

Manchester City Council

Planning Growth and Development
Town Hall
Albert Square
Manchester
M60 2LA

6th November 2024

**CONTROLLED WATERS TECHNICAL SUMMARY AND
HYDROGEOLOGICAL RISK ASSESSMENT
ANCOATS GREEN - JERSEY STREET, ANCOATS**

E3P have previously been commissioned by Civic Engineers in relation to completing ground investigation works and an assessment of ground conditions in relation to the proposed redevelopment of Ancoats Green, Jersey Green and Prussia Street Arm Greenway and associated Public Realm Improvements.

1. INTRODUCTION

The following reports have previously been produced by E3P and submitted in relation to planning application 136141/VO/2023:

-  **E3P** - Phase II Geoenvironmental Site Assessment - Ancoats Green, Jersey Street and Prussia Street Arm Greenway Public Realm Improvements (Report Ref. 15-798-R2-1), Dated January 2023;
-  **E3P** - Supplementary Geoenvironmental Investigation - Ancoats Green, Jersey Street (Report Ref: 15-798-L1), Dated December 2023; and
-  **E3P** - Contaminated Land Remediation Strategy – Ancoats Green, Jersey Street (Report Ref: 15-798-R4-1), Dated May 2024.

E3P understands that the above reports have been reviewed by Manchester City Council (MCC) Environmental Health Officer and the Environment Agency. The Environment Agency has provided comments in relation to the application to discharge condition 10 (Ground Conditions) and condition 11 (Drainage Infiltration) and have not recommended discharge of these conditions in respect of the potential risk to controlled waters.

This letter aims to provide a technical summary of the works completed alongside a review of available data to inform an updated conceptual site model to determine whether the site poses a significant risk to controlled waters receptors. For further detail, the above reports should be read in conjunction with this letter.

The comments received from the Environment Agency (Letter Reference: SO/2024/124304/02-L01) have been summarised below:





From our review, we note that contamination has been identified on site and is largely associated with the historically infilled Bengal branch arm of the Rochdale Canal. The ground investigation undertaken shows there to be considerable organic contamination present in the form of impacted, shallow, groundwater. The investigative works completed on the Jersey Street area of the branch canal appears to have introduced a concrete plug which should prevent lateral movement. However, no other information has been provided to support the later position in the remediation strategy (dated May 2024) that no further work needs to be undertaken to address the impacted materials within the remainder of the infilled canal length. Overall, we disagree with some of the information/conclusions presented in the reporting. Of particular note:

- ✳ Limited sampling rounds have been undertaken during the investigation period to satisfactorily inform the characterisation of the site and subsequent assessment of risk.
- ✳ The overall conclusion that there is likely to be little or no risk from the current conditions on-site, especially when black, hydrocarbon-smelling liquid has been identified; and
- ✳ The contamination identified would not be subject to remedial actions.

1.1. REDEVELOPMENT PLAN

E3P understand that the proposals comprise soft landscaping improvements, hard landscaping works including provision of a formal play area, and installation of Sustainable Urban Drainage Systems (SuDS).

Figure 1 indicates the proposed development layout which is included as an attachment to this letter.

For the avoidance of doubt, this letter refers to the area highlighted yellow (Phase 1 – Ancoats Green) and this area is herein referred to as ‘the site’.

Figure 1 **Proposed Development Plan**





2. UPDATED CONCEPTUAL HYDROGEOLOGICAL MODEL

2.1. INTRODUCTION

The existing soils and groundwater have been investigated to date by E3P within the Phase II Geoenvironmental Site Assessment (Report Ref. 15-798-R2-1, dated January 2023) and Supplementary Geoenvironmental Investigation (Report Ref: 15-798-L1, dated December 2023).

This letter report aims to summarise the factors concerning the controlled waters risk on the site, as well as building on an updated detailed assessment of the source pathway receptor linkages across the site.

2.2. SOURCES

Historically, the site has been subjected to extensive infilling and former housing, recreation grounds and Wharf were present. Chemical by-products of manufacturing processes and compounds within the Made Ground may have subsequently leached down into the underlying ground and contaminated groundwater both within Made Ground and natural drift deposits. The former canal (Prussia Street Arm) in the west of the site was infilled circa 1955 and comprises Made Ground deposits to a maximum proven depth of 4.20 m bgl.

Figure 2 Historical Features Plan

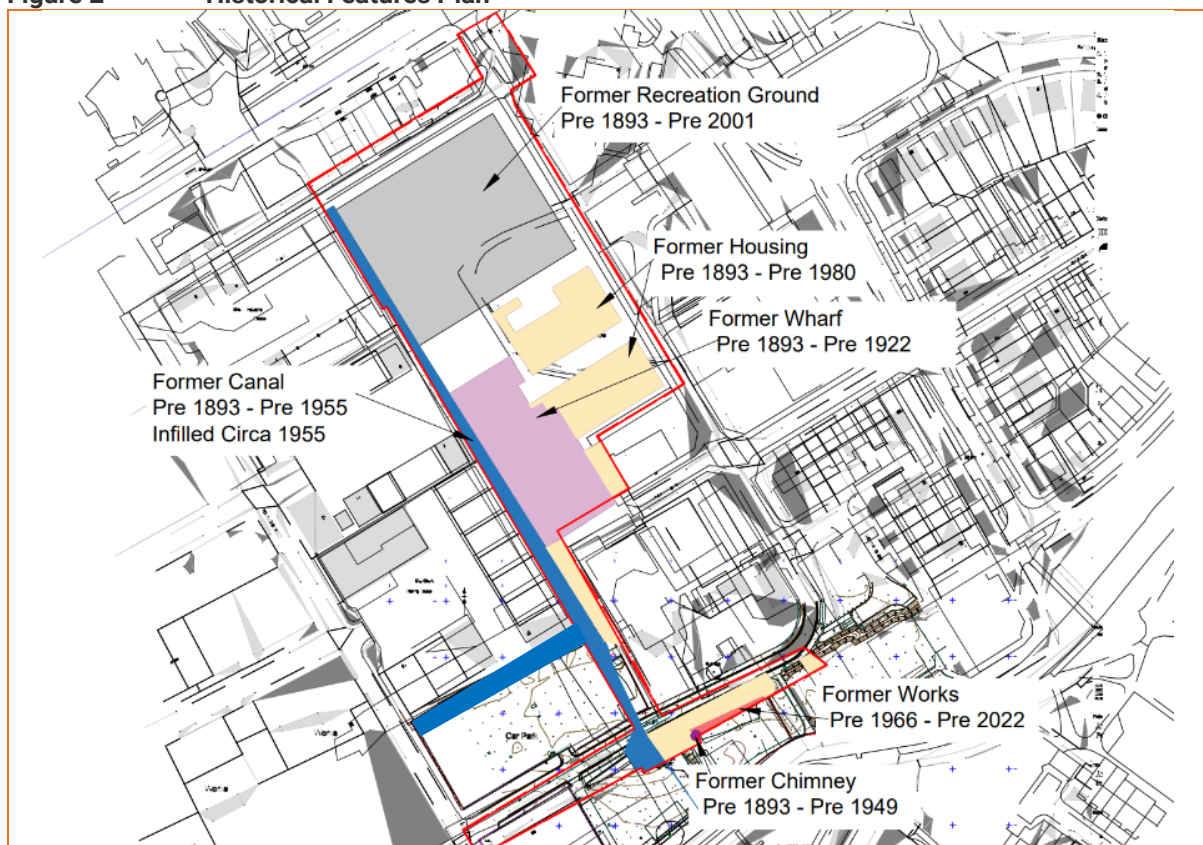




Table 1 presents a summary of exploratory locations undertaken within the infilled canal, the depth of encountered infill material, the presence of underlying superficial deposits and chemical analysis undertaken at each location.

Table 1 Summary of Exploratory Locations and Chemical Sampling

AREA INVESTIGATED	EXPLORATORY LOCATION	FINAL DEPTH (m bgl)	EVIDENCE OF INFILLED CANAL (m bgl)	CLAY DEPOSITS (m bgl)	CHEMICAL ANALYSIS UNDERTAKEN
Infilled Prussia Canal Arm	WS101	5.45	1.50 – 3.80	3.80 – 5.45	4 no. soil samples
	WS102	5.45	1.90 – 3.70	3.70 – 5.45	2 no. leachate samples
	WS103	5.45	1.75 – 3.70	3.70 – 5.45	2 no. water samples
	WS104	5.45	2.00 – 3.70	3.70 – 5.45	1 no. water sample
	WS203	5.45	2.20 – 4.20	4.20 – 5.45	5 no. soil samples
	TT101	4.10	2.20 – 3.90	3.90 – 4.10	4 no. leachate samples
	TT102	3.90	2.20 – 3.90	-	
	TT103	3.90	2.20 – 3.90	-	
Base of the Infilled Canal	TT102	3.90	2.20 – 3.90	-	2 no. soil samples
	TT103	3.90	2.20 – 3.90	-	2 no. leachate samples
Natural Clay Deposits	TT101	4.10	2.20 – 3.90	3.90 – 4.10	1 no. soil sample
	WS206	5.45	Not encountered	2.00 – 5.45	1 no. water sample

A total of 9 soil samples and 6 leachate samples were submitted for laboratory testing to characterise the Made Ground within the infilled canal. 2 no. soil samples of the Made Ground at the base of the infilled canal and 1 no. soil sample of the underlying natural CLAY were submitted for chemical analysis to understand the deeper contamination, chemical composition of the underlying CLAY and potential for downward migration.

Subsequent groundwater monitoring was undertaken with three visits in total, in August 2022, January 2023 and July 2023. Water samples were obtained from WS104 (two visits), WS203 (one visit) and WS206 (one visit). WS104 and WS203 were both installed with monitoring wells within the Made Ground while WS206 was installed with a monitoring well within the natural CLAY.

Widespread heavy metal and PAH contamination and TPH contamination has been identified in the soil, leachate and groundwater analysis within the area of the infilled canal. The soil and groundwater samples within the natural CLAY deposits (TT101 at 4.10m bgl and WS206) did not indicate any significant levels of TPH, PAHs or heavy metals which indicate that minimal downward migration has occurred and the dominant area/source of contamination is the Made Ground within the infilled canal.

No significantly elevated levels of contamination were identified within groundwater from WS206, however groundwater taken from WS104 and WS203 indicated the presence of PAHs, TPHs and heavy metals.



2.3. PATHWAYS

2.3.1. BGS GEOLOGY

Beneath the deep Made Ground, the site is underlain by cohesive natural strata which will act to inhibit vertical and lateral migration of mobile contaminants towards the principal aquifer to the northeast of the site within the Collyhurst Sandstone Formation bedrock. Cohesive deposits with also restrict vertical migration towards the underlying Secondary A aquifer within the Manchester Marls Mudstone bedrock.

Solid bedrock geology was not encountered within the E3P investigations, however a review of BGS boreholes in the proximity of the site has been carried out to infer the approximate depths of bedrock beneath the site.

The BGS borehole logs are summarised in Table 2 below.

Table 2 Summary of BGS Borehole Records

LOCATION	DEPTH	MADE GROUND	DRIFT	SOLID	FORMATION NAME	AQUIFER
SJ89NE2378 (Directly south of the site)	14.80	1.40	1.40 – 8.60 Cohesive 8.60 - 12.80 Granular	12.80 – 14.80 MUDSTONE	Manchester Marls Formation – MUDSTONE	Secondary A
SJ 89 NE/178 (8m east of the site)	30.48	3.00	3.00 – 24.38 Stiff CLAY with occasional SAND bands >14.00 m bgl 24.38 – 30.48 SAND and GRAVEL	Not encountered	N/A	Principal
SJ 89 NE/190 (Directly east of the site)	36.58	-	0.00 - 35.66 Cohesive Drift	35.66 – 36.58 SANDSTONE	Collyhurst Sandstone Formation - SANDSTONE	Principal
SJ 89 NW1349 (365m west of the site)	25.40	3.04	3.04 – 18.58 Cohesive Drift	18.58 – 25.40 SANDSTONE	Chester Sandstone Formation - SANDSTONE	Principal

The above records indicate that bedrock is encountered at varying depths between the Mudstone and the Sandstone bedrock, with the lower sensitive Manchester Marl formation encountered at approximately 14m bgl site while the higher sensitivity Collyhurst Sandstone is recorded at depths in excess of 35m bgl.

The Manchester Marl formation is understood to be present directly beneath the infilled canal while the Collyhurst Sandstone formation is recorded to underly the east of the site.



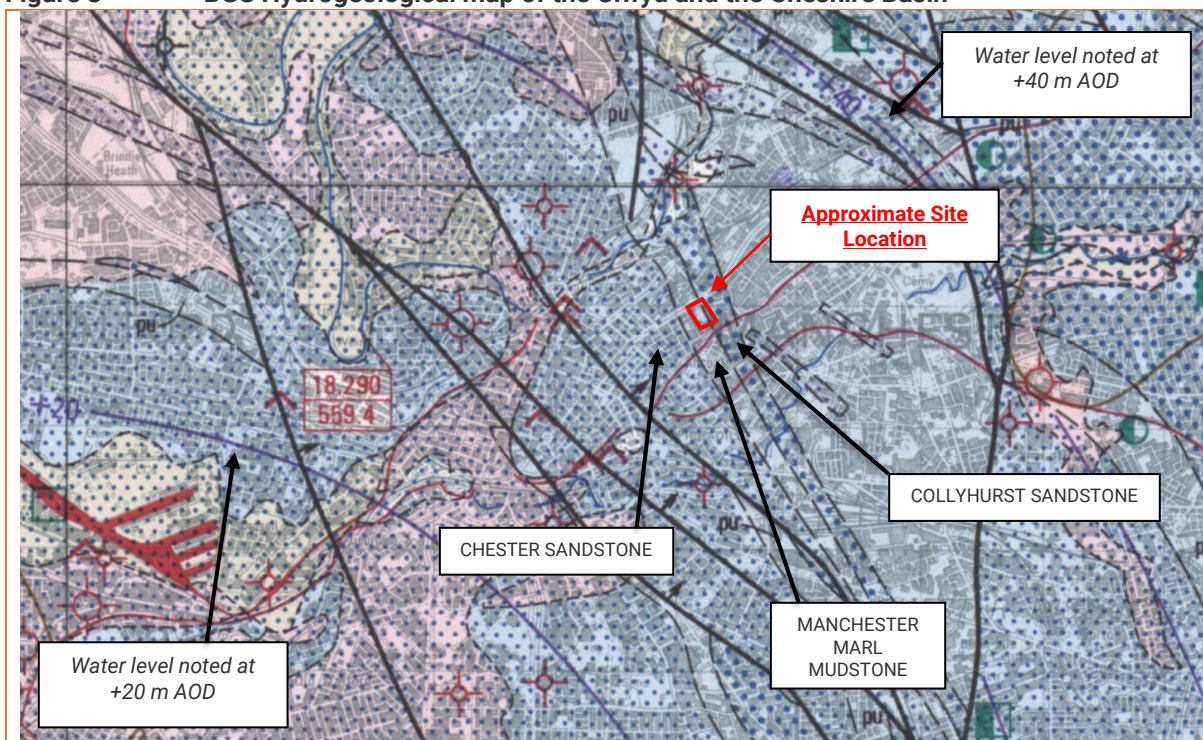
2.3.2. HYDROGEOLOGY

A snapshot of the BGS hydrogeological map of the Clwyd and the Cheshire Basin is presented in Figure 3 below.

The hydrogeological mapping indicates that water levels to the northeast of the site are circa 40m AOD while water levels to the southwest of the site are circa 30m AOD. The site is located in between the two recorded water levels, indicating that groundwater levels beneath the site are approximately 30-35m AOD. For reference, existing ground level is circa 50m AOD, therefore groundwater beneath the site is approximately 15 m bgl.

Hydrogeological mapping also indicates that groundwater flows in a south westerly direction, down the hydraulic gradient towards the River Mersey.

Figure 3 BGS Hydrogeological map of the Clwyd and the Cheshire Basin



Source: <https://webapps.bgs.ac.uk/data/maps/maps.cfc?method=viewRecord&mapId=11567>

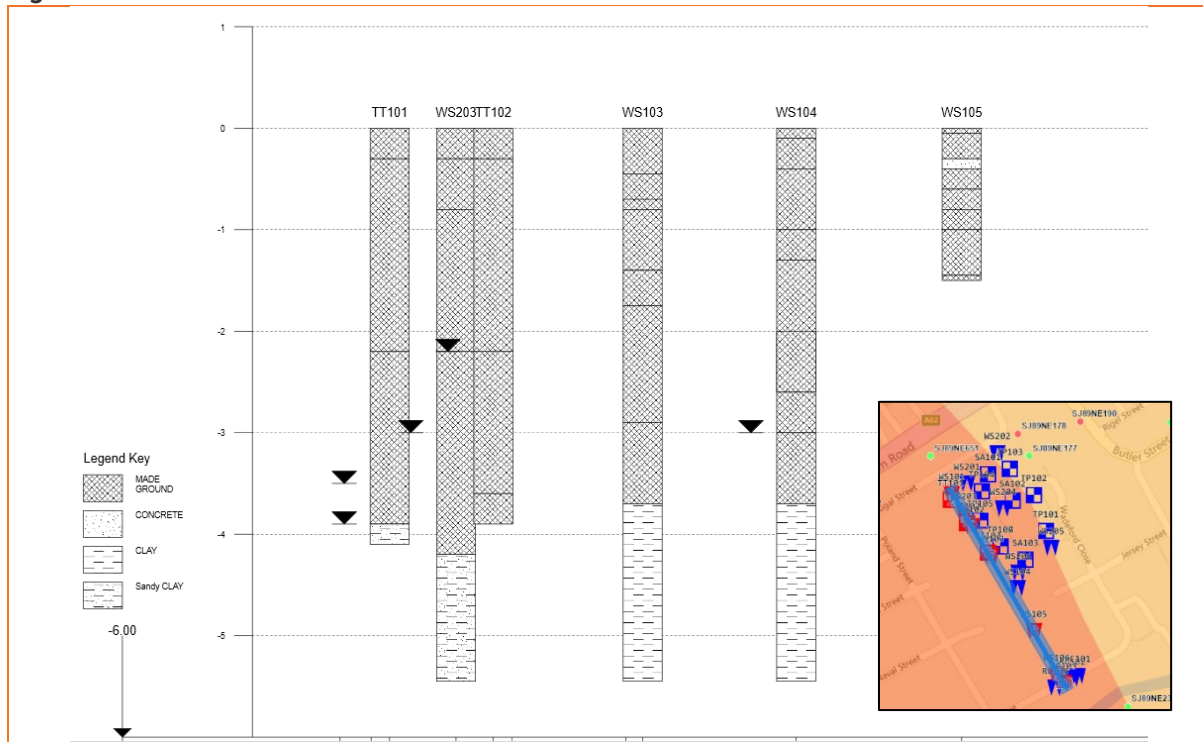
It is noted that during the E3P investigations, water strikes were recorded as perched water within the Made Ground and no water strikes were recorded within the underlying Glacial Till.

Figure 4 indicates a cross section of the E3P boreholes with the noted perched water within the Made Ground with water strikes encountered between 1.50m bgl and 3.90m bgl.

As there were no water strikes recorded within the Glacial Till, it is therefore unlikely that any water within the infilled made ground is in hydraulic continuity with the underlying groundwater due to the underlying low permeability glacial till limiting downward migration.



Figure 4 Cross section across the area of infilled canal



2.3.3. PLANNING PORTAL REVIEW – GROUND CONDITIONS

E3P have undertaken a review of planning applications within the vicinity of the site to gain further understanding of the underlying ground conditions to inform the conceptual site model.

E3P have reviewed the planning application (Ref: 130354/FO/2021) and associated documents for the proposed redevelopment for a parcel of land off Poland Street (approximately 75m south of the site).

The Phase 2 Geoenvironmental Site Assessment (Report Ref: E3P 13-350-R2) has been reviewed. The development site comprises a section of the infilled canal along the northern boundary which underwent intrusive site investigation including trial trenching window sample boreholes and deep cable percussive boreholes.

Ground conditions encountered within the infilled canal correlate with the findings from the site investigation at Ancoats Green. Made Ground impacted with TPHs and PAHs has been identified to circa 3.00 m bgl. This has been confirmed to be underlain by cohesive low permeability clay deposits. Deep cable percussive boreholes indicate the presence of high-strength CLAY to circa 11.70 m bgl subsequently underlain by bedrock.

The presence of the low-permeability clay which is also confirmed to be present beneath the site, will restrict the downward migration of mobile phase contaminants.



2.3.4. PROPOSED DEVELOPMENT

As the site is currently open, public space, with little hardstanding surface cover, rainfall is not being intercepted and subsequently infiltrates freely into the underlying Made Ground, potentially mobilising the identified contaminants.

Drainage Proposals

A snapshot of Drawing Ref: 1826-01-CIV-XX-XX-D-C-20101 is presented in Figure 5, providing a comparison between the existing and proposed site layouts. The proposals, which include positively drained hardstanding (either permeable or non-permeable), reduce the permeation of rainwater by 30%. Additionally, considering the footprint of the filled canal, the rainwater permeation potential is reduced by 25% compared to the existing site scenario.

The current site has 100% rainwater permeation potential. Across the footprint of the canal, the existing trees and roots occupy 56% of the canal footprint area within the Ancoats Green boundary.

The reduction in rainwater permeation across the site, particularly in the area of the filled canal where deep Made Ground is present, will significantly limit the downward movement of surface water into the canal area, ultimately reducing the leaching potential of the identified contamination.

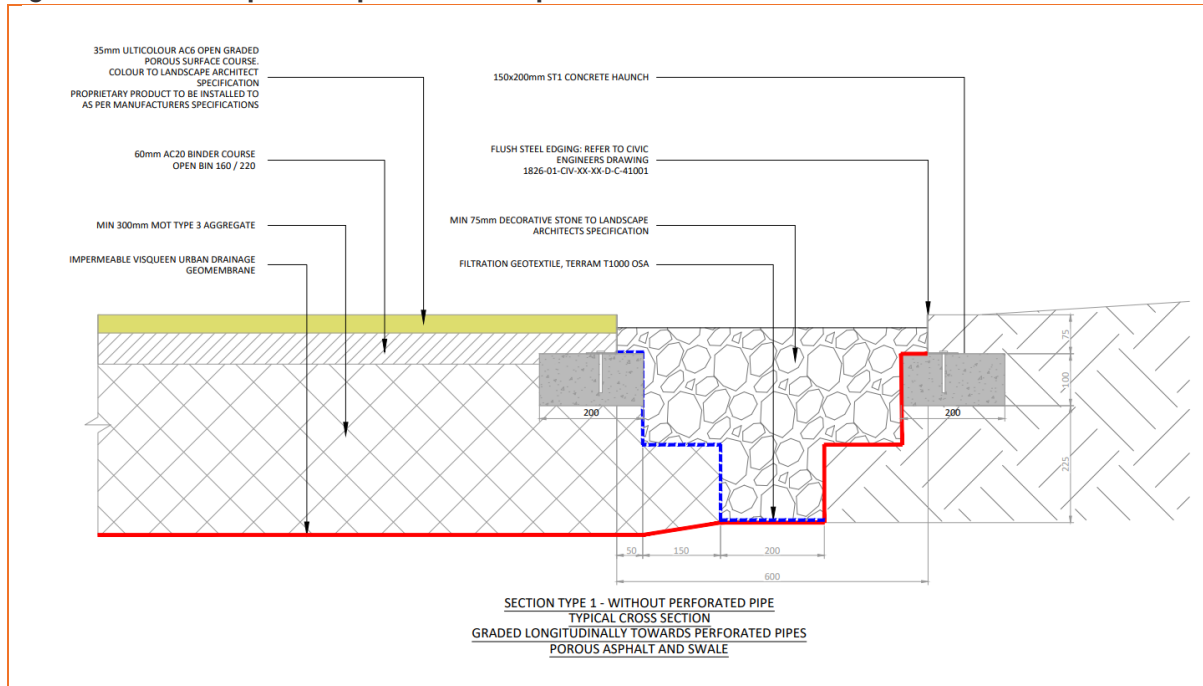
Figure 5 Existing and Proposed Catchment Zones



A cross section is presented in Figure 6 which indicates the proposed positively drained hardstanding inclusive of an impermeable membrane, resulting in the collection of any rainwater permeating through the proposed hardstanding areas of the site, inclusive of the play area and rain gardens.



Figure 6 Proposed Impermeable Visqueen membrane



Where permeation is still plausible in proposed areas of soft standing, it is considered that the water will migrate laterally through the granular Made Ground towards the deepest part of the Made Ground (the infilled canal), however it is deemed unlikely to migrate vertically due to the surrounding low permeability glacial till.

Any surface water which migrates in this fashion would be unlikely to migrate vertically or laterally into any underlying groundwater which may be within hydraulic continuity of the underlying aquifers.

Existing Vegetation and Tree Root Protection Zones

Figure 5 indicates the Tree Root Protection Areas (RPAs) where trees are to be retained on site within the proposed development.

A tree survey and constraints report has been submitted as part of the planning application which identifies the presence and condition of the existing trees on site. A snapshot of the proposed tree retention and removal plan for the development is included within Figure 7.

This indicates the presence of Category B trees along the west of the site within the area of the infilled canal. Category B trees are an important Arboricultural asset and provide amenity value in the local and wider landscape with Arboricultural quality and longevity.

[illegible]

The tree RPAs are noted across approximately 56% of the footprint of the infilled canal. This significantly reduces the viability of remediating the contamination within the infilled canal without posing a potential risk of tree loss.



2.5. SOURCE – PATHWAY RECEPTOR LINKAGES

The site has therefore been identified to be within a moderately sensitive groundwater environment, with the main risks to controlled waters considered to be the underlying aquifers.

The site is predominantly underlain by the Manchester Marl Formation – MUDSTONE, classified as a Secondary A Aquifer. This is a potential receptor, however, in the absence of any potable groundwater abstraction boreholes in the locality, the overall risk is greatly reduced.

The east of the site is underlain by Collyhurst Formation SANDSTONE, classified as a Principal Aquifer, which is noted to the northeast of the site. The Chester Sandstone Formation, also classified as a Principal Aquifer, is noted approximately 200m southwest of the site.

Based on the above hydrogeological assessment, it is known that water in this area flows in a south-westerly direction. As the Collyhurst Sandstone is noted to be Northeast of the site, this therefore greatly reduces the chance of any mobilisation of contaminants towards this receptor as the flow would be in the opposite direction.

In addition, BGS boreholes in this location (directly east of the site), indicate that bedrock is located at 35 m bgl, capped by more than 20m of low permeability Glacial Till.

It is therefore considered by E3P that any infiltration in areas of soft standing across the site, indicate no evident pathway to the Principal Aquifer, and therefore the risk is considered to be low to negligible.

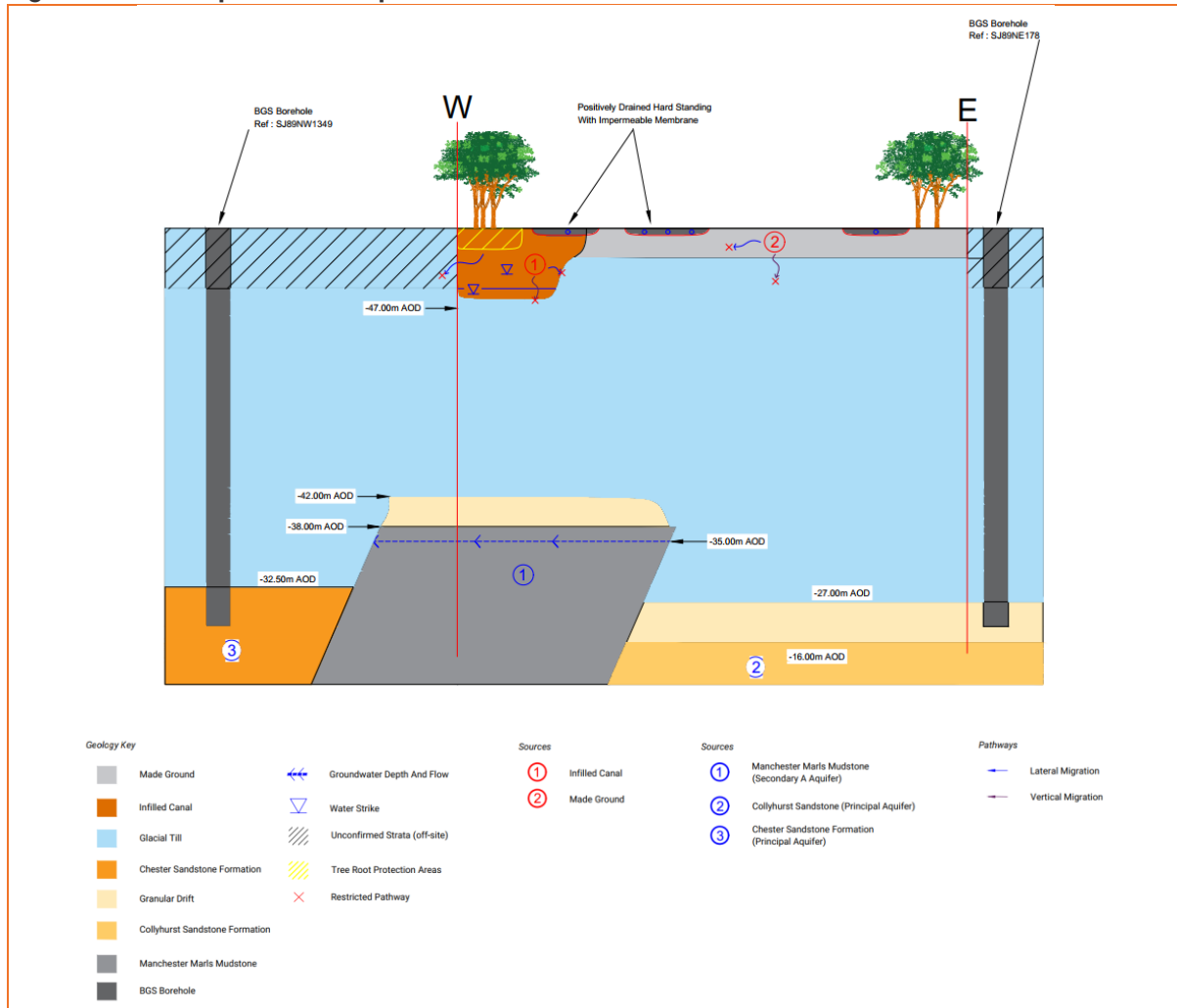
Regarding the Chester Sandstone formation to the southwest of the site, BGS boreholes in this area indicate bedrock at approximately 30 m bgl. With this formation being more than 200m away from the site, as well as at 30 m depth, it is considered unlikely that this is a viable receptor for the site given the presence of low permeability clay.

Lastly, groundwater has been noted on the Hydrogeological Mapping at between 20 m and 40 m AOD. The topographic map places the site 50-51 m AOD, which indicates true groundwater to be at around 15 m bgl. As all water strikes encountered on site were recorded within the Made Ground, there is no evidence of any water within hydraulic continuity of the aquifers in question, and therefore a reduced risk.

E3P has developed a Controlled Waters Conceptual Site Model which is included within Figure 9. Based on the CSM, the main source of mobile contamination is the infilled canal which is recorded to a maximum proven depth of 4.20 m bgl. This is underlain by low permeability clay deposits which will significantly reduce the viability of downward migration of mobile contaminants. The perched water within the Made Ground is not within hydraulic continuity with the true groundwater. Groundwater movements within the deep water table are understood to migrate to the south west away from the principal aquifer (Collyhurst Sandstone Formation). The Chester Sandstone Formation (Principal Aquifer) is recorded >200m west of the site and therefore given the presence of low-permeability clay, the potential for migration towards this receptor is deemed negligible.



Figure 9 Updated Conceptual CSM



2.6. MIGRATION ALONG THE EXISTING CANAL ARM

E3P understands that based on the existing ground conditions, underlying geology and hydrogeological setting of the site, the vertical migration of mobile phase contamination is deemed to be limited.

The migration of contaminants laterally across the site is also deemed to be limited due to the canal being lined with low permeability CLAY. An assessment of the potential for migration along the existing infilled canal arm has concluded that due to the presence of a clay bund and concrete fill, any mobile contamination cannot reach the Rochdale Canal to the south.

The development of Ancoats Green forms part of the wider planning application including the Prussia Street Arm which is directly south of the site and is along the route of the infilled canal.

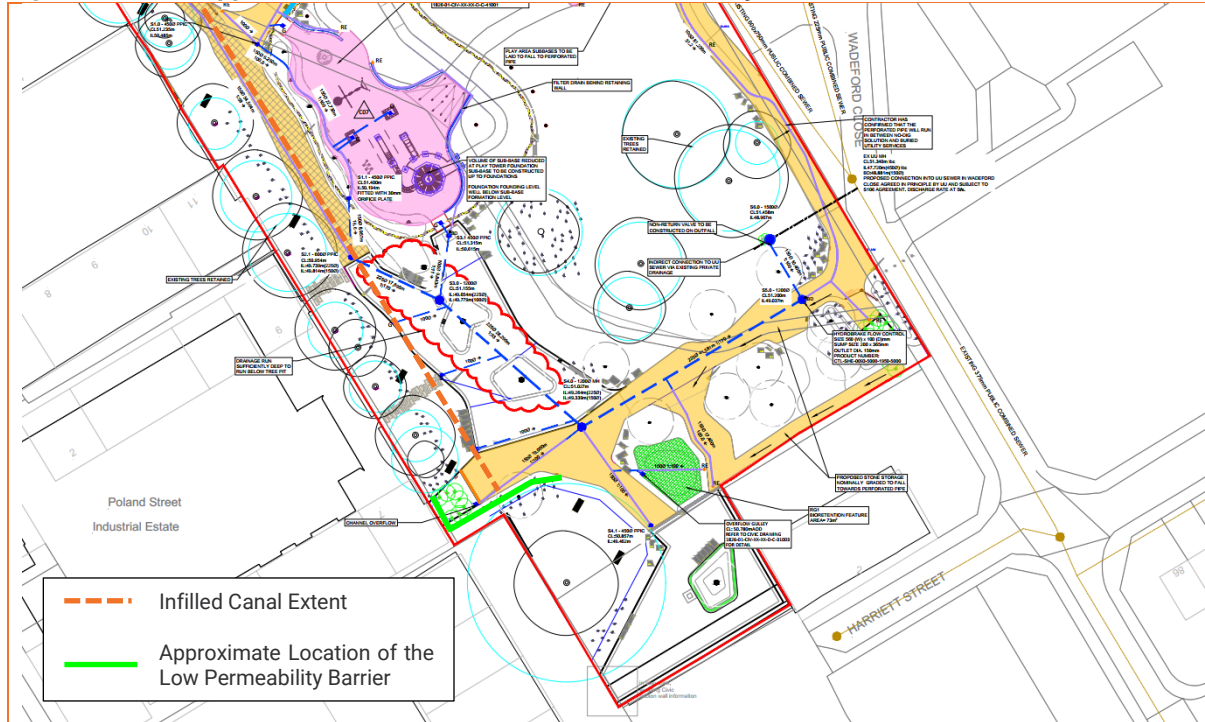
It is recommended that a low permeability barrier is installed on the southern boundary of the Ancoats Green phase of development to reduce the lateral migration along the infilled canal arm. This will aim to reduce the movement of perched water within the Made Ground and also reduce the potential for migration of mobile phase contamination.

The specific design of the low permeability barrier will be included in an updated Remediation Strategy for the proposed development of Ancoats Green. It should be noted that the remediation requirements for the Prussia Street Arm will be included under a separate cover at a later date.



Figure 10 indicates the approximate location of the low permeability barrier. This will be confirmed within the remediation strategy with a full design proposal to ensure the viability of the barrier to prevent the lateral migration along the infilled canal.

Figure 10 **Approximate Location of the Low-Permeability Barrier**



3. CONCLUSION

3.1. SUMMARY

Based on the previous site investigations and further desk-based assessments, E3P has developed a detailed conceptual hydrogeological model for the site to understand the potential. Historical infilling of the former Prussia Arm Canal, primarily poses a controlled waters risk due to contamination within the Made Ground and perched water.

Contaminants include heavy metals, PAHs, and TPHs. Soil and groundwater analysis indicates that the majority of the contamination is within the Made Ground while the Made Ground at the base has significantly lower levels of contamination. The underlying CLAY does not appear to have been impacted by any potential downward migration of mobile phase contaminants.

The Rochdale Canal is not considered a viable receptor due to impermeable barriers along the former canal route to the south.

Vertical migration of contamination is restricted by the cohesive low-permeability clay deposits that underlie the Made Ground. This significantly reduces the risk of contaminants reaching the deeper Secondary A and Principal Aquifers.



The primary receptor for groundwater contamination is the Collyhurst Sandstone Formation (Principal Aquifer) located to the northeast. The south-westerly groundwater flow direction within the underlying bedrock along with the presence of low permeability Glacial Till significantly reduce the likelihood of contaminant migration towards the aquifer.

3.1.1. RECOMMENDATIONS

- ✳ The installation of a low-permeability barrier along the southern boundary of Ancoats Green. This barrier will reduce the potential lateral movement of perched water encountered within the Made Ground, reducing the risk of migration off-site.
- ✳ The proposed development includes the provision of positively drained permeable hardstanding with an underlying impermeable membrane that will reduce rainwater permeation potential by approximately 30%, limiting the leaching of contaminants.
- ✳ Retention of trees within the Tree Root Protection Areas (RPAs) will also minimize soil disruption and reduce contaminant mobilisation.

The specific design details for the low-permeability barrier and other remediation requirements will be provided under a separate cover in a Remediation Strategy for the Ancoats Green (Phase 1) site.

I trust the information provided in this letter report is satisfactory however if there is anything further, please do not hesitate to contact me.

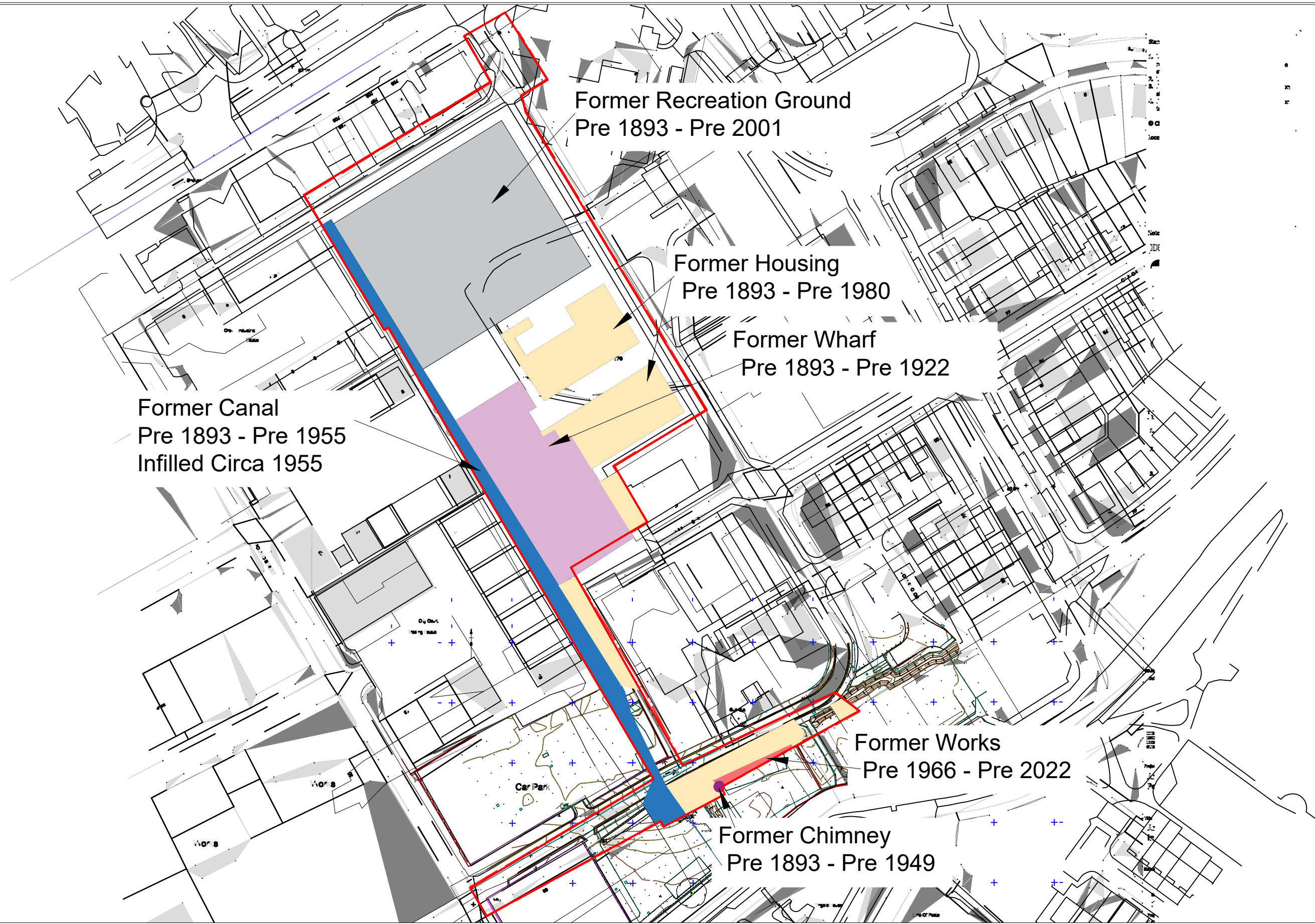
Yours sincerely,
For and on behalf of E3P Ltd

Written by:
Nicola Dawson
Senior Geoenvironmental Consultant

Authorised by:
Stephanie Cox
Director

Attachments:

- ✳ E3P Drawing Ref: 15-798-003 – Historical Features Plan
- ✳ Civic Engineers Drawing Ref: 1826-01-CIV-XX-XX-D-G-20101-20101 – Catchment Areas
- ✳ Civic Engineers Drawing Ref: 1826-01-CIV-XX-XX-D-C-30001 – Drainage Strategy
- ✳ Civic Engineers Drawing Ref: 1826-01-CIV-XX-XX-D-C-31003 – Drainage Detail
- ✳ Civic Engineers Drawing Ref: 1826-01-CIV-XX-XX-D-C-31005 – Drainage Detail
- ✳ E3P Drawing Ref: 15-798-011 – Controlled Waters Conceptual Site Model



Former Recreation Ground
Pre 1893 - Pre 2001

Former Housing
Pre 1893 - Pre 1980

Former Wharf
Pre 1893 - Pre 1922

Former Canal
Pre 1893 - Pre 1955
Infilled Circa 1955

Former Works
Pre 1966 - Pre 2022

Former Chimney
Pre 1893 - Pre 1949



Site Features Former Canal Former Recreation Ground Former Chimney Former Housing Former Warf	Notes:					Client: Civic Engineers	Job No: 15-798	Date: 09.01.2023	e3p Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk											
							Drawing No: 003	Scale: NTS@ A3												
<table><tr><td>P1</td><td>REVA</td><td>09.01.2023</td><td>OW</td><td>HM</td></tr><tr><td>Phase</td><td>Issue</td><td>Date</td><td>Drawn</td><td>Checked</td></tr></table>						P1	REVA	09.01.2023	OW	HM	Phase	Issue	Date	Drawn	Checked	Job Title: Jersey Street, Ancoats		Drawing Title: Historical Features Plan		The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
P1	REVA	09.01.2023	OW	HM																
Phase	Issue	Date	Drawn	Checked																



SITE CATCHMENT AREAS SUMMARY

	CATCHMENT DESCRIPTION	AREA	COMMENTS
1	ANCOATS GREEN SITE AREA UNDER THIS DEVELOPMENT PHASE (EXCLUDES EXISTING PORTUGAL ST HIGHWAY)	9664m²	
2	RETAINED TREE ROOT PROTECTION ZONES (WITHIN SITE BOUNDARY). UNABLE TO REMEDIATE	3150m²	33% INFILTRATION POTENTIAL
3	EXISTING PERMEABLE AREA (GRASS)	5842m²	60% INFILTRATION POTENTIAL
4	EXISTING IMPERMEABLE AREAS (ASHPHALT PATHWAYS DRAIN TO SOFT LANDSCAPING - NO FORMAL DRAINAGE IDENTIFIED)	672m²	7% INFILTRATION POTENTIAL
5	RETAINED TREE ROOT PROTECTION ZONES (WITHIN SITE BOUNDARY). UNABLE TO REMEDIATE	3150m²	33% INFILTRATION POTENTIAL
6	PROPOSED PERMEABLE AREA (GRASS)	3606m²	37% INFILTRATION POTENTIAL
7	PROPOSED HARDSTANDING (POSITIVELY DRAINED)	2791m²	29% POSTIVELY DRAINED. NO INFILTRATION
8	POSITIVELY DRAINED LINED RAINGARDENS	117m²	1% POSITIVELY DRAINED. NO INFILTRATION

- NOTES:
- THEREFORE 30% REDUCTION IN INFILTRATION POTENTIAL
 - 33% UNABLE TO BE REMEDIATED DUE TO TREE PROTECTION ZONES
 - 37% WITH NO RESTRICTION TO INFILTRATION

CANAL ARM FOOTPRINT AREA SUMMARY

	CATCHMENT DESCRIPTION	AREA	COMMENTS
1	INDICATIVE INFILLED CANAL FOOTPRINT WITHIN FOOTPRINT OF ANCOATS GREEN BOUNDARY	1049m²	
2	EXISTING PERMEABLE GRASS OR SOFT LANDSCAPE AREA OVER INFILLED CANAL	423m²	40% INFILTRATION POTENTIAL
3	RETAINED TREE ROOT PROTECTION ZONE OVER INFILLED CANAL ARM	585m²	56% INFILTRATION POTENTIAL
4	EXISTING IMPERMEABLE AREA OVER INFILLED CANAL ARM	41m²	4% DRAINS TO SOFT. INFILTRATION POTENTIAL
5	PROPOSED PERMEABLE GRASS OR SOFT LANDSCAPE AREA OVER INFILLED CANAL	203m²	19% INFILTRATION POTENTIAL
6	RETAINED TREE ROOT PROTECTION ZONE OVER INFILLED CANAL ARM	585m²	56% INFILTRATION POTENTIAL
7	PROPOSED IMPERMEABLE AREA OVER INFILLED CANAL ARM	261m²	25% POSTIVELY DRAINED. NO INFILTRATION

- NOTES:
- FOOTPRINT OF CANAL INDICATIVE BASED ON HISTORICAL RECORDS
 - 25% REDUCTION IN INFILTRATION POTENTIAL
 - 56% UNABLE TO BE REMEDIATED DUE TO PRESENCE OF TREES

- STANDARD NOTES
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
 - THIS DRAWING SHOULD NOT BE SCALED.
 - ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
 - ALL DISCREPANCIES SHOULD BE REPORTED TO C/A/E.A. PRIOR TO THE COMMENCEMENT OF WORKS.
- © CIVIC ENGINEERS LIMITED
- KEY AND NOTES
- EXTENT OF WORKS BOUNDARY
 - PROPOSED RAIN GARDEN WITH LINED SUB-BASE
 - POROUS ASPHALT WITH LINED ATTENUATION SUB-BASE
 - PERMEABLE PLAY SURFACE WITH LINED ATTENUATION SUB-BASE
 - IMPERMEABLE PAVING POSTIVELY DRAINED INTO DRAINAGE CHANNEL
 - EXISTING HARDSTANDING (PATHS) DRAINS TO SOFT LANDSCAPE
 - TREE ROOT PROTECTION ZONE
 - INDICATIVE LINE OF INFILLED CANAL

06.11.24

P01

ISSUED FOR INFORMATION

CK

CK

DATE

REV

DESCRIPTION

DRAWN

CHKD

Civic Engineers

MANCHESTER

Civic's Warehouse, 77 Dale Street, Manchester, M1 2HG, Tel: 0161 238 6767

LONDON

Reeds Wharf, 35 Abchurch Lane, London EC4A 3DF, Tel: 020 7253 2877

LEEDS

15 New Mill Street, Wharfedale, Leeds, LS2 9BT, Tel: 0113 2025 110

GLASGOW

15 Virginia Street, Glasgow G1 1TH, Tel: 0141 201 1820

www.civicingineers.com

PROJECT

POLAND STREET ZONE

TITLE

ANCOATS GREEN INFILTRATION POTENTIAL ASSESSMENT

DRAWING STATUS

STATUS CODE

FOR APPROVAL

-

CE PROJECT No.

SCALE @ A0

DATE CREATED

DRAWN

CHECKED

1826-01

1:200

NOV'24

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DRAWING No.

REV

1826-01-CIV-XX-XX-D-C-20101

P01



- STANDARD NOTES
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
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KEY AND NOTES

- EXTENT OF WORKS BOUNDARY
- SLOPE GRADIENT
- PROPOSED RAIN GARDEN
- POROUS ASPHALT WITH PERMEABLE SUB-BASE (MIN 300mm DEEP)
- POROUS ASPHALT WITH PERMEABLE SUB-BASE (MIN 500mm DEEP)
- ACO CHANNEL M1500 10.0 WITH SLOTTED GRATING DUCTILE IRON C250
- PERMEABLE PLAY SURFACE WITH PERMEABLE SUB-BASE
- EXISTING COMBINED SEWER
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER PIPE
- PROPOSED PERFORATED SURFACE WATER PIPE
- PROPOSED DRAINAGE RILL
- RODDING EYE
- EXISTING GULLY
- EXISTING COMBINED SEWER MANHOLE - INDICATIVE LOCATION
- PROPOSED GULLY
- ACO UNIVERSAL SUMPED OUTLET GULLY
- EXISTING BELOW GROUND PRIVATE DRAINAGE

SUDS ELEMENTS
RAINGARDENS WILL BE UNDERLAIN BY A 300mm THICK LAYER OF 4-20MM CLEAN STONE (SUDS) AGGREGATE MATERIAL WITH A VOID RATIO OF 30% BELOW THE GROWING MEDIUM LAYER.

POROUS SURFACING TO BE LAID OVER A MINIMUM 300mm DEEP LAYER OF TYPE 3 OPEN GRADED AGGREGATE. COMPACTED TO ACHIEVE 30% VOID RATIO FOR VOLUME CALCULATION PURPOSES.

RAINGARDENS TO BE PLANTED USING WATER RESILIENT NATIVE PLANTS IN ACCORDANCE WITH PLANTIE LANDSCAPE DETAILS AND SPECIFICATION

ALL DRAINAGE TO UU SEWER US FOR HARDSTANDING AREAS ONLY

NO LAND DRAINAGE IS DRAINING TO UU SEWERS

16.08.24	C07	ADDITIONAL NOTES ADDED, SITE LAYOUT UPDATED	TC	OK
29.05.24	C06	ADDITIONAL NOTES ADDED, SITE LAYOUT UPDATED	TC	OK
07.05.24	C05	NRV ADDED TO FINAL PRIVATE MANHOLE	TC	26
15.04.24	C04	DRY CORNER UPDATED, S2.1 MOVED	2H	TC
21.03.24	C03	UPDATED SITE LAYOUT	2H	TC
10.02.24	C02	UPDATED AS INDICATED	2G	CRK
12.06.24	C01	SUBMITTED FOR STAGE 5	BW	26
09.02.24	P06	SUBMITTED FOR PRE COMMENCEMENT CONDITIONS	BW	26
16.11.23	P05	UPDATED TO PLANT COMMENTS	BW	TC
31.07.23	P04	ISSUED FOR STAGE 4	CD	OK
09.05.23	P03	ISSUED FOR STAGE 4	BW	OK
05.02.23	P02	REQUIRE BOUNDARY UPDATED	BW	OK
16.12.22	P01	ISSUED FOR INFORMATION	BW	OK
DATE	REV	DESCRIPTION	DRAWN	CHKD

Civic Engineers

MANCHESTER
LONDON
GLASGOW

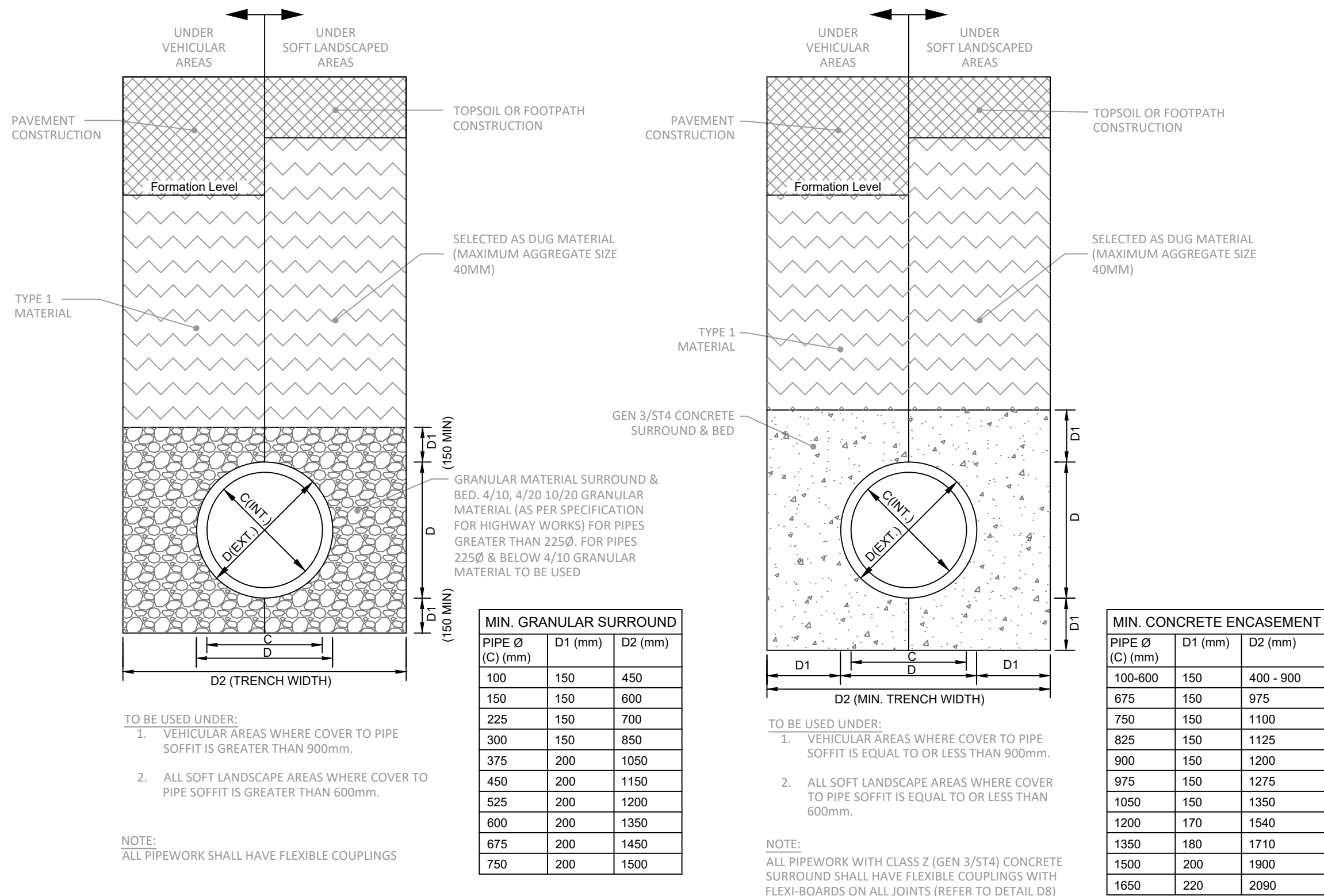
200 Oldfield Road, Manchester, M1 2PL, Tel: 0161 238 6791
100 Oldfield Road, London E1 2DA, Tel: 020 7253 2877
100 Oldfield Road, Glasgow G1 1TH, Tel: 0141 238 6791

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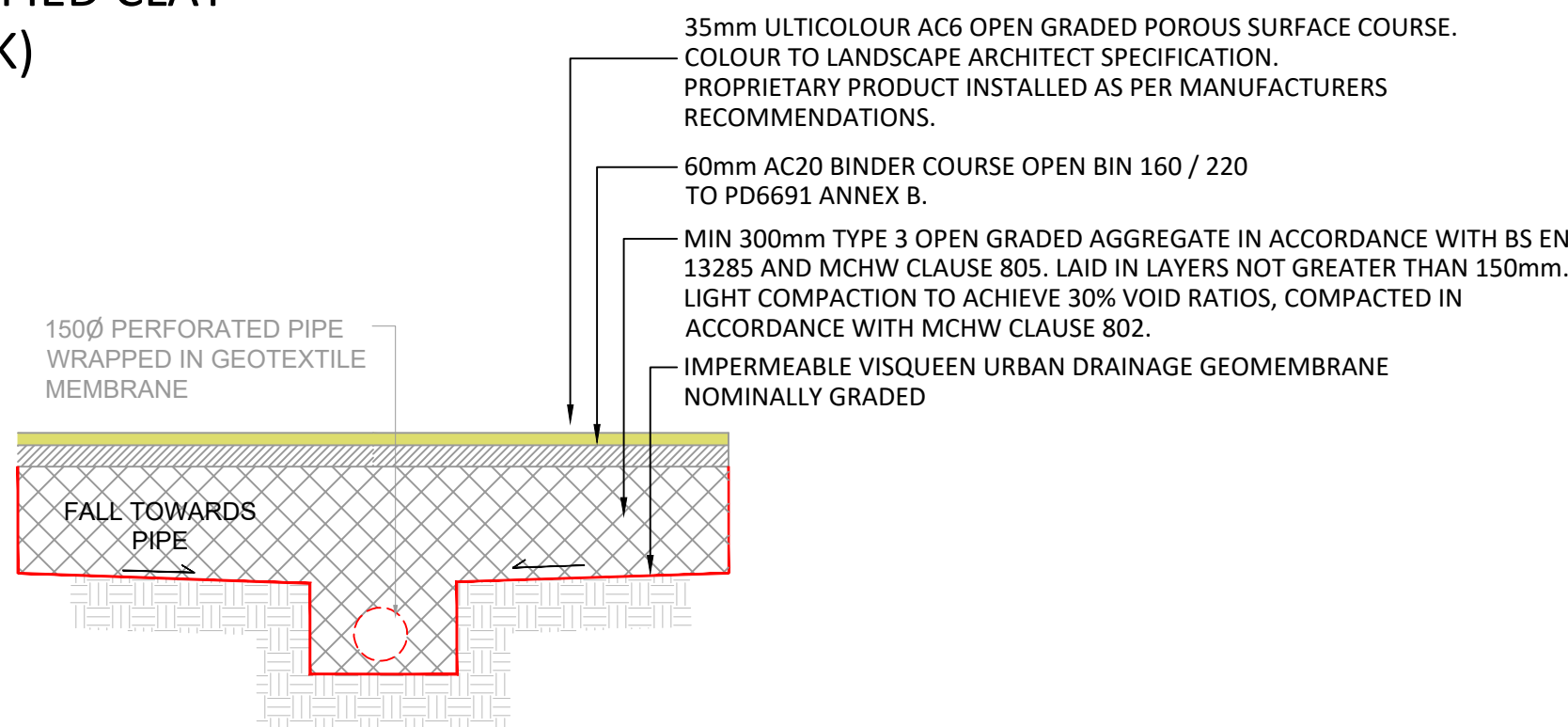
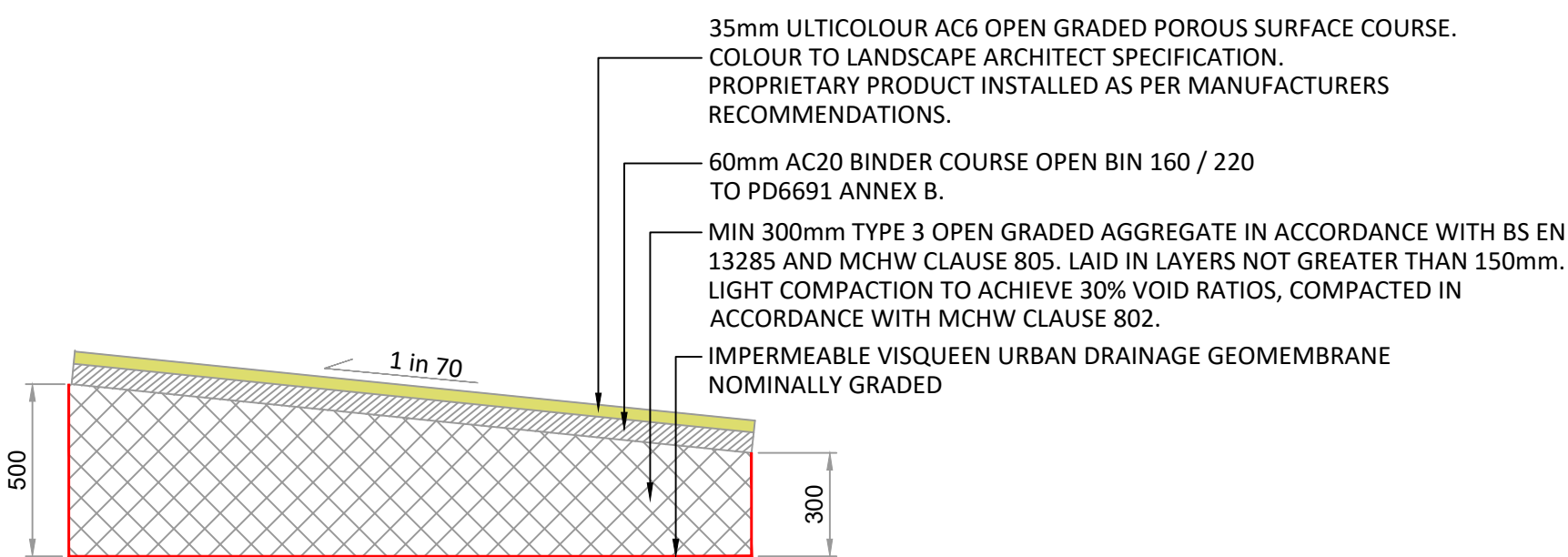
TITLE
PROPOSED DRAINAGE STRATEGY
ANCOATS GREEN

DRAWING STATUS				STATUS CODE	
STAGE 5				-	
CE PROJECT NO	SCALE @ A0	DATE CREATED	DRAWN	CHECKED	
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1826-01-CIV-XX-XX-D-C-30001					C07

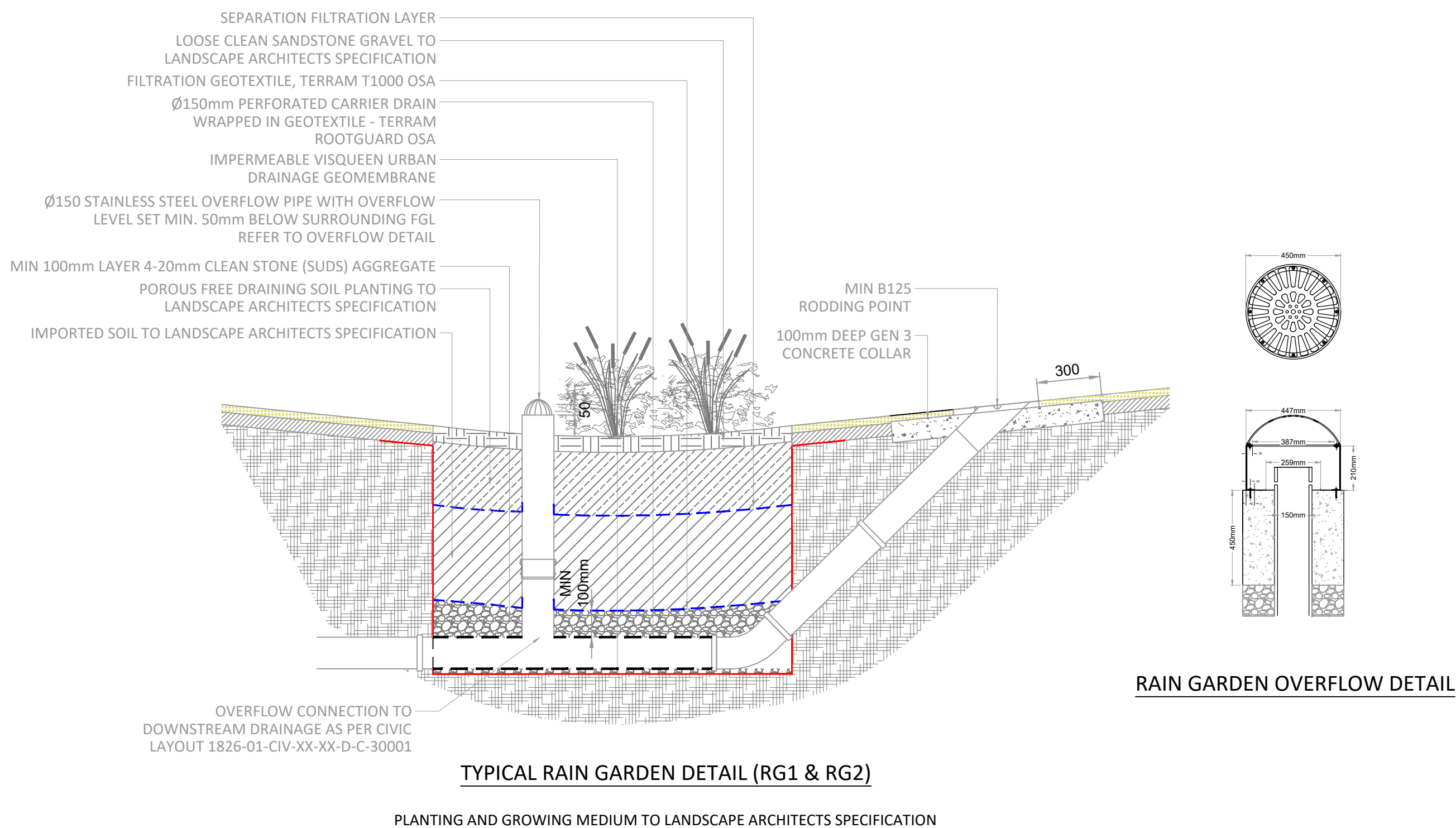


CLASS S PIPE BEDDING & SURROUND (TO BE USED FOR PLASTIC, VITRIFIED CLAY & CONCRETE PIPEWORK)

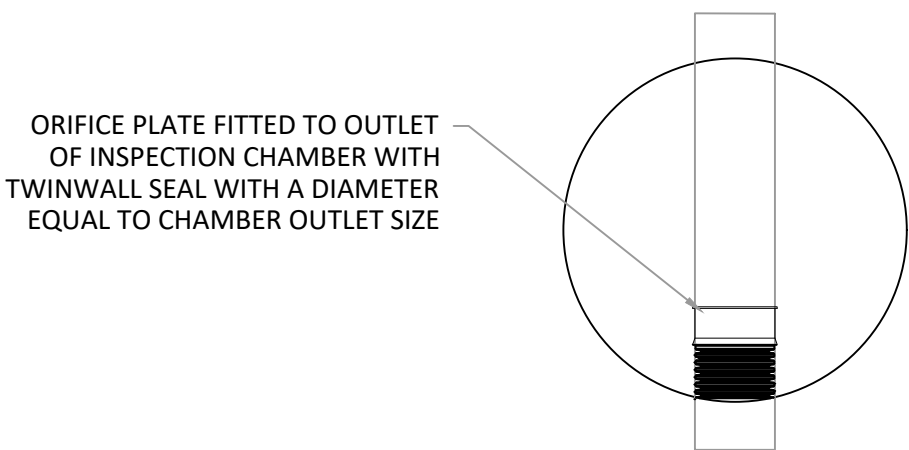
CLASS Z PIPE BEDDING & SURROUND (TO BE USED FOR PLASTIC, VITRIFIED CLAY & CONCRETE PIPEWORK)



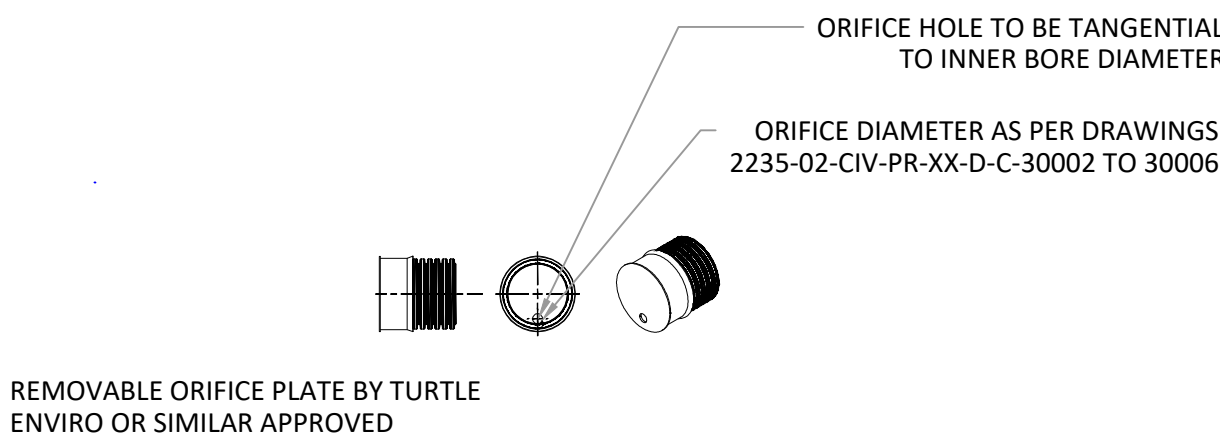
TYPICAL PERMEABLE PAVING DETAIL



PLANTING AND GROWING MEDIUM TO LANDSCAPE ARCHITECTS SPECIFICATION



TYPICAL ORIFICE PLATE WITHIN INSPECTION CHAMBER



ORIFICE PLATE DETAIL

Standard Notes

1. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and the specification.
2. This drawing should not be scaled.
3. All dimensions are to be verified by the contractor on site.
4. All discrepancies should be reported to the C.A. prior to the commencement of the works.

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Notes

BENCHING NOTES
MAIN & BRANCH CHANNELS TO BE BEDDED AND JOINTED IN 1:3 CEMENT MORTAR.
MAIN CHANNEL BENCHING TO BE FORMED VERTICALLY TO A MINIMUM OF THE SOFFIT OF THE OUTLET PIPE. THE BENCHING SHALL BE ROUNDED OFF TO A RADIUS OF APPROXIMATELY 25MM AND SLOPED UPWARDS AT A GRADIENT OF 1:10 TO 1:30 TO CHAMBER WALLS.
BENCHING SHALL BE FLOATED TO A SMOOTH, HARD SURFACE WITH A 1:2 CEMENT MORTAR LAID MONOLITHIC WITH THE BENCHING.

SIDE BRANCHES OF DIAMETER UP TO AND INCLUDING 1500 SHOULD DISCHARGE TO THE MAIN CHANNEL IN THE DIRECTION OF FLOW, PREFERABLY AT HALF PIPE LEVEL. WHERE THE CONNECTING ANGLE IS MORE THAN 45°, THREE QUARTER SECTION BENDS SHOULD BE SHAPED SO AS TO CONTAIN THE FLOW WITHOUT PERMITTING FOULING AND FACILITATE RODDING OF BRANCH DRAINS.

A BRANCH WITH GREATER THAN 1500 SHOULD BE SET WITH THE SOFFIT LEVEL WITH THAT OF THE MAIN DRAIN.

COVERS & FRAMES
INTERNAL COVERS AND FRAMES TO BE DOUBLE LOCKED AND SEALED AND SHALL BE OF THE RECESSED TYPE TO ACCOMMODATE INFILL MATERIAL.

COVERS WITHIN BLOCK PAVED AREAS SHALL BE ORIENTATED TO SUIT ORIENTATION OF SURROUNDING BLOCKWORK.
MANHOLE COVERS AND FRAMES SITUATED WITHIN VEHICULAR AREAS ARE TO BE CLASS D400. MANHOLE COVERS AND FRAMES SITUATED WITHIN NON-VEHICULAR AREAS ARE TO BE CLASS B125. MANHOLE COVERS AND FRAMES ARE TO COMPLY WITH BS EN124-2 IF CAST IRON.

MANHOLE ACCESS TO BE ORIENTATED SUCH THAT STEP IRONS LEAD TO BENCHING AND NOT PIPE CHANNELS.

OVERSAIL CORBELLING SHALL NOT EXCEED 30MM ON EACH COURSE.

CHAMBERS WITH OUTGOING PIPES GREATER THAN 600MM DIAMETER SHALL BE FITTED WITH GUARD BARS, SAFETY CHAINS OR OTHER SAFETY DEVICES.

TOE HOLES TO BE PROVIDED IN BENCHING OF SEWER GREATER THAN 450MM DIAMETER FOR ACCESS TO PIPE INVERT.

ALL CONNECTIONS INTO AND OUT OF CHAMBERS/GULLIES TO HAVE CLASS Z CONCRETE SURROUND WITH FLEXIBLE COUPLINGS AND FLEXIBOARDS ON ALL COUPLINGS WHERE COVER TO PIPE SOFFIT IS EQUAL TO OR LESS THAN:

- 1) 1200MM UNDER VEHICULAR AREAS
- 2) 600MM UNDER NON-VEHICULAR AREAS

ALL CONCRETE USED IN CONSTRUCTION WITHIN SEWER/DRAIN AND DOMESTIC DRAINAGE TO BE CONSTRUCTED WITH SULPHATE RESISTING CEMENT.

16.04.24	C04	ADDITIONAL NOTE ADDED TO RAIN GARDEN DETAIL AND ORIFICE PLATE DETAIL ADDED	ZG	TC
15.04.24	C03	RAIN GARDEN DETAIL UPDATED	ZG	TC
21.03.24	C02	UPDATED FOLLOWING TQ19	ZH	TC
12.01.24	C01	ISSUED FOR STAGE 5	BW	ZG
05.01.24	P03	SUBMITTED FOR PRE COMMENCEMENT CONDITIONS	BW	ZG
31.07.23	P02	ISSUED FOR TENDER	BW	CK
10.05.23	P01	ISSUED FOR TENDER	BW	CK
Date	Rev	Description	Drawn	Chkd



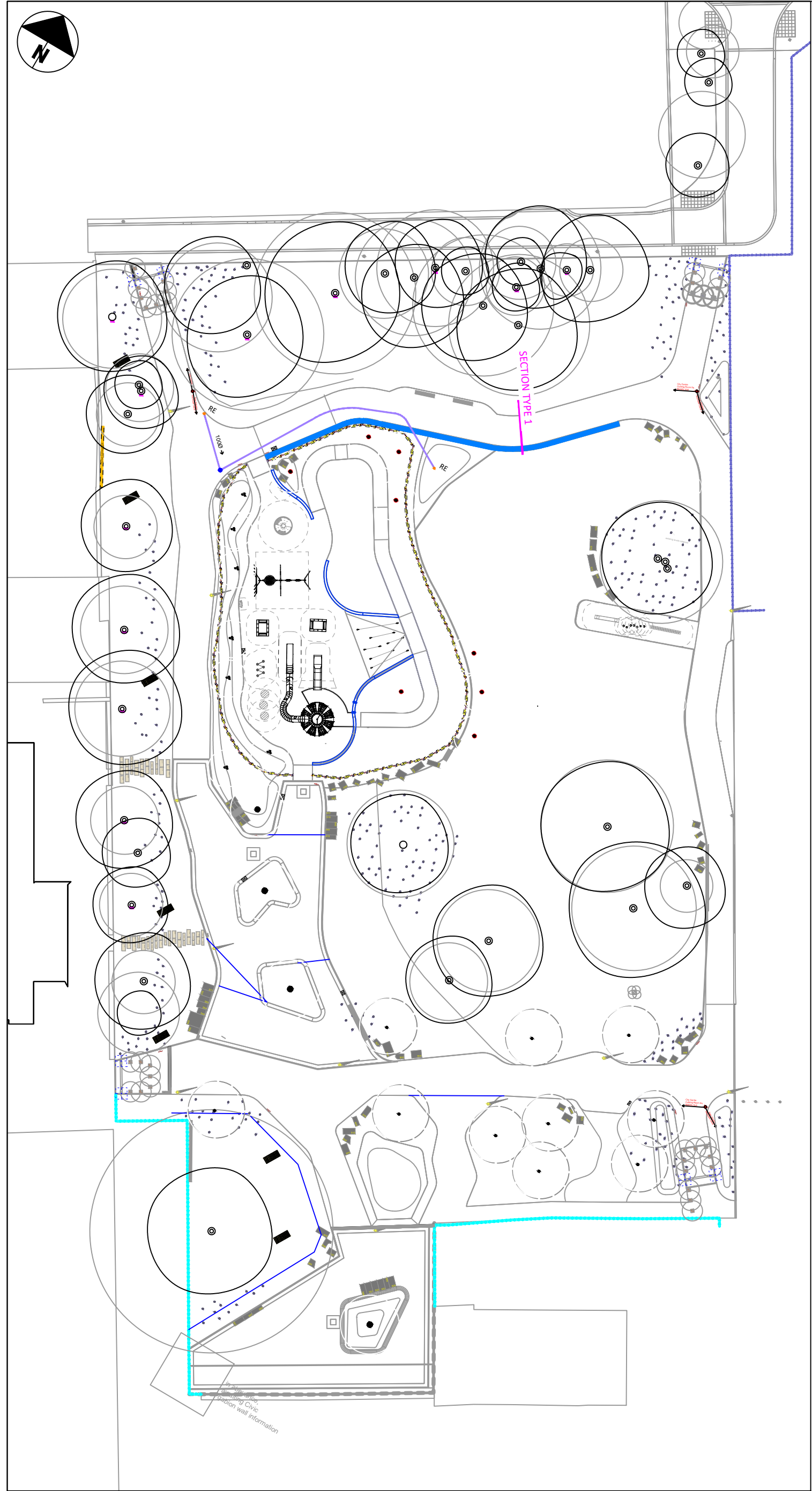
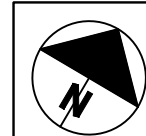
Project
POLAND STREET ZONE

Title
ANCOATS GREEN DRAINAGE DETAILS SHEET 3

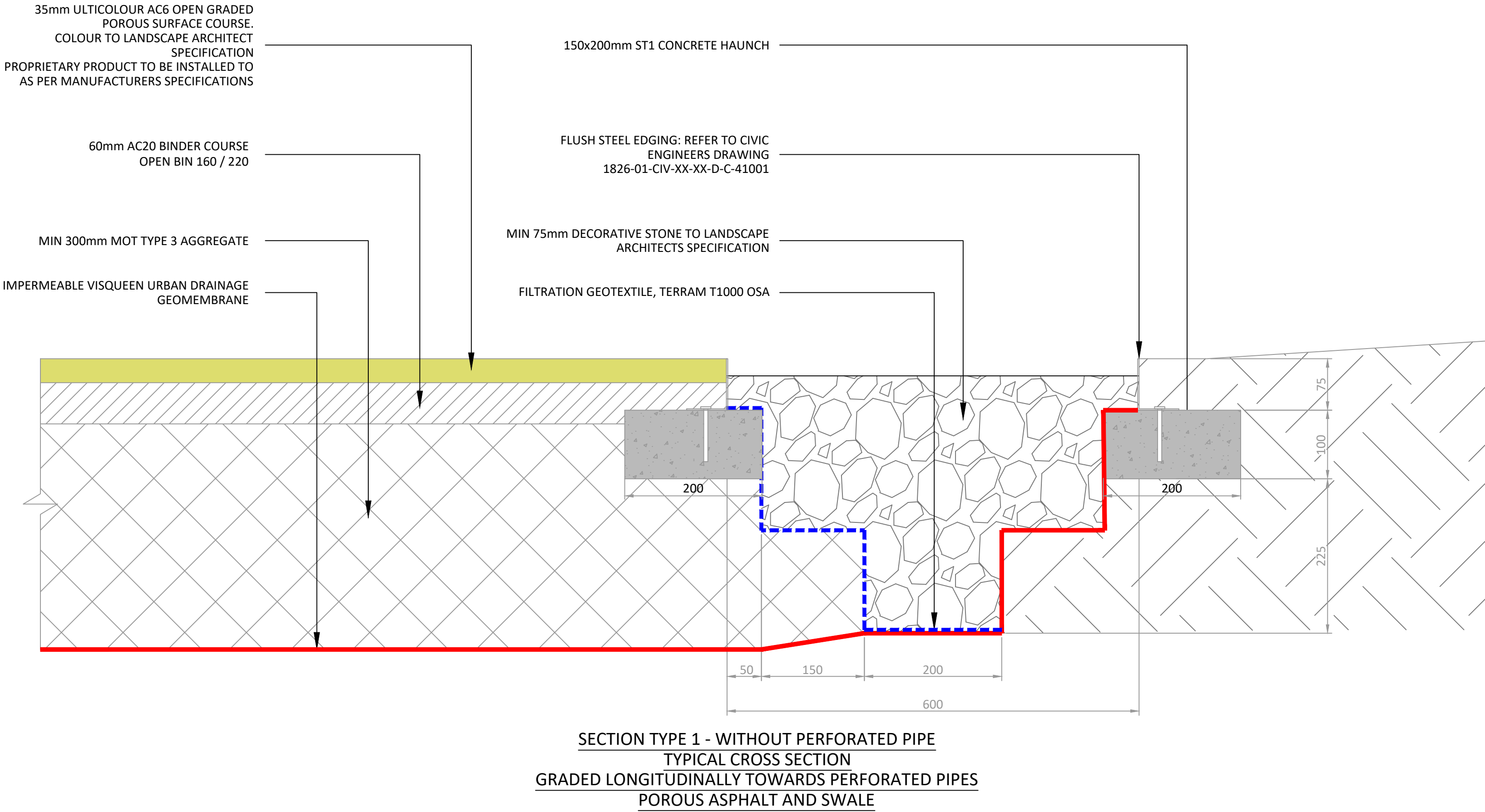
Status
STAGE 5

Project Number	Scale @ A1	Date Created	Drawn	Checked	Suitability
1826-01	1:20	MAY'23	BW	CK	-

Drawing Number	Revision
1826-01-CIV-XX-XX-D-C-31003	C04



KEYPLAN
SCALE 1:500



STANDARD NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
- THIS DRAWING SHOULD NOT BE SCALED.
- ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
- ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

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15.04.24	C02	UPDATED TO SUIT LATEST DRAINAGE LAYOUT	ZG	TC
21.03.24	C01	SUBMITTED FOR CONSTRUCTION	ZH	CK
DATE	REV	DESCRIPTION	DRAWN	CHKD

MANCHESTER Carron's Warehouse, 77 Dale Street, Manchester, M1 2HG. Tel: 0161 228 6751

LONDON Rends Wharf, 33 Mill Street, London SE1 2AA. Tel: 020 7253 2077

LEEDS 1 Saw Mill Street, Winter Lane, Leeds, LS1 5HW. Tel: 0113 2035 130

GLASGOW 35 Virginia Street, Glasgow, G1 1TN. Tel: 0141 370 8899

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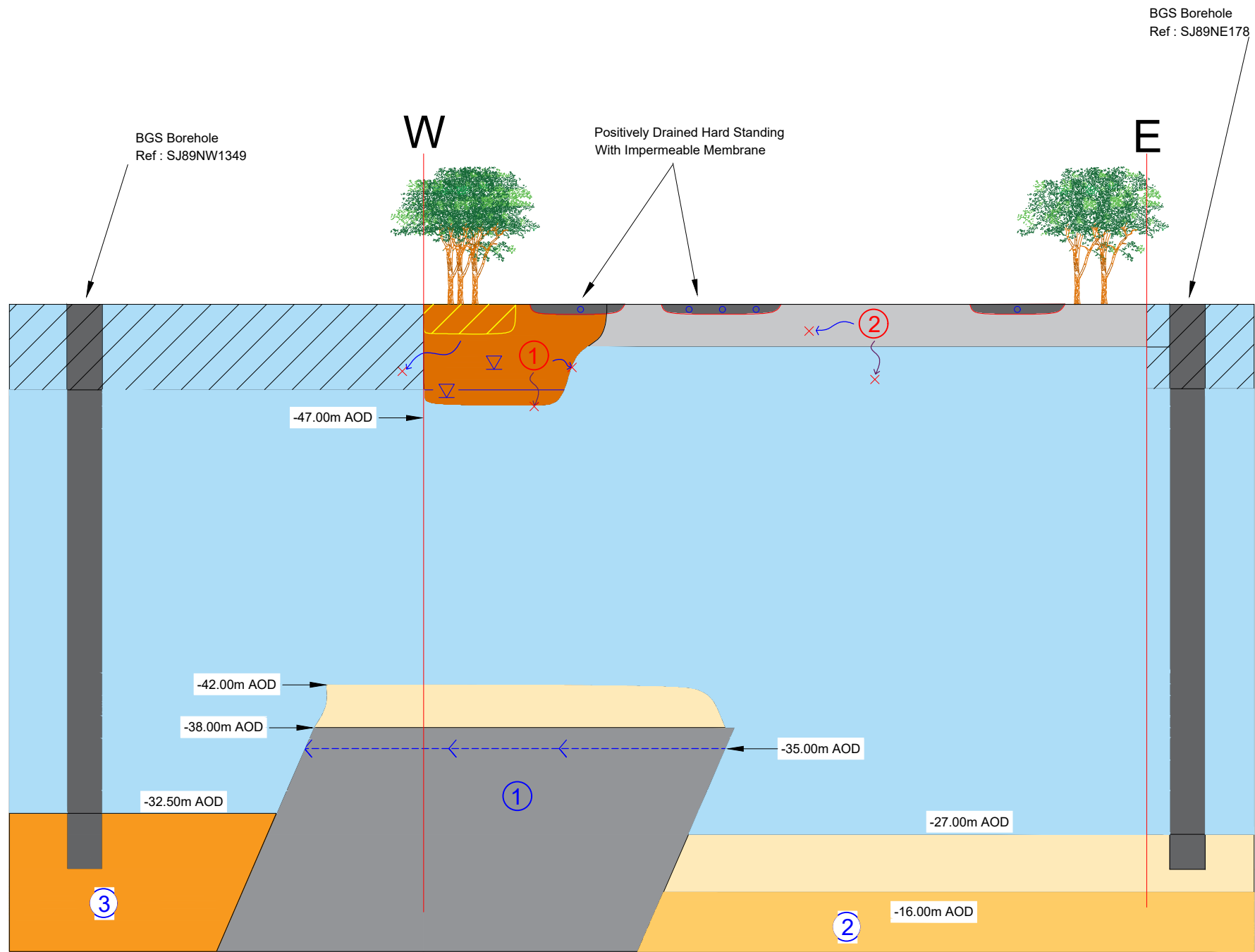
PROJECT

POLAND STREET ZONE

TITLE

**ANCOATS GREEN
TQ18
DRAINAGE SWALE DETAIL**

DRAWING STATUS					STATUS CODE	
STAGE 5					-	
CE PROJECT No.	SCALE @ A1	DATE CREATED	DRAWN	CHECKED		
1826-01	1:10	MAR '24	ZH	CK		
DRAWING No.					REV	
1826-01-CIV-XX-XX-D-C-31005					C02	



Geology Key

	Made Ground
	Infilled Canal
	Glacial Till
	Chester Sandstone Formation
	Granular Drift
	Collyhurst Sandstone Formation
	Manchester Marls Mudstone
	BGS Borehole

Sources

①	Infilled Canal
②	Made Ground

Sources

①	Manchester Marls Mudstone (Secondary A Aquifer)
②	Collyhurst Sandstone (Principal Aquifer)
③	Chester Sandstone Formation (Principal Aquifer)

Pathways

	Lateral Migration
	Vertical Migration

Notes:

P1	REVA	06.11.2024	TG	HM	HM
Phase	Issue	Date	Drawn	Checked	PM

Client:

Civiv Engineers

Job Title:

Jersey Street,
Ancoats

Job No:

15-798

Drawing No:

011

Date:

06.11.2024

Scale:

NTS

Drawing Title:

Conceptual Site
Model



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