed with several small unidentified buildings and by 1968 the site was occupied by the electricity board depot. By 1991 several additional small buildings had been developed. In 2006 the BWB site walkover identified an above ground tank on site. By 2018 the HBS site walkover identified that all the buildings on site had been demolished, and the tanks removed, leaving the site in its current state. A full summary of the site history can be found in the Ground Conditions Report by HBS.
Development Proposal	The BWB Phase II Report was written with a commercial development in mind. The subsequent HBS review of the initial report assessed the site with a residential development in mind, and it is understood that the site is currently proposed to be developed with residential housing.

3.2. GEOLOGY & SOILS

Geology	The ground conditions expected to be encountered are summarised within the BWB Phase I Desk Study. In general it was not anticipated that significant depths of Made Ground would be present on site. The BGS 1:50,000 map sheet shows that the site is underlain by strata of the Carboniferous Lower Westphalian Coal Measures.
Radon	The HBS Ground Conditions Report states that less than 1% of homes in the area surrounding the site have recorded radon levels above the recommended action level, therefore in accordance with BRE211 no radon protection measures are required for the proposed development.
Ground workings	No ground workings noted within the Phase I Desk Study by BWB.
Mining	The Phase I Desk Study by BWB states that coal seams are likely to be present at shallow depth beneath the site. These seams may have been worked at some point.
Natural Ground Subsidence	The BWB Phase I Desk Study states that the risk from Compressible Ground is moderate, the risk from shrink/swell clays and running sands is low, and there is no risk from potential dissolution of soluble rocks.
Boreholes	The Phase I Desk Study by BWB identified that a previous intrusive investigation had taken place on site in 2001, which included 5№ cable percussion boreholes, and 6№ open hole rotary boreholes. These generally found <1m of Made Ground, overlying weathered coal measures mudstone, sandstone, siltstone and coal seams. The boreholes identified up to 7№ coal seams present beneath the site, ad depths ranging from just below the Made Ground to 60mbgl, with thicknesses ranging from 0.1m to 1.3m.

3.3. ENVIRONMENTAL OVERVIEW

The following records are as stated in the BWB Phase I Desk Study for the site:

Historical and Current Land Use	The BWB Phase I Desk Study identified the following on site potential sources of contamination; • Electricity sub-station • Fuel tanks • Building demolition The Phase I Desk Study also identified the following off site potential sources of contamination; • Colliery • Timber yard • Railway land and foundry • Bus depot
Landfill Sites	2№ landfill sites have previously been recorded within 500m of the site, the nearest being 316m north west of the site.
Waste Transfer & Processing Stations	The site was registered as a waste transfer station between 1992 and 1999.
Hydrogeology	The bedrock on site is recorded as a Secondary A Aquifer.
Hydrology	The Phase I Desk Study by BWB does not identify any surface water features within 250m of the site.

Flooding	The site is not recorded to lie within a floodplain, and the chance of flooding is less than 0.1%.

3.4. HBS RECOMMENDATIONS FOR FURTHER WORK

The Ground Conditions Report carried out by HBS recommended that several further works be carried out, this site investigation report aims to address some of these recommendations which are as follows:

- Further investigation beneath the former building footprint to validate the ground conditions present.
- Supplemental investigation around TP11 and TP12 to collate chemical data to allow a detailed quantitative risk assessment to be completed.
- Supplemental investigation in the north eastern corner of the site to investigate the extent of deeper Made Ground reported present.
- Full scale soakaway testing to BRE365 standards in the locations of proposed soakaways, if proposed.
- Drilling of an additional three holes within the eastern edge of the site to confirm the shallow coal in this location is intact.

4. INTRUSIVE INVESTIGATION

4.1. FIELDWORK

This supplementary intrusive investigation consisted of 3№ open hole rotary boreholes and 10№ Trial Pits excavated by JCB, 2№ of which were utilised for soakaway testing. An additional 18№ sampling pits were excavated by JCB and hand digging techniques. The intrusive investigations were carried out on 11th to 13th February 2019; the locations of which can be found within Appendix I. The weather during the investigation was clear.

The trial pits specifically targeted the area of the former building and the area of deeper Made Ground in the north east of the site.

The sampling pits were excavated by breaking out a 300mm x 300mm square of concrete, and hand digging until reaching the Made Ground. The pits specifically targeted the area surrounding TP011 and TP012 carried out during the site investigation by BWB in 2006, however the locations were restricted due to services, vegetation, and a large stockpile of building rubble.

The open hole rotary boreholes were carried out in the eastern area of the site, in order to fill in gaps within the shallow coal mining investigation carried out by BWB as part of the site investigation in 2006.

The trial pits found Made Ground to depths of between 0.6mbgl (TP01 and TP05) and 3.1mbgl (TP09). The Made Ground varied in composition ranging from gravelly clay to sandy gravel.

Superficial deposits comprising soft to firm clay were identified under the majority of the site with typical thicknesses ranging between 0.2m (TP05) and 1.6m (TP04). Trial pits 6 to 10 were excavated to determine the thickness of Made Ground in the north eastern area of the site, and as such were terminated once reaching natural material.

Bedrock was deepest adjacent to the northern edge of the existing concrete slab of the former building, and was encountered at between 0.6mbgl (TP01) and 2.7mbgl (TP02). Bedrock comprised mudstone, siltstone, and coal.

Logs of the Boreholes and Trial Pits can be found in Appendix II and III of this report respectively.

4.2. GROUNDWATER

Groundwater was not identified during this site investigation, aside from a small amount of perched water in TP09 at 1.5mbgl.

4.3. GAS MONITORING

Gas monitoring was carried out as part of the initial site investigation by BWB, and as such no further monitoring was required.

4.4. LABORATORY TESTING

The desk study recommended a regime of contamination testing on soil samples recovered from the intrusive investigation. Samples were obtained during the site investigation and tested at a UKAS accredited laboratory for contaminants including:

- *Heavy Metals*
- *Polycyclic Aromatic Hydrocarbons*
- *Total Petroleum Hydrocarbons*
- *Asbestos*

5. CONTAMINATION ASSESSMENT

5.1. GENERAL

Current Environmental Legislation, in particular Part IIA of the Environmental Protection Act 1990, adopts a risk-based approach to the evaluation of contaminated sites, based on the proposed end use of the site. The commonly accepted approach is to adopt a Source-Pathway-Receptor model where the Source of the contaminant is examined in relation to potential Receptors (i.e. humans, controlled waters etc.) to determine if there is a Pathway (i.e. contaminant linkage) connecting them. If any of these elements (i.e. contaminant, pathway or receptor) are absent or removed, then there is no risk.

The Department of the Environment, Food and Rural Affairs (DEFRA) have published a series of guidelines in connection with Risk Assessment. In addition The Environment Agency has produced the Contaminated Land Exposure Model (CLEA) which models guideline values for those elements which pose the greatest risk to human health.[1] Using values derived from CLEA, a site specific, conceptual model has been used to determine any significant contaminant linkages and identify suitable risk management proposals on which remediation design (if any required) can be based. The conceptual model is summarised at the end of this section in tabular form.

By considering the Source-Pathway-Receptors Model, an assessment can be made as to whether the source contamination can reach a receptor. The degree and significance of any resulting risk is then determined. The categorisation of the risk is based on consideration of both:

- The likelihood or probability of an event (taking into account both the presence of the Source and the Receptor, and the integrity of the Pathway).
- The severity of the potential consequence (taking into account both the potential severity of the Source and the sensitivity of the Receptor).

The following categorisation of risk has been adopted in this report:

Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
High	Harm is likely to arise to a designated receptor from an identified hazard without appropriate remedial action.
Moderate	It is possible that, without appropriate remedial action, harm could arise to a designated receptor, but it is relatively unlikely that any such harm would be severe and, if harm were to occur, it is more likely that such harm would be relatively mild.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that, at worst, this harm, if realised, would normally be mild.
Negligible	The presence of an identified hazard does not give rise to the potential to cause any significant harm to a designated receptor on this site.

[1] Updated technical background to the CLEA model, Science Report SC050021/SR3, The Environment Agency, 2009

5.2. PRELIMINARY CONCEPTUAL SITE MODEL

The following table provides a list of the potential Sources, Pathways and Receptors that have potential to exist on this site as defined in the Phase I desk study by BWB dated May 2006.

Source	Pathway	Receptor
Contaminants contained within the Made Ground	Vertical migration through site soils	Underlying Minor Aquifer
	Direct contact	Existing site users
	Direct contact	Ground workers
	Surface run-off	On and off site drainage system
	Lateral migration through site soils	Existing buildings on site

Based on the above conceptual site model and the gaps in previous works requiring investigation, the following sources of contamination have been investigated;

- Soils
  - Heavy Metals
  - Poly Aromatic Hydrocarbons
  - Total Petroleum Hydrocarbons
  - Asbestos

5.3. CONTAMINATION CRITERIA FOR SOIL TESTING

Suitable 4 Use Levels (S4ULs) published by Land Quality Management, have been used to assess risk.[2] Where there are no S4ULs, Defra Category 4 Screening Levels (C4SLs) have been used as intervention values to assess risk.[3]

It is proposed that the site will be developed with residential housing and private gardens. Therefore the proposed land use can be classified as 'residential with home produce' in accordance with the CLEA Guidelines.

Soils were taken from site and tested for % Soil Organic Matter (SOM).

Location	**TP01**	**TP02**	**TP03**	**TP04**
Depth (m)	**0.5**	**0.3**	**0.4**	**0.25**
Strata	**Made Ground**	**Made Ground**	**Made Ground**	**Made Ground**
SOM (%)	**0.6**	**0.2**	**0.3**	**<0.1**

Taking the lowest SOM recorded as the worst case scenario, the results of the chemical analysis on the soil samples are compared against the S4ULs for residential developments with home grown produce with 1% SOM (where there are published S4ULs) and C4SLs where there are no published S4ULs. These values are then used as Intervention Values (IV) to assess the risk.

[2] The LQM/CIEH S4ULs for Human Health Risk Assessment, Land Quality Press, Nathanail et. al, 2015.
[3] SP1010, Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, DEFRA 2014

5.4. RESULTS OF CONTAMINATION TESTING

The following tables are summaries of the laboratory test results. Please see the key below for the origin of each intervention value.

Intervention Value Key

Author	Type	Land Use
Land Quality Management	S4UL	Residential with home produce
DEFRA	C4SL	Residential with home produce

Results of Contamination Testing Beneath Former Building Slab

Heavy Metals

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					**IV**	**Number Exceeding**
Arsenic	<1	<1	<1	<1	37	0
Cadmium	<0.5	<0.5	0.5	<0.5	11	0
Copper	13	3	5	4	2400	0
Chromium	10	5	10	8	910	0
Chromium (V)	<1	<1	<1	<1	6	0
Lead	21	7	8	8	200	0
Mercury	<0.17	<0.17	<0.17	<0.17	40	0
Nickel	12	9	17	10	130	0
Selenium	<1	<1	<1	<1	250	0
Zinc	40	13	22	40	3700	0

Polycyclic Aromatic Hydrocarbons

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					**IV**	**Number Exceeding**
Acenaphthene	<0.01	0.04	<0.01	<0.01	210	0
Acenaphthylene	<0.01	<0.01	<0.01	<0.01	170	0
Anthracene	<0.02	<0.02	<0.02	<0.02	2400	0
Benzo(a)anthracene	0.04	<0.04	<0.04	<0.04	7.2	0
Benzo(a)pyrene	<0.04	<0.04	<0.04	<0.04	2.2	0
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	2.6	0
Benzo(ghi)perylene	<0.05	<0.05	<0.05	<0.05	320	0
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07	77	0
Chrysene	<0.06	<0.06	<0.06	<0.06	15	0
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	0.24	0

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					**IV**	**Number Exceeding**
Fluoranthene	0.09	<0.08	<0.08	<0.08	280	0
Fluorene	<0.01	<0.01	<0.01	<0.01	170	0
Indeno(123-cd)pyrene	0.04	<0.03	<0.03	<0.03	27	0
Naphthalene	<0.03	<0.03	<0.03	<0.03	2.3	0
Phenanthrene	0.08	0.05	<0.03	<0.03	95	0
Pyrene	0.08	<0.07	<0.07	<0.07	620	0
Total PAH	0.33	0.09	<0.08	<0.08		0

Total Petroleum Hydrocarbons

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					**IV**	**Number Exceeding**
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	42	0
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	100	0
Ali >C8-C10	<0.01	<0.01	<0.01	<0.01	27	0
Ali >C10-C12	<0.1	<0.1	<0.1	<0.1	130	0
Ali >C12-C16	<0.1	<0.1	<0.1	<0.1	1100	0
Ali >C16-C21	<0.1	<0.1	<0.1	<0.1	65000	0
Ali >C21-C35	<0.1	<0.1	<0.1	<0.1	65000	0
Total Aliphatics	<0.1	<0.1	<0.1	<0.1	-	-
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	70	0
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	130	0
Aro >C8-C9	0.05	<0.01	<0.01	<0.01	34	0
Aro >C9-C10	<0.01	<0.01	<0.01	<0.01	34	0
Aro >C10-C12	<0.1	<0.1	<0.1	<0.1	74	0
Aro >C12-C16	<0.1	<0.1	<0.1	<0.1	140	0
Aro >C16-C21	<0.1	<0.1	<0.1	<0.1	260	0
Aro >C21-C35	<0.1	<0.1	<0.1	<0.1	1100	0

Location	TP01	TP02	TP03	TP04		
Depth (m)	0.5	0.3	0.4	0.25		
Strata	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)					**IV**	**Number Exceeding**
Total Aromatics	<0.1	<0.1	<0.1	<0.1	-	-
TPH (Ali & Aro)	<0.1	<0.1	<0.1	<0.1	-	-
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01	0.087	0
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01	130	0
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	47	0
BTEX - m & p Xylene	0.05	<0.01	<0.01	<0.01	56	0
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01	60	0
MTBE	<0.01	<0.01	<0.01	<0.01	-	-

Asbestos

Location	TP01	TP02	TP03	TP04	
Depth (m)	0.5	0.3	0.4	0.25	
Strata	Made Ground	Made Ground	Made Ground	Made Ground	
Contaminant					**Number Exceeding**
Asbestos in Soil	NAD	NAD	NAD	NAD	0

Results of Contamination Testing in Northern Area of the Site (Area Surrounding TP011 and TP012 carried out by BWB)

Heavy Metals

Location	TP05	TP07	TP08	TP09	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04	SP05		
Depth (m)	0.25	0.6	0.4	0.2	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3	0.3		
Strata	Made Ground	Made Ground	Made Ground	Fill	Made Ground	Fill	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														**IV**	**Number Exceeding**
Arsenic	<1	6	<1	<1	<1	<1	<1	<1	1	2	2	<1	<1	37	0
Cadmium	<0.5	0.7	0.6	<0.5	<0.5	0.7	<0.5	<0.5	0.7	0.5	0.7	1	0.6	11	0
Copper	3	23	10	3	3	9	7	6	13	26	33	14	7	2400	0
Chromium	6	16	9	3	4	6	7	4	5	14	15	10	5	910	0
Lead	5	42	28	9	5	29	23	21	25	331	309	63	26	200	2

Location	TP05	TP07	TP08	TP09	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04	SP05		
Depth (m)	0.25	0.6	0.4	0.2	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3	0.3		
Strata	Made Ground	Made Ground	Made Ground	Fill	Made Ground	Fill	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														**IV**	**Number Exceeding**
Mercury	<0.17	0.23	<0.17	<0.17	<0.17	0.37	0.45	0.48	0.36	<0.17	<0.17	0.43	0.53	40	0
Nickel	9	25	12	5	7	5	5	3	3	16	10	5	5	130	0
Selenium	<1	1	<1	<1	<1	1	<1	<1	<1	<1	<1	1	<1	250	0
Zinc	18	77	44	28	11	67	60	53	92	260	354	110	66	3700	0

Location	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18		
Depth (m)	0.3	0.4	0.4	0.3	0.2	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.5		
Strata	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														**IV**	**Number Exceeding**
Arsenic	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	37	0
Cadmium	<0.5	<0.5	<0.5	<0.5	0.6	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11	0
Copper	9	5	4	4	3	7	5	4	5	4	4	4	4	2400	0
Chromium	6	5	5	4	3	5	3	6	5	3	6	3	4	910	0
Lead	24	15	12	11	13	20	18	20	17	13	15	20	8	200	0
Mercury	0.61	<0.17	0.21	<0.17	0.35	0.34	0.4	0.48	0.49	0.26	0.38	0.28	<0.17	40	0
Nickel	3	5	5	6	4	3	3	3	2	4	3	3	5	130	0
Selenium	1	<1	<1	<1	<1	1	<1	<1	<1	1	1	2	<1	250	0
Zinc	68	31	26	26	39	58	45	58	45	45	40	53	21	3700	0

Polycyclic Aromatic Hydrocarbons

Location	TP05	TP07	TP08	TP09	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04	SP05		
Depth (m)	0.25	0.6	0.4	0.2	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3	0.3		
Strata	Made Ground	Made Ground	Made Ground	Fill	Made Ground	Fill	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														**IV**	**Number Exceeding**
Acenaphthene	<0.01	0.01	0.08	0.02	<0.01	<0.01	0.02	0.02	<0.01	<0.01	<0.01	0.4	<0.01	210	0
Acenaphthylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	170	0
Anthracene	<0.02	0.03	0.08	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.55	<0.02	2400	0
Benzo(a)anthracene	<0.04	0.1	0.16	<0.04	<0.04	<0.04	0.14	<0.04	<0.04	<0.04	<0.04	1.32	<0.04	7.2	0
Benzo(a)pyrene	<0.04	0.07	0.13	<0.04	<0.04	<0.04	0.1	<0.04	<0.04	<0.04	0.37	0.85	<0.04	2.2	0
Benzo(b)fluoranthene	<0.05	0.08	0.16	<0.05	<0.05	<0.05	0.14	0.06	<0.05	0.34	0.49	1.2	<0.05	2.6	0
Benzo(ghi)perylene	<0.05	<0.05	0.13	<0.05	<0.05	<0.05	0.06	0.08	<0.05	0.46	0.62	0.66	0.08	320	0
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.39	<0.07	77	0
Chrysene	<0.06	0.1	0.2	<0.06	<0.06	<0.06	0.15	0.09	<0.06	<0.06	<0.06	1.33	<0.06	15	0
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.17	<0.04	0.24	0
Fluoranthene	<0.08	0.18	0.31	<0.08	<0.08	<0.08	0.28	0.09	<0.08	<0.08	<0.08	2.71	<0.08	280	0
Fluorene	<0.01	0.02	0.05	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.29	<0.01	170	0
Indeno(123-cd)pyrene	<0.03	0.05	0.13	<0.03	<0.03	<0.03	0.07	0.06	<0.03	0.37	0.53	0.76	0.04	27	0
Naphthalene	<0.03	<0.03	0.08	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	0.56	<0.03	2.3	0
Phenanthrene	<0.03	0.17	0.34	0.05	<0.03	0.06	0.17	0.08	<0.03	<0.03	<0.03	1.84	<0.03	95	0
Pyrene	<0.07	0.15	0.29	0.08	<0.07	<0.07	0.22	0.12	<0.07	<0.07	<0.07	2.81	<0.07	620	0
Total PAH	<0.08	0.96	2.14	0.15	<0.08	0.1	1.41	0.6	<0.08	1.17	2.01	15.8	0.12	-	-

Location	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18		
Depth (m)	0.3	0.4	0.4	0.3	0.2	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.5		
Strata	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground		
Contaminant (mg/kg)														**IV**	**Number Exceeding**
Acenaphthene	1	0.01	<0.01	0.02	0.07	<0.01	<0.01	0.02	<0.01	<0.01	0.06	0.02	<0.01	210	0
Acenaphthylene	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	170	0
Anthracene	1.59	<0.02	<0.02	0.03	0.09	<0.02	<0.02	0.03	<0.02	<0.02	0.06	0.03	<0.02	2400	0
Benzo(a)anthracene	3.26	<0.04	<0.04	0.12	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	0.08	<0.04	7.2	0
Benzo(a)pyrene	2.09	<0.04	<0.04	0.08	0.2	<0.04	<0.04	0.09	<0.04	<0.04	0.1	0.09	<0.04	2.2	0
Benzo(b)fluoranthene	2.35	<0.05	<0.05	0.11	0.26	<0.05	<0.05	0.12	<0.05	<0.05	0.15	0.12	<0.05	2.6	0
Benzo(ghi)perylene	1.26	0.06	<0.05	0.06	0.12	0.05	<0.05	0.12	<0.05	<0.05	0.07	0.07	<0.05	320	0
Benzo(k)fluoranthene	0.81	<0.07	<0.07	<0.07	0.09	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	77	0
Chrysene	2.63	<0.06	<0.06	0.12	0.19	<0.06	<0.06	<0.06	<0.06	<0.06	0.16	0.09	<0.06	15	0
Dibenzo(ah)anthracene	0.32	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.24	1
Fluoranthene	6.5	<0.08	<0.08	0.22	0.35	<0.08	<0.08	0.08	<0.08	<0.08	0.32	0.16	<0.08	280	0
Fluorene	0.75	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.02	<0.01	170	0
Indeno(123-cd)pyrene	1.56	0.04	<0.03	0.06	0.14	0.04	<0.03	0.1	<0.03	<0.03	0.07	0.08	<0.03	27	0
Naphthalene	1.04	<0.03	<0.03	0.04	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	<0.03	<0.03	2.3	0
Phenanthrene	4.93	0.04	<0.03	0.2	0.31	<0.03	<0.03	0.05	<0.03	<0.03	0.37	0.15	<0.03	95	0
Pyrene0	5.56	<0.07	<0.07	0.19	0.3	<0.07	<0.07	0.12	<0.07	<0.07	0.27	0.14	<0.07	620	0
Total PAH	35.7	0.15	<0.08	1.25	2.41	0.09	<0.08	0.73	<0.08	<0.08	1.89	1.05	<0.08	-	-

The full test certificates are included in Appendix IV of this report.

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5.5. CONTAMINATION SOURCES

Samples taken from beneath the existing slab

No elevated levels identified.

Source	Elevated Levels Present?
Heavy Metals	No
Poly Aromatic Hydrocarbons	No
Total Petroleum Hydrocarbons	No
Asbestos	No

Samples taken from north eastern area of the site

Elevated levels of Lead were identified in 2No. samples taken from the north eastern area of the site, both samples taken from Sampling Point 3 (SP03) at depths of 0.3m and 0.8mbgl.

Elevated levels of Dibenzo(ah)anthracene (PAH) were identified in SP06 at 0.3mbgl.

Source	Elevated Levels Present?
Heavy Metals	Yes
Poly Aromatic Hydrocarbons	Yes

5.6. PATHWAYS

Based on the proposed land use, the possible pathways that exist on site for any possible source of contamination are as follows;

Pathway	Pathway Present	Comments
Direct Contact with soil/ water	Yes	Potential for contact with soil/ water during future landscaping/development works
Incidental ingestion	Yes	Potential for ingestion of soils/ water during future landscaping/development works
Inhalation of soil dust/ asbestos fibres	Yes	Potential for inhalation of soil dust/ asbestos during future landscaping/development works and ground disturbance
Leaching/ migration of liquids	Yes	Potential for leaching to aquifer as the site will be developed with soft, vegetative cover
Surface water run-off	Yes	Site to be developed with residential housing with roads, therefore potential for surface water runoff present
Migration/ emission/ accumulation inhalation of vapours	Yes	Migration and emission of vapours possible, and accumulation possible in proposed residential buildings
Plant uptake/ plant uptake followed by ingestion	Yes	Proposed residential houses to have private gardens, with the potential for home grown produce, increasing plant uptake

5.7. RECEPTORS

Based on the identified sources of contamination, and the present pathways, the potential receptors for the development are:-

Receptor	Receptor Present	Comments
Site worker	Yes	Contractors carrying out ground/development works and landscaping
Maintenance staff	Yes	Future gardeners/ landscaping staff
Long term site user/ future resident	Yes	Future residents
Off-site resident	Yes	Residential housing adjacent to the southern boundary of the site
Flora & Fauna	Yes	Flora on landscaped areas
Aquifer	No	Bedrock is a Secondary A Aquifer, however there are no groundwater abstractions or source protection zones in the vicinity of the site
Surface water	No	No surface watercourses in the vicinity of the site
Buildings & Infrastructure	Yes	No buildings proposed on the site

5.8. SITE SPECIFIC MODEL

Source	Contaminant	Receptor	Pathway	Risk
Soil based contaminants (Solid)	**Heavy Metals[1]**	**A – Construction Workers[1]** **B – Maintenance Worker[1]** **C – Future End user[1]** **D – Off-Site Resident[1]** **E – Flora & Fauna[1]**	**a – Direct contact with soil/ water[1]** **b – Incidental ingestion[1]** **c – Inhalation of soil dust/ asbestos fibres[1]** **d – Leaching/ migration[1]** **e – Surface water run off[1]** **g – Plant uptake/ plant uptake followed by ingestion[1]**	**Moderate**
	Polycyclic Aromatic Hydrocarbons[1]	**A – Construction Workers[1]** **B – Maintenance Worker[1]** **C – Future End user[1]** **D – Off-Site Resident[1]** **E – Flora & Fauna[1]**	**a – Direct contact with soil/ water[1]** **b – Incidental ingestion[1]** **c – Inhalation of soil dust/ asbestos fibres[1]** **d – Leaching/ migration[1]** **e – Surface water run off[1]** **f – Migration/ emission/ inhalation of vapours[1]** **g – Plant uptake/ plant uptake followed by ingestion[1]**	**Moderate**
	Total Petroleum Hydrocarbon[2]	**A – Construction Workers[1]** **B – Maintenance Worker[1]** **C – Future End user[1]** **D – Off-Site Resident[1]** **E – Flora & Fauna[1]**	**a – Direct contact with soil/ water[1]** **b – Incidental ingestion[1]** **c – Inhalation of soil dust/ asbestos fibres[1]** **d – Leaching/ migration[1]** **e – Surface water run off[1]** **f – Migration/ emission/ inhalation of vapours[1]** **g – Plant uptake/ plant uptake followed by ingestion[1]**	Negligible
Asbestos in Made Ground	*Asbestos fibres [2]*	**A – Construction Workers[1]** **B – Maintenance Worker[1]** **C – Future End user[1]** **D – Off-Site Resident[1]**	**c – Inhalation of soil dust/ asbestos fibres[1]**	Negligible

[1] Source/ Pathway/ Receptor PRESENT on site
[2]Source/ Pathway/ Receptor NOT PRESENT on site

5.9. CONTAMINATION ISSUES

Based upon the conceptual site model, there are 10№ contamination linkages present for the sources tested for.

1. Heavy Metals with respect to Construction Workers
2. Heavy Metals with respect to End User
3. Heavy Metals with respect to Flora and Fauna
4. Heavy Metals with respect to Maintenance Workers
5. Heavy Metals with respect to Off Site Residents
6. PAH with respect to Construction Workers
7. PAH with respect to End User
8. PAH with respect to Flora and Fauna
9. PAH with respect to Maintenance Workers
10. PAH with respect to Off Site Residents

5.10. ASSESSED RISKS AND MANAGEMENT

Elevated concentrations of Lead and Dibenzo(ah)anthracene are present in the Northern area of the site.

A site induction should warn construction workers as to the presence of contaminated material onsite. Appropriate personal protective equipment should be worn, accompanied with employing good personal hygiene standards (especially before eating) in order to minimise the risk to construction workers on site.

The contaminants identified are deemed to exist within the made ground at the surface of the site in the central northern area of the site (found in TP011 by BWB, and in SP03 and SP06 by Met Engineers), due to the large amount of testing carried out in this area of the site and the small area within which the contamination was identified it is determined that these elevated levels can be treated as a hotspot.

Dependent on the final levels and form of the proposed development, various options for remediation may be viable. One such option may be a (600m thick in rear gardens or 450mm thick in front gardens) capping layer of clean, certified, topsoil and subsoil. This layer of clean infill would create a suitable barrier to prevent a pathway between the contamination and the potential receptors on site.

The following table details the assessed risk from the Site-Specific conceptual site model, the possible management/remediation proposals and the Residual Risk after these proposals have been implemented.

Source	Pathway	Receptor	Risk	Management / Remediation Proposals	Residual Risk
Heavy Meals and PAH (Lead and Dibenzo(ah)anthracene)	a, b, c	**A**	**Moderate**	Site induction to cover the potential for contaminants existing on site. Personal Protective Equipment to be used at all times including gloves. Good levels of Personal hygiene to be maintained including washing hands before eating.	**Negligible**
	a, b, c, d, g	**B, C, E**	**Moderate**	In the area where elevated levels have been identified, a site strip should be carried out to leave soft landscaped areas 450mm in front gardens and 600mm in rear gardens below final site levels. A cap of clean certified topsoil is to be imported in order to create a suitable barrier between contamination and source. However other forms of remediation may be viable and the final method will be determined within the remediation statement.	**Negligible**
	e	**D**	**Low**	Site to be developed with grassed gardens, reducing surface water runoff. And in non-soft landscaped areas the proposed houses and associated tarmacked roads which will provide a barrier between the source and receptor.	**Negligible**

All ground works should be monitored by a suitably qualified person and significant deviation from the findings of this document is to be reported to the Engineer immediately prior to commencing any further works.

5.11. ENVIRONMENTAL SUMMARY

Elevated levels of Lead and Dibenzo(ah)anthracene have been found in the central northern area of the site.

A site induction and appropriate PPE should mitigate any risk towards construction workers.

Depending on the final site levels and form of development, in the central northern area of the site sufficient Made Ground should be removed from all soft landscaped areas and replaced with 450mm in front gardens and 600mm in rear gardens of clean, certified, topsoil and subsoil. Other options may be available and the final method of remediation will be determined within the remediation statement.

A remediation statement will be required to accompany any planning application detailing the risks identified and the mitigation measures prescribed.

All ground works should be monitored by a suitably qualified person and any significant deviation from the findings of this document is to be reported to the Engineer immediately prior to commencing any further works.

6. SOAKAWAY TESTING

6.1. GENERAL

The Ground Conditions Report by HBS recommended that soakaway testing be carried out on site to assess the viability of soakaways being utilised for surface water drainage.

Infiltration testing was carried out in 2№ trial pits (TP01 and TP05) to achieve this aim. The trial pits were excavated to depths of 1.6mbgl (TP01) to 2.2mbgl (TP05) and were filled with 300mm of water and the water level monitored over a 2 hour period. In TP01 during the first test the majority of the water soaked away within the 2 hour period, therefore the test was repeated 2№ additional times. During the first test the water level in TP05 did not fall within the 2 hour period, and as such only 1№ test was carried out.

TP01 was excavated to a depth of 1.6mbgl and found 200mm of concrete over 200mm of Made Ground, on top of mudstone and siltstone bedrock.

TP05 was excavated to a depth of 2.2mbgl and found 100mm of tarmac over 500mm of Made Ground, above 0.8m of clay, on top of siltstone bedrock.

6.2. RESULTS

The results of the soakaway testing are provided below;

	Water depth (mm)			
Time (mins)	TP01 (Test 1) 11/02/19	TP01 (Test 2) 11/02/19	TP01 (Test 3) 12/02/19	TP05 11/02/19
1	305	310	300	310
2	305	310	300	310
3	305	300	300	310
4	300	300	300	310
5	300	290	300	310
10	280	280	295	310
15	265	270	295	310
20	250	255	290	310
25	240	250	280	310
30	225	240	280	310
45	200	200	270	310
60	170	180	260	310
75	140	150	245	315
90	115	130	230	320
105	85	100	215	310
120	55	80	200	310

The coefficient of permeability for test No.3 in TP01 was calculated as $2.98x10^{-6}$, therefore it is determined that this value is too low for soakaways to be viable for the proposed development. The full soakaway results for TP01 can be found in Appendix V of this report.

6.3. CONSLUSION

The soakaway test results show that in TP01, despite the first test returning a mildly positive result, subsequent tests showed very slow infiltration with the water level in test №3 falling by only 100mm in a 2 hour period. The test in TP05 returned a negative results with the water level remaining the same by the end of the 2 hour testing period.

Due to the above it is determined that soakaway drainage is **NOT** considered suitable for the proposed development.

7. GEOTECHNICAL ASSESSMENT

7.1. GENERAL

The site investigation was required to assess the risk to development due to potential unrecorded shallow depth coal mining in the eastern area of the site. 3No. open hole rotary boreholes to 20mbgl were undertaken to achieve this aim.

In addition the investigation was required to determine the extent of the Made Ground in a former "quarried" area in the north east of the site.

7.2. GEOLOGICAL ASSESSMENT

Artificial Deposits

The trial pits found Made Ground to depths of between 0.6mbgl (TP01 and TP05) and 3.1mbgl (TP09). The Made Ground varied in composition ranging from gravelly clay to sandy gravel.

This site investigation aimed to confirm the extent of a deeper area of Made Ground in the north eastern area of the site identified in the initial site investigation by BWB. To achieve this aim 5№ trial pits (TP06 – TP10) were excavated to depths of between 1.2m (TP07) and 3.3mbgl (TP09) to prove the depth to natural ground. The only trial pit to find significantly deeper (>1mgl) Made Ground was TP09 which was located in the far north eastern corner of the site and found Made Ground to a depth of 3.1mbgl. The Made Ground in this area of the site generally comprised medium dense sandy gravelly COBBLES with high boulder content, on top of reworked firm brown CLAY with occasional gravels of coal.

Superficial Deposits

Superficial deposits comprising soft to firm clay were identified under the majority of the site with typical thicknesses ranging between 0.2m (TP05) and 1.6m (TP04). Trial pits 6 to 10 were excavated to determine the thickness of Made Ground in the north eastern area of the site, and as such were terminated once reaching natural material.

Bedrock

Bedrock was deepest adjacent to the northern edge of the existing concrete slab of the former building, and was encountered at between 0.6mbgl (TP01) and 2.7mbgl (TP02). Bedrock comprised mudstone, siltstone, and coal seams.

7.3. MINING

The initial site investigation by BWB identified several near surface coal seams, varying in thickness from 0.4m to 1.5m, the two shallowest being identified as the Winter seam and the Top Beamshaw seam. This report identified that there was a high risk of subsidence due to unrecorded shallow depth coal mining in the eastern area of the site, and as such further investigation was required.

During this site investigation by Met Engineers, TP03 found an intact thin (0.25m thick) band of shiny black coal was identified at a top depth of 1.8mbgl.

Met Engineers carried out 3№ open hole rotary boreholes were undertaken to 20mbgl in the eastern area of the site to confirm the presence of any voids/workings beneath this area.

No evidence of coal or voids/workings was uncovered within the boreholes and therefore it is determined that the risk from subsidence in the eastern area of the site due to migration of crown holes as a result of unrecorded shallow depth coal mining is **NEGLIGIBLE** and no further actions are required. Rotary borehole logs are provided within Appendix II of this report.

7.4. GEOTECHNICAL SUMMARY

No evidence of coal mining voids or workings were uncovered during this site investigation, and as such no further actions with regards to risks from shallow coal mining in the east of the site are considered necessary.

All ground works should be monitored by a suitably qualified person and any significant deviation from the findings of this document is to be reported to the Engineer immediately prior to commencing any further.

8. CONCLUSIONS AND RECOMMENDATIONS

In conclusion:

- 10№ contamination linkages are deemed exist on the site.
- It is considered that the area around SP03 and SP06 can be treated as a hotspot of contamination.
- In this area where elevated levels of PAH and Heavy Metals have been identified, sufficient Made Ground should be removed to allow the placement of a 450mm thick in front gardens and 600mm thick in rear gardens capping layer of clean, certified topsoil.
- A site induction and appropriate PPE should mitigate any risk towards construction workers.
- Soakaway drainage is deemed unsuitable for the proposed development.
- The open hole rotary boreholes found no evidence of coal or voids/workings, therefore it is determined that the risk from subsidence as a result of unrecorded shallow coal mining is negligible in the eastern area of the site.
- The extent of deeper Made Ground in the north eastern area of the site is limited with depths of less than 1mbgl identified in all trial pits aside from TP09 which was located in the far north eastern corner of the site and found Made Ground to a depth of 3.1mbgl.

Based on these findings, we recommend that the following should be undertaken:

- A remediation statement will need to be prepared to accompany any planning application, detailing all remedial measures for the site as well as detailed guidance on the verification of the measures employed

APPENDIX I

Site Investigation Plan

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1. Do not scale dimensions from this drawing in either paper or electronic format.
2. To be read in conjunction with all relevant Engineer's, Architect's and Other drawings and specifications.
3. All building products to be used in strict accordance with the manufacturer's recommendations.
4. Any discrepancies are to be reported to the Engineer immediately.
5. Main Contractor to provide a detailed method statement for all works prior to commencement on site.

APPROX NORTH

= Open Hole Rotary Borehole Location

= Trial Pit Location

= Soil Sampling Location

RO1
RO2
RO3
TP01 (SA)
TP02
TP03
TP04
TP05 (SA)
TP06
TP07
TP08
TP09
TP10
Trees and Bushes
Demolition Rubble
MADE GROUND PRESENT UP TO DEPTHS OF BETWEEN 0.5M AND 3.1M
10m
SP01
SP02
SP03
SP04
SP05
SP06
SP07
SP08
SP09
SP10
SP11
SP12
SP13
SP14
SP15
SP16
SP17
SP18
CONJECTURED MINOR SEAM OUTCROP ON MINING REPORT PLANS (BOREHOLES 2006), EXPLORATORY HOLE REPORT, 2001, AND ADDITIONAL
CONJECTURED BARNSHAW SEAM (MINING REPORT, 2001)
HARBOROUGH HOUSE
BRICK BUILDING
SUB-STN
TANK
TREES AND BUSHES
BUS SHELTER

Issue	Date	Drawn	Ch'k'd
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Project: Harborough Hill Road, Barnsley
P18-01848

Title: Site Investigation Location Plan

Drawn	TAW	Checked	AEC	Scale	NTS
Date	20.03.19	Date	20.03.19		
Status	Final			Original Size	A3

Drawing No: P18-01848-Met-M2-GE-001
Issue: 1

APPENDIX II

Open Hole Rotary Borehole Logs

GEOINVESTIGATE Ltd.

Your Ref. P18-01848 **Our Ref.** G19035 **RH No.1** **Sheet No. 1 of 1**
Location: Harborough Hill Road / Schwabisch Gmund Way, Barnsley S71 1BP **DATE:** 12/02/19

Depth (m)	Description of Strata	Thick -ness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
2.80	TARMAC / orange DRIFT Large cobbles (possible concrete) from 1.70m to 2.20m	2800					Flush lost at 1.90m		2.50
6.10	Sandy SILTSTONE	3300							5.00
11.1	MUDSTONE	5000							7.50 10.00
16.3	SANDSTONE	5200							12.50 15.00
20.0	SILTSTONE with MUDSTONE inclusions	3700							17.50 20.00
	Rotary hole terminated at 20.00m								

Remarks: Casing to 1.50m
Microdrill rotary open hole borehole to 20m
No cores recovered from borehole
No gas detected from borehole on completion
Flush lost at 1.90m. No voids encountered.

Key:
Slotted Pipe
Plain Pipe
Bentonite
Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test
C Cone Penetration Test

RH1

GEOINVESTIGATE Ltd.

Your Ref. P18-01848 **Our Ref.** G19035 **RH No.2** **Sheet No. 1 of 1**
Location: Harborough Hill Road / Schwabisch Gmund Way, Barnsley S71 1BP **DATE:** 12/02/19

Depth (m)	Description of Strata	Thick -ness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
2.60	TARMAC / orange and brown DRIFT	2600							2.50
6.40	Light brown sandy SILTSTONE	3800							5.00
11.7	Light grey MUDSTONE	5300							7.50 10.00
17.1	Light grey SANDSTONE	5400							12.50 15.00
20.0	Grey SILTSTONE with occasional MUDSTONE inclusions	2900					Full Flush		17.50 20.00
	Rotary hole terminated at 20.00m								

Remarks: Casing to 1.50m
Microdrill rotary open hole borehole to 20m
No cores recovered from borehole
No gas detected from borehole on completion
Full flush returned. No voids encountered.

Key:
Slotted Pipe
Plain Pipe
Bentonite
Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test
C Cone Penetration Test

RH2

GEOINVESTIGATE Ltd.

Your Ref. P18-01848 **Our Ref.** G19035 **RH No.3** **Sheet No. 1 of 1**
Location: Harborough Hill Road / Schwabisch Gmund Way, Barnsley S71 1BP **DATE:** 12/02/19

Depth (m)	Description of Strata	Thick -ness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
2.10	TARMAC / orange and brown DRIFT	2100							
6.70	Light brown sandy SILTSTONE / silty SANDSTONE	4600							2.50 5.00
12.3	Light grey MUDSTONE	5600							7.50 10.00 12.50
16.9	Light grey SANDSTONE	4600							15.00
20.0	Grey SILTSTONE with occasional MUDSTONE inclusions	3100					Full Flush		17.50 20.00
	Rotary hole terminated at 20.00m								

Remarks: Casing to 1.50m
Microdrill rotary open hole borehole to 20m
No cores recovered from borehole
No gas detected from borehole on completion
Full flush returned. No voids encountered.

Key:
Slotted Pipe
Plain Pipe
Bentonite
Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test
C Cone Penetration Test

RH3

APPENDIX III

Trial Pit Logs

Met Consultancy Group Ltd
Southgate House
Pontefract Road
Leeds
LS10 1SW
Email: admin@metconsultancygroup.com
Phone: 0113 200 8900

Trial Pit Log

TrialPit No: TP01
Sheet 1 of 1

Project Name: Harborough Hill Road	Project No. P18-01848	Co-ords: 434792.00 - 406642.00 Level: 96.25	Date 11/02/2019
Location: Land off Harborough Hill Road, Barnsley, S71 1BP		Dimensions (m): 2.50 × 0.70 Depth 1.60	Scale 1:25
Client: NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	96.05		Concrete
	0.50	ES		0.60	95.65		MADE GROUND. Loose light grey and brown sandy GRAVEL with high cobble content. Sand is fien to coarse, gravel is fine to coarse angular concrete and crick, cobbles are angular brick up to 200mm across. Plastic bags, metal rebar and glass also present.
				0.90	95.35		Weak orangish brown silty MUDSTONE. Distinctly weathered.
				1.20	95.05		Weak light grey silty MUDSTONE. Distinctly weathered.
				1.60	94.65		Medium strong light yellowish grey SILTSTONE.
							End of Pit at 1.60m

Remarks: Soakaway test carried out

Stability:	Stable	Weather:	Clear

Trial Pit Photos

TP01	
Harborough Hill Road	P18-01848



Soil Arisings. TP01.



Soil Horizons. TP01.

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Trial Pit Log

TrialPit No: TP02
Sheet 1 of 1

Project Name: Harborough Hill Road	Project No. P18-01848	Co-ords: 434798.00 - 406643.00 Level: 96.66	Date 11/02/2019
Location: Land off Harborough Hill Road, Barnsley, S71 1BP		Dimensions (m): 2.50 x 0.70 Depth 3.50	Scale 1:25
Client: NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	96.46		Mesh reinforced CONCRETE slab.
	0.30	ES					MADE GROUND. Medium dense light orangish brown sandy gravelly COBBLE with high boulder content. Sand is medium, gravel is fine to coarse, sub-rounded to rounded sandstone, cobbles are sub-rounded to rounded sandstone up to 200mm across, boulders are sub-rounded to rounded sandstone up to 400mm across.
				2.70	93.96		Firm light grey CLAY.
				2.90	93.76		Medium strong light grey thinly bedded SILTSTONE with 2mm ripple marks. Distinctly weathered.
				3.50	93.16		End of Pit at 3.50m

Remarks: Measuring stick not used due to instability,

Stability:	Unstable	Weather:	Clear

Trial Pit Photos

TP02	
Harborough Hill Road	P18-01848



Soil Arisings. TP02.



Soil Horizons. TP02.

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Trial Pit Log

TrialPit No: TP03
Sheet 1 of 1

Project Name: Harborough Hill Road	Project No. P18-01848	Co-ords: 434813.00 - 406633.00 Level: 96.62	Date 11/02/2019
Location: Land off Harborough Hill Road, Barnsley, S71 1BP		Dimensions (m): 2.50 x 0.70 Depth 2.55	Scale 1:25
Client: NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	96.42		Reinforced CONCRETE slab.
	0.40	ES		0.60	96.02		MADE GROUND. Medium dense light orangish brown sandy gravelly COBBLE with high boulder content. Sand is medium, gravel is fine to coarse, sub-rounded to rounded sandstone, cobbles are sub-rounded to rounded sandstone up to 200mm across, boulders are sub-rounded to rounded sandstone up to 400mm across.
				1.00	95.62		MADE GROUND. Very soft black gravelly sandy CLAY. Sand is fine, gravel is fine to medium mudstone.
				1.80	94.82		Firm mottled orangish brown and light grey CLAY.
				2.05	94.57		Weak black medium quality slightly shiny COAL.
				2.50	94.12		Weak mottled orangish brown and light grey SILTSTONE.
				2.55	94.07		Medium strong yellowish brown SILTSTONE. End of Pit at 2.55m

Remarks:

Stability:	Stable	Weather:	Clear

Trial Pit Photos

TP03	
Harborough Hill Road	P18-01848



Soil Arisings. TP03.



Soil Horizons. TP03.

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Trial Pit Log

TrialPit No: TP04
Sheet 1 of 1

Project Name:	Harborough Hill Road	Project No. P18-01848	Co-ords: 434798.00 - 406647.00 Level: 96.67	Date 12/02/2019
Location:	Land off Harborough Hill Road, Barnsley, S71 1BP	Dimensions (m): Depth 2.60	2.50 × 0.70	Scale 1:25
Client:	NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	96.47		Reinforced CONCRETE slab.
	0.25	ES					MADE GROUND. Medium dense light orangish brown sandy gravelly COBBLE with high boulder content. Sand is medium, gravel is fine to coarse, sub-rounded to rounded sandstone, cobbles are sub-rounded to rounded sandstone up to 200mm across, boulders are sub-rounded to rounded sandstone up to 400mm across.
				0.70	95.97		Firm greenish dark grey gravelly CLAY. Gravel is fine to coarse sub-rounded quartzite, mudstone and sandstone.
				0.95	95.72		Stiff orangish brown sandy gravelly CLAY. Sand is fine, gravel is fine to coarse sub-rounded quartzite, mudstone and sandstone.
				1.60	95.07		Stiff mottled orangish brown and light grey CLAY.
	2.00		HVP=110				
				2.30	94.37		Medium strong light greyish orangish brown SILTSTONE. Distinctly weathered.
				2.60	94.07		End of Pit at 2.60m

1 2 3 4 5

Remarks:

Stability:	Stable	Weather:	Clear

Trial Pit Photos

TP04	
Harborough Hill Road	P18-01848



Soil Arisings. TP04.



Soil Horizons. TP04.

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Trial Pit Log

TrialPit No: TP05
Sheet 1 of 1

Project Name:	Harborough Hill Road	Project No. P18-01848	Co-ords: 434800.00 - 406643.00 Level: 93.00	Date 11/02/2019
Location:	Land off Harborough Hill Road, Barnsley, S71 1BP	Dimensions (m): Depth 2.20	2.50 × 0.80	Scale 1:25
Client:	NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	92.90		Black tarmac
	0.25	ES		0.40	92.60		MADE GROUND. Loose yellowish brown very gravelly sand with high cobble and boulder content, SAND is medium. Gravel is fine to coarse sub-rounded to rounded sandstone, cobbles are sub-rounded to rounded sandstone up to 200mm across, boulders are sub-rounded to rounded sandstone up to 400mm across.
				0.60	92.40		MADE GROUND. Medium dense multicoloured gravelly CLAY. Gravel is fine to coarse angular brick, tarmac and sandstone.
							Firm mottled orangish brown and light grey CLAY with occasional angular cobbles of siltstone up to 200mm across.
				1.40	91.60		Weak light grey and yellow distinctly weathered SILTSTONE.
				2.20	90.80		End of Pit at 2.20m

1
2
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5

Remarks: Soakaway test carried out

Stability:	Stable	Weather:	Clear

Trial Pit Photos

TP05	
Harborough Hill Road	P18-01848



Soil Arisings. TP05.



Soil Horizons / Infiltration Testing. TP05.

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Trial Pit Log

TrialPit No: TP06
Sheet 1 of 1

Project Name: Harborough Hill Road	Project No. P18-01848	Co-ords: 434829.00 - 406633.00 Level: 96.60	Date 12/02/2019
Location: Land off Harborough Hill Road, Barnsley, S71 1BP		Dimensions (m): 2.50 x 0.70 Depth 3.05	Scale 1:25
Client: NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15	96.45		Tarmac
				0.40	96.20		FILL. Medium dense light cream very gravelly SAND. Sand is coarse, gravel is fine to coarse sub-rounded to rounded limestone.
				0.70	95.90		MADE GROUND. Medium dense reddish brown very sandy GRAVEL. Sand is medium to coarse, gravel is fine to coarse angular to sub-angular red oxidised mudstone. Tapers off from south to north.
	1.00 1.00	B	HVP=100				Firm yellowish brown gravelly CLAY. Gravel is fine to medium angular mudstone. Becomes light grey with orangish brown mottling at 1mbgl.
				1.50	95.10		Very weak dark brown thinly laminated MUDSTONE. Destructured, recovered as coarse angular gravels.
				2.00	94.60		
				2.05	94.55		Strong reddish purplish brown thinly bedded MUDSTONE.
							Weak dark grey MUDSTONE.
				2.80	93.80		Medium strong dark grey MUDSTONE.
				3.05	93.55		End of Pit at 3.05m

Remarks:

Stability:	Stable	Weather:	Clear

Trial Pit Photos

TP06	
Harborough Hill Road	P18-01848



Soil Arisings. TP06.



Soil Arisings. TP06.

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Trial Pit Log

TrialPit No: TP07
Sheet 1 of 1

Project Name:	Harborough Hill Road	Project No. P18-01848	Co-ords: 434857.00 - 406631.00 Level: 95.00	Date 12/02/2019
Location:	Land off Harborough Hill Road, Barnsley, S71 1BP	Dimensions (m): Depth 1.30	2.50 × 0.70	Scale 1:25
Client:	NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.08	94.92		Tarmac
				0.38	94.62		FILL. Medium dense light cream very gravelly SAND. Sand is coarse, gravel is fine to coarse sub-rounded to rounded limestone.
	0.60	ES		0.65	94.35		MADE GROUND. Firm orangish brown mottled with light grey gravelly CLAY. Gravel is fine to coarse angular to rounded mudstone and sandstone.
				0.90	94.10		MADE GROUND. Medium dense reddish purplish brown very sandy GRAVEL. Sand is medium to coarse, gravel is fine to coarse angular to sub-rounded red mudstone.
	1.20		HVP=70				Soft orangish brown and light grey CLAY.
				1.30	93.70		End of Pit at 1.30m

1
2
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5

Remarks:

Stability:	Stable	Weather:	Clear

Trial Pit Photos

TP07	
Harborough Hill Road	P18-01848



Soil Arisings. TP07.



Soil Horizons. TP07.

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Trial Pit Log

TrialPit No: TP08
Sheet 1 of 1

Project Name:	Harborough Hill Road	Project No. P18-01848	Co-ords: 434813.00 - 406658.00 Level: 92.80	Date 12/02/2019
Location:	Land off Harborough Hill Road, Barnsley, S71 1BP	Dimensions (m): Depth 1.40	2.50 × 0.70	Scale 1:25
Client:	NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	92.70		Tarmac
				0.20	92.60		FILL. Medium dense light cream very sandy GRAVEL. Sand is coarse, gravel is fine to coarse, sub-rounded to rounded limestone.
	0.40	ES		0.50	92.30		MADE GROUND. Medium dense orangish brown very gravelly SAND with high cobble content. Sand is fine to medium, gravel is fine to coarse angular to rounded sandstone, cobbles are sub-angular to rounded sandstone up to 200mm across.
				0.90	91.90		MADE GROUND. Soft mottled light and dark brown gravelly CLAY. Gravel is fine to medium angular mudstone and sandstone. With rootlets.
	1.10		HVP=110				Firm mottled light grey and orangish brown CLAY.
				1.40	91.40		End of Pit at 1.40m

1
2
3
4
5

Remarks:

Stability:	Stable	Weather:	Clear

Trial Pit Photos

TP08	
Harborough Hill Road	P18-01848



Soil Arisings. TP08.



Soil Horizons. TP08.

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Trial Pit Log

TrialPit No: TP09
Sheet 1 of 1

Project Name: Harborough Hill Road	Project No. P18-01848	Co-ords: 434838.00 - 406655.00 Level: 93.10	Date 13/02/2019
Location: Land off Harborough Hill Road, Barnsley, S71 1BP		Dimensions (m): 2.50 x 0.80 Depth 3.30	Scale 1:25
Client: NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10	93.00		Tarmac
	0.20	ES					FILL. Medium dense light cream very gravelly SAND. Sand is fine to medium, gravel is fine to coarse sub-rounded to rounded limestone.
				0.30	92.80		
	0.40	ES					MADE GROUND. Medium dense orangish brown gravelly SAND with high cobble and boulder content. Sand is coarse, gravel is fine to coarse sub-rounded to rounded sandstone, cobbles and boulders and sub-rounded sandstone up to 400mm across.
▼				1.50	91.60		REWORKED. Firm brown CLAY with occasional fine angular gravels of coal.
				3.10	90.00		Firm mottled orangish brown and light grey CLAY.
	3.20		HVP=95				
				3.30	89.80		End of Pit at 3.30m

Remarks: Perched water at 1.5mbgl

Stability:	Very unstable	Weather:	Clear

Trial Pit Photos

TP09	
Harborough Hill Road	P18-01848



Soil Arisings. TP09.



Soil Horizons. TP09.

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Trial Pit Log

TrialPit No: TP10
Sheet 1 of 1

Project Name:	Harborough Hill Road	Project No. P18-01848	Co-ords: 434848.00 - 406656.00 Level: 94.00	Date 13/02/2019
Location:	Land off Harborough Hill Road, Barnsley, S71 1BP	Dimensions (m): Depth 1.40	2.50 × 0.70	Scale 1:25
Client:	NPS Property Consultants Ltd			Logged TAW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15	93.85		Tarmac
	0.20	ES					FILL. Medium dense light cream very gravelly SAND. Sand is coarse, gravel is fine to coarse sub-rounded to rounded limestone.
				0.40	93.60		MADE GROUND. Soft dark brown mottled with reddish brown mottling sandy gravelly CLAY. Sand is medium, gravel is angular fine to coarse mudstone, sandstone and brick.
	0.60	ES					
				0.80	93.20		Firm mottled light grey and light orangish brown CLAY.
				1.40	92.60		End of Pit at 1.40m

Remarks:

Stability:	Stable	Weather:	Clear

Trial Pit Photos

TP10	
Harborough Hill Road	P18-01848



Soil Arisings. TP10.



Soil Horizons. TP10.

APPENDIX IV

Soil Test Results

Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/01457
Issue Number: 1 **Date:** 27 February, 2019

Client:
MET Engineers Ltd
Southgate House
Pontefract Road
Leeds
LS10 1SW

Project Manager: Ami Cooper/Thomas White
Project Name: Harborough Hill Road, Barnsley
Project Ref: P18-01848
Order No: PO-02430
Date Samples Received: 14/02/19
Date Instructions Received: 15/02/19
Date Analysis Completed: 27/02/19

Prepared by:



Holly Neary-King
Sales Executive

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 19/01457

Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/1	19/01457/2	19/01457/3	19/01457/4	19/01457/5	19/01457/6	19/01457/7	19/01457/8	Units	Method ref
Client Sample No	1	2	3	4	5	7	8	9		
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP07	TP08	TP09		
Depth to Top	0.5	0.3	0.4	0.25	0.25	0.6	0.4	0.2		
Depth To Bottom										
Date Sampled	11-Feb-19	11-Feb-19	11-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	4ABE	4ABE	4A	4AB	4AB	5AB	4AB	4A		
% Stones >10mm$_A$	19.7	18.3	9.2	30.4	35.6	35.1	14.6	32.5	% w/w	A-T-044
Organic matter$_D^{M\#}$	0.6	0.2	0.3	<0.1	-	-	-	-	% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	<1	<1	<1	<1	<1	6	<1	<1	mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	0.5	<0.5	<0.5	0.7	0.6	<0.5	mg/kg	A-T-024s
Copper$_D^{M\#}$	13	3	5	4	3	23	10	3	mg/kg	A-T-024s
Chromium$_D^{M\#}$	10	5	10	8	6	16	9	3	mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	-	-	-	-	mg/kg	A-T-040s
Lead$_D^{M\#}$	21	7	8	8	5	42	28	9	mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	0.23	<0.17	<0.17	mg/kg	A-T-024s
Nickel$_D^{M\#}$	12	9	17	10	9	25	12	5	mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1	<1	1	<1	<1	mg/kg	A-T-024s
Zinc$_D^{M\#}$	40	13	22	40	18	77	44	28	mg/kg	A-T-024s

Envirolab Job Number: 19/01457

Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/1	19/01457/2	19/01457/3	19/01457/4	19/01457/5	19/01457/6	19/01457/7	19/01457/8	Units	Method ref
Client Sample No	1	2	3	4	5	7	8	9		
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP07	TP08	TP09		
Depth to Top	0.5	0.3	0.4	0.25	0.25	0.6	0.4	0.2		
Depth To Bottom										
Date Sampled	11-Feb-19	11-Feb-19	11-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	4ABE	4ABE	4A	4AB	4AB	5AB	4AB	4A		
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD	-	-	-	-		A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	-	-	-	-		

Envirolab Job Number: 19/01457

Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/1	19/01457/2	19/01457/3	19/01457/4	19/01457/5	19/01457/6	19/01457/7	19/01457/8	Units	Method ref
Client Sample No	1	2	3	4	5	7	8	9		
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP07	TP08	TP09		
Depth to Top	0.5	0.3	0.4	0.25	0.25	0.6	0.4	0.2		
Depth To Bottom										
Date Sampled	11-Feb-19	11-Feb-19	11-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	4ABE	4ABE	4A	4AB	4AB	5AB	4AB	4A		
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	0.04	<0.01	<0.01	<0.01	0.01	0.08	0.02	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.08	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.04	<0.04	<0.04	<0.04	<0.04	0.10	0.16	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	0.13	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	0.16	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	<0.06	<0.06	<0.06	0.10	0.20	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.09	<0.08	<0.08	<0.08	<0.08	0.18	0.31	<0.08	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.05	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.04	<0.03	<0.03	<0.03	<0.03	0.05	0.13	<0.03	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	<0.03	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.08	0.05	<0.03	<0.03	<0.03	0.17	0.34	0.05	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.08	<0.07	<0.07	<0.07	<0.07	0.15	0.29	0.08	mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.33	0.09	<0.08	<0.08	<0.08	0.96	2.14	0.15	mg/kg	A-T-019s

Envirolab Job Number: 19/01457

Client Project Name: Harborough Hill Road, Barnsley

Client Project Ref: P18-01848

Lab Sample ID	19/01457/1	19/01457/2	19/01457/3	19/01457/4	19/01457/5	19/01457/6	19/01457/7	19/01457/8	Units	Method ref
Client Sample No	1	2	3	4	5	7	8	9		
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP07	TP08	TP09		
Depth to Top	0.5	0.3	0.4	0.25	0.25	0.6	0.4	0.2		
Depth To Bottom										
Date Sampled	11-Feb-19	11-Feb-19	11-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	12-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	4ABE	4ABE	4A	4AB	4AB	5AB	4AB	4A		
TPH CWG										
Ali >C5-C6$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C6-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C8-C10$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C10-C12$_A^\#$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Ali >C12-C16$_A^\#$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Ali >C16-C21$_A^\#$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C5-C7$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C7-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C8-C9$_A^\#$	0.05	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C9-C10$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C10-C12$_A^\#$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C12-C16$_A^\#$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
BTEX - Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - Toluene$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - m & p Xylene$_A^\#$	0.05	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - o Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
MTBE$_A^\#$	<0.01	<0.01	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s

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Lab Sample ID	19/01457/9	19/01457/10	19/01457/11	19/01457/12	19/01457/13	19/01457/14	19/01457/15	19/01457/16	Units	Method ref
Client Sample No	9b	10	10b	SP01	SP02	SP03	SP03b	SP04		
Client Sample ID	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04		
Depth to Top	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3		
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Solid		
Sample Matrix Code	4A	4AB	4AB	4AB	7	4AE	4ABE	7		
% Stones >10mm$_A$	33.3	26.9	18.3	30.9	<0.1	40.6	34.9	<0.1	% w/w	A-T-044
Arsenic$_D^{M\#}$	<1	<1	<1	<1	1	2	2	<1	mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	0.7	<0.5	<0.5	0.7	0.5	0.7	1.0	mg/kg	A-T-024s
Copper$_D^{M\#}$	3	9	7	6	13	26	33	14	mg/kg	A-T-024s
Chromium$_D^{M\#}$	4	6	7	4	5	14	15	10	mg/kg	A-T-024s
Lead$_D^{M\#}$	5	29	23	21	25	331	309	63	mg/kg	A-T-024s
Mercury$_D$	<0.17	0.37	0.45	0.48	0.36	<0.17	<0.17	0.43	mg/kg	A-T-024s
Nickel$_D^{M\#}$	7	5	5	3	3	16	10	5	mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	1	<1	<1	<1	<1	<1	1	mg/kg	A-T-024s
Zinc$_D^{M\#}$	11	67	60	53	92	260	354	110	mg/kg	A-T-024s

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Lab Sample ID	19/01457/9	19/01457/10	19/01457/11	19/01457/12	19/01457/13	19/01457/14	19/01457/15	19/01457/16	Units	Method ref
Client Sample No	9b	10	10b	SP01	SP02	SP03	SP03b	SP04		
Client Sample ID	TP09	TP10	TP10	SP01	SP02	SP03	SP03	SP04		
Depth to Top	0.4	0.2	0.4	0.2	0.3	0.3	0.8	0.3		
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Solid		
Sample Matrix Code	4A	4AB	4AB	4AB	7	4AE	4ABE	7		
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	0.02	0.02	<0.01	<0.10	<0.10	0.40	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.10	0.01	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	0.04	<0.02	<0.02	<0.20	<0.20	0.55	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	0.14	<0.04	<0.04	<0.40	<0.40	1.32	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	0.10	<0.04	<0.04	<0.40	<0.40	0.85	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05	0.14	0.06	<0.05	<0.50	<0.50	1.20	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	0.06	0.08	<0.05	<0.50	0.62	0.66	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.70	<0.70	0.39	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	0.15	0.09	<0.06	<0.60	<0.60	1.33	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.40	<0.40	0.17	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	0.28	0.09	<0.08	<0.80	<0.80	2.71	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	0.02	<0.01	<0.01	<0.10	<0.10	0.29	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	0.07	0.06	<0.03	0.37	0.53	0.76	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	0.04	<0.03	<0.03	<0.03	<0.30	<0.30	0.56	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	0.06	0.17	0.08	<0.03	<0.30	<0.30	1.84	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	0.22	0.12	<0.07	<0.70	<0.70	2.81	mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	0.10	1.41	0.60	<0.08	<0.80	1.15	15.8	mg/kg	A-T-019s

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Lab Sample ID	19/01457/17	19/01457/18	19/01457/19	19/01457/20	19/01457/21	19/01457/22	19/01457/23	19/01457/24	Units	Method ref
Client Sample No	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12		
Client Sample ID	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12		
Depth to Top	0.3	0.3	0.4	0.4	0.3	0.2	0.3	0.4		
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19		
Sample Type	Solid	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	7	7	4AB	4AB	4AB	4AB	4ABE	4AB		
% Stones >10mm$_A$	<0.1	<0.1	33.9	26.0	25.6	30.7	32.9	27.2	% w/w	A-T-044
Arsenic$_D^{M\#}$	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-024s
Cadmium$_D^{M\#}$	0.6	<0.5	<0.5	<0.5	<0.5	0.6	0.5	<0.5	mg/kg	A-T-024s
Copper$_D^{M\#}$	7	9	5	4	4	3	7	5	mg/kg	A-T-024s
Chromium$_D^{M\#}$	5	6	5	5	4	3	5	3	mg/kg	A-T-024s
Lead$_D^{M\#}$	26	24	15	12	11	13	20	18	mg/kg	A-T-024s
Mercury$_D$	0.53	0.61	<0.17	0.21	<0.17	0.35	0.34	0.40	mg/kg	A-T-024s
Nickel$_D^{M\#}$	5	3	5	5	6	4	3	3	mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	1	<1	<1	<1	<1	1	<1	mg/kg	A-T-024s
Zinc$_D^{M\#}$	66	68	31	26	26	39	58	45	mg/kg	A-T-024s

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Lab Sample ID	19/01457/17	19/01457/18	19/01457/19	19/01457/20	19/01457/21	19/01457/22	19/01457/23	19/01457/24	Units	Method ref
Client Sample No	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12		
Client Sample ID	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12		
Depth to Top	0.3	0.3	0.4	0.4	0.3	0.2	0.3	0.4		
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19		
Sample Type	Solid	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES		
Sample Matrix Code	7	7	4AB	4AB	4AB	4AB	4ABE	4AB		
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	1.00	0.01	<0.01	0.02	0.07	<0.01	<0.01	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	1.59	<0.02	<0.02	0.03	0.09	<0.02	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	3.26	<0.04	<0.04	0.12	0.19	<0.04	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	2.09	<0.04	<0.04	0.08	0.20	<0.04	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	2.35	<0.05	<0.05	0.11	0.26	<0.05	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.08	1.26	0.06	<0.05	0.06	0.12	0.05	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	0.81	<0.07	<0.07	<0.07	0.09	<0.07	<0.07	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	2.63	<0.06	<0.06	0.12	0.19	<0.06	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	0.32	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	6.50	<0.08	<0.08	0.22	0.35	<0.08	<0.08	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	0.75	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.04	1.56	0.04	<0.03	0.06	0.14	0.04	<0.03	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	1.04	<0.03	<0.03	0.04	0.05	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	4.93	0.04	<0.03	0.20	0.31	<0.03	<0.03	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	5.56	<0.07	<0.07	0.19	0.30	<0.07	<0.07	mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.12	35.7	0.15	<0.08	1.25	2.41	0.09	<0.08	mg/kg	A-T-019s

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Lab Sample ID	19/01457/25	19/01457/26	19/01457/27	19/01457/28	19/01457/29	19/01457/30			Units	Method ref
Client Sample No	SP13	SP14	SP15	SP16	SP17	SP18				
Client Sample ID	SP13	SP14	SP15	SP16	SP17	SP18				
Depth to Top	0.3	0.3	0.4	0.3	0.4	0.5				
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AB	4AB	4ABE	4AB	4ABE	4AB				
% Stones >10mm$_A$	18.9	21.5	38.7	26.8	13.9	41.1			% w/w	A-T-044
Arsenic$_D^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			mg/kg	A-T-024s
Copper$_D^{M\#}$	4	5	4	4	4	4			mg/kg	A-T-024s
Chromium$_D^{M\#}$	6	5	3	6	3	4			mg/kg	A-T-024s
Lead$_D^{M\#}$	20	17	13	15	20	8			mg/kg	A-T-024s
Mercury$_D$	0.48	0.49	0.26	0.38	0.28	<0.17			mg/kg	A-T-024s
Nickel$_D^{M\#}$	3	2	4	3	3	5			mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	1	1	2	<1			mg/kg	A-T-024s
Zinc$_D^{M\#}$	58	45	45	40	53	21			mg/kg	A-T-024s

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Client Project Ref: P18-01848

Lab Sample ID	19/01457/25	19/01457/26	19/01457/27	19/01457/28	19/01457/29	19/01457/30			Units	Method ref
Client Sample No	SP13	SP14	SP15	SP16	SP17	SP18				
Client Sample ID	SP13	SP14	SP15	SP16	SP17	SP18				
Depth to Top	0.3	0.3	0.4	0.3	0.4	0.5				
Depth To Bottom										
Date Sampled	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AB	4AB	4ABE	4AB	4ABE	4AB				
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.02	<0.01	<0.01	0.06	0.02	<0.01			mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.03	<0.02	<0.02	0.06	0.03	<0.02			mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	0.15	0.08	<0.04			mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.09	<0.04	<0.04	0.10	0.09	<0.04			mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.12	<0.05	<0.05	0.15	0.12	<0.05			mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.12	<0.05	<0.05	0.07	0.07	<0.05			mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07			mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	<0.06	0.16	0.09	<0.06			mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.08	<0.08	<0.08	0.32	0.16	<0.08			mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	0.03	0.02	<0.01			mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.10	<0.03	<0.03	0.07	0.08	<0.03			mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	0.08	<0.03	<0.03			mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.05	<0.03	<0.03	0.37	0.15	<0.03			mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.12	<0.07	<0.07	0.27	0.14	<0.07			mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.73	<0.08	<0.08	1.89	1.05	<0.08			mg/kg	A-T-019s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: MET Engineers Ltd, Southgate House, Pontefract Road, Leeds, LS10 1SW

Project No: 19/01457

Date Instructions Received: 15/02/2019 (am)

Project: Harborough Hill Road, Barnsley

Cool Box Temperatures (°C): 14.0, 14.1, 14.0, 14.0

Clients Project No: P18-01848

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

APPENDIX V

TP01 Soakaway Testing Results

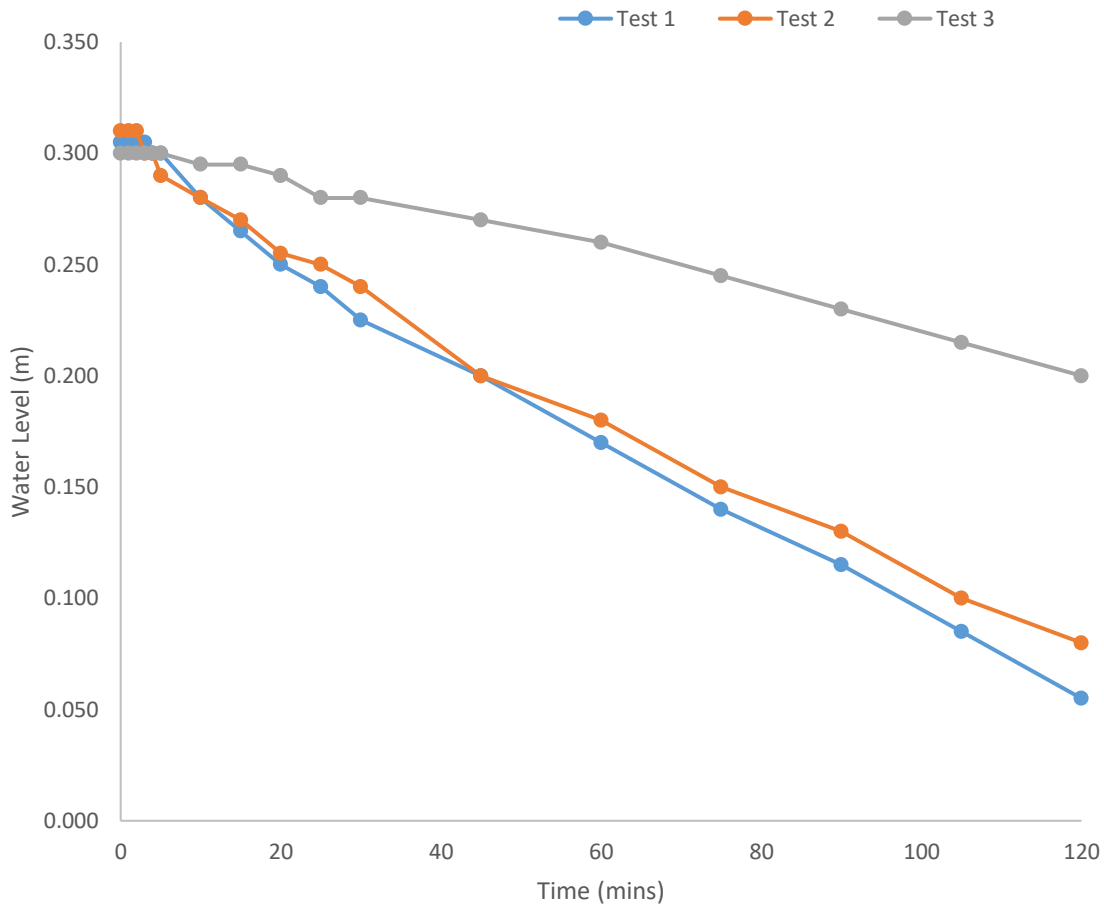
FOUL WATER LOG

Date:	11/02/19 - 12/02/19
Project No.	P18-01848
Project Title:	Harborough Hill Road
Trial Pit No:	1

MET Engineers Ltd.
Southgate House, Pontefract Road,
Leeds, W.Yorkshire, LS10 1SW
Tel: 0113 200 8900 Fax: 0113 200 8901
Web: www.metengineers.com

Depth Of Trial Pit (m)	1.6
Depth of Water Test (m)	0.3
Width Of Water Test (m)	0.7
Length of Water Test (m)	2.5

	Water Level (m)		
Mins	Test 1	Test 2	Test 3
0	0.305	0.310	0.300
1	0.305	0.310	0.300
2	0.305	0.310	0.300
3	0.305	0.300	0.300
4	0.300	0.300	0.300
5	0.300	0.290	0.300
10	0.280	0.280	0.295
15	0.265	0.270	0.295
20	0.250	0.255	0.290
25	0.240	0.250	0.280
30	0.225	0.240	0.280
45	0.200	0.200	0.270
60	0.170	0.180	0.260
75	0.140	0.150	0.245
90	0.115	0.130	0.230
105	0.085	0.100	0.215
120	0.055	0.080	0.200



	Test 1	Test 2	Test 3
Start Water Depth (m)	0.305	0.310	0.300
Start time (mins)	0	0	0
Finish Water depth (mbgl)	0.055	0.080	0.200
Finish time (mins)	120	120	120
Effective Area at 50% (m^2)	2.71	1.96	1.96
Effective time (mins)	80	85	250
Effective Volume (m^3)	0.21875	0.20125	0.0875
Permeability Coefficient " f "	1.68E-05	2.01E-05	2.98E-06

Average Coefficient of Permeability	1.33E-05

Appendix K – Drainage Management Plan

HL Structural Engineers

Drainage Maintenance Plan

Project: Barnsley Youth Zone

Client: Barnsley Youth Zone

Job No: 777

Report Reference: BAR-HLE-XX-XX- RP-C-00002

DOCUMENT ISSUE HISTORY

Revision	Date Issued	Author	Checker	Approver
P1	30.12.21	Nick Holt MEng CEng MICE MIStructE	Nick Holt MEng CEng MICE MIStructE	Nick Holt MEng CEng MICE MIStructE

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DRAINAGE MAINTENANCE SCHEDULES 2

APPENDIX A – DRAINAGE MAINTENANCE SCHEDULES 1

INTRODUCTION

This document has been prepared to provide details of the operation and maintenance requirements for the proposed drainage system for the Barnsley Youth Zone in Barnsley.

The purpose of the Drainage Maintenance Plan is to mitigate the onsite and offsite risk of flooding and to manage pollution discharge into the Public Sewers for the lifetime of the development.

This Document should be read in conjunction with the following documents:

- SUSTAINABLE DRAINAGE STRATEGY & FLOOD RISK ASSESSMENT REPORT

This document must be revised at completion of the works to take into consideration specific requirements from drainage product suppliers to be included in the Operation and Maintenance Manual and the Health and Safety File to be prepared by the Contractor.

This Drainage Maintenance Plan applies to the proposed private Surface Water and Foul Water Drainage Networks as described in the above report.

DRAINAGE COMPONENTS

The proposed Youth Zone contains the following Drainage Elements that will require operation and maintenance throughout the lifetime of the development.

Surface Water System	Foul Water System
Roofs, External Hard Pavements and Landscaping	Above Ground Drainage
Gutters and Rain Water Pipes	Inspection Chambers
Channel Drains and Gullies	Below Ground Pipes
Inspection Chambers	
Below Ground Pipes	
Attenuation Tank	
Flow Control Manholes	
Vortex Separator (or Similar)	

MAINTENANCE BODY

The Youth Zone maintenance and operations will be the responsibility of the charity Barnsley Youth Zone staff that will look after the maintenance of not just the drainage system but all aspects of the site.

The operation of the Youth Zone will be funded from multiple revenue streams including user contributions, council funding, grant funding and charitable donations.

HEALTH AND SAFETY

The Youth Zone will carry out a specific risk assessment and method statements that will adopt best practice health and safety policies for maintenance of the drainage systems and the personnel carrying out the maintenance operations will be fully trained and qualified to carry out the tasks.

DRAINAGE MAINTENANCE SCHEDULES

It is recommended that each element of the drainage system is maintained in accordance with the regime summarized in the **Drainage Maintenance Schedules** in **Appendix A**.

These Schedules must be revised at completion of the works to take into consideration specific requirements from drainage product suppliers to be included in the Operation and Maintenance Manual and the Health and Safety File to be prepared by the Contractor.

APPENDIX A – DRAINAGE MAINTENANCE SCHEDULES

Drainage Element:	SW - Roofs, External Hard Pavements and Landscaping	
Maintenance Regime	Tasks	Frequency
Regular	Remove all litter and debris from external hard landscaped areas and adjacent landscaping, which may pose a risk blockage to the drainage system	monthly
	Inspect and Remove debris from roofs which may pose a risk blockage to the gutters and drainage systems.	as required
Remedial Action	Carry out repairs to roof when required (e.g replacing loose/ broken roof slates and tiles, corrosion, waterproofing, etc).	

Drainage Element:	SW - Gutters and Rain Water Pipes	
Maintenance Regime	Tasks	Frequency
Regular	Clear leaves and debris from gutters and downpipes regularly , preferably in spring and autumn after blossom and leaf fall. More frequent attention may be needed if the building is surrounded by trees or perched upon by pigeons	6 months
	Inspect gutters and downpipes for signs of damage by frost/corrosion. Check if gutters slope the wrong way (i.e. away from the outlet) or if gutters allow water to overflow over the wall surface. Carry out repairs if required	
Remedial Action	Inspect and check the fixings for downpipes and gutters. If loose carry out repairs.	

Drainage Element:	SW - Channel Drains and Gullies	
Maintenance Regime	Tasks	Frequency
Regular	Visual inspections to pay particular attention to: signs of damage of gratings, covers and locking systems.	6 months
	Clear leaves and debris from channel drains and sumps. Gratings to be removed to carry out the task.	

Drainage Element:	SW and FW - Inspection Chambers	
Maintenance Regime	Tasks	Frequency
Regular	Open Covers and inspect for signs of damage. Carry out repairs if required.	6 months
	Open Covers and inspect for signs of debris/sediment in the drainage system. If debris/sediment is found in inspection chambers carry out inspection of drainage pipe network	

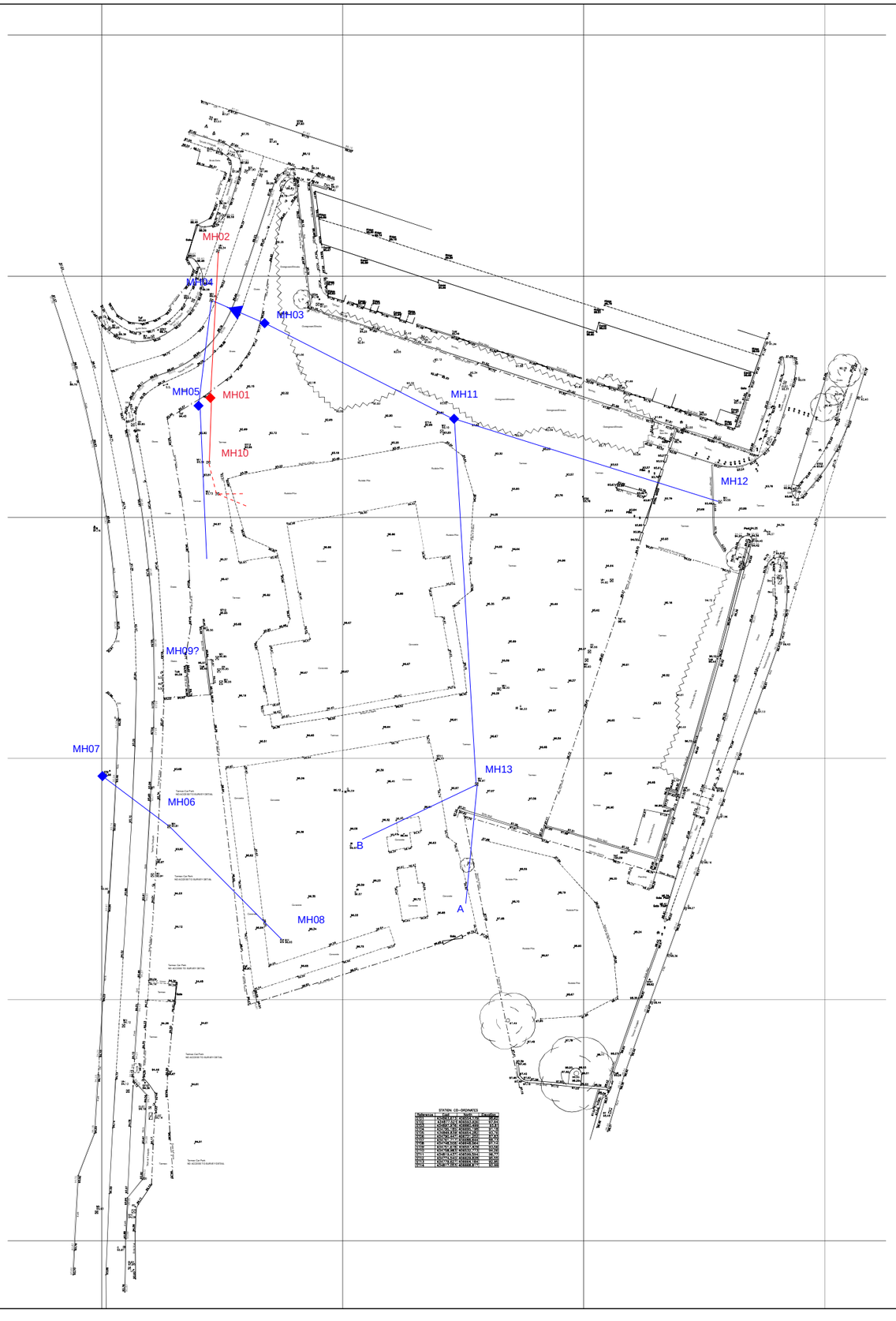
Drainage Element:	SW and FW -Below Ground Pipes	
Maintenance Regime	Tasks	Frequency
Remedial Action	In the event of flooding/ponding carry out CCTV Survey of pipework for signs of damage/blockge. Remove debris using rod or jet-wash system and carry out repairs to pipework if required.	as required

Drainage Element:	SW - Attenuation Tank	
Maintenance Regime	Tasks	Frequency
Regular	Open Upstream and Downstream Catchpit Covers and inspect for signs of debris/sediment in the sumps. If debris/sediment is found in the sumps carry out inspection of attenuation tank using CCTV Survey. Remove debris/sediment if required	6 months and after big storm event
	Carry out CCTV Survey to inspect tank for signs of damage. Carry out repairs if required.	yearly

Drainage Element:	SW - Flow Control Manholes	
Maintenance Regime	Tasks	Frequency
Regular	Open Covers and inspect for signs of damage. Carry out repairs if required.	6 months and after big storm event
	Open Covers and inspect for signs of debris/sediment in the sump. If debris/sediment is found in inspection chambers carry out inspection of drainage pipe network and attenuation tank (see schedule)	

Drainage Element:	FW- Above Ground Drainage	
Maintenance Regime	Tasks	Frequency
Regular	Carry out visial inspect for signs of damage or leaks in the system. Carry out repairs if required.	6 months
Remedial Action	In the event of flooding/ponding inspect for signs of damage/blockge. Remove debris using rod system and carry out repairs to pipework if required.	as required

Appendix L – Drainage CCTV Survey



N

Abbreviation & Symbol Key.

B	Bollard	RSC	Rolled Steel Column
BB	Belisha Beacon	RSJ	Rolled Steel Joist
BT	British Telecom Cover	RWP	Rain Water Pipe
BM	Bench Mark	SC	Stop Cock
CL	Cover Level	SP	Sign Post
DK	Drop Kerb	STP	Stand Pipe
EL	Electricity Cover	SV	Stop Valve
EP	Electricity Pole	SVP	Soil Vent Pipe
FH	Fire Hydrant	SWG	Storm Water Gully
FFP	Flagged Footpath	SW	Storm water
G	Gully	TFP	Tarmac Footpath
GM	Gas Meter	TL	Traffic Light
GV	Gas Valve	TP	Telegraph Pole
IC	Inspection Cover	UTL	Unable To Lift
IL	Invert Level	VP	Vent Pipe
LB	Letter Box	WM	Water Meter
LP	Lamp Post	WP	Waste Pipe
MB	Multi Bole		
MH	Man Hole	Fences & Walls	
Mkr	Marker Post	Ret	Retaining Wall
MS	Mile Stone	B/W	Barbed Wire
CATV	Cable Telecommunications	C/B	Close Boarded
NB	Notice Board	C/I	Corrugated Iron
NFI	No Further Information	C/L	Chain Link
OSBM	Ordnance Survey BM	C/P	Chestnut Paling
P	Post	I/R	Iron Railing
PB	Post Box	Lat	Lattice
RE	Rodding Eye	P/C	Post & Chain
RL	RootLine	P/R	Post & Rail
RS	Road Sign	P/W	Post & Wire
SS	Street Name Sign		
N/S	Non Slip Paving	Trees	
		0.25/10/10/Syc	
		Diameter/Height/Spread/Species	

General

Details or services hidden or obscured by vegetation, debris or vehicles at survey dates may be omitted. Hedge & Vegetation details are outline

Control & Datum Information

Grid - Station ST01 Coordinates are OS GPS RTK
All other Stations are relative to this in Plane Grid Projection and Grid North

Datum - Station ST01 datum is OS GPS RTK
All other Stations are relative to this in Plane Grid Projection

OS Grid @ 50m to cover Site

Revision	Description	By	Date

Surv.	Drawn	Date	Chkd	Date	Appr'd	Date
GH/KH	GH/SH	20/11/18	SH	21/11/18		

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Client.

NPS Group

Title. SITE PLAN

Site. Land off
Schwabisch Gmund Way
Barnsley

H SURVEYS LTD
41 Brampton Crescent
Wombwell
Barnsley
Yorkshire S73 0SZ
T: 01226 734099 , E: stephen@hhsurveys.co.uk
Web: hh-surveys.com

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Dwg No. NPS/349/SP-2D

Sheet No.

SCALE	1/500	REV.	

UNDERGROUND SURVEYS UK LTD
UNIT CG17 & 18 WARRINGTON BUSINESS PARK, WARRINGTON
Tel. 01925444664
INFO@UNDERGROUNDSURVEYS.CO.UK

Project

Project Name:	14429 SURVEY OPS BARNSLEY
Project Description:	CCTV Drainage Inspection Report
Project Number:	14429
Project Date:	02/11/2021
Inspection Standard:	MSCC5 Sewers & Drainage GB (SRM5 Scoring)

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Project Information

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Client

Company: Survey Operations
Contact: Ian Thompson
Street: Smith Street
Town or City: Skemersdale
Post Code: WN8 8LN

Site

Company: Site Address
Department: Barnsley Youth Zone
Town or City: Barnsley
Post Code: S71 1AY

Contractor

Company: UNDERGROUND SURVEYS UK LTD
Contact: KELLY RICHARDSON
Department: DIRECTOR
Street: UNIT CG17 & 18 WARRINGTON BUSINESS PARK
Town or City: WARRINGTON
County: CHESHIRE
Post Code: WA28TX
Phone: 01925444664
Email: INFO@UNDERGROUNDSURVEYS.CO.UK

UNDERGROUND SURVEYS UK LTD
UNIT CG17 & 18 WARRINGTON BUSINESS PARK, WARRINGTON
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Scoring Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Structural Defects

Grade 3: Best practice suggests consideration should be given to repairs in the medium term.

Grade 4: Best practice suggests consideration should be given to repairs to avoid a potential collapse.

Grade 5: Best practice suggests that this pipe is at risk of collapse at any time. Urgent consideration should be given to repairs to avoid total failure.

Section	PLR	Grade	Description
4	MH06X	4	Fractures, multiple from 12 o'clock to 12 o'clock
7	MH09X	4	Multiple defects
9	MH12X	4	Multiple defects

Service / Operational Condition

Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.

Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.

Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Section	PLR	Grade	Description
1	MH01X	3	Multiple defects
3	MH05X	3	Multiple defects
4	MH06X	3	Settled deposits, coarse, 5% cross-sectional area loss
6	MH08X	3	Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss
7	MH09X	2	Multiple defects
9	MH12X	3	Multiple defects
10	MH13X	5	Roots, mass at joint, 20% cross-sectional area loss
11	MH11X	5	Roots, mass at joint, 20% cross-sectional area loss
12	MH13AX	4	Multiple defects
13	MH13BX	3	Multiple defects

Abandoned Surveys

Section	PLR	Description
7	MH09X	Survey abandoned
9	MH12X	Survey abandoned
10	MH13X	Survey abandoned
10	MH13X	Survey abandoned
11	MH11X	Survey abandoned
12	MH13AX	Survey abandoned
13	MH13BX	Survey abandoned

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Scoring Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Information

These scoring summaries are based on the SRM grading from the WRc.

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Section Profile

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Circular, 150 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
1	MH01	MH02	02/11/2021	MOTTRAM ROAD	Vitrified clay	28.05 m	28.05 m
4	MH06	MH07	02/11/2021	SCHWABISH GMUND WAY	Vitrified clay	17.80 m	17.80 m
5	MH06A	MH06	02/11/2021	SCHWABISH GMUND WAY	Vitrified clay	0.60 m	0.60 m
6	MH08	MH06	02/11/2021	SCHWABISH GMUND WAY	Vitrified clay	32.48 m	32.48 m
8	MH10	MH01	02/11/2021	LAND OFF HARBOROUGH HILL ROAD	Vitrified clay	13.06 m	13.06 m

Total: 5 Inspections x Circular 150 mm = 91.99 m Total Length and 91.99 m Inspected Length

Circular, 225 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
2	MH03	MH04	02/11/2021	MOTTRAM ROAD	Vitrified clay	12.42 m	12.42 m
3	MH05	MH04	02/11/2021	MOTTRAM ROAD	Vitrified clay	21.11 m	21.11 m

Total: 2 Inspections x Circular 225 mm = 33.52 m Total Length and 33.52 m Inspected Length

Total: 7 Inspections = 125.51 m Total Length and 125.51 m Inspected Length

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Tel. 01925444664
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Section Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Number of sections	13
Total length of sections	309.46 m
Total length of inspected sections	319.29 m
Total length of abandoned inspections	-9.83 m
Number of abandoned inspections	7
Number of section inspection photos	28
Number of section inspection videos	14
Number of section inspection scans	0
Number of section inclination measurements	0

PLR:	MH01X	**Upstream Node:**	MH01
Inspection Direction:	2	**Downstream Node:**	MH02
Inspected Length:	28.05 m	**Dia/Height:**	150 mm
Total Length:	28.05 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH02
2	0.00	WL	Water level, 5% of the vertical dimension
3	0.02	ING	Ingress of soil from 3 o'clock to 4 o'clock, 5% cross-sectional area loss
4	0.02	ING	Ingress of soil from 7 o'clock to 9 o'clock, 5% cross-sectional area loss
5	9.91	LR	Line deviates right
6	18.83	DEX	Settled deposits, other, 5% cross-sectional area loss
7	25.61	RFJ	Roots, fine at joint
8	26.60	RFJ	Roots, fine at joint
9	28.05	MHF	Finish node, manhole, reference: MH01

PLR:	MH03X	**Upstream Node:**	MH03
Inspection Direction:	2	**Downstream Node:**	MH04
Inspected Length:	12.42 m	**Dia/Height:**	225 mm
Total Length:	12.42 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH04
2	0.00	WL	Water level, 5% of the vertical dimension
3	6.50	RFJ	Roots, fine at joint
4	8.26	RFJ	Roots, fine at joint
5	10.88	RFJ	Roots, fine at joint
6	12.42	MHF	Finish node, manhole, reference: MH03

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Section Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

PLR:	MH05X	**Upstream Node:**	MH05
Inspection Direction:	2	**Downstream Node:**	MH04
Inspected Length:	21.11 m	**Dia/Height:**	225 mm
Total Length:	21.11 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH04
2	0.00	WL	Water level, 5% of the vertical dimension
3	0.70	DES	Settled deposits, fine, 5% cross-sectional area loss, start
4	14.68	DES	Settled deposits, fine, 5% cross-sectional area loss, finish
5	14.68	LR	Line deviates right
6	19.83	RFJ	Roots, fine at joint
7	20.51	DES	Settled deposits, fine, 5% cross-sectional area loss
8	21.11	MHF	Finish node, manhole, reference: MH05

PLR:	MH06X	**Upstream Node:**	MH06
Inspection Direction:	1	**Downstream Node:**	MH07
Inspected Length:	17.80 m	**Dia/Height:**	150 mm
Total Length:	17.80 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH06
2	0.00	WL	Water level, 5% of the vertical dimension
3	0.58	JN	Junction at 2 o'clock, 100mm dia
4	0.60	DER	Settled deposits, coarse, 5% cross-sectional area loss
5	7.77	FM	Fractures, multiple from 12 o'clock to 12 o'clock
6	8.09	JN	Junction at 11 o'clock, 100mm dia
7	17.80	MHF	Finish node, manhole, reference: MH07

PLR:	MH06AX	**Upstream Node:**	MH06A
Inspection Direction:	2	**Downstream Node:**	MH06
Inspected Length:	0.60 m	**Dia/Height:**	150 mm
Total Length:	0.60 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH06
2	0.00	WL	Water level, 5% of the vertical dimension
3	0.60	OCF	Finish node, other special chamber, reference: MH06A

PLR:	MH08X	**Upstream Node:**	MH08
Inspection Direction:	2	**Downstream Node:**	MH06
Inspected Length:	32.48 m	**Dia/Height:**	150 mm
Total Length:	32.48 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH06
2	0.00	WL	Water level, 5% of the vertical dimension
3	31.90	DEE	Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss
4	32.48	MHF	Finish node, manhole, reference: MH08

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Section Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

PLR:	MH09X	**Upstream Node:**	MH09
Inspection Direction:	2	**Downstream Node:**	MH05
Inspected Length:	27.82 m	**Dia/Height:**	225 mm
Total Length:	27.82 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH05
2	0.00	WL	Water level, 5% of the vertical dimension
3	0.70	REM	General remark
4	1.41	JN	Junction at 6 o'clock, 225mm dia
5	2.35	SC	Pipe size changes, new size(s), 150mm high
6	2.57	RFJ	Roots, fine at joint
7	3.73	RFJ	Roots, fine at joint
8	6.78	RFJ	Roots, fine at joint
9	12.96	FM	Fractures, multiple from 3 o'clock to 9 o'clock
10	13.23	H	Hole in drain or sewer from 7 o'clock to 9 o'clock
11	13.23	LL	Line deviates left
12	16.81	RFJ	Roots, fine at joint
13	18.25	JN	Junction at 3 o'clock, 100mm dia
14	18.58	RFJ	Roots, fine at joint
15	21.57	RFJ	Roots, fine at joint
16	25.06	RFJ	Roots, fine at joint
17	27.82	REM	General remark
18	27.82	SA	Survey abandoned

PLR:	MH10X	**Upstream Node:**	MH10
Inspection Direction:	2	**Downstream Node:**	MH01
Inspected Length:	13.06 m	**Dia/Height:**	150 mm
Total Length:	13.06 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH01
2	0.00	WL	Water level, 5% of the vertical dimension
3	0.60	JN	Junction at 6 o'clock, 150mm dia
4	0.60	RFJ	Roots, fine at joint
5	2.80	LL	Line deviates left
6	3.43	RFJ	Roots, fine at joint
7	13.06	MHF	Finish node, manhole, reference: MH10

PLR:	MH12X	**Upstream Node:**	MH12
Inspection Direction:	2	**Downstream Node:**	MH11
Inspected Length:	48.28 m	**Dia/Height:**	225 mm
Total Length:	48.28 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH11
2	0.00	WL	Water level, 5% of the vertical dimension
3	3.50	RFJ	Roots, fine at joint
4	17.42	JN	Junction at 9 o'clock, 100mm dia

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Section Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

No.	m+	Code	Observation
5	17.42	DES	Settled deposits, fine, 5% cross-sectional area loss
6	33.04	JN	Junction at 9 o'clock, 100mm dia
7	33.04	FC	Fracture, circumferential from 4 o'clock to 8 o'clock
8	39.59	JN	Junction at 2 o'clock, 100mm dia
9	44.33	H	Hole in drain or sewer at 10 o'clock
10	45.48	DER	Settled deposits, coarse, 10% cross-sectional area loss
11	45.48	RF	Roots, fine
12	48.28	B	Broken pipe from 1 o'clock to 6 o'clock
13	48.28	SA	Survey abandoned

PLR:	MH13X	**Upstream Node:**	MH13
Inspection Direction:	2	**Downstream Node:**	MH11
Inspected Length:	9.83 m	**Dia/Height:**	225 mm
Total Length:	41.60 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH11
2	0.00	WL	Water level, 5% of the vertical dimension
3	1.22	CXI	Connection defective, connecting pipe is intruding at 1 o'clock, 100mm dia, intrusion: 10%
4	4.55	RFJ	Roots, fine at joint
5	6.12	RFJ	Roots, fine at joint, start
6	9.83	RFJ	Roots, fine at joint, finish
7	9.83	RMJ	Roots, mass at joint, 10% cross-sectional area loss
8	9.83	SA	Survey abandoned

PLR:	MH13X	**Upstream Node:**	MH13
Inspection Direction:	1	**Downstream Node:**	MH11
Inspected Length:	41.60 m	**Dia/Height:**	225 mm
Total Length:	41.60 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH13
2	0.00	WL	Water level, 5% of the vertical dimension
3	17.65	JN	Junction at 3 o'clock, 100mm dia
4	22.75	RFJ	Roots, fine at joint
5	32.81	JN	Junction at 9 o'clock, 100mm dia
6	32.81	SC	Pipe size changes, new size(s), 225mm high
7	34.81	JN	Junction at 3 o'clock, 100mm dia
8	34.81	RFJ	Roots, fine at joint
9	38.06	RFJ	Roots, fine at joint
10	41.34	WL	Water level, 30% of the vertical dimension
11	41.34	DER	Settled deposits, coarse, 20% cross-sectional area loss
12	41.34	RMJ	Roots, mass at joint, 20% cross-sectional area loss
13	41.34	CXI	Connection defective, connecting pipe is intruding at 10 o'clock, 100mm dia, intrusion: 10%
14	41.60	SA	Survey abandoned

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Section Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

PLR:	MH11X	**Upstream Node:**	MH11
Inspection Direction:	1	**Downstream Node:**	MH03
Inspected Length:	23.60 m	**Dia/Height:**	225 mm
Total Length:	23.60 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH11
2	0.00	WL	Water level, 5% of the vertical dimension
3	8.98	JN	Junction at 3 o'clock, 100mm dia
4	16.99	RFJ	Roots, fine at joint
5	23.20	WL	Water level, 20% of the vertical dimension
6	23.20	RMJ	Roots, mass at joint, 20% cross-sectional area loss
7	23.60	SA	Survey abandoned

PLR:	MH13AX	**Upstream Node:**	MH13A
Inspection Direction:	2	**Downstream Node:**	MH13
Inspected Length:	15.11 m	**Dia/Height:**	150 mm
Total Length:	15.11 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH13
2	0.00	WL	Water level, 5% of the vertical dimension
3	2.69	LR	Line deviates right
4	4.49	DES	Settled deposits, fine, 30% cross-sectional area loss
5	6.09	JN	Junction at 9 o'clock, 100mm dia
6	6.09	DER	Settled deposits, coarse, 20% cross-sectional area loss
7	11.47	DES	Settled deposits, fine, 10% cross-sectional area loss
8	15.11	DEE	Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss
9	15.11	SA	Survey abandoned

PLR:	MH13BX	**Upstream Node:**	MH13B
Inspection Direction:	2	**Downstream Node:**	MH13
Inspected Length:	27.54 m	**Dia/Height:**	150 mm
Total Length:	27.53 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: MH13
2	0.00	WL	Water level, 5% of the vertical dimension
3	3.31	DER	Settled deposits, coarse, 10% cross-sectional area loss
4	7.82	JN	Junction at 3 o'clock, 100mm dia
5	10.53	RFJ	Roots, fine at joint
6	10.53	CN	Connection other than junction at 10 o'clock, 100mm dia
7	13.21	JN	Junction at 3 o'clock, 100mm dia
8	13.21	RF	Roots, fine
9	19.94	JN	Junction at 3 o'clock, 100mm dia
10	19.94	RF	Roots, fine
11	23.06	DES	Settled deposits, fine, 10% cross-sectional area loss, start
12	23.06	RF	Roots, fine
13	26.74	JN	Junction at 3 o'clock, 150mm dia

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Section Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

No.	m+	Code	Observation
14	27.29	DES	Settled deposits, fine, 10% cross-sectional area loss, finish
15	27.53	SA	Survey abandoned

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Project Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	MH01X	MH01	MH02	Mottram Road	Barnsley	F	VC	Circular 150mm	28.05 m
2	SEC	MH03X	MH03	MH04	Mottram Road	Barnsley	S	VC	Circular 225mm	12.42 m
3	SEC	MH05X	MH05	MH04	Mottram Road	Barnsley	S	VC	Circular 225mm	21.11 m
4	SEC	MH06X	MH06	MH07	Schwabish Gmund Way	Barnsley	S	VC	Circular 150mm	17.80 m
5	SEC	MH06AX	MH06A	MH06	Schwabish Gmund Way	Barnsley	S	VC	Circular 150mm	0.60 m
6	SEC	MH08X	MH08	MH06	Schwabish Gmund Way	Barnsley	S	VC	Circular 150mm	32.48 m
7	SEC	MH09X	MH09	MH05	Land Off Harborough Hill Road	Barnsley	S	VC	Circular 225mm	27.82 m
8	SEC	MH10X	MH10	MH01	Land Off Harborough Hill Road	Barnsley	F	VC	Circular 150mm	13.06 m
9	SEC	MH12X	MH12	MH11	Land Off Harborough Hill Road	Barnsley	F	VC	Circular 225mm	48.28 m
10	SEC	MH13X	MH13	MH11	Land Off Harborough Hill Road	Barnsley	F	VC	Circular 225mm	41.60 m
11	SEC	MH11X	MH11	MH03	Land Off Harborough Hill Road	Barnsley	S	VC	Circular 225mm	23.60 m
12	SEC	MH13AX	MH13A	MH13	Land Off Harborough Hill Road	Barnsley	S	VC	Circular 150mm	15.11 m
13	SEC	MH13BX	MH13B	MH13	Land Off Harborough Hill Road	Barnsley	S	VC	Circular 150mm	27.53 m
									Total:	**309.46 m**

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Project Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Pipe Levels

No.	PLR	Upstream Node	Upstream C.L.	Upstream I.L.	Upstream I.D.	Downstream Node	Downstream C.L.	Downstream I.L.	Downstream I.D.
1	MH01X	MH01			0.000 m	MH02			2.000 m
2	MH03X	MH03			0.000 m	MH04			0.000 m
3	MH05X	MH05			0.000 m	MH04			1.500 m
4	MH06X	MH06			1.350 m	MH07			2.300 m
5	MH06AX	MH06A			0.000 m	MH06			1.350 m
6	MH08X	MH08			0.000 m	MH06			1.350 m
7	MH09X	MH09			0.000 m	MH05			4.800 m
8	MH10X	MH10			0.000 m	MH01			5.300 m
9	MH12X	MH12			0.000 m	MH11			0.000 m
10	MH13X	MH13			0.000 m	MH11			0.800 m
11	MH11X	MH11			0.800 m	MH03			3.600 m
12	MH13AX	MH13A			0.000 m	MH13			0.000 m
13	MH13BX	MH13B			0.000 m	MH13			0.000 m

Pipe Summary by Profile

Profile		Total Length	No. Pipes
Circular 150mm		28.05 m	
Circular 150mm		17.80 m	
Circular 150mm		0.60 m	
Circular 150mm		32.48 m	
Circular 150mm		13.06 m	
Circular 150mm		15.11 m	
Circular 150mm		27.53 m	
Circular 150mm	=	134.63 m	7
Circular 225mm		12.42 m	
Circular 225mm		21.11 m	
Circular 225mm		27.82 m	
Circular 225mm		48.28 m	
Circular 225mm		41.60 m	
Circular 225mm		23.60 m	
Circular 225mm	=	174.82 m	6

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Project Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Profile		Total Length	No. Pipes
Total	=	**309.46 m**	**13**

Inspection Summary

Pipe No.	Insp. No.	Upstream Node	Downstream Node	Dir.	Operator	Insp. Date	Insp. Time	Str	Ser	Final Observation	Length
1	1	MH01	MH02	US	Pk	02/11/2021	8:12	1	4	MHF	28.05 m
2	1	MH03	MH04	US	Pk	02/11/2021	8:32	1	2	MHF, NO COVER ON MANHOLE	12.42 m
3	1	MH05	MH04	US	Pk	02/11/2021	8:40	1	3	MHF	21.11 m
4	1	MH06	MH07	DS	Pk	02/11/2021	9:31	4	3	MHF	17.80 m
5	1	MH06A	MH06	US	Pk	02/11/2021	9:38	1	1	OCF, CAPPED	0.60 m
6	1	MH08	MH06	US	Pk	02/11/2021	9:39	1	3	MHF, FILLED WITH DEBRIS	32.48 m
7	**1**	**MH09**	**MH05**	**US**	**Pk**	**02/11/2021**	**10:11**	**4**	**5**	**SA, HARD TO PUSH RODS**	**27.82 m**
8	1	MH10	MH01	US	Pk	02/11/2021	10:31	1	2	MHF	13.06 m
9	**1**	**MH12**	**MH11**	**US**	**Pk**	**02/11/2021**	**11:55**	**4**	**3**	**SA, DUE TO DER**	**48.28 m**
10	**1**	**MH13**	**MH11**	**US**	**Pk**	**02/11/2021**	**12:05**	**1**	**5**	**SA, DUE TO RMJ**	**9.83 m**
10	**2**	**MH13**	**MH11**	**DS**	**Pk**	**02/11/2021**	**12:50**	**1**	**5**	**SA, DUE TO DER RM**	**41.60 m**
11	**1**	**MH11**	**MH03**	**DS**	**Pk**	**02/11/2021**	**12:12**	**1**	**5**	**SA, DUE TO RMJ**	**23.60 m**
12	**1**	**MH13A**	**MH13**	**US**	**Pk**	**02/11/2021**	**13:02**	**1**	**4**	**SA, DUE TO DEE**	**15.11 m**
13	**1**	**MH13B**	**MH13**	**US**	**Pk**	**02/11/2021**	**13:13**	**1**	**3**	**SA, DUE TO DES**	**27.54 m**
										Total:	**319.29 m**

Inspection Summary by Profile

Profile		Total Length	No. Inspections
Circular 150mm		28.05 m	
Circular 150mm		17.80 m	
Circular 150mm		0.60 m	
Circular 150mm		32.48 m	
Circular 150mm		13.06 m	
Circular 150mm		15.11 m	
Circular 150mm		27.54 m	
Circular 150mm	=	134.64 m	7

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Project Summary

Project Name	Project Number	Project Date
14429 SURVEY OPS BARNSLEY	14429	02/11/2021

Profile		Total Length	No. Inspections
Circular 225mm		12.42 m	
Circular 225mm		21.11 m	
Circular 225mm		27.82 m	
Circular 225mm		48.28 m	
Circular 225mm		9.83 m	
Circular 225mm		41.60 m	
Circular 225mm		23.60 m	
Circular 225mm	=	184.66 m	7
Total	**=**	**319.29 m**	**14**

Defect Summary

				CCTV Drainage Survey Observation Count																			
				General				Structural Condition									Service Condition							
Sect. No.	Insp. No.	Upstream Node	Downstream Node	Insp. Length (m)	No. Grade 4/5 Obs.	Survey Abandoned	Camera Under Water	Cracks	Fractures	Broken	Deformed	Collapsed	Holes	Surface Damage	Displaced Joints	Open Joints	Roots	Infiltration	Encrustation	Silt	Grease	Obstruction	Water Level	Line Deviates
1	1	MH01	MH02	28.0													2						1	1
2	1	MH03	MH04	12.4													3						1	
3	1	MH05	MH04	21.1													1			3			1	1
4	1	MH06	MH07	17.8	1				1														1	
5	1	MH06A	MH06	0.6																			1	
6	1	MH08	MH06	32.5															1				1	
7	**1**	**MH09**	**MH05**	**27.8**	**2**	**1**			**1**				**1**				**7**						**1**	**1**
8	1	MH10	MH01	13.1													2						1	1
9	**1**	**MH12**	**MH11**	**48.3**	**2**	**1**			**1**	**1**			**1**				**2**			**1**			**1**	
10	**1**	**MH13**	**MH11**	**9.8**		**1**											**4**						**1**	
10	**2**	**MH13**	**MH11**	**41.6**	**1**	**1**											**4**						**2**	
11	**1**	**MH11**	**MH03**	**23.6**	**1**	**1**											**2**						**2**	
12	**1**	**MH13A**	**MH13**	**15.1**	**1**	**1**													**1**	**2**			**1**	**1**
13	**1**	**MH13B**	**MH13**	**27.5**		**1**											**4**			**2**			**1**	
			Total:	**319.3**	**8**	**7**			**3**	**1**			**2**				**31**		**2**	**8**			**16**	**5**

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Completed section inspection - 02/11/2021 - MH01X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
1	1	02/11/21	8:12	SURVEY OPS	No Rain Or Snow	No	MH01X

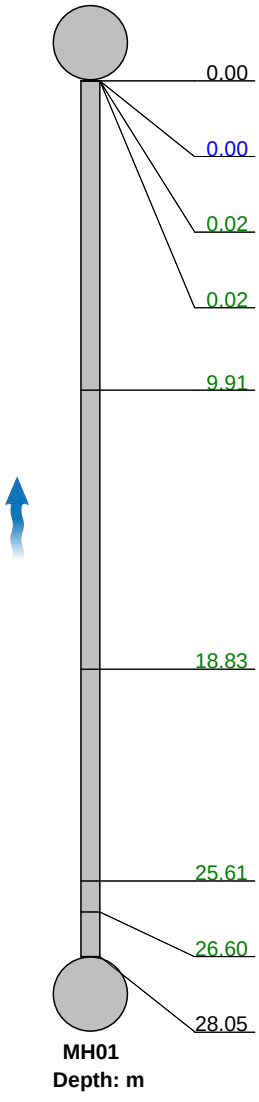
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.60 m	Public Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH01
Road:	Mottram Road	**Inspected Length:**	28.05 m	**Upstream Pipe Depth:**	
Location:	Road	**Total Length:**	28.05 m	**Downstream Node:**	MH02
Surface Type:	Asphalt Highway	**Joint Length:**		**Downstream Pipe Depth:**	2.000 m

Use:	Foul	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	150 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: Repair (incl Patch line)

Scale: 1:242



Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MH02	
0.00	WL	Water level, 5% of the vertical dimension	
0.02	ING	Ingress of soil from 3 o'clock to 4 o'clock, 5% cross-sectional area loss	3
0.02	ING	Ingress of soil from 7 o'clock to 9 o'clock, 5% cross-sectional area loss	3
9.91	LR	Line deviates right: SLIGHT	
18.83	DEX	Settled deposits, other, 5% cross-sectional area loss: FOUL	3
25.61	RFJ	Roots, fine at joint: CIP PATCH REQ	2
26.60	RFJ	Roots, fine at joint: CIP PATCH REQ	2
28.05	MHF	Finish node, manhole, reference: MH01	


RFJ - 25.61 m

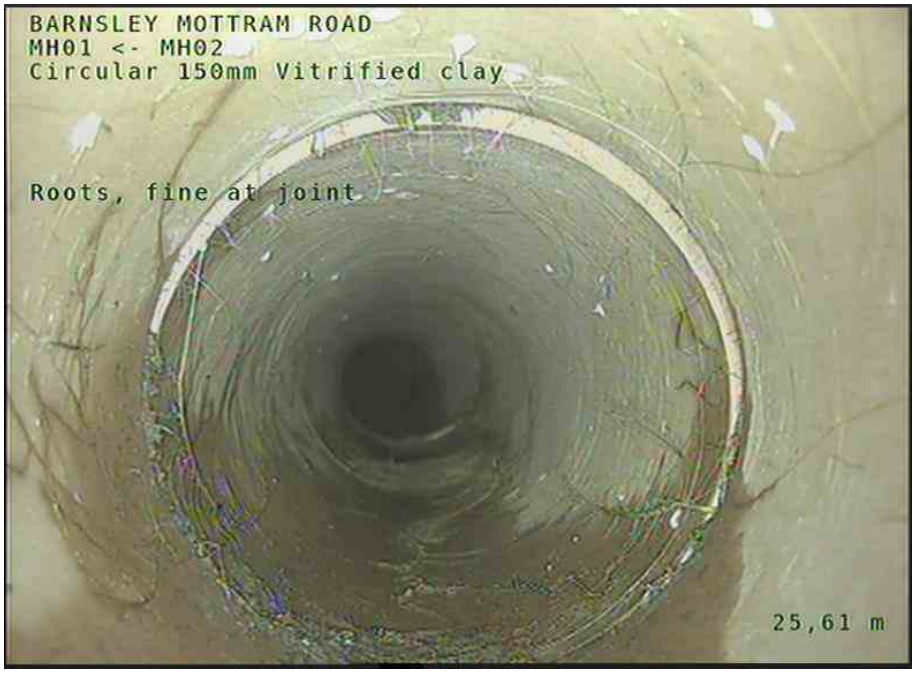

RFJ - 26.60 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	5	8.0	0.5	12.0	4.0

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Section Pictures - 02/11/2021 - MH01X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
1	2	MH01X	SURVEY OPS	14429



1, 00:02:51, 25.61 m
Roots, fine at joint, CIP PATCH REQ



2, 00:03:01, 26.60 m
Roots, fine at joint, CIP PATCH REQ

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Completed section inspection - 02/11/2021 - MH03X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
2	1	02/11/21	8:32	SURVEY OPS	No Rain Or Snow	No	MH03X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.70 m	Public Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH03
Road:	Mottram Road	**Inspected Length:**	12.42 m	**Upstream Pipe Depth:**	
Location:	Road	**Total Length:**	12.42 m	**Downstream Node:**	MH04
Surface Type:	Asphalt Highway	**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:108

Position [m]	Code	Observation	Grade
Depth: m			
MH04			
0.00	MH	Start node, manhole, reference: MH04	
0.00	WL	Water level, 5% of the vertical dimension	
6.50	RFJ	Roots, fine at joint: CIP PATCH REQ	2
8.26	RFJ	Roots, fine at joint: CIP PATCH REQ	2
10.88	RFJ	Roots, fine at joint: CIP PATCH REQ	2
12.42	MHF	Finish node, manhole, reference: MH03: NO COVER ON MANHOLE	
MH03			
Depth: m			


RFJ - 6.50 m


RFJ - 8.26 m


RFJ - 10.88 m

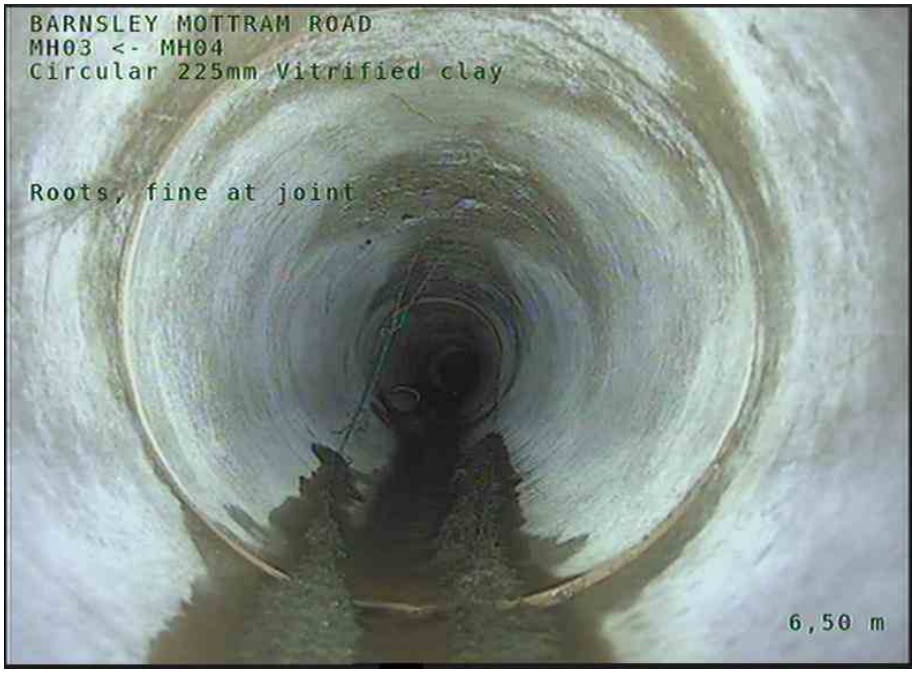

MHF - 12.42 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	3	1.0	0.5	3.0	2.0

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Section Pictures - 02/11/2021 - MH03X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
2	2	MH03X	SURVEY OPS	14429



1, 00:00:40, 6.50 m
Roots, fine at joint, CIP PATCH REQ



2, 00:00:50, 8.26 m
Roots, fine at joint, CIP PATCH REQ

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Section Pictures - 02/11/2021 - MH03X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
2	2	MH03X	SURVEY OPS	14429



3, 00:01:05, 10.88 m
Roots, fine at joint, CIP PATCH REQ



4, 00:01:29, 12.42 m
Finish node, manhole, reference: MH03, NO COVER ON MANHOLE

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Completed section inspection - 02/11/2021 - MH05X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
3	1	02/11/21	8:40	SURVEY OPS	No Rain Or Snow	No	MH05X

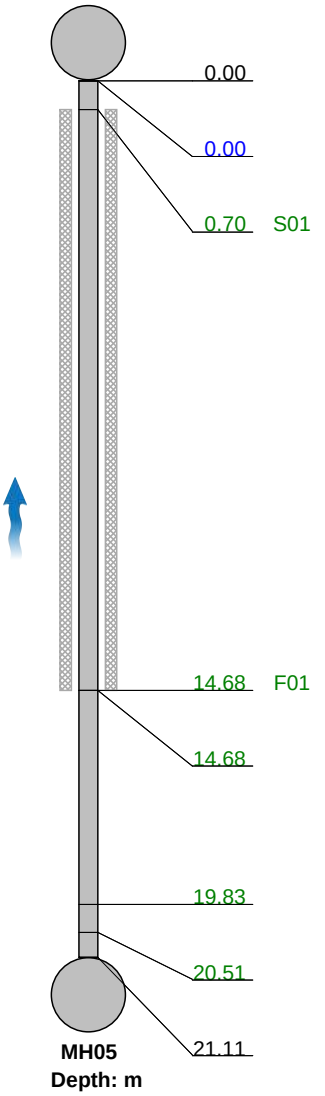
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.70 m	Public Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH05
Road:	Mottram Road	**Inspected Length:**	21.11 m	**Upstream Pipe Depth:**	
Location:	Road	**Total Length:**	21.11 m	**Downstream Node:**	MH04
Surface Type:	Asphalt Highway	**Joint Length:**		**Downstream Pipe Depth:**	1.500 m

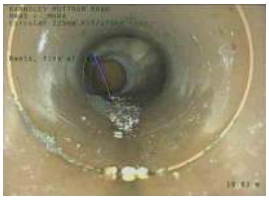
Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:182



Position [m]		Code	Observation	Grade
0.00		MH	Start node, manhole, reference: MH04	
0.00		WL	Water level, 5% of the vertical dimension	
0.70	S01	DES	Settled deposits, fine, 5% cross-sectional area loss, start	
14.68	F01	DES	Settled deposits, fine, 5% cross-sectional area loss, finish	3
14.68		LR	Line deviates right: SLIGHT	
19.83		RFJ	Roots, fine at joint: CIP PATCH REQ	2
20.51		DES	Settled deposits, fine, 5% cross-sectional area loss	3
21.11		MHF	Finish node, manhole, reference: MH05	

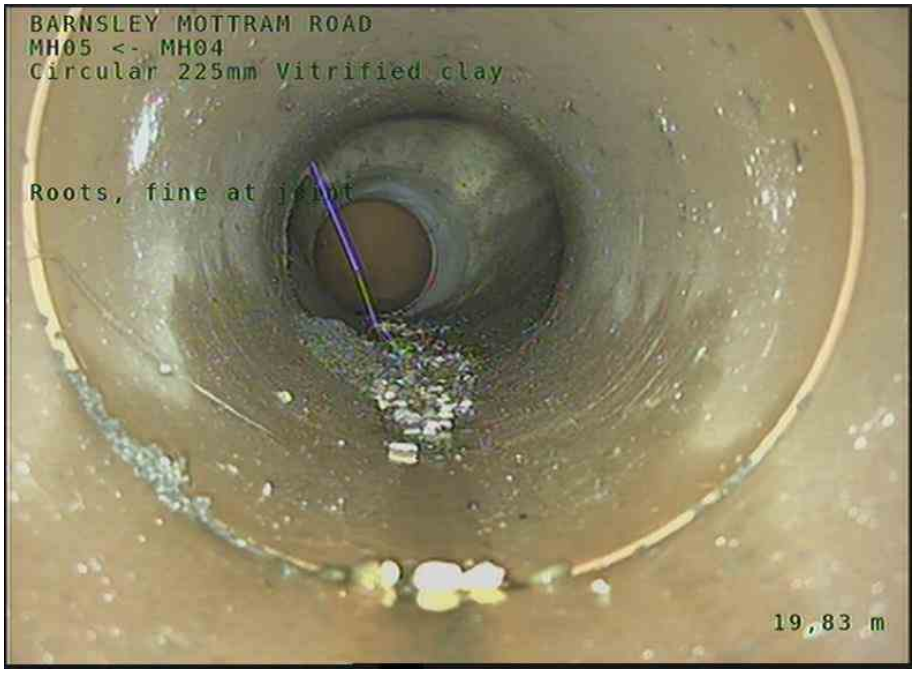

RFJ - 19.83 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	3	2.0	1.6	31.0	3.0

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Section Pictures - 02/11/2021 - MH05X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
3	2	MH05X	SURVEY OPS	14429



1, 00:01:31, 19.83 m
Roots, fine at joint, CIP PATCH REQ

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Completed section inspection - 02/11/2021 - MH06X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
4	1	02/11/21	9:31	SURVEY OPS	No Rain Or Snow	No	MH06X

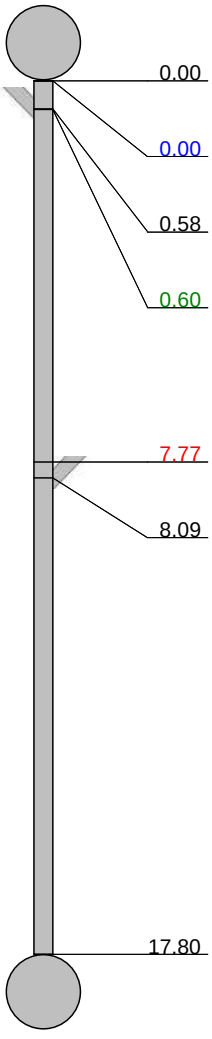
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.60 m	Public Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	1	**Upstream Node:**	MH06
Road:	Schwabish Gmund Way	**Inspected Length:**	17.80 m	**Upstream Pipe Depth:**	1.350 m
Location:	Other walkway	**Total Length:**	17.80 m	**Downstream Node:**	MH07
Surface Type:	Asphalt Highway	**Joint Length:**		**Downstream Pipe Depth:**	2.300 m

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	150 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:154



Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MH06	
0.00	WL	Water level, 5% of the vertical dimension	
0.58	JN	Junction at 2 o'clock, 100mm dia	
0.60	DER	Settled deposits, coarse, 5% cross-sectional area loss	3
7.77	FM	Fractures, multiple from 12 o'clock to 12 o'clock: CIP PATCH REQ	4 / 2
8.09	JN	Junction at 11 o'clock, 100mm dia	
17.80	MHF	Finish node, manhole, reference: MH07	

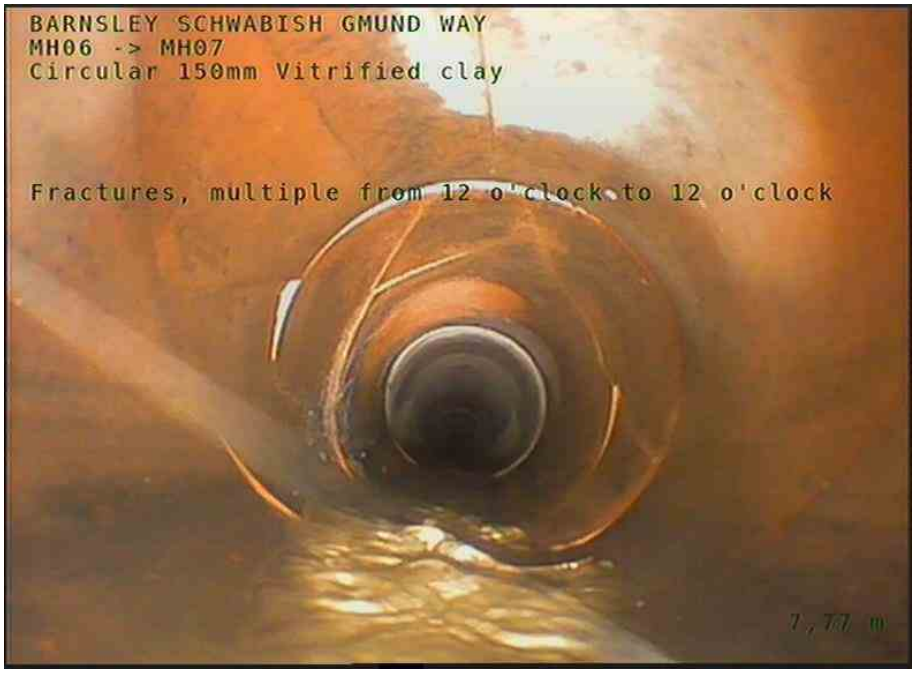

FM - 7.77 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
1	80.0	10.3	80.0	4.0	2	2.0	0.4	3.0	3.0

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Section Pictures - 02/11/2021 - MH06X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
4	1	MH06X	SURVEY OPS	14429



1, 00:02:15, 7.77 m
Fractures, multiple from 12 o'clock to 12 o'clock, CIP PATCH REQ

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Completed section inspection - 02/11/2021 - MH06AX

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
5	1	02/11/21	9:38	SURVEY OPS	No Rain Or Snow	No	MH06AX

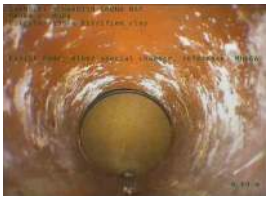
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.60 m	Public Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH06A
Road:	Schwabish Gmund Way	**Inspected Length:**	0.60 m	**Upstream Pipe Depth:**	0.000 m
Location:	Other walkway	**Total Length:**	0.60 m	**Downstream Node:**	MH06
Surface Type:	Asphalt Highway	**Joint Length:**		**Downstream Pipe Depth:**	1.350 m

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	150 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:50	Position [m]	Code	Observation	Grade
Depth: 1.35 m MH06				
	0.00	MH	Start node, manhole, reference: MH06	
	0.00	WL	Water level, 5% of the vertical dimension	
	0.60	OCF	Finish node, other special chamber, reference: MH06A: CAPPED	
MH06A				



OCF - 0.60 m

Depth: 0.00 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 02/11/2021 - MH06AX

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
5	2	MH06AX	SURVEY OPS	14429



1, 00:00:07, 0.60 m
Finish node, other special chamber, reference: MH06A, CAPPED

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Completed section inspection - 02/11/2021 - MH08X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
6	1	02/11/21	9:39	SURVEY OPS	No Rain Or Snow	No	MH08X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.60 m	Public Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH08
Road:	Schwabish Gmund Way	**Inspected Length:**	32.48 m	**Upstream Pipe Depth:**	
Location:	Other walkway	**Total Length:**	32.48 m	**Downstream Node:**	MH06
Surface Type:	Asphalt Highway	**Joint Length:**		**Downstream Pipe Depth:**	1.350 m

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	150 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:281

Position [m]	Code	Observation	Grade
Depth: 1.35 m			
MH06			
0.00	MH	Start node, manhole, reference: MH06	
0.00	WL	Water level, 5% of the vertical dimension	
31.90	DEE	Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss	3
32.48	MHF	Finish node, manhole, reference: MH08: FILLED WITH DEBRIS	
MH08			
Depth: m			



MHF - 32.48 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	1	2.0	0.1	2.0	3.0

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Section Pictures - 02/11/2021 - MH08X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
6	2	MH08X	SURVEY OPS	14429



1, 00:04:45, 32.48 m
Finish node, manhole, reference: MH08, FILLED WITH DEBRIS

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Abandoned section inspection - 02/11/2021 - MH09X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
7	1	02/11/21	10:11	SURVEY OPS	No Rain Or Snow	No	MH09X

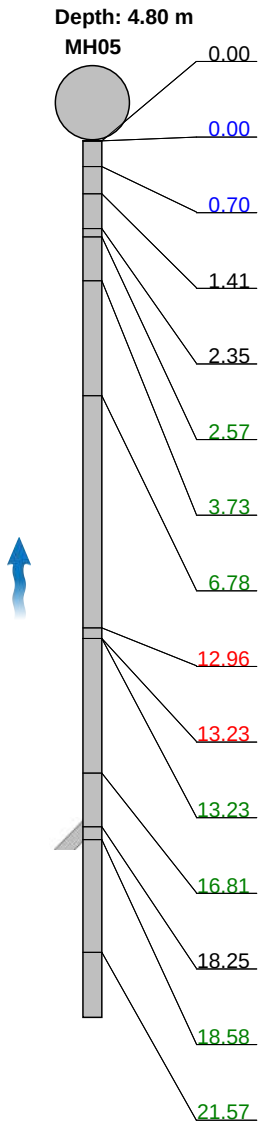
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.70 m	Private Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH09
Road:	Land Off Harborough Hill Road	**Inspected Length:**	27.82 m	**Upstream Pipe Depth:**	
Location:	Property or buildings	**Total Length:**	27.82 m	**Downstream Node:**	MH05
Surface Type:	Asphalt Highway	**Joint Length:**		**Downstream Pipe Depth:**	4.800 m

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:201



Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MH05	
0.00	WL	Water level, 5% of the vertical dimension	
0.70	REM	General remark: UNABLE TO SHOW START DUE TO BACKDROP	
1.41	JN	Junction at 6 o'clock, 225mm dia: BACKDROP	
2.35	SC	Pipe size changes, new size(s), 150mm high	
2.57	RFJ	Roots, fine at joint: CIP PATCH REQ	2
3.73	RFJ	Roots, fine at joint: CIP PATCH REQ	2
6.78	RFJ	Roots, fine at joint: CIP PATCH REQ	2
12.96	FM	Fractures, multiple from 3 o'clock to 9 o'clock: CIP PATCH REQ	4 / 2
13.23	H	Hole in drain or sewer from 7 o'clock to 9 o'clock: CIP PATCH	4
13.23	LL	Line deviates left	
16.81	RFJ	Roots, fine at joint: CIP PATCH	2
18.25	JN	Junction at 3 o'clock, 100mm dia	
18.58	RFJ	Roots, fine at joint: CIP PATCH REQ	2
21.57	RFJ	Roots, fine at joint: CIP PATCH REQ	2


JN - 1.41 m


RFJ - 2.57 m


RFJ - 3.73 m


RFJ - 6.78 m


FM - 12.96 m

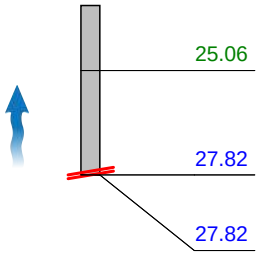
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Abandoned section inspection - 02/11/2021 - MH09X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
7	1	02/11/21	10:11	SURVEY OPS	No Rain Or Snow	No	MH09X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.70 m	Private Sewer	Not Specified

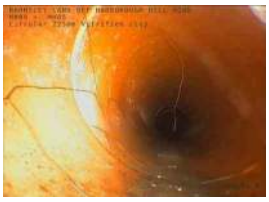
Scale: 1:201



Position [m]	Code	Observation	Grade
25.06	RFJ	Roots, fine at joint: CIP PATCH REQ	2
27.82	REM	General remark: UNABLE TO PUSH RODS	
27.82	SA	Survey abandoned: HARD TO PUSH RODS	



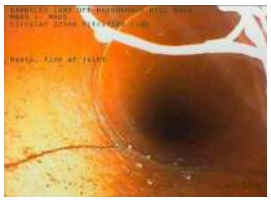
H - 13.23 m



RFJ - 16.81 m



RFJ - 18.58 m



RFJ - 21.57 m



RFJ - 25.06 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
2	160.0	113.2	160.0	4.0	8	1.0	5.7	8.0	5.0

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Section Pictures - 02/11/2021 - MH09X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
7	2	MH09X	SURVEY OPS	14429



1, 00:00:23, 1.41 m
Junction at 6 o'clock, 225mm dia, BACKDROP



2, 00:00:40, 2.57 m
Roots, fine at joint, CIP PATCH REQ

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Section Pictures - 02/11/2021 - MH09X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
7	2	MH09X	SURVEY OPS	14429



3, 00:00:57, 3.73 m
Roots, fine at joint, CIP PATCH REQ



4, 00:01:21, 6.78 m
Roots, fine at joint, CIP PATCH REQ

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Section Pictures - 02/11/2021 - MH09X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
7	2	MH09X	SURVEY OPS	14429



5, 00:02:01, 12.96 m
Fractures, multiple from 3 o'clock to 9 o'clock, CIP PATCH REQ



6, 00:02:19, 13.23 m
Hole in drain or sewer from 7 o'clock to 9 o'clock, CIP PATCH

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Section Pictures - 02/11/2021 - MH09X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
7	2	MH09X	SURVEY OPS	14429



7, 00:02:43, 16.81 m
Roots, fine at joint, CIP PATCH

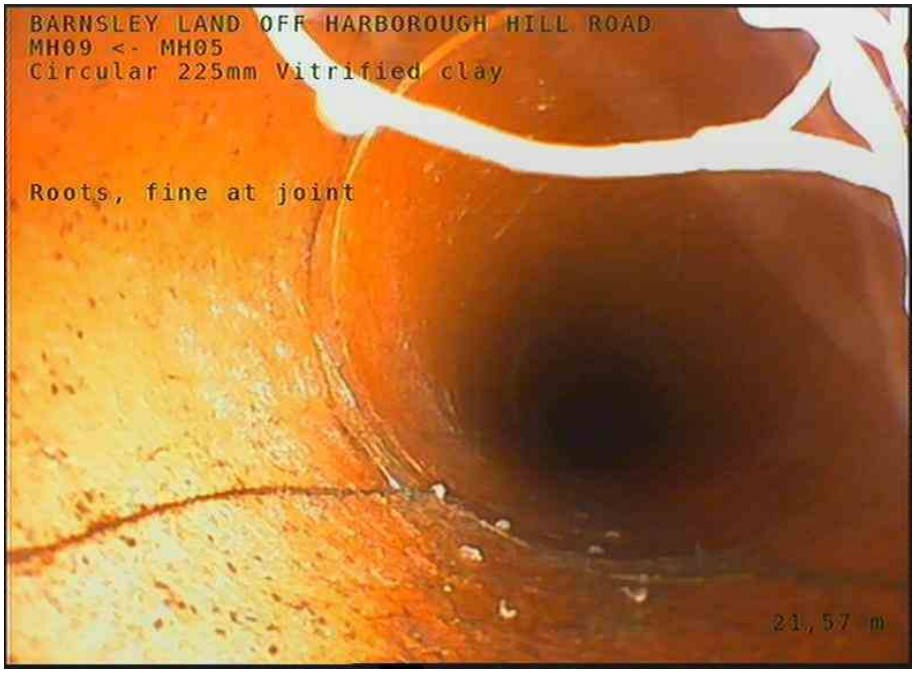


8, 00:02:58, 18.58 m
Roots, fine at joint, CIP PATCH REQ

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Section Pictures - 02/11/2021 - MH09X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
7	2	MH09X	SURVEY OPS	14429



9, 00:03:19, 21.57 m
Roots, fine at joint, CIP PATCH REQ



10, 00:04:15, 25.06 m
Roots, fine at joint, CIP PATCH REQ

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Completed section inspection - 02/11/2021 - MH10X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
8	1	02/11/21	10:31	SURVEY OPS	No Rain Or Snow	No	MH10X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.60 m	Private Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH10
Road:	Land Off Harborough Hill Road	**Inspected Length:**	13.06 m	**Upstream Pipe Depth:**	
Location:	Property or buildings	**Total Length:**	13.06 m	**Downstream Node:**	MH01
Surface Type:	Asphalt Footway	**Joint Length:**		**Downstream Pipe Depth:**	5.300 m

Use:	Foul	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	150 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:113

Depth: 5.30 m
MH01

Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MH01	
0.00	WL	Water level, 5% of the vertical dimension	
0.60	JN	Junction at 6 o'clock, 150mm dia: BACKDROP	
0.60	RFJ	Roots, fine at joint: CIP PATCH REQ	2
2.80	LL	Line deviates left: SLIGHT	
3.43	RFJ	Roots, fine at joint: CIP PATCH REQ	2
13.06	MHF	Finish node, manhole, reference: MH10	


RFJ - 3.43 m

MH10
Depth: m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	2	1.0	0.6	2.0	2.0

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Section Pictures - 02/11/2021 - MH10X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
8	2	MH10X	SURVEY OPS	14429



1, 00:01:09, 3.43 m
Roots, fine at joint, CIP PATCH REQ

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Abandoned section inspection - 02/11/2021 - MH12X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
9	1	02/11/21	11:55	SURVEY OPS	No Rain Or Snow	No	MH12X

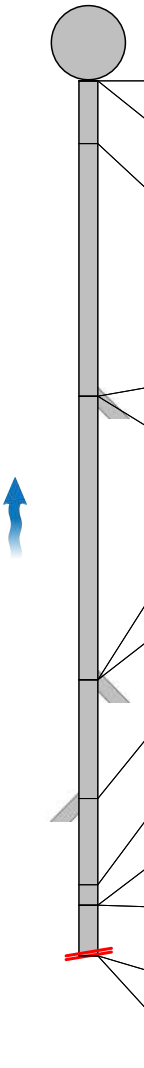
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.70 m	Private Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH12
Road:	Land Off Harborough Hill Road	**Inspected Length:**	48.28 m	**Upstream Pipe Depth:**	
Location:	Property or buildings	**Total Length:**	48.28 m	**Downstream Node:**	MH11
Surface Type:	Asphalt Footway	**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Foul	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:417



Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MH11	
0.00	WL	Water level, 5% of the vertical dimension	
3.50	RFJ	Roots, fine at joint: CIP PATCH REQ	2
17.42	JN	Junction at 9 o'clock, 100mm dia	
17.42	DES	Settled deposits, fine, 5% cross-sectional area loss	3
33.04	JN	Junction at 9 o'clock, 100mm dia	
33.04	FC	Fracture, circumferential from 4 o'clock to 8 o'clock	3 / 2
39.59	JN	Junction at 2 o'clock, 100mm dia	
44.33	H	Hole in drain or sewer at 10 o'clock	4
45.48	DER	Settled deposits, coarse, 10% cross-sectional area loss	3
45.48	RF	Roots, fine	2
48.28	B	Broken pipe from 1 o'clock to 6 o'clock	4
48.28	SA	Survey abandoned: DUE TO DER	


RFJ - 3.50 m


H - 44.33 m

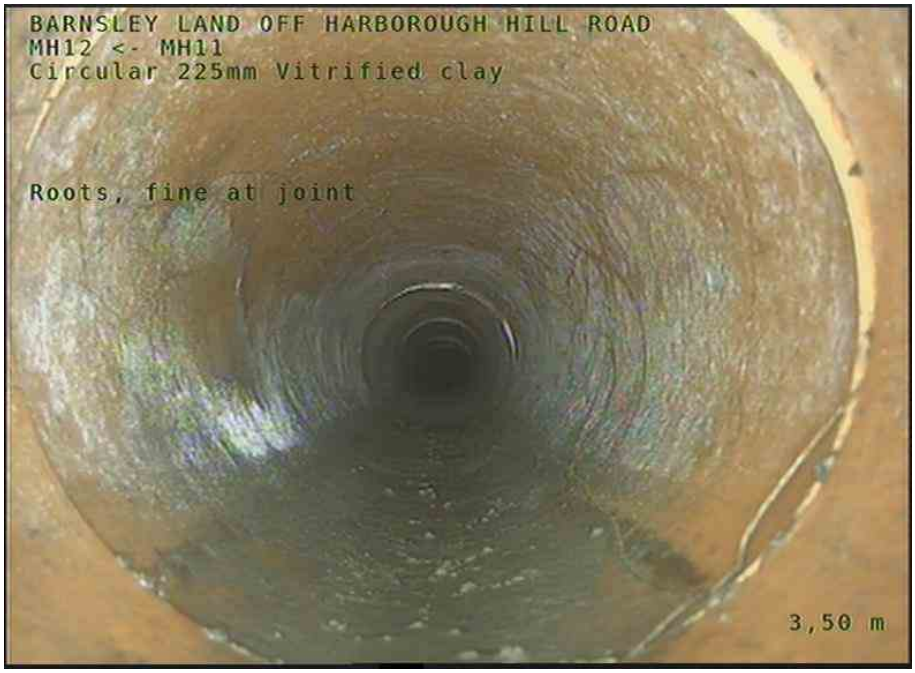

B - 48.28 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
3	80.0	57.1	200.0	4.0	5	3.0	2.0	7.0	3.0

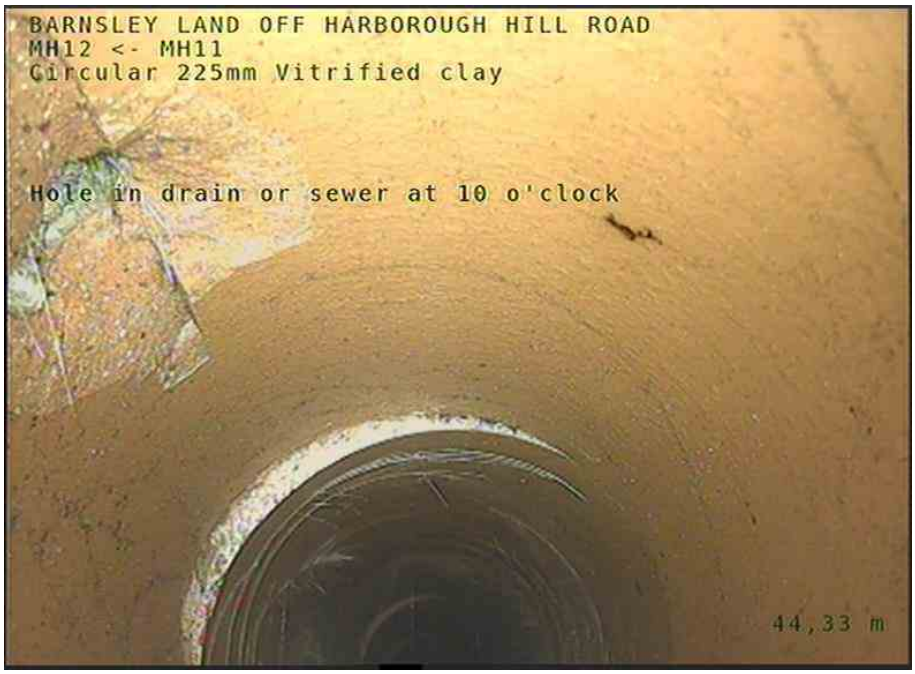
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Section Pictures - 02/11/2021 - MH12X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
9	2	MH12X	SURVEY OPS	14429



1, 00:00:26, 3.50 m
Roots, fine at joint, CIP PATCH REQ



2, 00:02:57, 44.33 m
Hole in drain or sewer at 10 o'clock

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Section Pictures - 02/11/2021 - MH12X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
9	2	MH12X	SURVEY OPS	14429



3, 00:04:43, 48.28 m
Broken pipe from 1 o'clock to 6 o'clock

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Abandoned section inspection - 02/11/2021 - MH13X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
10	1	02/11/21	12:05	SURVEY OPS	No Rain Or Snow	No	MH13X

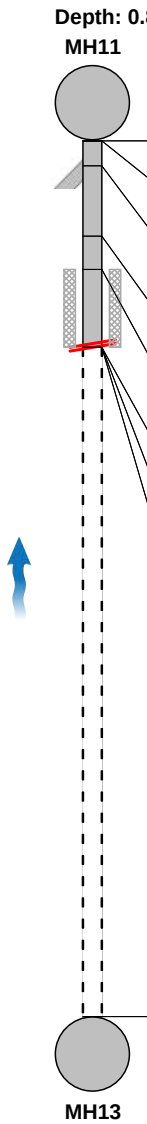
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.70 m	Private Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH13
Road:	Land Off Harborough Hill Road	**Inspected Length:**	9.83 m	**Upstream Pipe Depth:**	
Location:	Property or buildings	**Total Length:**	41.60 m	**Downstream Node:**	MH11
Surface Type:	Asphalt Footway	**Joint Length:**		**Downstream Pipe Depth:**	0.800 m

Use:	Foul	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:359



Position [m]		Code	Observation	Grade
0.00		MH	Start node, manhole, reference: MH11	
0.00		WL	Water level, 5% of the vertical dimension	
1.22		CXI	Connection defective, connecting pipe is intruding at 1 o'clock, 100mm dia, intrusion: 10%	3
4.55		RFJ	Roots, fine at joint: CIP PATCH REQ	2
6.12	S01	RFJ	Roots, fine at joint, start	
9.83	F01	RFJ	Roots, fine at joint, finish	2
9.83		RMJ	Roots, mass at joint, 10% cross-sectional area loss	3
9.83		SA	Survey abandoned: DUE TO RMJ	
41.60			End of pipe	


CXI - 1.22 m


RFJ - 4.55 m


RFJ - 6.12 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	4	4.0	9.0	11.0	5.0

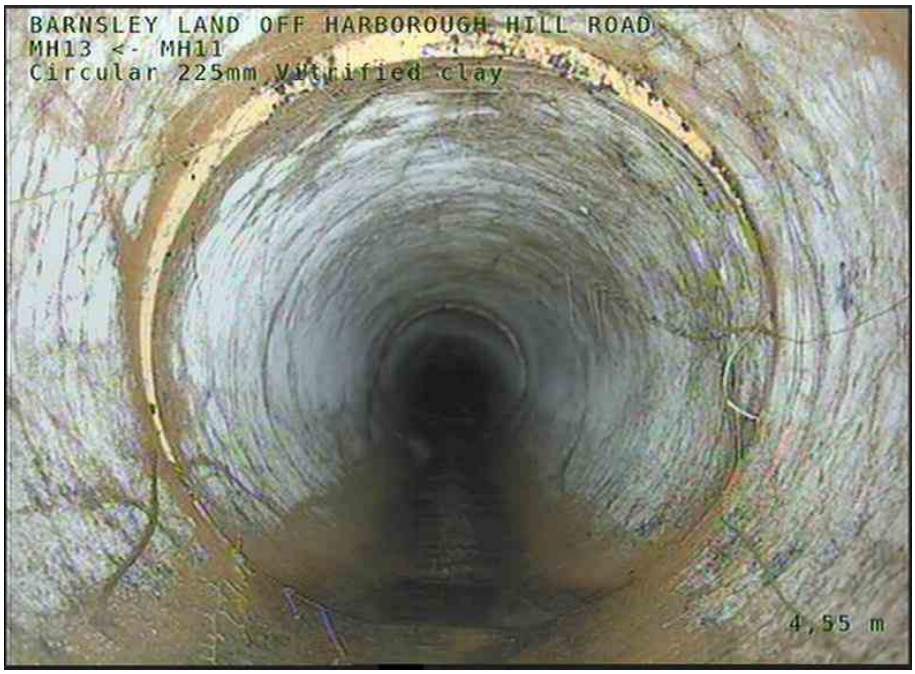
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Section Pictures - 02/11/2021 - MH13X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
10	2	MH13X	SURVEY OPS	14429



1, 00:00:21, 1.22 m
Connection defective, connecting pipe is intruding at 1 o'clock, 100mm dia, intrusion: 10%



2, 00:00:36, 4.55 m
Roots, fine at joint, CIP PATCH REQ

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Section Pictures - 02/11/2021 - MH13X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
10	2	MH13X	SURVEY OPS	14429



3, 00:00:44, 6.12 m
Roots, fine at joint, start

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Abandoned section inspection - 02/11/2021 - MH13X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
10	2	02/11/21	12:50	SURVEY OPS	No Rain Or Snow	No	MH13X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	Not Specified	Private Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	1	**Upstream Node:**	MH13
Road:	Land Off Harborough Hill Road	**Inspected Length:**	41.60 m	**Upstream Pipe Depth:**	
Location:	Property or buildings	**Total Length:**	41.60 m	**Downstream Node:**	MH11
Surface Type:	Asphalt Footway	**Joint Length:**		**Downstream Pipe Depth:**	0.800 m

Use:	Foul	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:359



Position [m]	Code	Observation	Grade
Depth: m MH13			
0.00	MH	Start node, manhole, reference: MH13	
0.00	WL	Water level, 5% of the vertical dimension: 3	
17.65	JN	Junction at 3 o'clock, 100mm dia	
22.75	RFJ	Roots, fine at joint	2
32.81	JN	Junction at 9 o'clock, 100mm dia	
32.81	SC	Pipe size changes, new size(s), 225mm high	
34.81	JN	Junction at 3 o'clock, 100mm dia	
34.81	RFJ	Roots, fine at joint	2
38.06	RFJ	Roots, fine at joint	2
41.34	WL	Water level, 30% of the vertical dimension	
41.34	DER	Settled deposits, coarse, 20% cross-sectional area loss	4
41.34	RMJ	Roots, mass at joint, 20% cross-sectional area loss	5
41.34	CXI	Connection defective, connecting pipe is intruding at 10 o'clock, 100mm dia, intrusion: 10%	3
41.60	SA	Survey abandoned: DUE TO DER RM	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	6	17.0	0.5	20.0	5.0

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Abandoned section inspection - 02/11/2021 - MH11X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
11	1	02/11/21	12:12	SURVEY OPS	No Rain Or Snow	No	MH11X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.70 m	Private Sewer	Not Specified

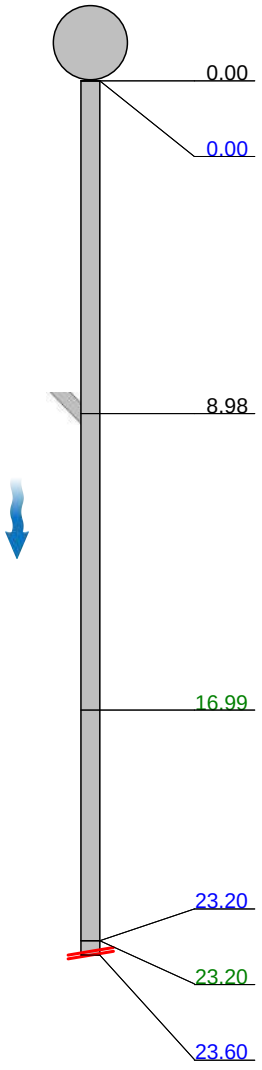
Town or Village:	Barnsley	**Inspection Direction:**	1	**Upstream Node:**	MH11
Road:	Land Off Harborough Hill Road	**Inspected Length:**	23.60 m	**Upstream Pipe Depth:**	0.800 m
Location:	Property or buildings	**Total Length:**	23.60 m	**Downstream Node:**	MH03
Surface Type:	Asphalt Footway	**Joint Length:**		**Downstream Pipe Depth:**	3.600 m

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:204

Depth: 0.80 m
MH11



Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MH11	
0.00	WL	Water level, 5% of the vertical dimension	
8.98	JN	Junction at 3 o'clock, 100mm dia	
16.99	RFJ	Roots, fine at joint	2
23.20	WL	Water level, 20% of the vertical dimension	
23.20	RMJ	Roots, mass at joint, 20% cross-sectional area loss	5
23.60	SA	Survey abandoned: DUE TO RMJ	



RMJ - 23.20 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	2	10.0	0.5	11.0	5.0

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Section Pictures - 02/11/2021 - MH11X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
11	1	MH11X	SURVEY OPS	14429



1, 00:01:32, 23.20 m
Roots, mass at joint, 20% cross-sectional area loss

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Abandoned section inspection - 02/11/2021 - MH13AX

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
12	1	02/11/21	13:02	SURVEY OPS	No Rain Or Snow	No	MH13AX

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.60 m	Private Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH13A
Road:	Land Off Harborough Hill Road	**Inspected Length:**	15.11 m	**Upstream Pipe Depth:**	0.000 m
Location:	Property or buildings	**Total Length:**	15.11 m	**Downstream Node:**	MH13
Surface Type:	Asphalt Footway	**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	150 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:131



Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MH13	
0.00	WL	Water level, 5% of the vertical dimension	
2.69	LR	Line deviates right	
4.49	DES	Settled deposits, fine, 30% cross-sectional area loss	4
6.09	JN	Junction at 9 o'clock, 100mm dia	
6.09	DER	Settled deposits, coarse, 20% cross-sectional area loss	4
11.47	DES	Settled deposits, fine, 10% cross-sectional area loss	3
15.11	DEE	Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss	3
15.11	SA	Survey abandoned: DUE TO DEE	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	4	5.0	0.9	14.0	4.0

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Abandoned section inspection - 02/11/2021 - MH13BX

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
13	1	02/11/21	13:13	SURVEY OPS	No Rain Or Snow	No	MH13BX

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
PK	SC15NYG	Ipek Ex	0.60 m	Private Sewer	Not Specified

Town or Village:	Barnsley	**Inspection Direction:**	2	**Upstream Node:**	MH13B
Road:	Land Off Harborough Hill Road	**Inspected Length:**	27.54 m	**Upstream Pipe Depth:**	0.000 m
Location:	Property or buildings	**Total Length:**	27.53 m	**Downstream Node:**	MH13
Surface Type:	Asphalt Footway	**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	150 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Sample condition survey	**Lining Material:**	No Lining

Comments: None
Recommendations: None

Scale: 1:238



Position [m]		Code	Observation	Grade
0.00		MH	Start node, manhole, reference: MH13	
0.00		WL	Water level, 5% of the vertical dimension	
3.31		DER	Settled deposits, coarse, 10% cross-sectional area loss	3
7.82		JN	Junction at 3 o'clock, 100mm dia	
10.53		RFJ	Roots, fine at joint	2
10.53		CN	Connection other than junction at 10 o'clock, 100mm dia	
13.21		JN	Junction at 3 o'clock, 100mm dia	
13.21		RF	Roots, fine	2
19.94		JN	Junction at 3 o'clock, 100mm dia	
19.94		RF	Roots, fine	2
23.06	S01	DES	Settled deposits, fine, 10% cross-sectional area loss, start	
23.06		RF	Roots, fine	2
26.74		JN	Junction at 3 o'clock, 150mm dia	
27.29	F01	DES	Settled deposits, fine, 10% cross-sectional area loss, finish	3
27.53		SA	Survey abandoned: DUE TO DES	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	6	3.0	0.6	16.0	3.0

Disclaimer and FOW Recommendations

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FOW Recommendations
We have identified remedial works from carrying out our CCTV drainage survey at your site, each of our recommendations has been detailed against each section survey, if you would like a quotation for Underground Surveys to carry out the remedial works that we have identified, please contact our office to discuss further on 01925 444664 or email AmyD@undergroundsurveys.co.uk