

Sister: Manchester

Hollaway Wall

Structural Appraisal & Outline Methodology Report

May 2025

PREPARED FOR

ID Manchester Limited and University of Manchester



Hollaway Wall Structural Appraisal & Outline Methodology Report

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CONTENTS

CONTENTS.....	1
1. Introduction.....	1
1.1. Site Overview	3
1.2. History	4
1.3. Existing Information	5
1.4. Constraints	8
2. Appraisal for Retention.....	10
2.1. Structural Form.....	10
2.2. Foundations.....	11
2.3. Condition	12
3. Proposed Development.....	17
3.1. Interventions	17
3.2. Considerations.....	17
4. Outline Method Statement	20
4.1. Recommendations	20
4.2. Sequence of Works	20
4.3. Access Requirements	21
4.4. Risk Mitigation	22
Appendix A – Core Hole Log Sections.....	
Appendix B – Structural Works Sketch	
Appendix C – Related Civic Drawings & Documents	

1. Introduction

Bruntwood SciTech appointed Civic Engineers to undertake a preliminary structural engineering appraisal for the Hollaway Wall, situated on the former University of Manchester Institute of Science and Technology (UMIST) campus in central Manchester. The aspiration is to retain and reuse this structure as part of the Sister Plot C development. This outline report has been prepared in support of submitting the application for Full Planning Permission and Listed Building Consent for works to the Hollaway Wall ("the Wall") and Listed Building Consent for works to the Viaduct.

Plot C is situated within the 'North Campus Strategic Regeneration Framework (SRF) area' as designated by the LPA in May 2017. This document was superseded in December 2023 under 'Innovation District Manchester SRF' and summarises the aims of the project which is being brought forward by ID Manchester Ltd, a joint venture ("the JV") between The University of Manchester ("the University") and Bruntwood SciTech ("BST"), working in close collaboration with Manchester City Council ("MCC"). The SRF is not a planning policy document, but it is wholly rooted in the policies of the adopted Development Plan. It has been drafted with consideration of MCC's strategic priorities and how the principles outlined can maximise the benefits delivered by the innovation district. The SRF is a material consideration in the determination of planning applications within the Framework Area.

The Plot C proposals comprise the demolition of Barnes-Wallis, Wright Robinson, Manchester Meeting Place, Morton, Moffat Buildings and the construction of two office buildings (Use Class E). At the base of the building, the buildings will be connected via an open shared lobby space, which shall comprise a variety of uses including social amenity spaces, as well as food and beverage establishments (Use Class E, Sui Generis – drinking establishment). The proposals will also include interventions to the Hollaway Wall, incorporating it into the new commercial element. Additionally, the proposals will involve the change of use of the railway arches to retail and food and beverage uses (Use Class E and Sui Generis– drinking establishment). The proposals will also include the creation of a new public square, access and other associated works.

This outline report summarises the work related specifically to the existing Hollaway Wall structure and briefly discusses how it fits in with the Plot C development. It includes site context and associated constraints, along with a recommended sequence of works and methodology.

Note that at the time of writing this report, Plot C is undergoing RIBA Stage 2 design and is, therefore, subject to further development and coordination. For Plot C specific information, reference should be made to the relevant structural design reports. Further details will follow as the proposals are developed, specialist concrete contractors are engaged with, and a full survey has been undertaken.

Appendix C of this report includes the following related Civic Drawings & Documents:

Description	Drawing/Document Number	Revision
Site Constraints	SISC0-CIV-XX-ZZ-DR-CV-10001	P01
Site Sections Sheet 1 of 4	SISC0-CIV-XX-ZZ-DR-CV-40001	P01
Site Sections Sheet 3 of 4	SISC0-CIV-XX-ZZ-DR-CV-40003	P01
Site Sections Sheet 3 of 4	SISC0-CIV-XX-ZZ-DR-CV-40004	P01
Existing Site Cross Sections Sheet 3	SISC0-CIV-EX-ZZ-DR-ST-12003	P01
Existing Site Cross Sections Sheet 4	SISC0-CIV-EX-ZZ-DR-ST-12004	P01
Hollaway Wall Factual Site Investigation Report	51019-CE-06-XX-R-G-1001	P01
Hollaway Wall Details	SISC0-CIV-EX-ZZ-DR-ST-10201	NYI – to be developed



Figure 1: Aerial view of the Hollaway Wall with site context. Source – Google Earth.

1.1. Site Overview

The proposed Plot C development site is approximately 21,733m² / 2.2ha. The Site is in Manchester City Centre and is bound by the Manchester South Junction and Altrincham Railway (MSJ&AR) Viaduct to the north, London Road to the east, The Mill to the south and the Renold Building to the west.

The Site currently comprises the landscaped area known as the Bowling Green, the Barnes Wallis and Wright Robinson Building, Manchester Meeting Place and Morton Labs, all associated with the former UMIST Campus of the University of Manchester. Although not listed, these buildings are of heritage interest. The Site also contains the Grade II Hollaway Wall and the MSJ&AR Viaduct. The Moffat Building is also contained within the Plot C boundary, this building is not considered to yield any heritage interest, however, it is physically connected to the Hollaway Wall.

The Site is located within the Whitworth Street Conservation Area, with the north aspect of the Plot C boundary (viaduct) forming the Conservation Area boundary. The Site therefore forms part of the designated area. The Site also includes a small parcel of land located to the north of the main site, accessed off Sackville Street. This parcel of land was previously used as a waste storage area and is enclosed by fencing and a gate.



Figure 2: Plan highlighting the existing structures within the Plot C development site. Note that Barnes Wallis and Wright Robinson are one building.

1.2. History

The Hollaway Wall was constructed c.1968 to the design of Anthony Hollaway, forming a concrete barrier and addressing the level change between London Road and the campus. The wall enclosed the Moffat Building, which is formed of a 1950s former confectionery warehouse, latterly adapted to accommodate the University Estates department, and subsequently the Department of Optometry.

The Wall forms one of the last components in what is today known as 'Plot C'. The structure is not depicted on early mapping or model masterplans of the UMIST site and was a later addition to the masterplan to address the emerging issues at London Road. The wall was designed by artist Anthony Hollaway, who also worked with Fairhurst's to design the concrete relief panels to the Chemistry Building (Faraday Building). Fairhurst was also partly responsible for the implementation of the Sculptural Hollaway Wall (1968) to the north-eastern aspect of the campus, just south of the railway viaduct. The wall was designed to address the level change and acted as a barrier to the heavily trafficked London Road, thereby separating it from the campus. The work was designed to 'enhance weathering and texture' by the use of 'rough sawn formwork'. Hollaway himself speaks of this, "the main endeavour was the decorative exploration in new ways of materials in common use and the inventive use of new materials emerging for purposes usually other than their expected application to the building industry". The concrete wall was designed with a dual purpose as a piece of art and a functional buffer, defining the north-eastern boundary of the university campus.

As highlighted in the above section on the Moffat Building, the Committee minutes from UMIST's Planning subcommittee archive note that adaptation of the Moffat building was not very successful and resulted in substantial problems with failing brickwork. The minutes from the Committee suggest that the painting of the building white, and indeed erection of a wall to 'screen' the building (i.e. the Hollaway Wall) were done to mitigate the poor architectural quality of the building. Historic plans from Manchester archives further suggest the wall was established to provide a screen wall to Moffat and address the level change alongside the Chemical Engineering building and the required service area. A covered lean-to was also proposed to sit immediately behind the wall; this is visible in archival plans and in historic aerial imagery of the site. The exact function of the lean-to is not known, with the only note on the plans identifying it as a 'storage bay'. This structure has since been removed (date unknown).

Whilst the listing description identifies the historic interest of the sculptural wall being derived in part from being an acoustic barrier, this function is not alluded to within the committee report or indeed any other identifiable source on the reasons for erecting the wall.



Figure 3: 1973 aerial image, close range of Hollaway Wall, featuring a single-storey lean-to behind. The Moffat building is extended and painted white. Source: Manchester Image archive.

1.3. Existing Information

A limited amount of record information has been found in regard to the Wall. Original drawings by Architects Harry S Fairhurst and Son were located at the Manchester library. The drawings are not specific to the Wall; rather, they formed part of the Morton Laboratory extension and Moffat building conversion works, which are both buildings in close proximity to the Hollaway Wall. The drawings happen to include elevations showing the Wall geometry above ground. Structural drawings, sections and construction details have not been discovered to date. Enquiries have been made with the Institution of Civil Engineers, the NBS (formerly the Cement and Concrete Association, which Anthony Hollaway was a part of) and the Manchester Archives.

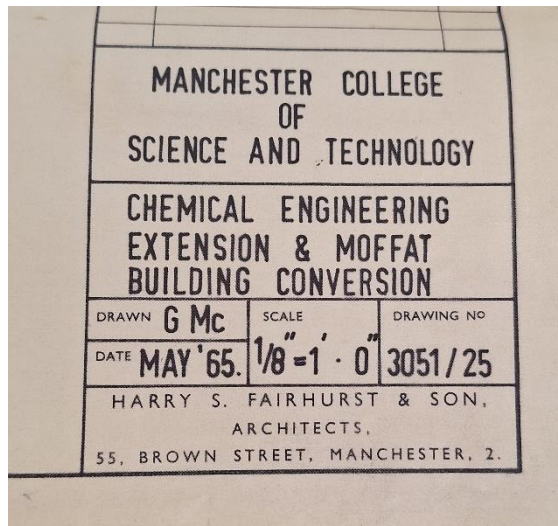


Figure 4: Original drawing reference extracted from Manchester Central Library archives

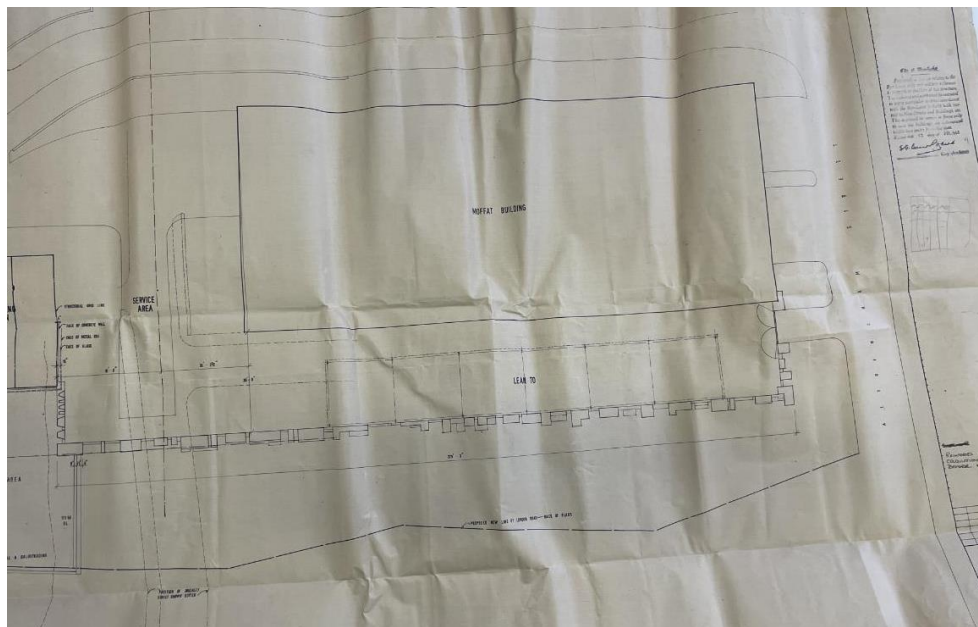


Figure 5: 1960s plan of site showing Hollaway Wall. Source - Manchester Library archives

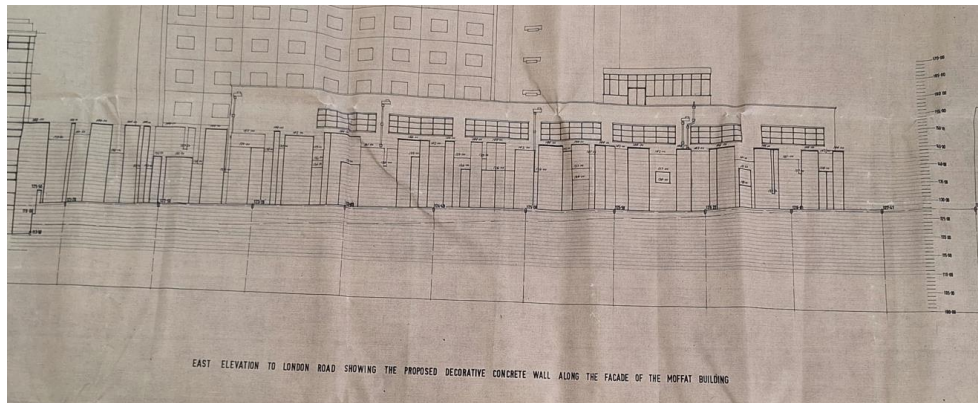


Figure 6: Full Hollaway Wall elevation from London Road. Source - Manchester Library archives

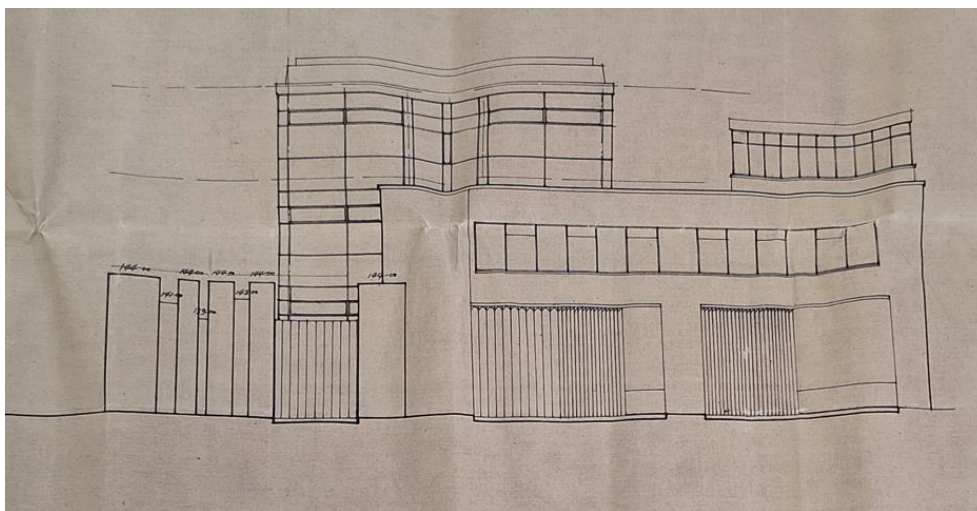


Figure 7: Elevation showing Hollaway Wall with Moffat building in the foreground and Morton Laboratory building in the background (from Altrincham Street). Source - Manchester Library archives.

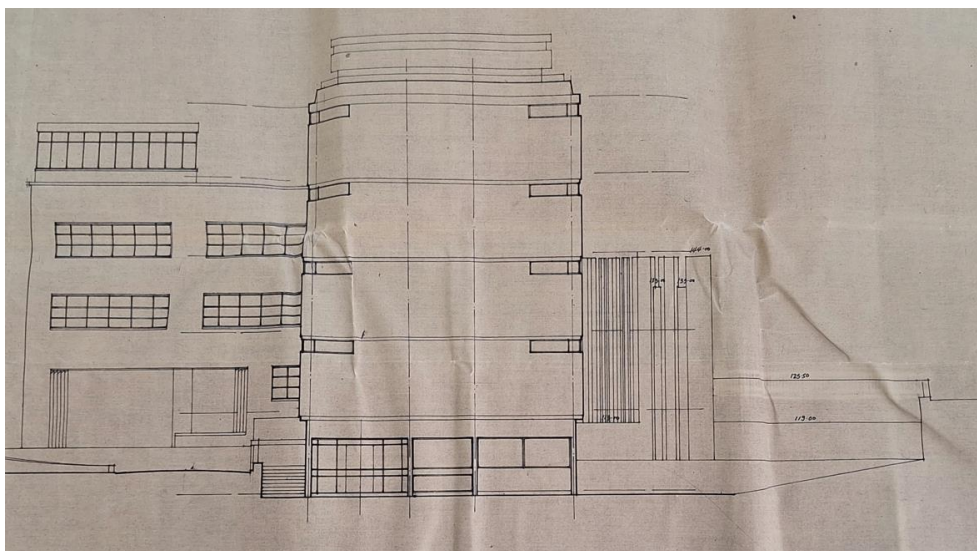


Figure 8: Elevation showing Hollaway Wall with Morton Laboratory building in the foreground and Moffat building in the background (south elevation). Source - Manchester Library archives.

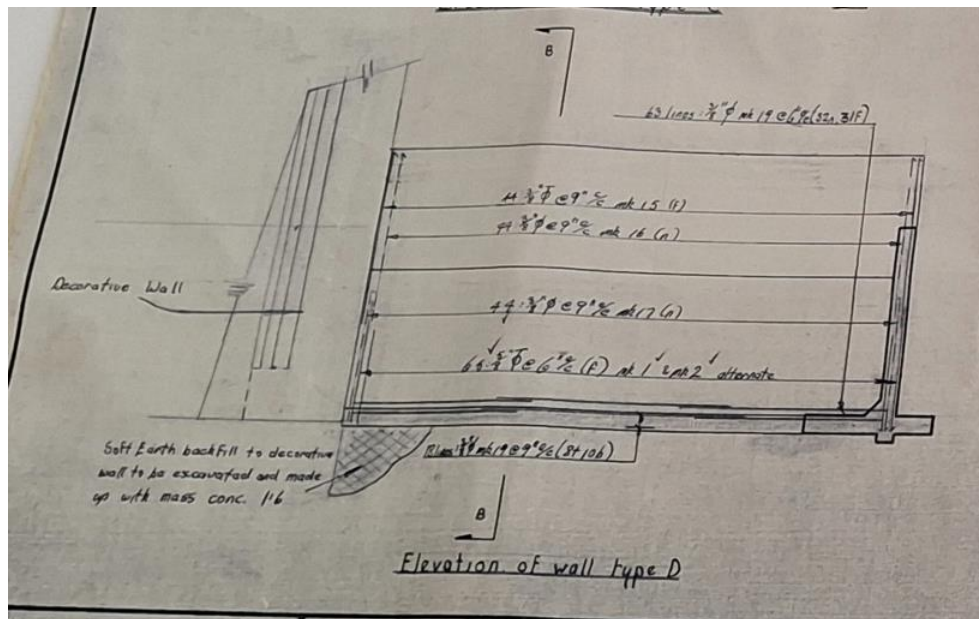


Figure 9: Section showing above ground section of Hollaway Wall in the context of retaining Wall to the east of Morton Laboratory building. Source - Manchester Library archives.

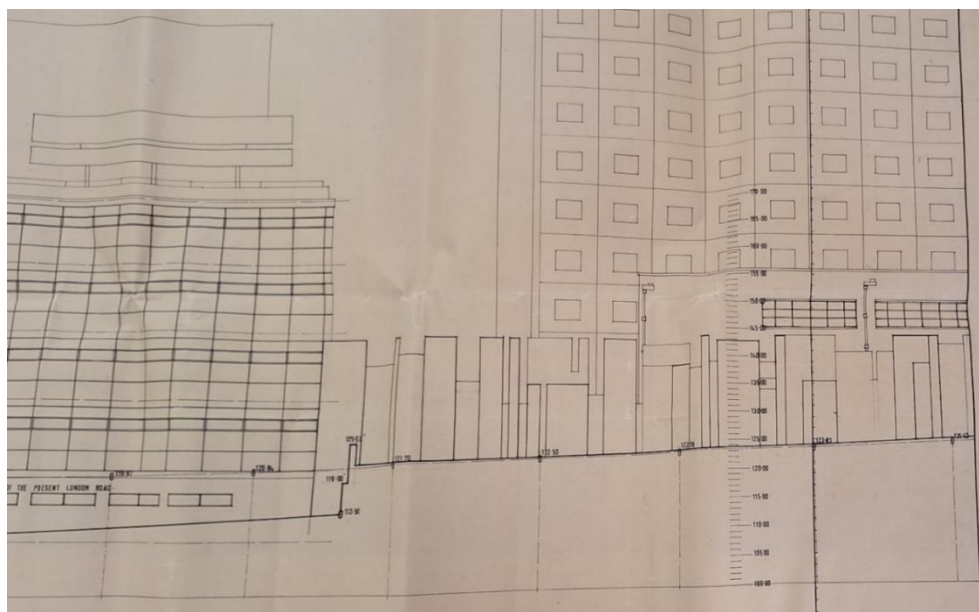


Figure 10: Partial Wall elevation (London Road) adjacent to Morton Laboratory. Source - Manchester Library archives.

1.4. Constraints

The north end of the Wall has an interface with the existing Moffat building (Figure 12), which is to be deconstructed as part of the Plot C site development. The Moffat building has a partial basement which resides under the northern half of the building. Similarly, the south end of the Wall is in close proximity to the existing Morton Laboratory building structure, which is to be deconstructed (Figure 13).

The Wall is located adjacent a contamination hotspot, as highlighted by Civic Earth's site investigation. Nearby BH1002 identified elevated concentrations of total PAHS and lead at 0.40mbgl and 1.30mbgl. Ongoing groundwater monitoring is also being undertaken in this specific borehole; therefore, it must be protected long-term throughout any site works.

There are numerous trees on the London Road side of the Hollaway Wall. Refer to the Arboricultural report prepared by Tyler Grange and submitted as part of the Applications for requirements regarding tree root protection zones.

Of note is the former River Medlock basin which cuts through a section of the Hollaway Wall (Figure 11). Refer to the wider Site Constraints drawing (SISC0-CIV-XX-ZZ-DR-CV-10001) for full context and utilities mapping.

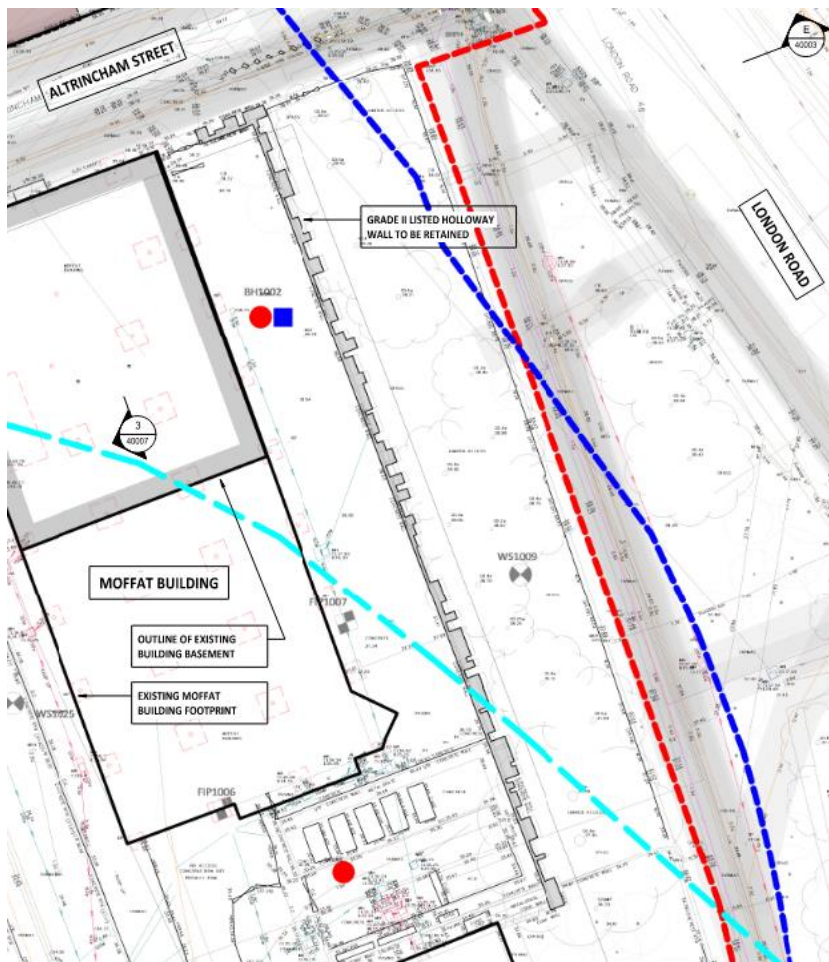


Figure 11: Extract from Site Constraints drawing (SISC0-CIV-XX-ZZ-DR-CV-10001)



Figure 12: Interface with Moffat building

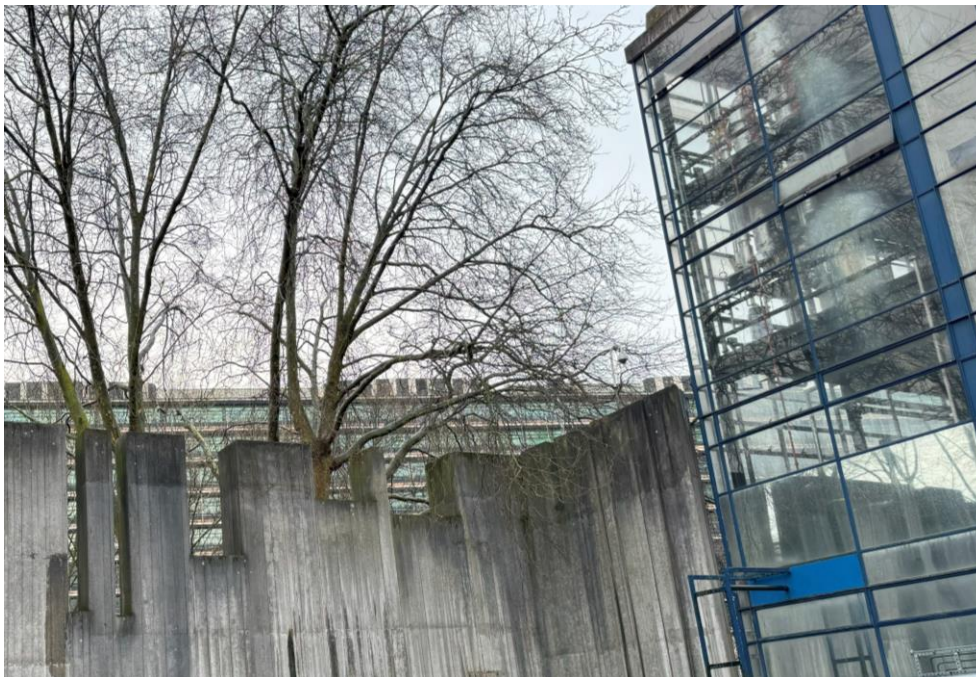


Figure 13: Proximity to Morton Laboratory building

2. Appraisal for Retention

2.1. Structural Form

The Hollaway Wall is a circa. 68 metre long exposed concrete wall, which varies in cross-sectional width and height (4.5 to 6 metres above ground level). This creates a staggered effect. Rough-sawn formwork was used to create the 'weathered' textured aesthetic – a concrete finish found across many of the nearby building structures on the former UMIST site.

Non-intrusive visual surveys to date indicate that the Wall is a reinforced concrete structure which appears to have been cast in-situ. There are no visible signs of joints commonly associated with precast concrete units. There appear to be some vertical fine cracks/joints; however, the lines likely indicate day joints between concrete pours or induced cracks for thermal movement, which would be expected for the form, length and thickness of the concrete used.

The Wall is retaining in part (primarily towards the south end), with level differences on either side of the Wall ranging from 0.34m (towards the north end) to 2.12m (towards the south end of the Wall). Refer to the Civic Engineers site sections as referenced in section 1 of this report.



Figure 14: Image taken from inside the Morton Laboratory building

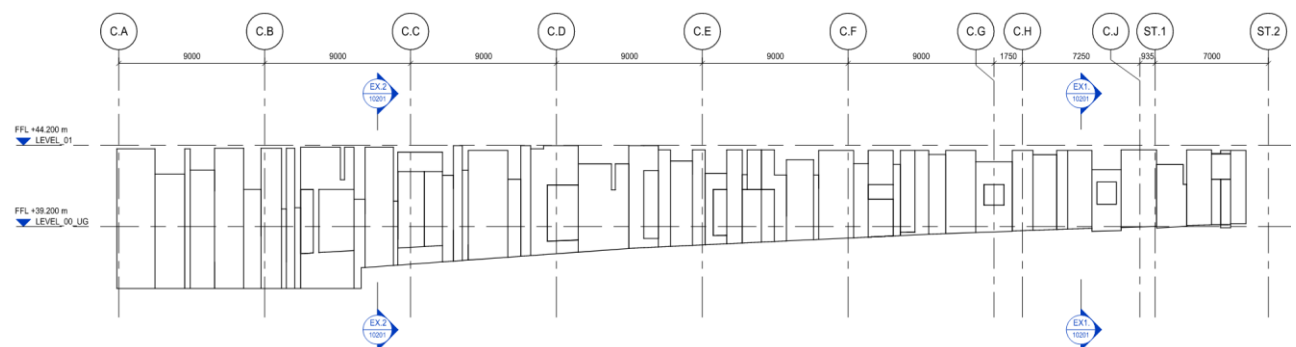


Figure 15: Existing Hollaway Wall elevation

2.2. Foundations

Civic Earth have undertaken ground investigations to establish the existing foundation arrangement of the Grade II Listed Hollaway Wall. This included investigation of the ground conditions in proximity to the Wall and exploratory core holes at various positions along the Wall on both sides (Moffat building side and London Road side). A summary of the findings of the cores can be found in Appendix A of this report. Refer to the Factual Site Investigation Report (51019-CE-06-XX-R-G-1001) in Appendix C of this report for the full output.

The investigations resulted in no concrete footing being found 0.7-0.9m away from the inside (western) face. However, it cannot be discounted that there may be a small projecting footing closer to the face of the Wall along this side.

The outside (eastern) face of the Wall steps in and out, varying in thickness along the length of the Wall, ranging from approximately 0.25m to 1.5m thick. Projecting concrete footings of thickness 1.25m and 2.1m from the adjacent face of the Wall were discovered in cores RC4003 A and RC4004 A. Both of these cores were taken at a section of the Wall of average thickness, and the distance the cores were bored away from the Wall meant they are located within the zone of the maximum thickness of the Wall. No concrete footing was discovered in RC4003 B or RC4004 B. RC4005 was cored at a wider part of the Wall, and no concrete footing was found in core A or B. It is possible that the footing extends beyond the widest part of the Wall, beyond the cores where concrete was discovered.

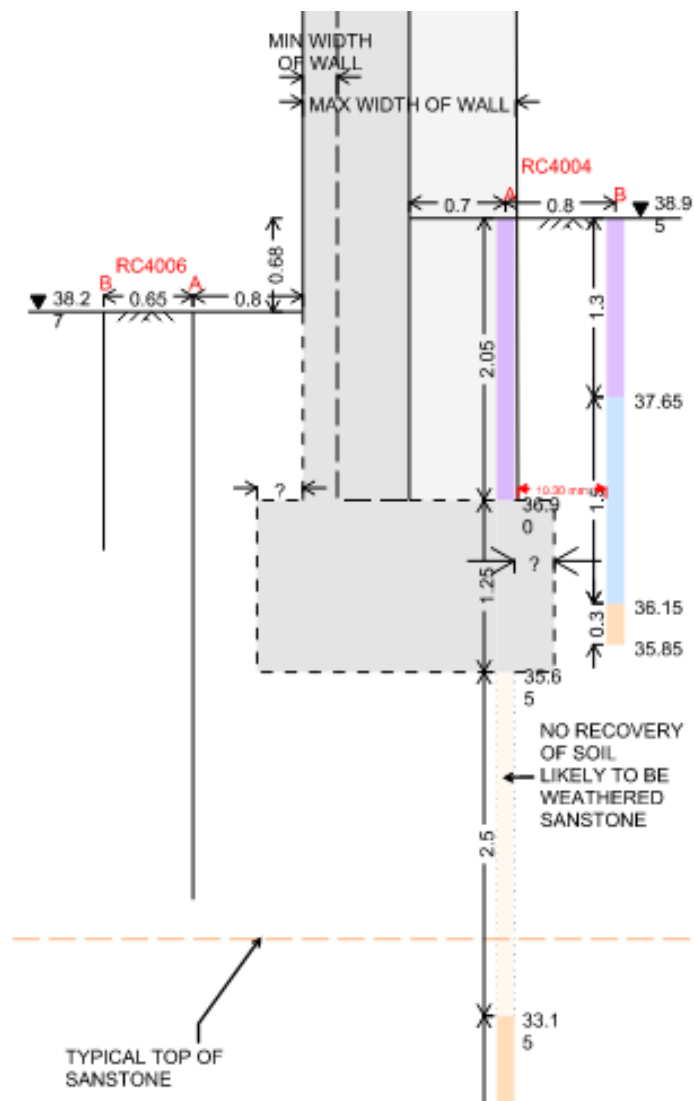


Figure 16: Extract from core logs showing typical foundation extents

2.3. Condition

The area to the east of the Wall is secured with fencing, preventing access and closer survey. This has prevented a full condition survey by Civic Engineers to date.

Degradation of the Wall has been noted during site visits, including spalling of the concrete surface, exposure of reinforcement and graffiti paint. Allocated parking signs have also historically been fixed onto the west face of the Wall, along with what we believe to have been a post-fixed canopy. There is surface damage and rusting evident following their removal.

Minor repairs, including corrosion protection and repair mortar to reinstate the concrete cover the exposed reinforcement, and surface cleaning are likely required to bring the Wall up to standard for the proposed development. The exposed finish of the existing Wall is to be determined at the time of writing this report, and once the scope and extent of this are established, along with full access to all faces of the Wall, Civic Engineers can undertake a full condition and repair survey.

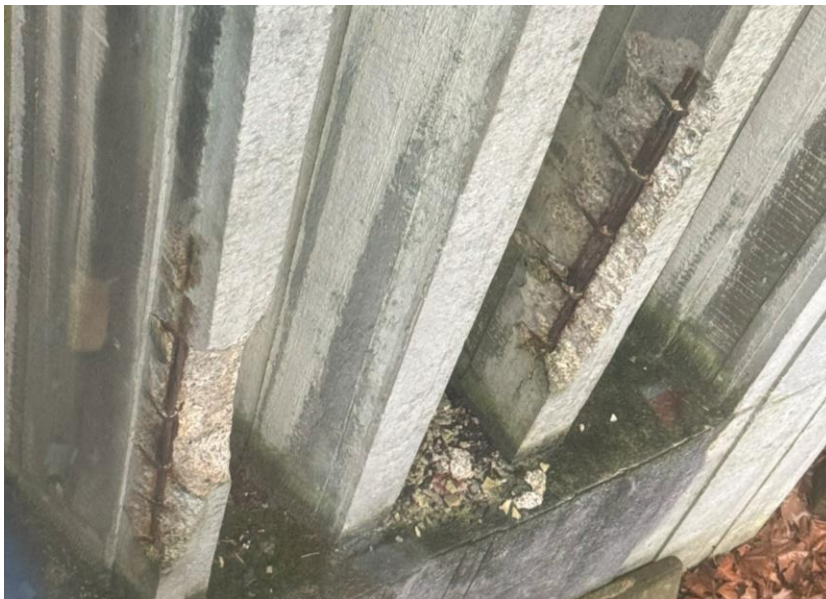


Figure 17: Exposed reinforcement on the South face where the Wall folds to meet the Morton Laboratory building (2024)



Figure 18: Further signs of exposed reinforcement (2024)



Figure 19: Signage fixed to the inside face of the Wall along with exposed reinforcement (2024)



Figure 20: Cracking evident at northern Wall edge (2024)



Figure 21: Evidence of former canopy structure (2024)



Figure 22: Remnants of former steel canopy structure (2024)



Figure 23: Rust stains thought to be from previous steel canopy structure (2024)



Figure 24: Graffiti to the accessible Altrincham Street facing elevation (2024)



Figure 25: Moss and vegetation evident atop the Wall (2024)

3. Proposed Development

The current development plans for Plot C at Sister in Manchester see proposed alterations to the Hollaway Wall, as outlined in the following sections.

3.1. Interventions

The proposed development includes interventions to the Hollaway Wall, incorporating the structure into the new commercial buildings, and a new service tunnel is to be constructed adjacent to the west side of the Hollaway Wall where the proposed formation level of the service tunnel is approximately 7m below existing ground level.

The Hollaway Wall is to pass through the end structural bay of building C2, with local sections carefully cut to allow access through within the internal space. These sections will be cut at ground level and the cut pieces 'folded' such that they are laid flat and reused in the horizontal plane in the new development. All cut concrete edges will be made good with corrosion inhibitor at any exposed reinforcement and repair mortar applied following the laying down of the cut out sections of the Wall.

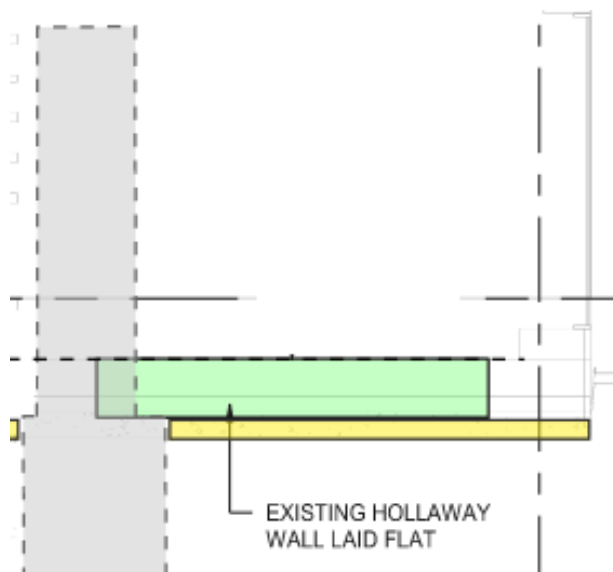


Figure 26: Indicative section through proposed Hollaway Wall showing piece laid flat

3.2. Considerations

3.2.1. Support

A study has been undertaken regarding the support for the proposed folded down pieces of the Hollaway Wall. Various options whereby the Plot C ground floor slab breaks around the concrete Hollaway Wall sections were investigated, with the location and presence of insulation varied. These options were discounted as the addition of a supporting ground floor slab would assist in protecting and preserving the Wall in the new horizontal arrangement. Incorporating a slab below also assists with the servicing strategy for the new building.

The new building will not rely upon the Hollaway Wall for support. The Wall will continue to be self-supporting in terms of vertical and lateral load.

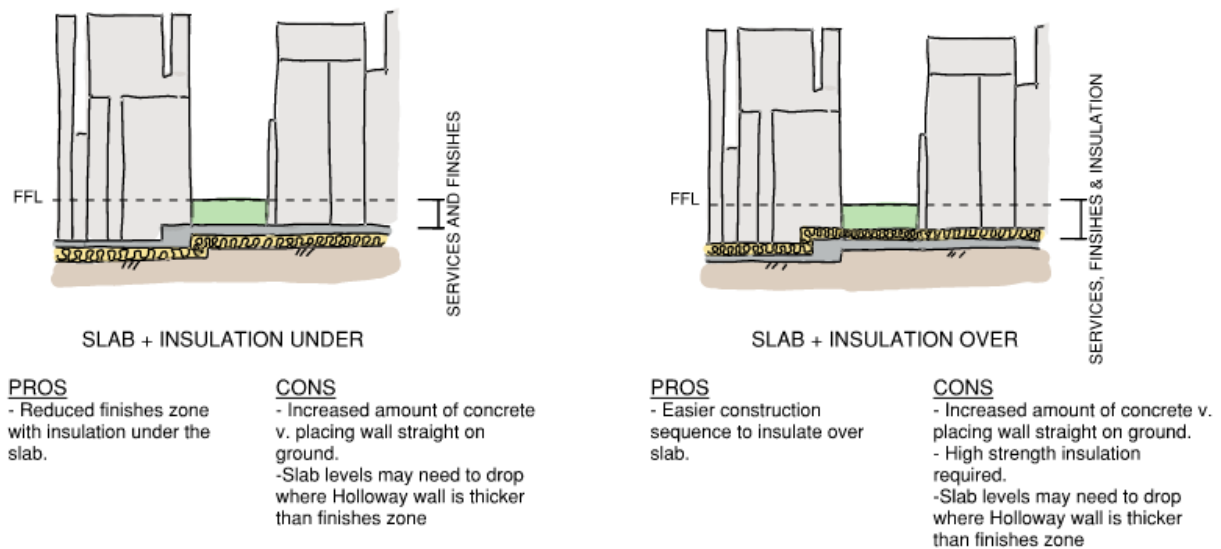
STUDY 1: SLABS RUN CONTINUOUS UNDER THE HOLLOWAY WALL AND PROVIDE SUPPORT

Figure 27: Sketch options for re-supporting the Holloway Wall flat pieces

3.2.2. Change in Environment Exposure Conditions

Part of the proposals see a significant portion of the Wall becoming encompassed within the Plot C building. The Wall is currently external in full and has therefore been subject to environmental factors such as freeze-thaw, carbonation, chloride-induced corrosion and sulphate attack. These external conditions likely necessitated higher durability measures, such as increased concrete cover, in line with concrete design codes at the time of construction. The proposed internal environment will be much less aggressive, thereby reducing the risk of freeze-thaw damage and chloride ingress. Physical damage is also less likely indoors. This change in conditions will likely extend the life of the Holloway Wall structure from its situation. Weathering of the now internal elements will subside, and the smaller sections of the Wall that remain external will continue to weather at the current rate and original design intent.

For the elements of Wall that are proposed to be laid flat, the concrete cover requirements for durability increase due to the change from being a vertical element to a horizontal element. For horizontal elements of the Wall becoming internal, the increase in exposure class from becoming vertical will likely be mitigated by the decrease in exposure class associated with becoming internal. For horizontal elements proposed to remain external, we suggest that a concrete cover meter survey is undertaken to verify that the existing cover to reinforcement is sufficient for the exposure class and usage as a slab.

To avoid thermal bridging in the final condition within the Plot C building, it was concluded that insulation would be required above or below the Holloway Wall piece. By incorporating a DPM and insulation below the horizontal Wall piece, the Wall will be located within an internal environment, reducing the exposure class by avoiding damp and temperature changes of an external environment. Refer to Figure 27 for the current options being considered.

3.2.3. Protection

The underside of the Wall will be suitably protected by a suitable build-up (refer to sections 3.2.1 and 3.2.2 of this report). This will avoid deflection of the concrete element.

During design, zones of influence have been considered in relation to the Wall and its foundations. During the construction of Plot C, suitable working zones will be in place to mitigate the risk of damaging the Wall.

In use, the impact of people walking over the Wall will be minimal. Floor slabs are commonly comprised of exposed reinforced concrete. Continuous foot traffic could accelerate general wear and tear of the concrete surface including cracking, spalling and loss of the shuttered finish, however the Wall was originally designed for an external environment and therefore has heightened durability when considered in a new internal environment for the majority of the length of the Wall.

Mitigation measures could be applied to reduce this risk such as protective coatings or surface hardening to protect the concrete surface from abrasion, sealants to prevent moisture penetration and regular maintenance and inspection including prompt addressing of any cracks or damage. Appropriate protection measures to be agreed with the Conservation Officer.

4. Outline Method Statement

4.1. Recommendations

Repair works to exposed reinforcement could include applying a corrosion inhibitor to the exposed bars, scabbling away the surrounding concrete to provide a rougher surface for the application of a repair mortar to re-achieve sufficient concrete cover. All repair and remediation products and methods are to be agreed upon with the Conservation Officer following a detailed condition survey of the wall and consultation with a specialist concrete contractor. This is to ensure that the resultant concrete finish is adequate.

4.2. Sequence of Works

Refer to Appendix B of this report for corresponding sketches.

4.2.1. Enabling Works

- Openings to be marked out onto the existing Wall face utilising plan and elevation drawings showing levels and setting out.
- Ground is to be suitably prepared with subbase, sand blinding, and supporting ground floor slab to be installed prior to Wall works.
- Temporary propping and lifting design to be undertaken by temporary works engineer. The lifting eyes should be suitable for vertical and perpendicular tilt.

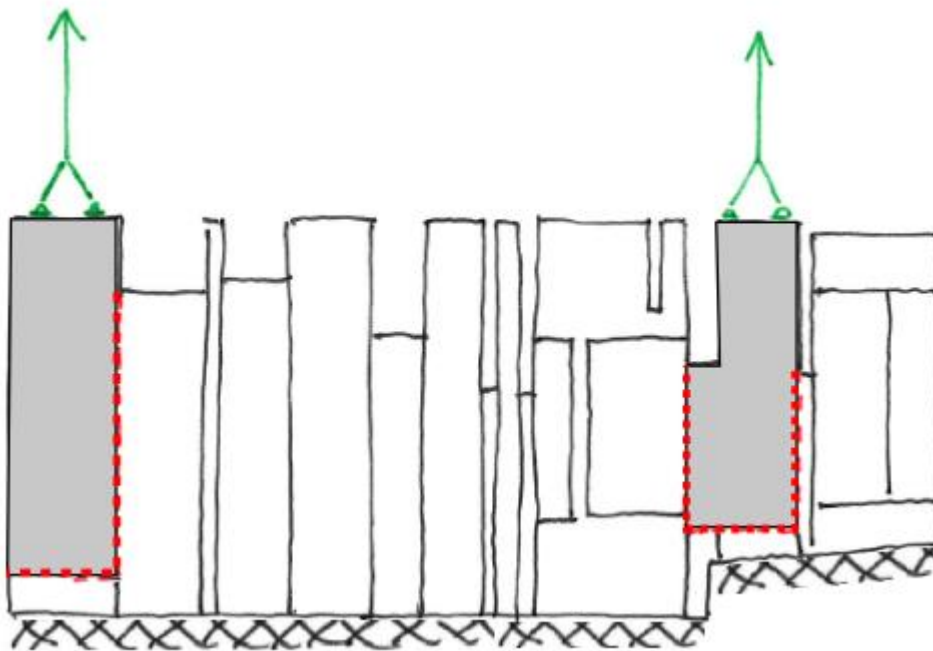


Figure 28: Indicative sketch of Holloway Wall with openings marked

4.2.2. Cutting the Wall

- Pilot holes to be drilled at the corners of the pieces to be cut. This is to allow precision and avoid damage to the concrete.
- A diamond-mounted saw is to be used to cut the sections of the Wall to form the openings. This will mean more accuracy and avoid damage to the reveals and base. For thicker sections of Wall, cutting is to be undertaken on both sides of the Wall.

- Temporary propping to be installed to the Wall face.
- Lifting eyes to be installed at the head of the Wall.
- Making good of cut concrete edges.

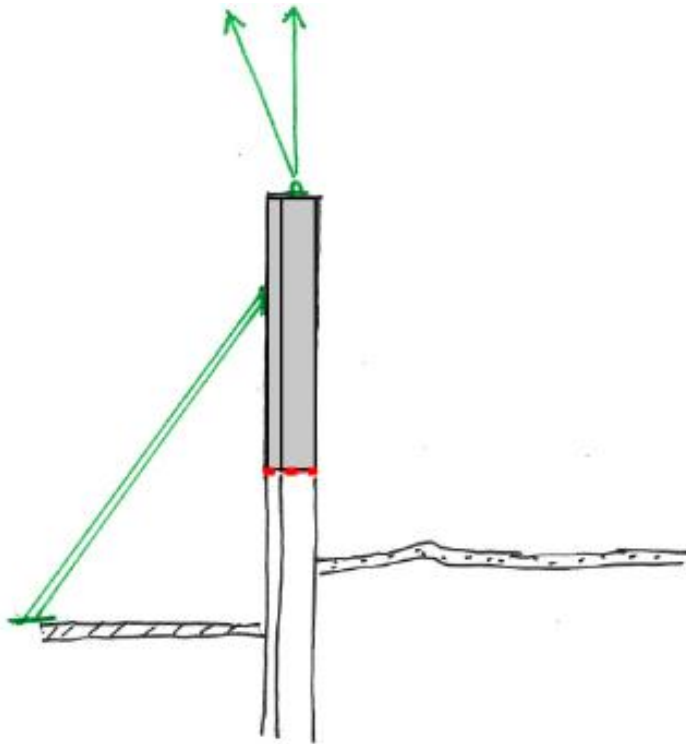


Figure 29: Section of Wall during works with temporary propping and lifting point shown

4.2.3. Lifting And Placing the Wall Pieces

- Utilising the lifting eyes and a suitable crane, lift the designated Wall sections vertically and manoeuvre to the final placement location.
- Wall section is to be rotated to the horizontal position and lowered towards the placement location.
- Wall placed horizontally in agreed location and level.
- Cut surfaces, exposed reinforcement and prop/lifting eye locations are to be made good following the works. The repair mortar used will be agreed upon with the Conservation Officer.

4.2.4. Protection and Maintenance

The level of protection is to be agreed upon with the Conservation Officer. The intention is to preserve the Wall whilst also keeping its aesthetic. This will also inform ongoing maintenance requirements.

4.3. Access Requirements

The land to the east of the Wall currently comprises an area of soft landscaping with mature trees, secured from the general public with fencing around the perimeter of the landscaped area. The land to the west of the Wall predominantly comprises an area of tarmac hardstanding shared with the Moffat building. Multiple below-ground utilities are located within this area. A former storage compound is adjacent to the southwest extent of the Wall.

Working zones are to be incorporated for the duration of the demolition and construction works. The movement of plant and materials, and vehicular or pedestrian movement will need to be mindful of the Wall.

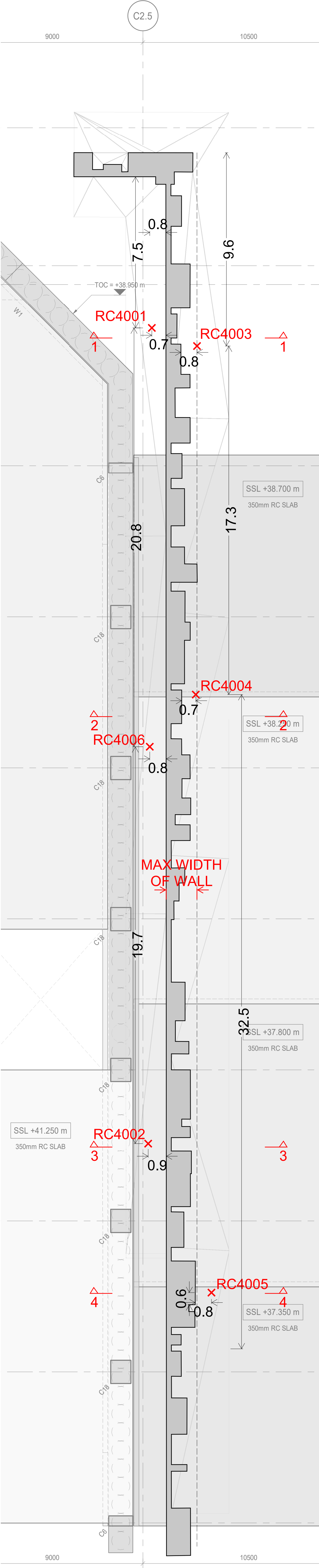
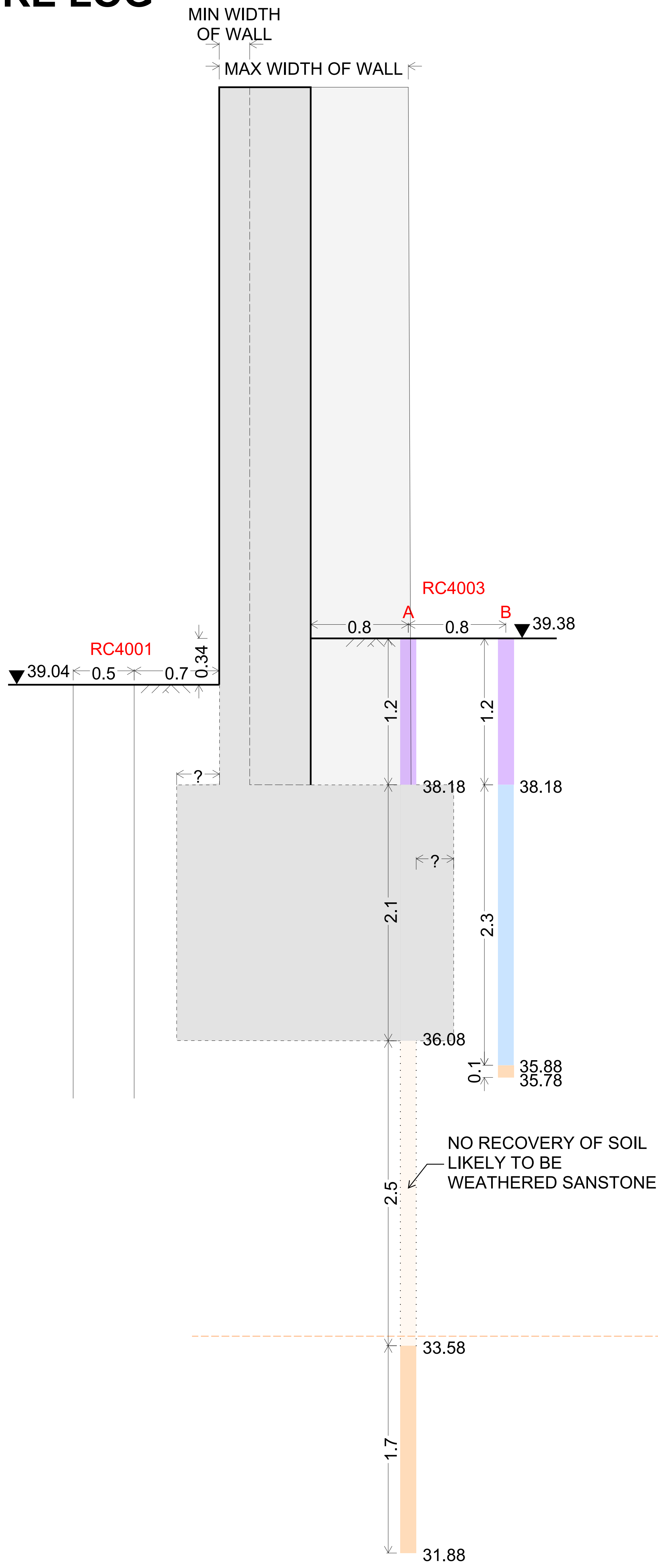
4.4. Risk Mitigation

Civic Earth have undertaken a supplementary site investigation to mitigate the risk of unexpected findings in the ground, such as contamination, buried relic structures and unidentified existing services.

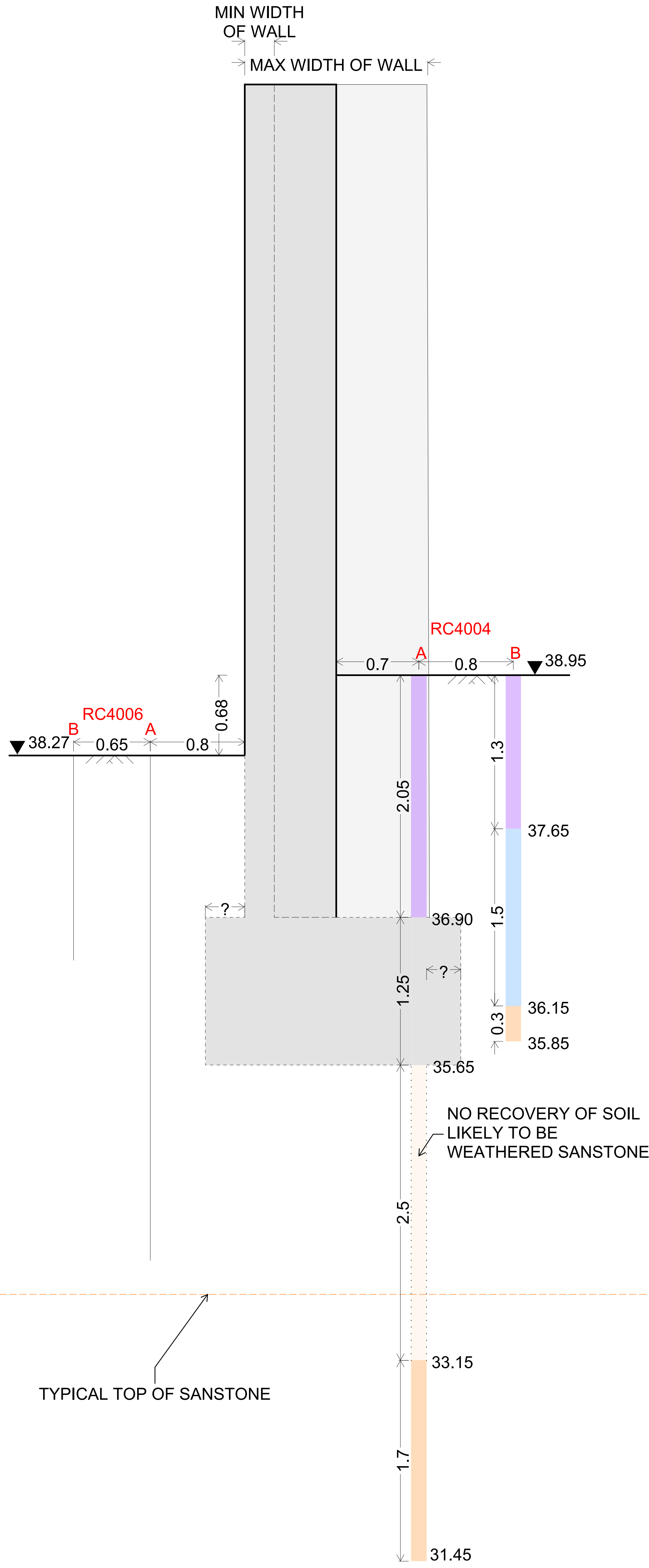
A competent temporary works engineer should be appointed to inform the lifting operations and help to advise on the temporary protection and stability of the Hollaway Wall during demolition and construction works.

Appendix A – Core Hole Log Sections

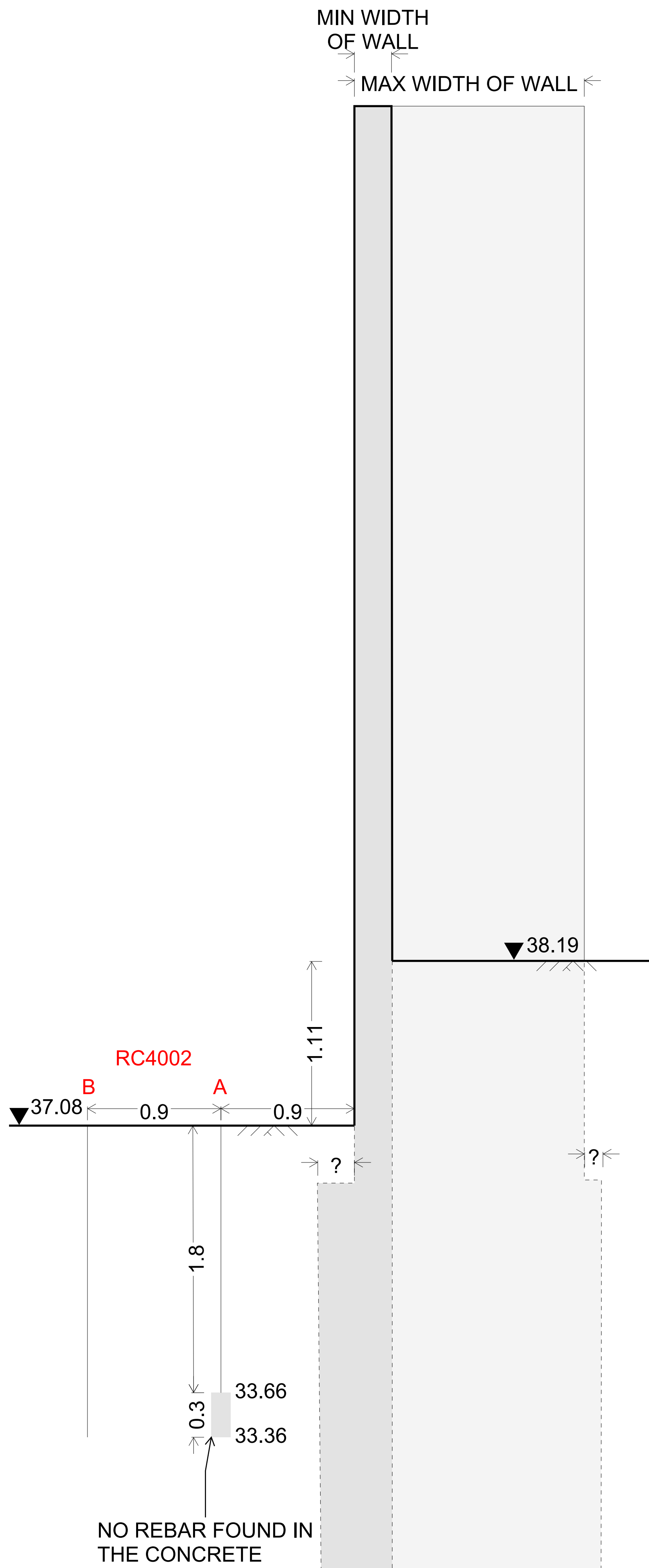
HOLLOWAY WALL CORE LOG



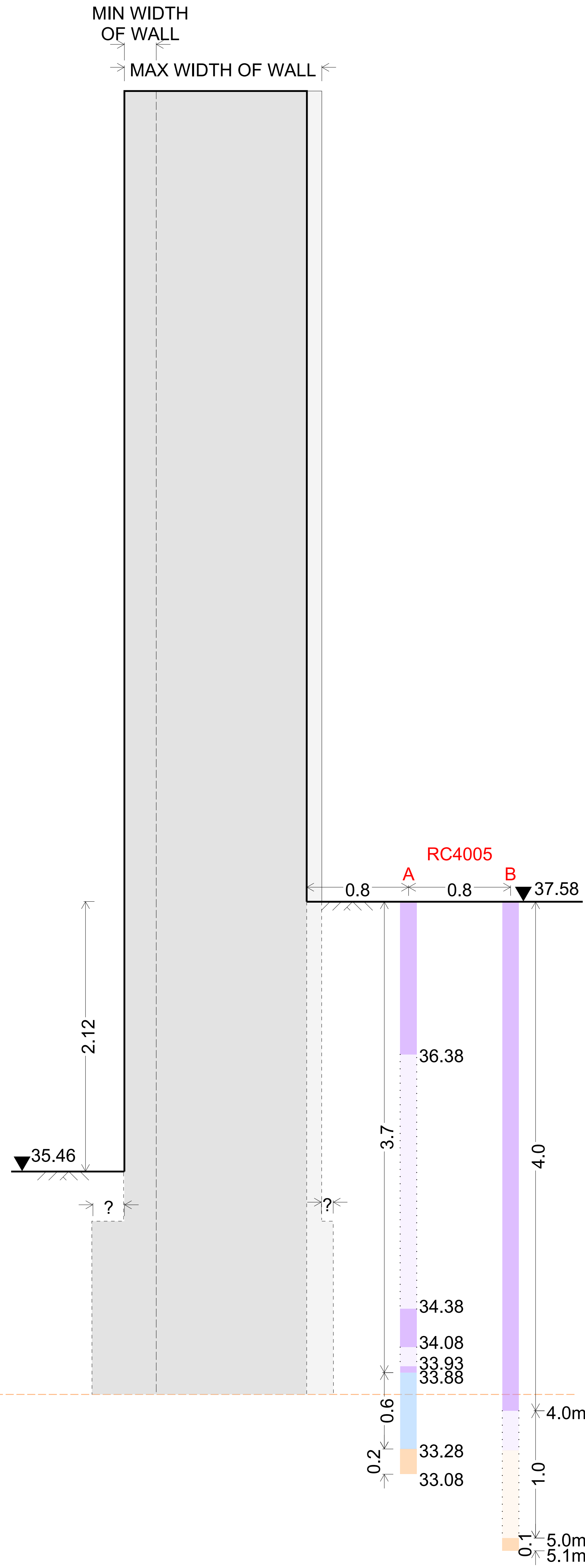
SECTION 1-1



SECTION 2-2



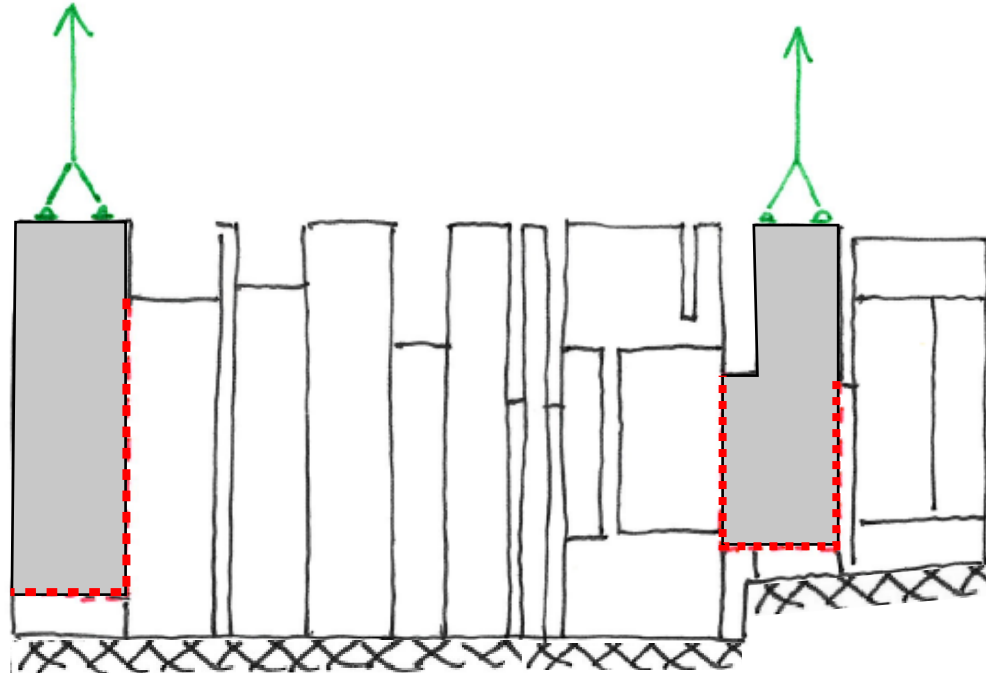
SECTION 3-3



SECTION 4-4

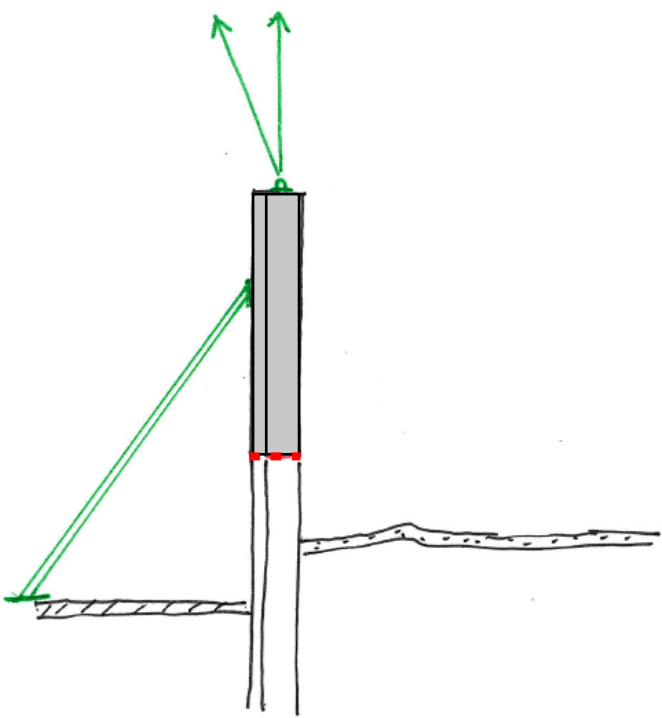
KEY	
	MADE GROUND
	CONCRETE
	GLACIAL FILL
	NO RECOVERY
	SANDSTONE

Appendix B – Structural Works Sketch



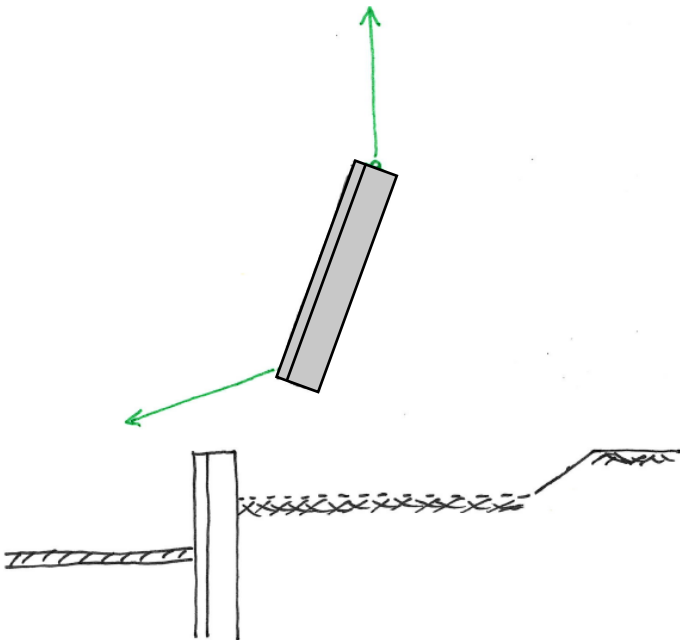
Stage 1: Forming the Openings (Elevation)

- The openings will be marked onto the existing wall face as per the drawing dimensions to identify the line to be cut.
- Pilot holes to be drilled at corners of cut lines to avoid cut extending beyond corner - allowing precision.
- A diamond mounted saw will be used to cut the sections of the wall to form the openings to achieve a deep accurate cut so that the reveals and base are not damaged. It may require cutting to be carried out to both faces subject to thickness of wall section being considered.



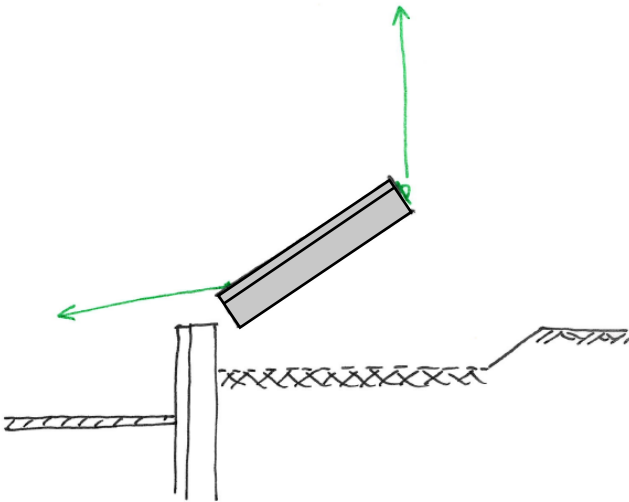
Stage 1: Forming the Openings (Section)

- Temporary propping to be installed to the wall face away from lay down area to prevent cut wall section toppling over once cut through.
- Lifting eye arrangement, suitable for vertical and perpendicular lift, to be installed to head of wall section to facilitate lifting via suitable crane.



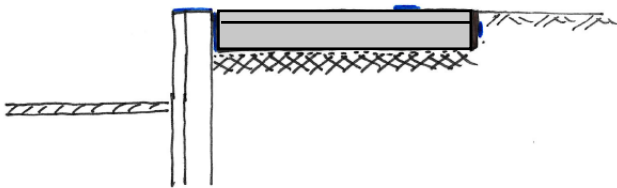
Stage 2(a): Lifting the Wall Sections

- Wall panel placement location prepared with subbase and sand blinding prior to lifting commencing.
- Wall section lifted vertically and manoeuvred over final placement position.



Stage 2(b): Manoeuvring the Wall Sections

- Wall section rotated to horizontal position and lowered towards final placement position.



Stage 3: Placing the Wall Sections & Making Good

- Wall section placed horizontal in agreed location and level.
- Cut surfaces, exposed rebar and prop/lifting eye fixing locations made good using corrosion prohibiter and repair mortar/grout agreed with Conservation Officer.

26/03/25	P01	First Issue	JBr	AR
DATE	REV	DESCRIPTION	DRAWN	CHKD



Civic Engineers

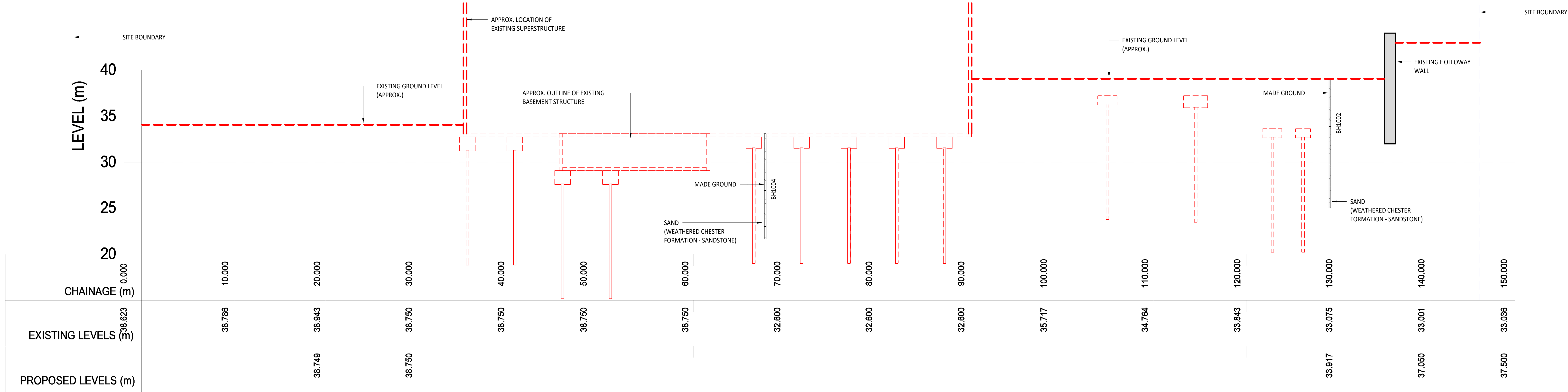
MANCHESTER / LONDON / LEEDS / GLASGOW
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PROJECT
Sister, Manchester - Plot C

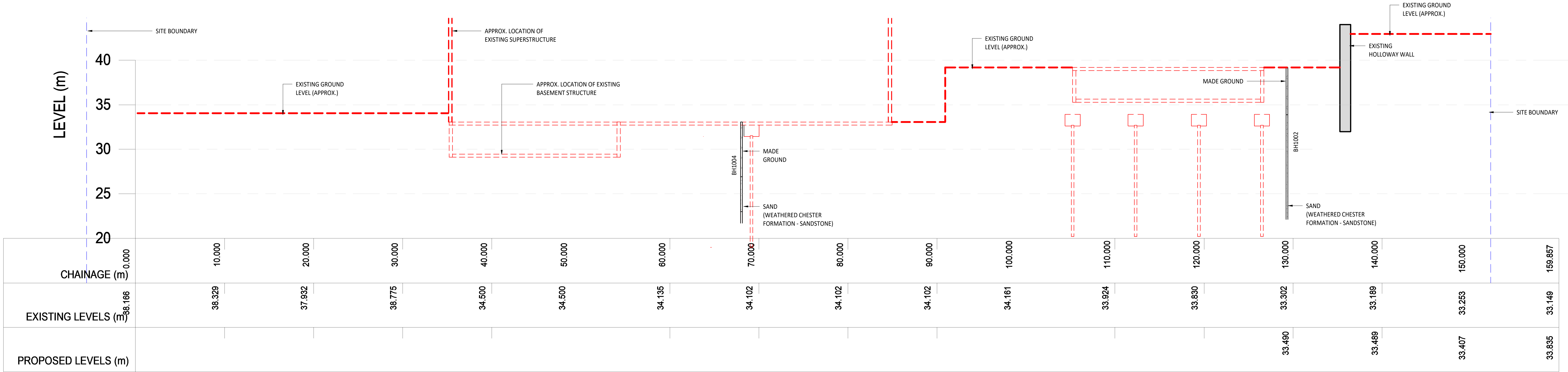
TITLE
Holloway Wall Structural Works

DRAWING STATUS INFORMATION				STATUS CODE	
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CE PROJECT No.	SCALE @ A3	DATE CREATED	DRAWN	CHECKED	
2750-01	NTS	Mar '25	JBr	AR	
DRAWING No.				REV	
SISCO-CIV-XX-XX-SK-ST-12001				P01	

Appendix C – Related Civic Drawings & Documents



SITE CONSTRAINTS SECTION E-E

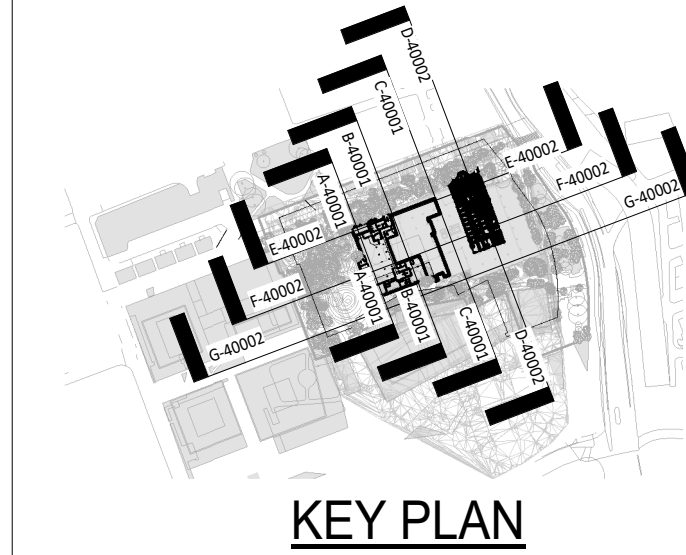


SITE CONSTRAINTS SECTION F-F

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LIFESTYLE HATCH/KEY	
MADE GROUND (APPROX) =	
SANDY GRAVELLY CLAY (APPROX) =	
INDICATIVE BOREHOLE =	
EXISTING RETAINING WALL =	
EXISTING HOLLOWAY WALL =	
EXISTING GROUND LEVEL =	
SITE BOUNDARY =	
APPROX. BREAK LINE =	
APPROX. LOCATION OF EXISTING SUPERSTRUCTURE AND/OR BASEMENT STRUCTURE =	
INDICATIONS OF STRATA LEVELS ON SECTIONS ARE INDICATIVE ONLY	

NOTE:

FOR ALL EXISTING LEVELS REFER TO TOPOGRAPHIC SURVEY AND FOR PROPOSED LEVELS, REFER TO CIVILS DRG: "2750-01-CIV-XX-EW-D-C-20001 - PLOT C PROPOSED CONTOUR PLAN"

THIS DRAWING TO BE READ IN CONJUNCTION WITH CIVIC ENGINEERS DEMOLITION PACK DRAWINGS.

- SISCO-CIV-EX-ZZ-DR-ST-10001
- SISCO-CIV-EX-ZZ-DR-ST-10101
- SISCO-CIV-EX-ZZ-DR-ST-12001
- SISCO-CIV-EX-ZZ-DR-ST-12002
- SISCO-CIV-EX-ZZ-DR-ST-12003
- SISCO-CIV-EX-ZZ-DR-ST-12004

11/03/20	REV	ISSUED FOR INFORMATION	JB	JT
DATE	REV	DESCRIPTION	DRAWN	CHKD

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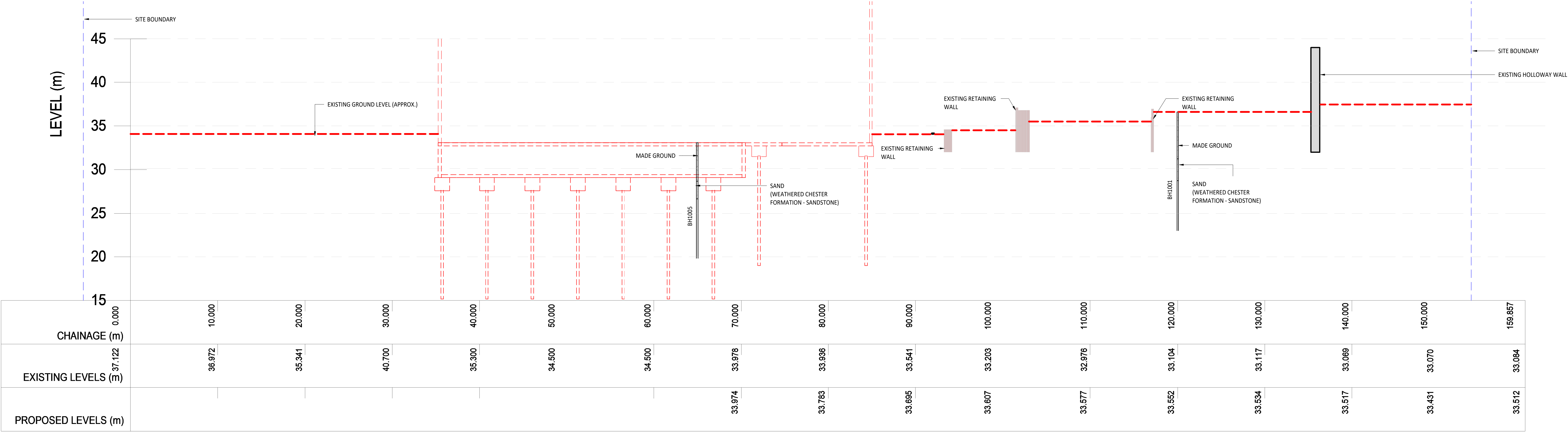
PROJECT

ID MANCHESTER

TITLE

SITE SECTIONS SHEET 3 OF 4

DRAWING STATUS					STATUS CODE	
INFORMATION						
CE PROJECT No.	SCALE @ A0	DATE CREATED	DRAWN	CHECKED		
IDM00	1:200	MAR.25	IB	JB		
DRAWING No.				REV		
SISCO-CIV-XX-ZZ-DR-CV-40003				P01		



SITE CONSTRAINTS SECTION G-G

STANDARD NOTES

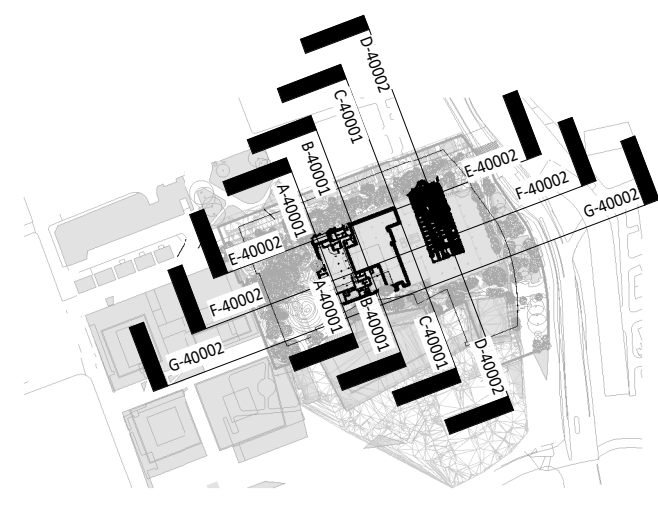
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3. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.

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KEY PLAN

LIFESTYLE HATCH/KEY	
MADE GROUND (APPROX) =	
SANDY GRAVELLY CLAY (APPROX) =	
INDICATIVE BOREHOLE =	
EXISTING RETAINING WALL =	
EXISTING HOLLOWWAY WALL =	
EXISTING GROUND LEVEL =	
SITE BOUNDARY =	
APPROX. BREAK LINE =	
APPROX. LOCATION OF EXISTING SUPERSTRUCTURE AND/OR BASEMENT STRUCTURE =	
INDICATIONS OF STRATA LEVELS ON SECTIONS ARE INDICATIVE ONLY	

NOTE:

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- SISCO-CIV-EX-ZZ-DR-ST-10101
- SISCO-CIV-EX-ZZ-DR-ST-12001
- SISCO-CIV-EX-ZZ-DR-ST-12002
- SISCO-CIV-EX-ZZ-DR-ST-12003
- SISCO-CIV-EX-ZZ-DR-ST-12004

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DATE	REV	DESCRIPTION	DRAWN	CHKD



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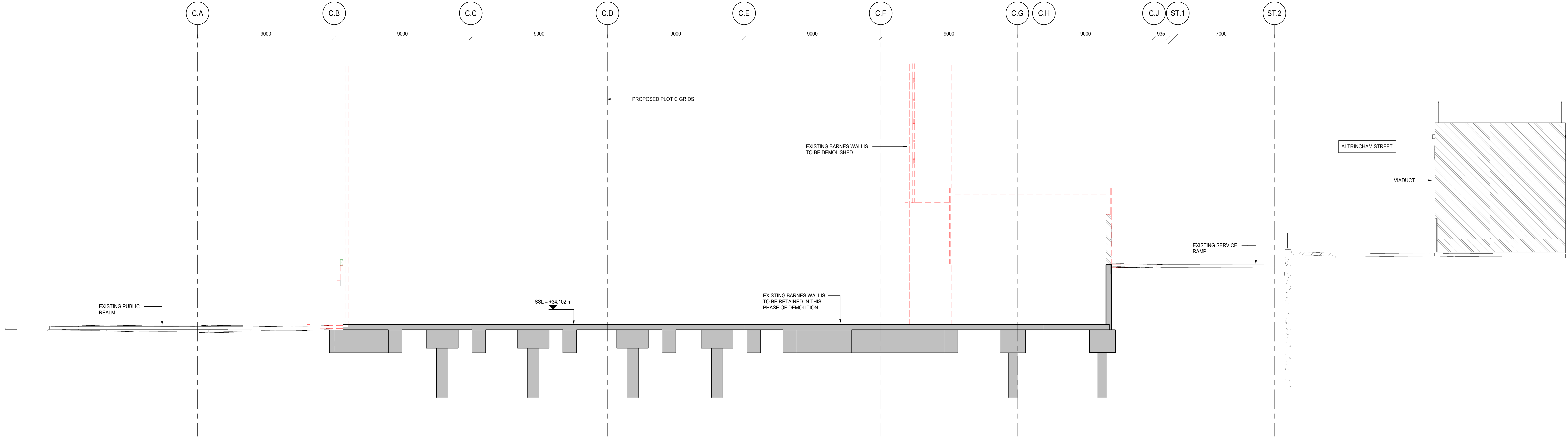
PROJECT

ID MANCHESTER

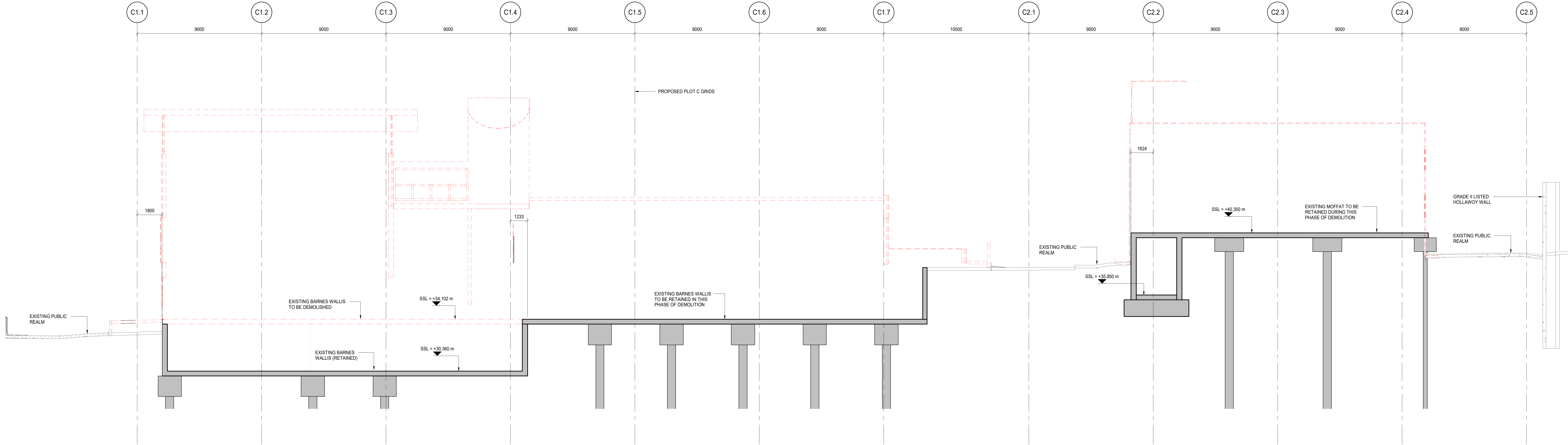
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SITE SECTIONS SHEET 4 OF 4

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DRAWING No.					REV	
SISCO-CIV-XX-ZZ-DR-CV-40004					P01	



EXISTING SITE SECTION 4-4
SCALE: 1 : 100



EXISTING SITE SECTION 5-5
SCALE: 1 : 100

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PROJECT
SISTER - PLOT C
MANCHESTER

TITLE
EXISTING SITE CROSS SECTIONS
SHEET 3

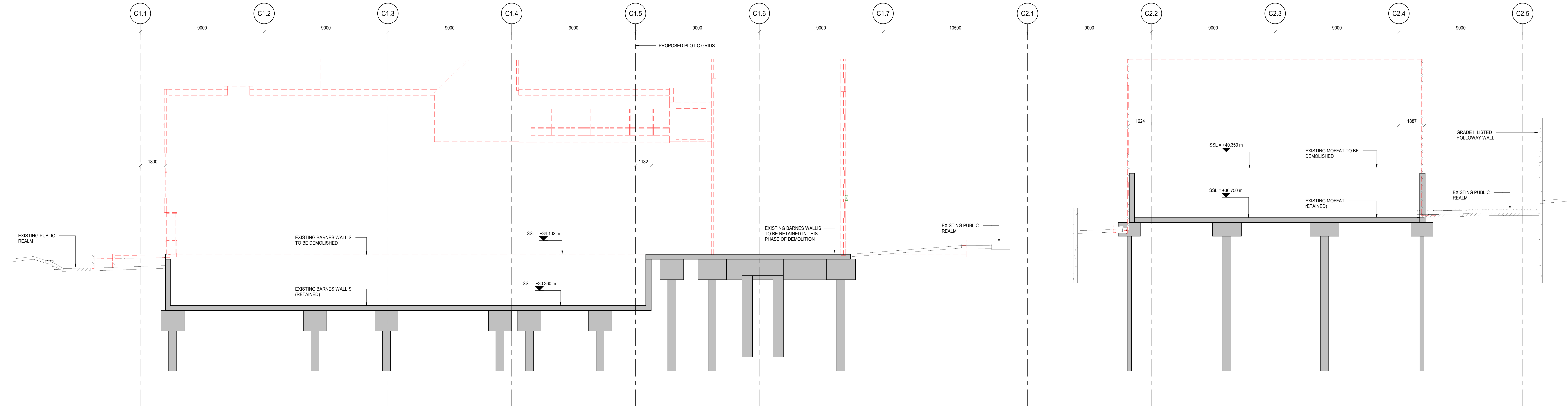
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INFORMATION

DRAWING No.
SISC0-CIV-EX-ZZ-DR-ST-12003

20/02/25	PH	SKED FOR INFORMATION	IB	JBr
DATE	REV	DESCRIPTION	DRAWN	CWED

CE PROJECT No.	SCALE @ A0	DATE CREATED	DRAWN	CHECKED
2750	1:100	FEB 25	IB	JBr



EXISTING SITE SECTION 6-6
SCALE: 1 : 100

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PROJECT
SISTER - PLOT C
MANCHESTER

TITLE
EXISTING SITE CROSS SECTIONS
SHEET 4

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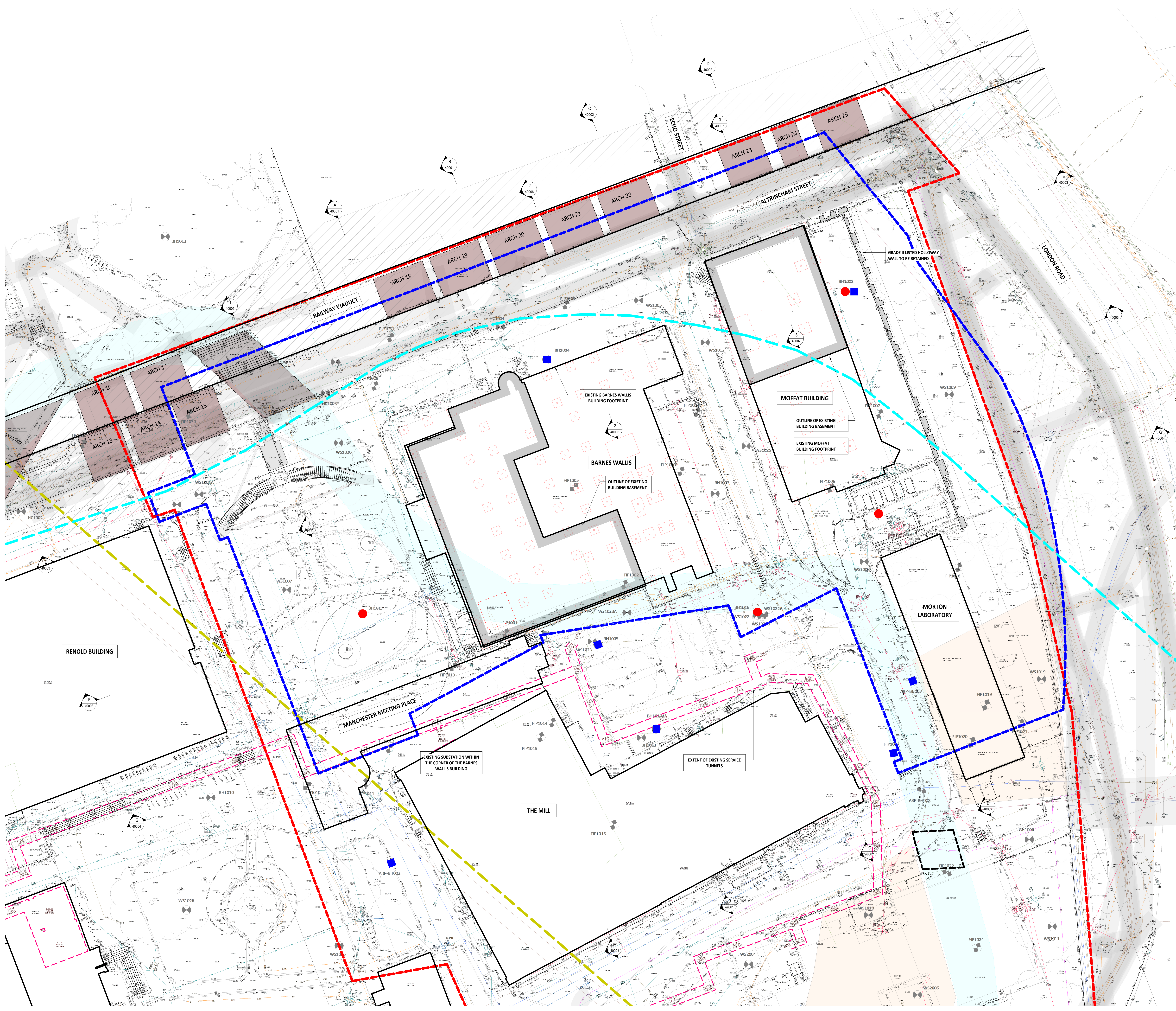
DRAWING STATUS

INFORMATION

STATUS CODE

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2750	1:100	FEB 25	IB	JBr	SISC0-CIV-EX-ZZ-DR-ST-12004	P01



KEY:

- UTILITY TO BE ABANDONED/DIVERTED
- WATER MAIN DIVERSION
- ELECTRICITY DIVERSION
- GAS MAIN DIVERSION
- EXISTING UTILITY EASEMENT

EXISTING UTILITIES BASED ON GPR SURVEY
IDM00-SEP-UE-SU-ZZ-00003, DATED MAY '23:

- BT STAT RECORD
- CABLE DUCT STAT RECORD
- CABLE TV
- CABLE TV STAT RECORD
- COTV
- COTV STAT RECORD
- TELECOMS
- TELECOMS STAT RECORD
- ELECTRIC
- ELECTRIC STAT RECORD
- FIBRE OPTICS
- FIBRE OPTICS STAT RECORD
- GPR DETECTION LINE
- MAINS GAS
- MAINS GAS STAT RECORD
- MAINS WATER
- MAINS WATER STAT RECORD
- SEWER CW
- SEWER CW STAT RECORD
- SEWER FW
- SEWER FW STAT RECORD
- SEWER SW
- SEWER SW STAT RECORD
- TRAFFIC SIGNAL CABLE
- TSC STAT RECORD
- UNIDENTIFIED TRACE
- UNIDENTIFIED CABLE
- UNIDENTIFIED PIPE
- UNIVERSITY OF MANCHESTER
- SERVICE TUNNEL (2m HIGH x 1.8m WDE)

GPR SURVEY QUALITY LEVEL:

A - VERIFICATION
B1 - HORIZONTAL/VERTICAL LOCATION USING MULTIPLE TECHNIQUES
B2 - HORIZONTAL/VERTICAL LOCATION USING A SINGLE TECHNIQUE
B3 - HORIZONTAL LOCATION USING A SINGLE TECHNIQUE
B4 - ASSUMED ROUTE
C - SITE RECONNAISSANCE
D - DESKTOP UTILITY RECORDS SEARCH

EXISTING UTILITIES BASED ON ARUP UTILITY REPORT
IDM00-ARP-ZZ-ZZ-DR-GI-10001, DATED NOV '22:

- BT TUNNEL - 3m (APPROX.) DIAMETER AT APPROX 15m BELOW THE SITE
- SHOOTERS BROOK WATERCOURSE

TOPOGRAPHICAL SURVEY TAKEN FROM DRAWING
60290 MH-VTO Medlock M2-G-0001, DATED SEP '23:

- RIVER MEDLOCK CULVERT

THIS DRAWING TO BE READ IN CONJUNCTION WITH CIVIC ENGINEERS DEMOLITION PACK DRAWINGS.

- SISCO-CIV-EX-ZZ-DR-ST-10001
- SISCO-CIV-EX-ZZ-DR-ST-10101
- SISCO-CIV-EX-ZZ-DR-ST-12001
- SISCO-CIV-EX-ZZ-DR-ST-12002
- SISCO-CIV-EX-ZZ-DR-ST-12003
- SISCO-CIV-EX-ZZ-DR-ST-12004

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COLOUR/HATCH KEY

HISTORICAL CHEMICAL WORKS = [Hatched Box]
FORMER RIVER MEDLOCK = [Blue Line]
FORMER RIVER MEDLOCK BASIN = [Blue Line]
EXISTING BT TUNNEL = [Blue Line]
LISTED HOLLOWAY WALL (RETAINED) = [Blue Line]
RED LINE BOUNDARY (SITE) = [Red Line]
BLUE LINE BOUNDARY (B C1) = [Blue Line]
PROPOSED (FUTURE) BUILDING OUTLINE = [Red Line]
CUT LINE, RETAINED/DEMOLISHED = [Red Line]
BASEMENT OF EXISTING BUILDINGS = [Hatched Box]
NETWORK RAIL EXCLUSION ZONES = [Hatched Box]

INDICATE LOCATIONS OF PROPOSED SITE INVESTIGATIONS CARRIED OUT BY CIVIC EARTH

ALL INFORMATION ON THIS DRAWING IS BASED ON ARUP DRAWINGS:
IDM00-ARP-ZZ-ZZ-DR-GI-10006 & 10007 FROM ARUP PRELIMINARY GROUND INVESTIGATION INTERPRETIVE REPORT:
IDM00-ARP-ZZ-ZZ-DR-GI-10001 & SURVEY & ENGINEERING PROJECT DRAWINGS:
IDM00-SEP-EX-ZZ-DR-B5-00002 & IDM00-SEP-UE-SU-ZZ-00002 TO 00004

REQUIREMENTS FOR TREE ROOT PROTECTION ZONES TO BE CONFIRMED FOLLOWING ARBORICULTURIST REPORT.

BOREHOLES REQUIRED FOR GROUNDWATER REASSURANCE MONITORING, MUST BE PROTECTED LONG-TERM THROUGHOUT WORKS.

APPLIES TO BOREHOLES BH1001, BH1002, BH1016A & BH1017

CONTAMINATION HOTSPOT

- BH1005 - GROSS HYDROCARBON CONTAMINATION IN GROUNDWATER, NEEDS INVESTIGATION, DELINEATION AND REMEDIATION
- BH1002 - ELEVATED CONCENTRATIONS OF TOTAL PAHS AND LEAD AT 0.40mg/l AND 1.30mg/l
- BH1004 - ELEVATED CONCENTRATION OF ARSENIC AT 6.00mg/l
- ARP-BH002 - ELEVATED CONCENTRATION OF CHROMIUM AT 2.50mg/l
- BH1013A - ELEVATED CONCENTRATIONS OF TOTAL TPH AT 0.50mg/l
- ARP-BH007 - ELEVATED CONCENTRATIONS OF TOTAL PAHS AT 1.00mg/l
- ARP-BH008 - ELEVATED CONCENTRATIONS OF TOTAL PAHS AND NAPHTHALENE AT 2.20mg/l AND 5.20mg/l

11/03/23 REV ISSUED FOR INFORMATION 10 10 10
DATE REV DESCRIPTION DRAWN CHD

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PROJECT
ID MANCHESTER

TITLE
SITE CONSTRAINTS

DRAWING STATUS
INFORMATION

CE PROJECT NO.	SCALE 1:250	DATE CREATED	DRAWN	CHECKED
IDM00	1:250	MAR 25	IB	JB
DRAWING NO.			REV	
SISCO-CIV-XX-ZZ-DR-CV-10001				P01

Site Photos



5. RC4005A



6. RC4006A

Contents

1.	Introduction	2
2.	Site Context	3
2.1.	Site Location	3
2.2.	Site Description.....	3
2.3.	Proposed Development.....	3
3.	Summary of the Previous Preliminary Site Investigation	5
4.	Supplementary Site Investigation.....	7
4.1.	Introduction	7
5.	Ground and Groundwater Conditions	9
5.1.	Summary of Ground Model.....	9
5.2.	Made Ground	9
5.3.	Glacial Till	9
5.4.	Chester Formation – Sandstone	10
5.5.	Holloway Wall Foundations	10
5.6.	Visual and Olfactory Potential Contamination	10
5.7.	Groundwater.....	10

Plates

Plate 1:	Approximate Site Location Plan (©OpenStreetMap Contributors).....	3
Plate 2:	Extract of Civic Engineers Holloway Wall Service Tunnel Interface Study	4
Plate 3:	Civic Earth 2024 Site Investigation Boreholes in proximity to the Holloway Wall	5
Plate 4:	Civic Earth 2024 Holloway Wall Foundation Inspection Pits	6
Plate 5:	Supplementary Site Investigation Exploratory Hole Location Plan	8

Appendices

- Appendix A: Exploratory Hole Location Plan
- Appendix B: Exploratory Hole Records
- Appendix C: Rotary Core Hole Investigation Sections
- Appendix D: Rotary Core Investigation Photographs
- Appendix E: Geological Cross Section

Factual Site Investigation Report

Prepared By	Kirsty Poore MSc, MSci (Hons), CGeol, FGS, ARSM, ROGEP Specialist
Reviewed By	Hal Godwin MSc, BSc (Hons), CGeol, DIC, FGS, ROGEP
Approved By	Dan Matthews BEng, CSci, CEnv, MIEEnvSc
Report Reference	51019-CE-06-XX-R-G-1001
Issued	14/11/2024
Status	P01 – First Issue

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1. Introduction

Civic Earth Limited was appointed on 5 September by Bruntwood SciTech (the Developer) on behalf of ID Manchester Limited (the Client) to undertake a supplementary site investigation to investigate the construction of the Grade II Listed Holloway Wall foundations and founding strata, and inform the proposed redevelopment of Plot C within the wider Sister Manchester development area (herein referred to as “the wider Sister area”).

The redevelopment proposals of Plot C include the demolition of the former University of Manchester (UOM) Wright Robinson, Manchester Meeting Place, Morton and Moffat buildings and the construction of a new high-rise commercial development. The proposed development includes interventions to the Holloway Wall, incorporating it into the new commercial structures. A new service tunnel is proposed to be constructed adjacent to the west side of the Holloway Wall where proposed formation level of the service tunnel is approximately 7m below existing ground level.

Investigation of the ground conditions in proximity to the Holloway Wall and a preliminary investigation of the Holloway Wall structure was carried out by Civic Earth in April and May 2024¹, and a technical note was produced by Civic Earth in August 2024² setting out the findings of the preliminary site investigation, potential foundation construction details of the Holloway Wall and proposed methodology of the supplementary site investigation.

This document presents the factual data obtained from the supplementary site investigation including exploratory hole logs and sections.

¹ Civic Earth (2024) *ID Manchester Masterplan Area. Factual Site Investigation Report*. Reference 51019-CE-02-XX-R-G-1001. Revision P01. 31 July 2024.

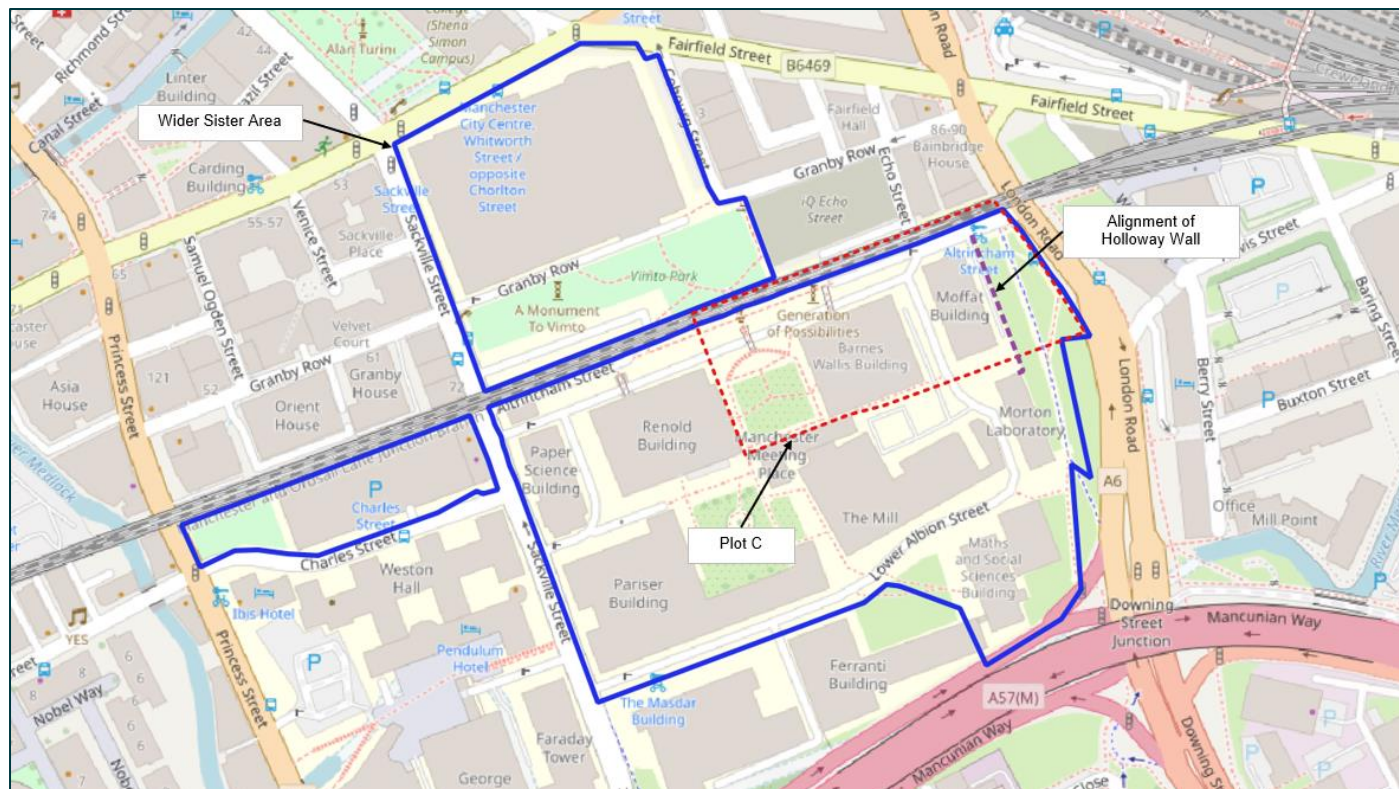
² Civic Earth (2024) *Plot C, ID Manchester. Supplementary Investigation at Holloway Wall*. Reference 51019-CE-02-XX-R-G-1003. Revision P03. 23 August 2024.

2. Site Context

2.1. Site Location

The Holloway Wall is a Grade II Listed sculptural concrete wall which is located in the east of the Plot C development, which is located in the east of the wider Sister area. The location of the Holloway Wall within Plot C and the wider Sister area is illustrated in Plate 1. The National Grid coordinates for the approximate centre of the wall are 384765E, 397660N.

Plate 1: Approximate Site Location Plan (©OpenStreetMap Contributors)



2.2. Site Description

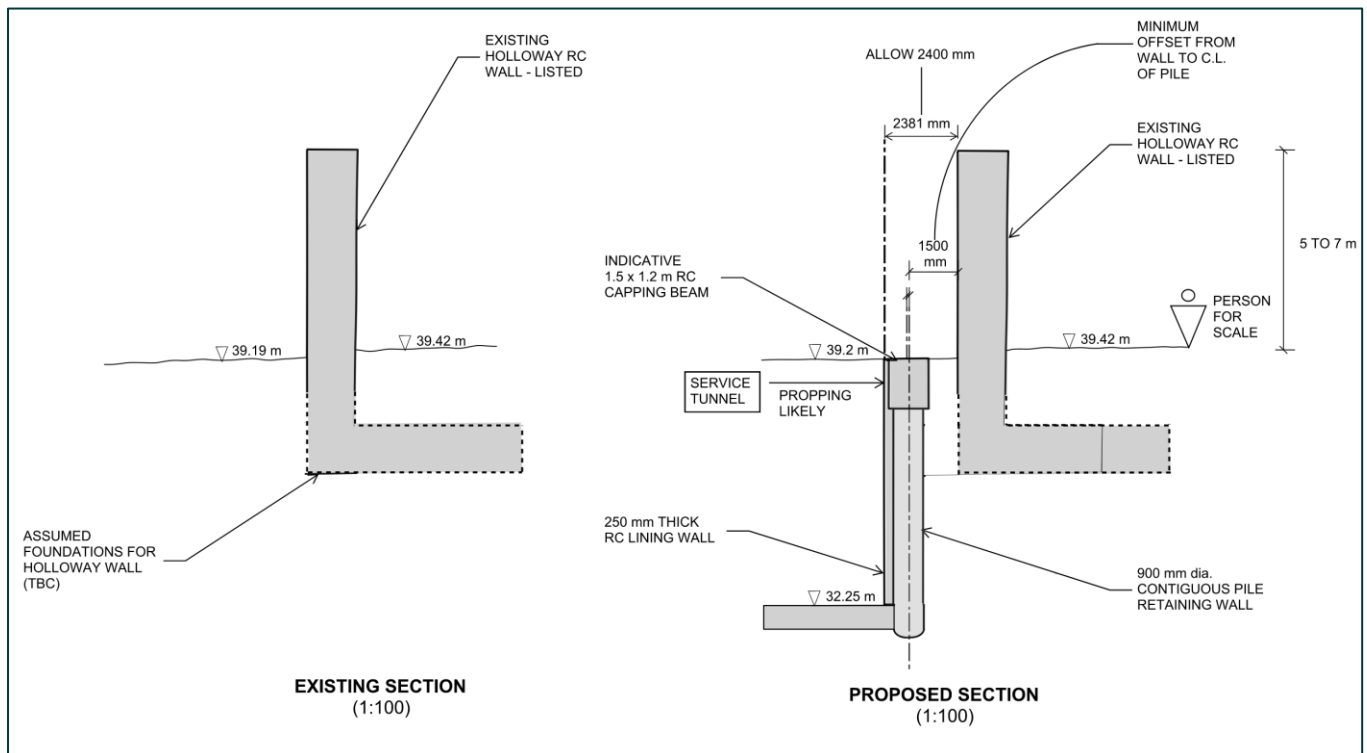
The wall was constructed in 1968 and was designed as a sound buffer between the University of Manchester (UOM) buildings to the west and London Road to the east³. The land to the east of the wall currently comprises an area of soft landscaping with mature trees, secured from the general public with fencing around the perimeter of the landscaped area. The land to the west of the wall predominantly comprises an area of tarmac hardstanding beyond which is the former UOM Moffat building. Multiple below ground utilities are located within this area. A former storage compound is adjacent to the southwest extent of the wall. Degradation of the wall has been noted during recent site visits by Civic Earth including spalling of the concrete surface, exposure of reinforcement within the concrete blocks and graffiti paint. Allocated parking signs have also historically been fixed onto the west face of the wall.

2.3. Proposed Development

The proposed development includes interventions to the Holloway Wall, incorporating it into the new commercial structures and a new service tunnel is to be constructed adjacent to the west side of the Holloway Wall where proposed formation level of the service tunnel is approximately 7m below existing ground level. An example of the proposed interaction between the service tunnel and the Holloway Wall (assuming an L shaped foundation to the east of the wall) is illustrated in Plate 2.

³ Historic England List Entry 1400857 (<https://historicengland.org.uk/listing/the-list/list-entry/1400857?section=official-list-entry>)

Plate 2. Extract of Civic Engineers Holloway Wall Service Tunnel Interface Study



3. Summary of the Previous Preliminary Site Investigation

Investigation of the ground conditions in proximity to the Holloway Wall was carried out by Civic Earth in April and May 2024 as part of a site investigation across the wider Sister area, including Plot C¹. Two rotary boreholes were drilled to the west of the Holloway Wall (BH1001 and BH1002) with a window sample borehole drilled in the land to the east of the Holloway Wall (WS1009), as illustrated in Plate 3. The location of the Holloway Wall is indicated by the purple dashed line. A summary of the ground conditions encountered in each of the boreholes is summarised in Table 1.

Table 1. Summary of Ground Conditions in Boreholes BH1001, BH1002 and WS1009

Level (mbgl) [mOD]	BH1001	BH1002	WS1009
Ground Level / Top of Made Ground	0.00 [+35.24]	0.00 [+38.79]	0.00 [+38.70]
Top of Glacial Till	Not Encountered	Not Encountered	1.80 [+36.90]
Top of Weathered Chester Formation	4.00 [+31.24]	4.90 [+33.89]	2.90 [+35.80]
Top of Chester Formation (Rock)	6.50 [+28.74]	Not Encountered	Not Encountered
Base of Hole	25.00 [+10.24]	25.00 [+13.79]	3.40 [+35.30]

Plate 3. Civic Earth 2024 Site Investigation Boreholes in proximity to the Holloway Wall



The borehole investigation indicated significant variation in the ground conditions either side of the Holloway Wall. Borehole WS1009 (to the east of the wall) recorded the top of the Chester Formation at 2.90m below ground level (mbgl) (+35.80m above Ordnance Datum (mOD)) whilst borehole BH1001 (to the west of the wall) recorded the top of the Chester Formation 4.90mbgl (+33.89); a variation of approximately 2.0m. It is noted that the Made Ground lies directly on top of the Chester Formation at borehole BH1001 and BH1002, suggesting that the natural superficial deposits may have been historically removed by anthropogenic activities; it is therefore unknown if the level of the Chester Formation that has been recorded at the borehole locations is the original/natural level of the bedrock, or whether the upper bedrock material has been removed to some degree during previous redevelopments. The Chester Formation was proven at 2.90mbgl in borehole WS1009 with natural Glacial Till deposits above.

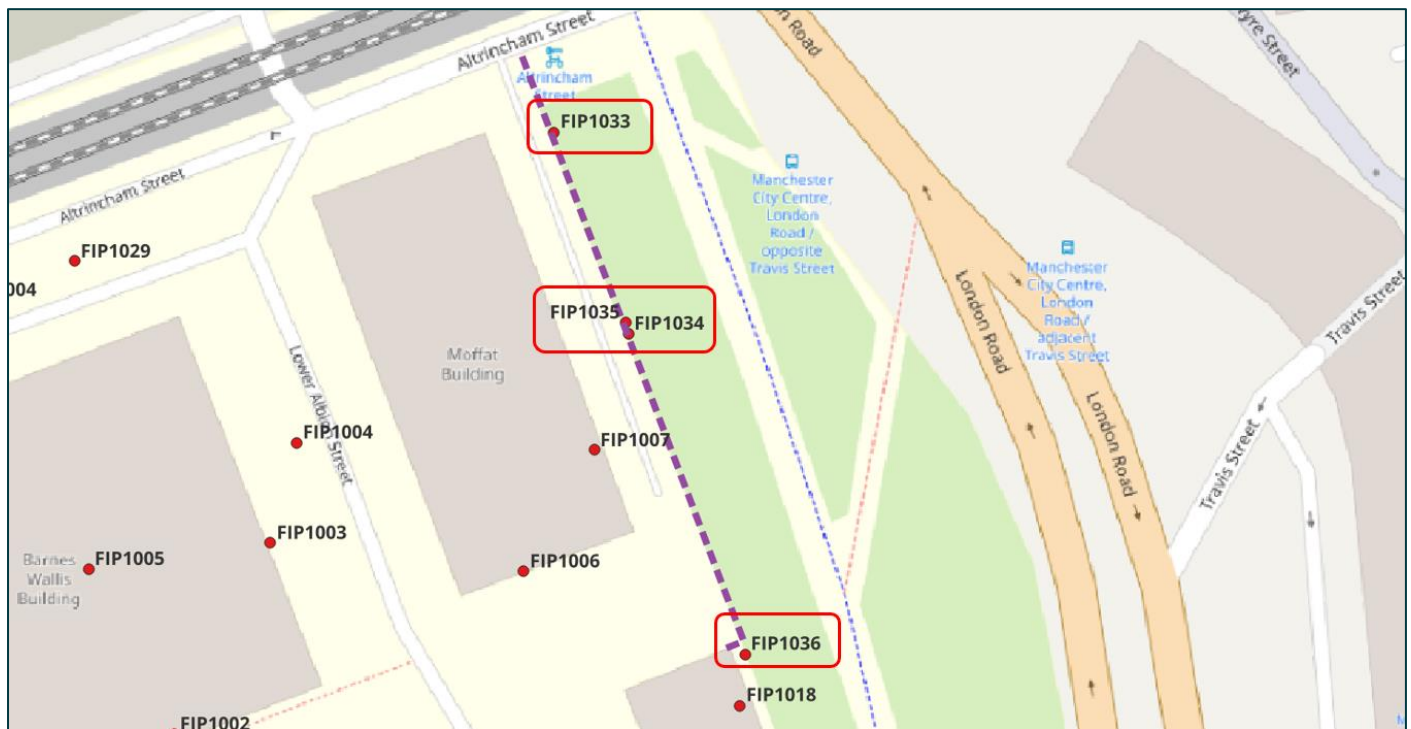
Groundwater level within the Chester Formation has been recorded to range between 6.96mbgl and 10.88mbgl (+28.28mOD and +27.91mOD) in boreholes BH1001 and BH1002 over three monitoring rounds between May and July 2024.

Preliminary investigation was also carried out adjacent to the Holloway Wall in May 2024 which included the excavation of 4 foundation inspection pits (FIP) to a maximum depth of 1.60mbgl to ascertain whether the Holloway Wall foundations were shallow (<1.50mbgl) or whether further supplementary investigation would be required to investigate the presence of foundations at depth. Following agreement of the investigation methodologies with Manchester City Council (MCC), the excavations were undertaken with hand tools with two locations adjacent to the east face of the wall, one location adjacent to the west face of the wall, and a final location adjacent to the southern end of the wall. The FIP locations are illustrated in Plate 4. A summary of the FIP findings is provided in Table 2. The preliminary investigations identified that the Holloway Wall foundations are at a greater depth than 1.50m in each location (>1.60mbgl in FIP1036) with the concrete wall structure observed to extend vertically downwards.

Table 2. Summary of Foundation Inspection Pit Findings

Location	Ground Level (mOD)	Base of Excavation (mbgl) [mOD]	Foundation Details
FIP1033	39.42	1.50 [+35.92]	Foundation not encountered at maximum excavation depth. Wall structure observed to extend vertically downwards with no step out within excavation depth.
FIP1034	38.20	1.50 [+36.70]	Foundation not encountered at maximum excavation depth. Wall structure observed to extend vertically downwards with no step out within excavation depth. Cobbly sandy gravel encountered within core hole excavation which collapsed into hole when excavation below 0.90mbgl attempted. Hole probed to 1.50mbgl and step out or underside of wall not encountered.
FIP1035	38.95	1.50 [+37.45]	Foundation not encountered at maximum excavation depth. Wall structure observed to extend vertically downwards with no step out within excavation depth.
FIP1036	34.66	1.50 [+33.06]	Foundation not encountered at maximum excavation depth. Wall structure observed to step out by 400mm at 0.30mbgl and then extend vertically to maximum excavation depth.

Plate 4. Civic Earth 2024 Holloway Wall Foundation Inspection Pits



4. Supplementary Site Investigation

4.1. Introduction

A supplementary site investigation was undertaken at the Holloway Wall between 2 and 8 October 2024. The site investigation comprised a series of rotary core holes at 6 locations (3 locations on each side of the Holloway Wall), with core holes undertaken at increasing distances away from the wall to confirm whether the foundation of the wall stepped out from the wall face, indicating an L or T-shaped foundation. A summary of the intrusive works completed is summarised in Table 3.

Table 3: Summary of Exploratory Hole Locations

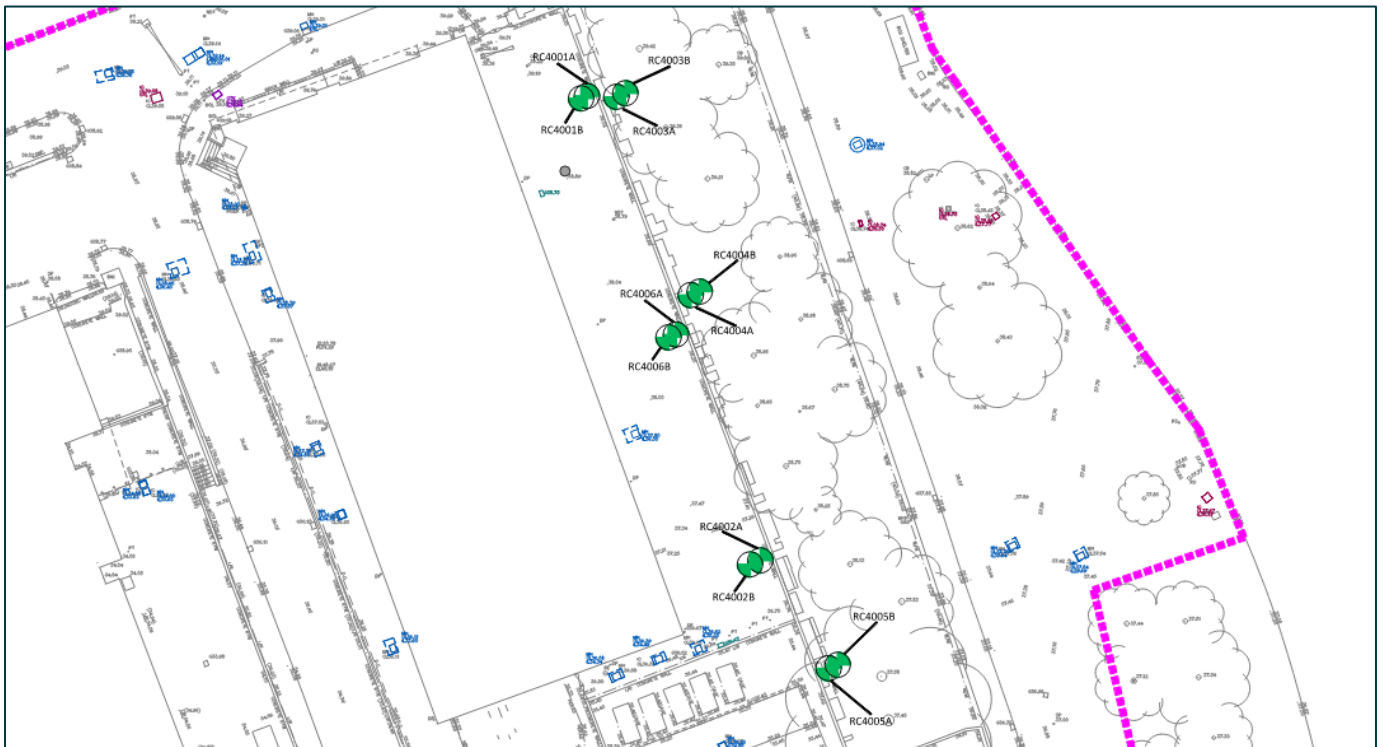
Location Reference	Distance from Wall (m)	Type of Exploratory Hole	Ground Level (mOD)	Base Depth (mbgl)	Base Levels (mOD)
RC4001A	0.70	RC	39.05*	7.50	31.55
RC4001B	1.20	RC	39.05*	4.50	34.55
RC4002A	0.90	RC	37.00*	7.50	29.50
RC4002B	1.80	RC	37.00*	4.00	33.00
RC4003A	0.80	RC	39.40*	7.50	31.90
RC4003B	1.50	RC	39.40*	3.60	35.80
RC4004A	0.70	RC	38.95*	6.00	32.95
RC4004B	1.50	RC	38.95*	3.10	35.85
RC4005A	0.70	RC	37.50*	6.00	31.50
RC4005B	1.20	RC	37.50*	5.10	32.40
RC4006A	0.80	RC	38.20*	7.50	30.70
RC4006B	1.45	RC	38.20*	2.80	35.40

RC = rotary core; * = ground level estimated from topographical survey.

Prior to breaking ground, exploratory holes were cleared for buried services by a specialist utility contractor utilising a cable avoidance tool (CAT) and signal generator. The exploratory hole position was measured in from fixed points and the coordinates and ground level generated from the site's topographical survey. The investigation was undertaken in general accordance with the requirements of BS 5930:2015+A1:2020⁴. The exploratory hole locations illustrated in Plate 5 and outlined on the exploratory hole location plan in [Appendix A](#). The rotary core hole records are included in [Appendix B](#) and rotary core sections are included in [Appendix C](#). Photographs of the cores recovered from the locations are included in [Appendix D](#).

⁴ British Standards Institution (2015) Code of practice for ground investigations. BS 5930:2015+A1:2020.

Plate 5. Supplementary Site Investigation Exploratory Hole Location Plan



5. Ground and Groundwater Conditions

5.1. Summary of Ground Model

A summary of the ground conditions encountered during the supplementary site investigation is provided in Table 4 (east of wall) and Table 5 (west of wall). An illustrative geological cross section is included in [Appendix E](#).

Table 4: Summary of Site Investigation Ground Conditions (mbgl) [mOD] – East of Wall

Top of Stratum	RC4003A	RC4003B	RC4004A	RC4004B	RC4005A	RC4005B
Made Ground	0.00 [39.40]	0.00 [39.40]	0.00 [38.95]	0.00 [38.95]	0.00 [37.50]	0.00 [37.50]
Holloway Wall Foundation	1.20 [38.20]	N/E	1.70 [37.25]	N/E	N/E	N/E
Glacial Till	N/E	1.20 [38.20]	N/E	1.30 [37.65]	3.70 [33.80]	N/E
Chester Formation	3.30 ^C [36.10 ^C]	3.50 [35.90]	2.70 [36.25]	2.80 [36.15]	4.50 ^C [33.00 ^C]	4.00 ^C [33.50 ^C]
Base of Hole	7.50 [31.90]	3.60 [35.80]	6.00 [32.95]	3.10 [35.85]	6.00 [31.50]	5.10 [32.40]

Notes: N/E = not encountered. C = no core recovery; however, considered to be in Chester Formation based on engineer and driller observations made on site and consideration of ground model at north end of wall.

Table 5: Summary of Site Investigation Ground Conditions (mbgl) [mOD] – West of Wall

Top of Stratum	RC4001A	RC4001B	RC4002A	RC4002B	RC4006A	RC4006B
Made Ground	0.00 [39.05]	0.00 [39.05]	0.00 [37.00]	0.00 [37.00]	0.00 [38.20]	0.00 [38.20]
Holloway Wall	N/E	N/E	N/E	N/E	N/E	N/E
No Core Recovery ^A	3.00 [36.05]	1.30 [37.75]	-	-	-	-
Glacial Till	1.60 [37.45]	2.00 [37.05]	2.10 [34.90]	2.50 [34.50]	1.90 [36.30]	0.35 [37.85]
Chester Formation	3.00 ^B [36.05 ^B]	3.50 [35.55]	5.50 [31.50]	3.70 [33.30]	3.00 ^C [35.20 ^C]	2.70 [35.50]
Base of Hole	7.50 [31.55]	4.50 [34.55]	7.50 [29.50]	4.00 [33.00]	7.50 [30.70]	2.80 [35.40]

Notes: N/R = not encountered. A = no core recovery, unable to confirm if horizon is stratum recorded above or below length of no recovery. B = no core recovery; however, considered to be in Chester Formation based on colouring and composition of returned water flush. C = no core recovery; however, considered to be in Chester Formation based on engineer and driller observations made on site and consideration of ground model at north end of wall.

5.2. Made Ground

Made Ground was encountered from below hardstanding or from surface at each exploratory hole location and ranged in thickness between 0.35m and 2.50m on the west side of the wall and between 1.20m and 3.70m on the east side of the wall. Concrete foundations of the Holloway Wall were encountered on the east side of the wall only in locations RC4003A and RC4004A, 0.80m and 0.70m away from the wall respectively. Details of the foundations encountered are provided in Section 5.5. The Made Ground comprised both granular horizons and cohesive horizons, both of variable consistency and density, similar to the ground conditions recorded during the previous Civic Earth investigation¹.

5.3. Glacial Till

Superficial deposits of Glacial Till were encountered in each of the exploratory hole locations with the exception of location RC4003A and RC4004A where the foundations of the Holloway Wall were encountered, suggesting that the superficial deposits were excavated during the construction of the wall, and location RC4005B. Where encountered, the top of the superficial deposits was recorded between 38.20mOD and 33.0mOD and recorded to range between 0.80m and 3.40m in thickness.

5.4. Chester Formation – Sandstone

The weathered Chester Formation was typically recovered gravelly sand or sandy gravel, and was encountered between 36.25mOD and 31.50mOD. The stratum was proven to the maximum investigation depth of 7.50mbgl (29.50mOD).

5.5. Holloway Wall Foundations

A summary of the foundation details of the Holloway Wall encountered during the supplementary site investigation is provided in Table 6.

Table 6: Summary of Holloway Wall Foundations encountered during Supplementary Site Investigation

Location	Distance from Wall (m)	Top Depth of Foundation (mbgl)	Top Level of Foundation (mOD)	Thickness of Foundation (m)	Details of Foundation
RC4003A	0.80	1.20	38.20	2.10	Concrete foundation encountered between 1.20mbgl and 3.30mbgl. No core recovery below concrete foundation; however, considered likely to be the Chester Formation based on composition of drilling flush return.
RC4004A	0.70	1.70	37.25	1.00	Concrete foundation encountered between 1.70mbgl and 2.70mbgl. Foundation located on Weathered Chester Formation.

5.6. Visual and Olfactory Potential Contamination

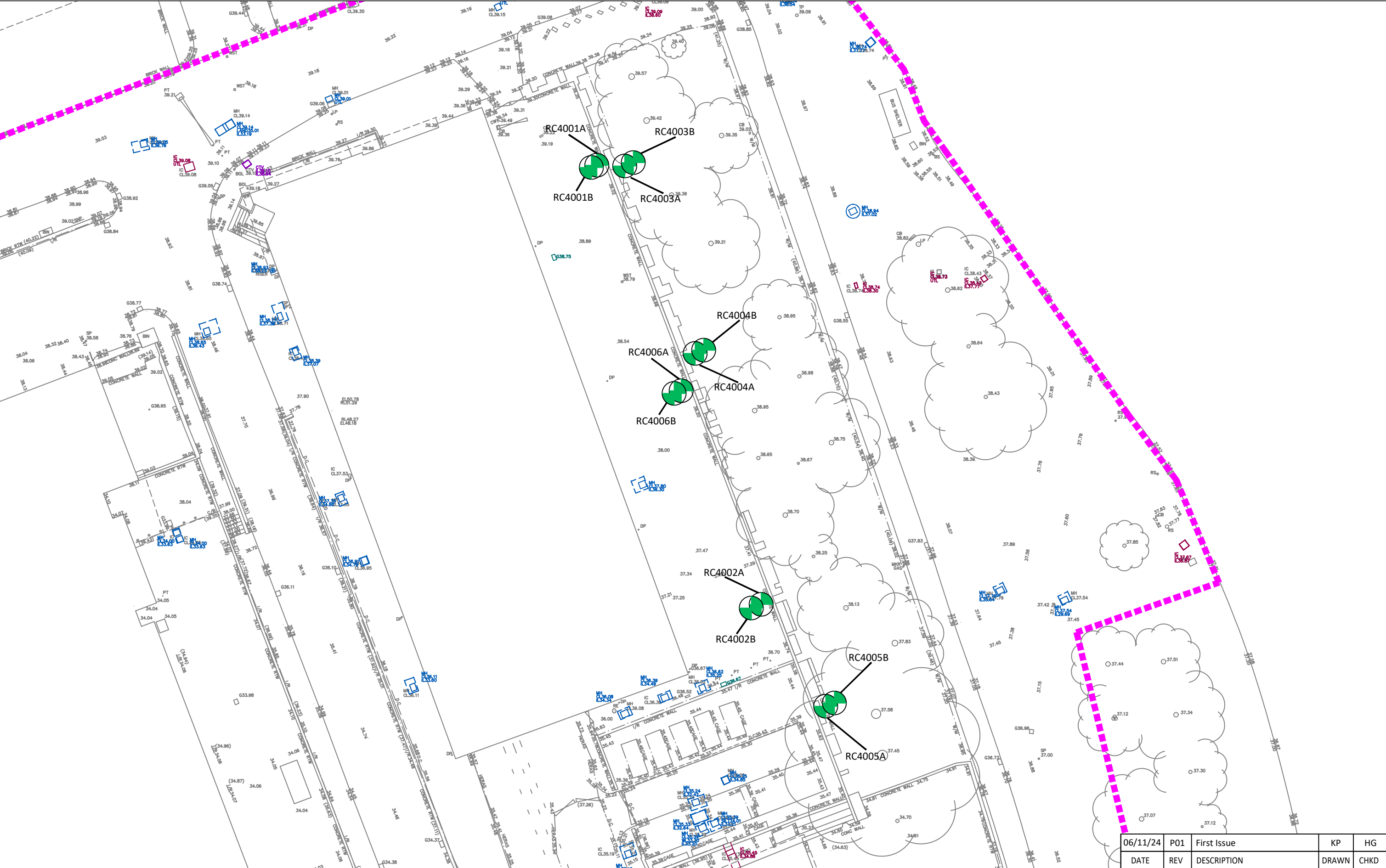
No olfactory and visual signs of potential contamination were noted during the supplementary site investigation. The presence of foreign materials such as bricks, concrete, coal, and ceramic was noted within the Made Ground.

5.7. Groundwater

No groundwater was encountered during the supplementary site investigation.

Appendix A

Exploratory Hole Location Plan



 Indicative Wider Sister Masterplan Area

 Rotary Core Investigation Location

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CIVIC

EARTH

PROJECT

Holloway Wall
Sister Manchester

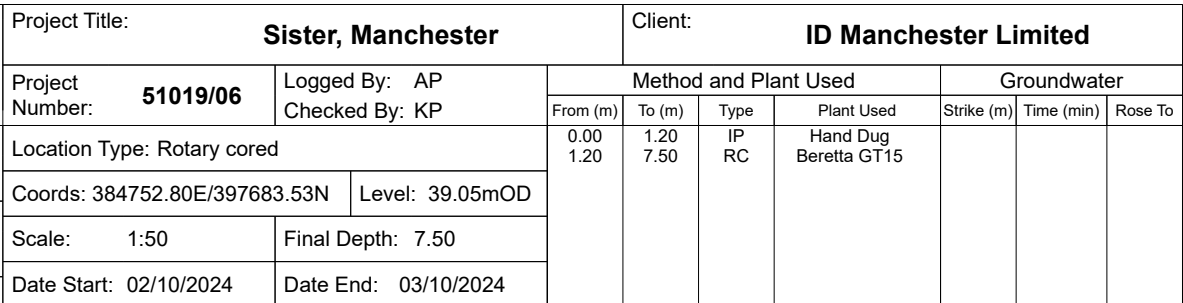
TITLE

Exploratory Hole Location
Plan

06/11/24	P01	First Issue		KP	HG
DATE	REV	DESCRIPTION		DRAWN	CHKD
DRAWING STATUS				STATUS CODE	
FOR INFORMATION				-	
CE PROJECT No.		SCALE @ A3	DATE CREATED	DRAWN	CHECKED
51019/06		NTS	06/11/24	KP	HG
DRAWING No.					REV
51019-CE-06-XX-D-G-0001					P01

Appendix B

Exploratory Hole Records

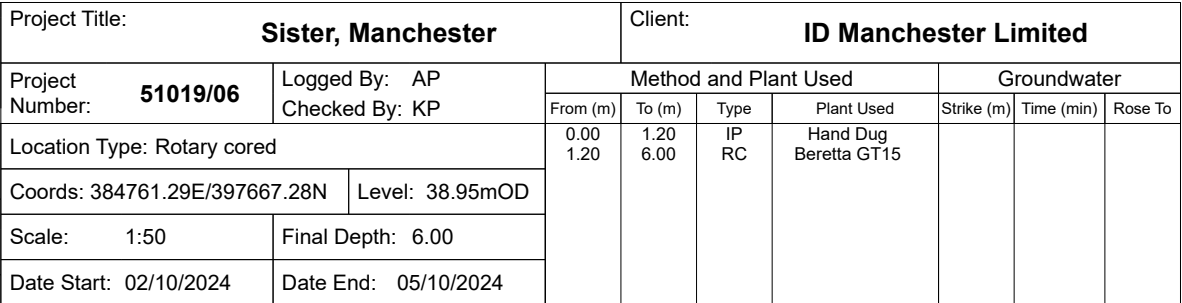


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Location ID: RC4002A		Location Type: Rotary cored				0.00	1.20	IP	Hand Dug					
		Coords: 384767.00E/397645.60N		Level: 37.00mOD		1.20	7.50	RC	Beretta GT15					
Status: FINAL		Scale: 1:50		Final Depth: 7.50										
		Date Start: 02/10/2024		Date End: 04/10/2024										
Sheet 1 of 1														
Inst/ Backfill	Depth (m)	Samples & Tests			Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description	Rotary Coring				Fract (mm) min avg max
		Sample Depth (m)	Type/Ref	Tests/Results						Core Run	TCR (%)	SCR (%)	ROD (%)	
	1.0					36.95	0.05		Black macadam. [MADE GROUND]					
						36.70	0.30		Strong pale grey concrete with 5mm steel reinforcement. 70% angular medium gravel, 28% cement, 2% voids. [MADE GROUND]					
									Black slightly clayey sandy gravel. Gravel is subangular to angular fine to coarse of concrete, brick, clinker and fragments of glass. Sand is fine to coarse. [MADE GROUND]					
						35.80	1.20							
						35.70	1.30			1.20 1.50	100	0	0	NI NI NI
									Red house brick. [MADE GROUND]					
						35.20	1.80		Brown slightly sandy gravelly clay. Gravel is subangular to angular fine to medium of concrete and brick. Sand is fine to coarse. [MADE GROUND]					
						34.90	2.10		Strong pale grey concrete. 70% angular medium gravel, 28% cement, 2% voids. [MADE GROUND]	1.50 3.00	100	20	20	NI NI NI
									Firm to stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to subangular fine to medium of sandstone, mudstone, quartz and rare coal. Sand is fine to coarse. [GLACIAL TILL]					
						33.20	3.80			3.00 4.50	100	0	0	NI NI NI
	2.0							Yellow brown SAND and GRAVEL. Gravel is subrounded to subangular fine to coarse of quartz, sandstone and mudstone. Sand is fine to coarse. Occasional cobbles noted. Cobbles are subrounded of sandstone. [GLACIAL TILL]						
	3.0													
	4.0													
	5.0													
	6.0													
	7.0													
	8.0													
	9.0													
	10.0													
Notes: 1. No groundwater encountered. 2. No sampling undertaken. 3. Borehole backfilled with grout, bentonite and arisings. 4. Borehole coordinates and ground level estimated from topographical survey. Borehole position measured from on-site features.						Hole Diameter		Casing		Hammer Information				
						Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Energy Ratio		Serial No.		
						7.50	102	7.50	146	%				
						Install Response Zones								
						Ref	From (m)	To (m)						

Project Title: Sister, Manchester				Client: ID Manchester Limited						
Project Number: 51019/06		Logged By: AP Checked By: KP		Method and Plant Used				Groundwater		
				From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
Location Type: Rotary cored				0.00 1.20	1.20 4.00	IP RC	Hand Dug Beretta GT15			
Coords: 384766.15E/397645.28N		Level: 37.00mOD								
Scale: 1:50		Final Depth: 4.00								
Date Start: 02/10/2024		Date End: 04/10/2024								

Project Title: Sister, Manchester				Client: ID Manchester Limited						
Project Number: 51019/06		Logged By: AP Checked By: KP		Method and Plant Used				Groundwater		
				From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
Location Type: Rotary cored				0.00	1.20	IP	Hand Dug			
				1.20	7.50	RC	Beretta GT15			
Coords: 384755.21E/397683.47N		Level: 39.40mOD								
Scale: 1:50		Final Depth: 7.50								
Date Start: 02/10/2024		Date End: 04/10/2024								

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		From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To							
Location ID: RC4003B		Location Type: Rotary cored				0.00 1.20	1.20 3.60	IP RC	Hand Dug Beretta GT15						
Status: FINAL		Coords: 384755.95E/397683.76N		Level: 39.40mOD											
		Scale: 1:50		Final Depth: 3.60											
		Date Start: 02/10/2024		Date End: 05/10/2024											
Sheet 1 of 1															
Inst/ Backfill	Depth (m)	Samples & Tests			Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description	Rotary Coring				Fract (mm) min avg max	
		Sample Depth (m)	Type/Ref	Tests/Results						Core Run	TCR (%)	SCR (%)	ROD (%)		
	1.0					39.00	0.40		Dark brown slightly sandy gravelly clay. Gravel is subrounded to angular fine to medium of brick, concrete, mudstone, coal and sandstone. Sand is fine to coarse. Occasional roots and rootlets noted. [MADE GROUND]						
						38.20	1.20		Red brown slightly gravelly sandy clay. Gravel is subangular fine to medium of brick, tile and concrete. Sand is fine to coarse. [MADE GROUND]						
									Stiff becomiing very stiff grey brown slightly sandy gravelly CLAY. Gravel is subrounded to rounded fine to medium of sandstone, mudstone and coal. [GLACIAL TILL]	1.20 1.50	100	0	0	NI NI NI	
										1.50 3.00	100	0	0	NI NI NI	
	3.0					35.90 35.80	3.50 3.60		Red brown gravelly sand. Sand is fine to coarse. Gravel is subrounded fine to medium of sandstone lithorelics. [WEATHERED CHESTER FORMATION - SANDSTONE]	3.00 3.60	100	0	0	NI NI NI	
	4.0								EOH at 3.60m - Terminated on Engineer's instructions						
	5.0														
	6.0														
	7.0														
	8.0														
	9.0														
	10.0														
Notes:										Hole Diameter		Casing		Hammer Information	
1. No groundwater encountered. 2. No sampling undertaken. 3. Borehole backfilled with grout, bentonite and arisings. 4. Borehole coordinates and ground level estimated from topographical survey. Borehole position measured from on-site features.										Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Energy Ratio	Serial No.
										3.60	102	3.60	146	%	
										Install Response Zones					
										Ref	From (m)	To (m)			



Project Title: Sister, Manchester				Client: ID Manchester Limited						
Project Number: 51019/06		Logged By: AP Checked By: KP		Method and Plant Used				Groundwater		
				From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
Location Type: Rotary cored				0.00	1.20	IP	Hand Dug			
				1.20	3.10	RC	Beretta GT15			
Coords: 384762.03E/397667.56N		Level: 38.95mOD								
Scale: 1:50		Final Depth: 3.10								
Date Start: 02/10/2024		Date End: 05/10/2024								

Project Title: Sister, Manchester				Client: ID Manchester Limited						
Project Number: 51019/06		Logged By: AP Checked By: KP		Method and Plant Used				Groundwater		
				From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
Location Type: Rotary cored				0.00	1.20	IP	Hand Dug			
				1.20	5.10	RC	Beretta GT15			
Coords: 384773.32E/397637.08N		Level: 37.50mOD								
Scale: 1:50		Final Depth: 5.10								
Date Start: 03/10/2024		Date End: 07/10/2024								

Project Title: Sister, Manchester				Client: ID Manchester Limited						
Project Number: 51019/06		Logged By: AP Checked By: KP		Method and Plant Used				Groundwater		
				From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
Location Type: Rotary cored				0.00 1.20	1.20 7.50	IP RC	Hand Dug Beretta GT15			
Coords: 384760.09E/397664.05N		Level: 38.20mOD								
Scale: 1:50		Final Depth: 7.50								
Date Start: 03/10/2024		Date End: 07/10/2024								

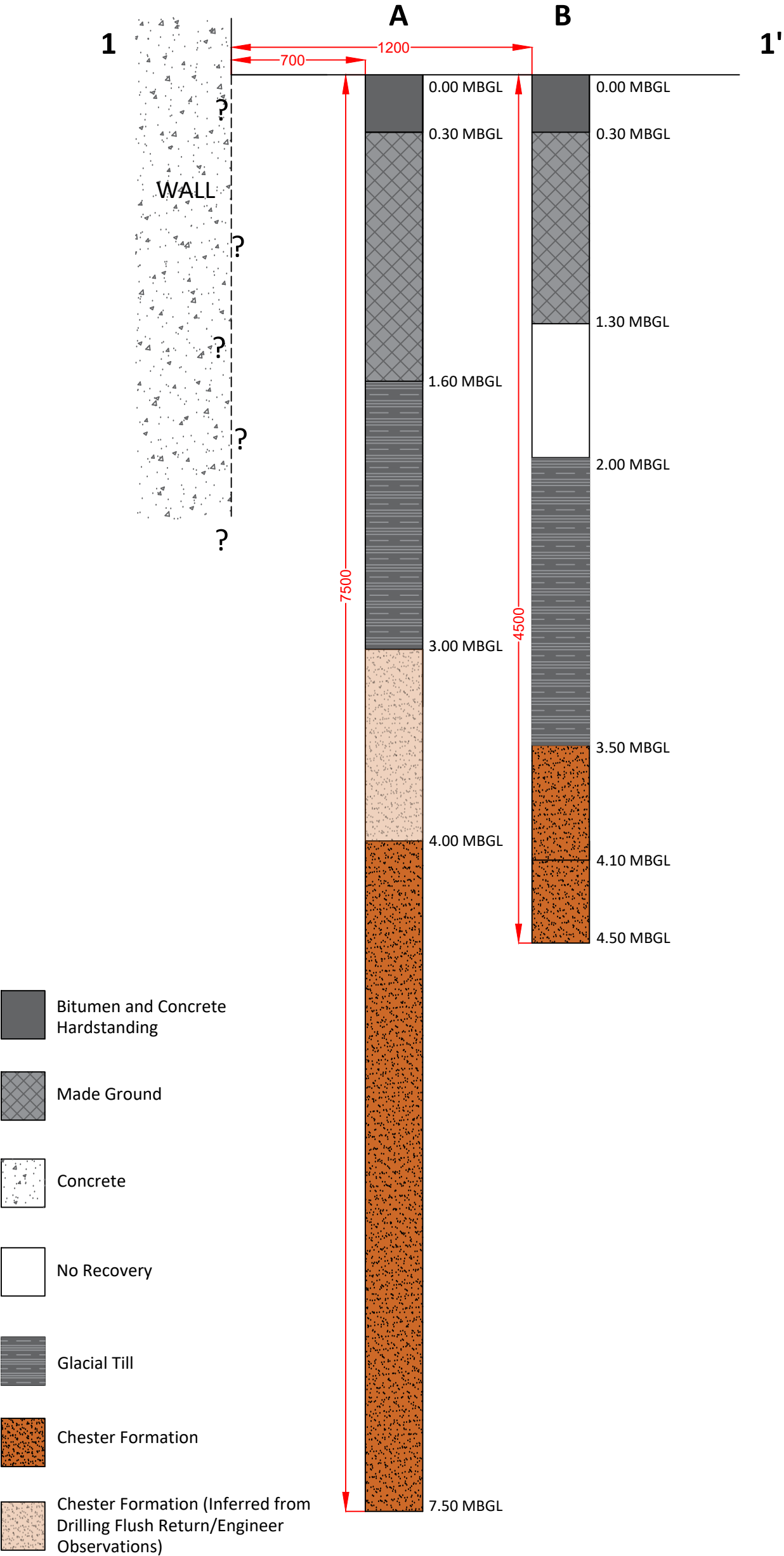
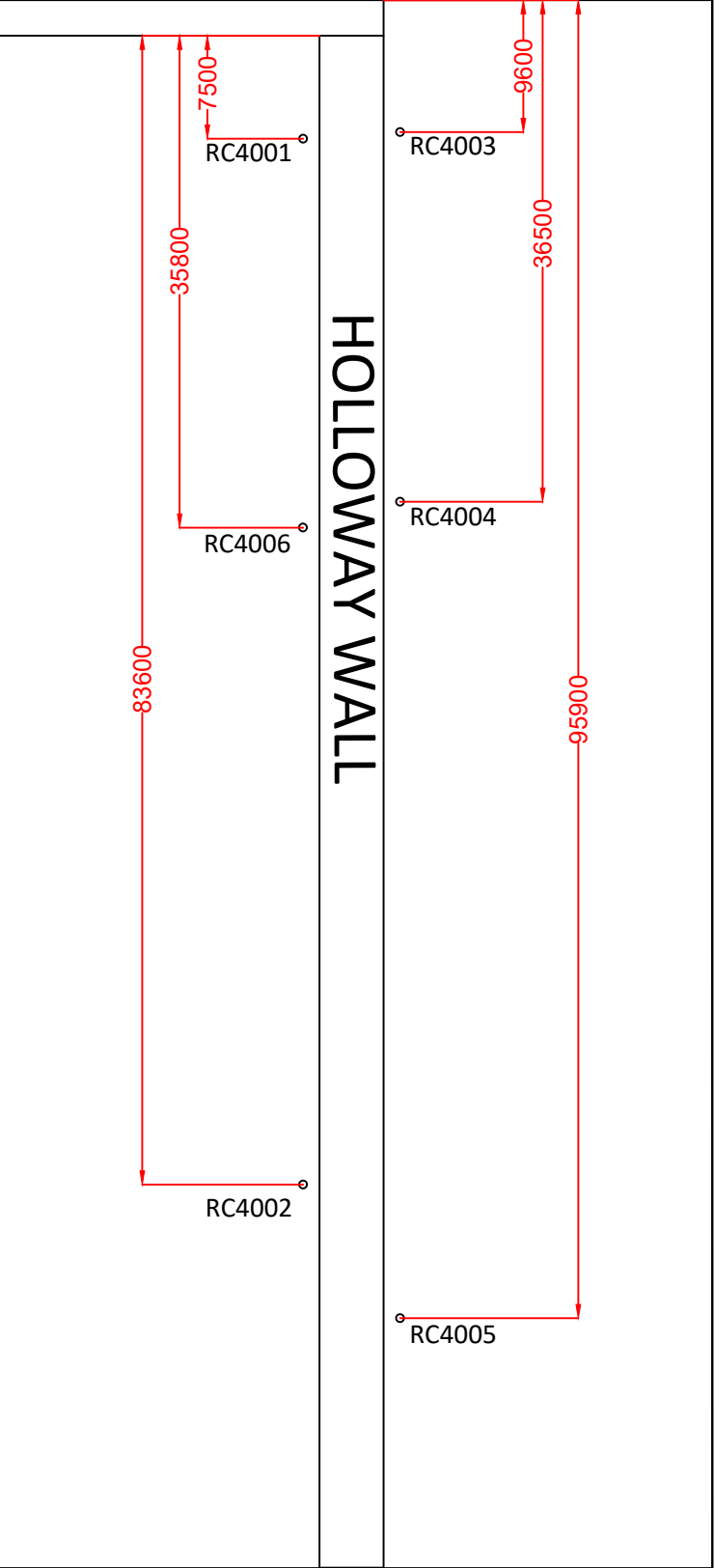
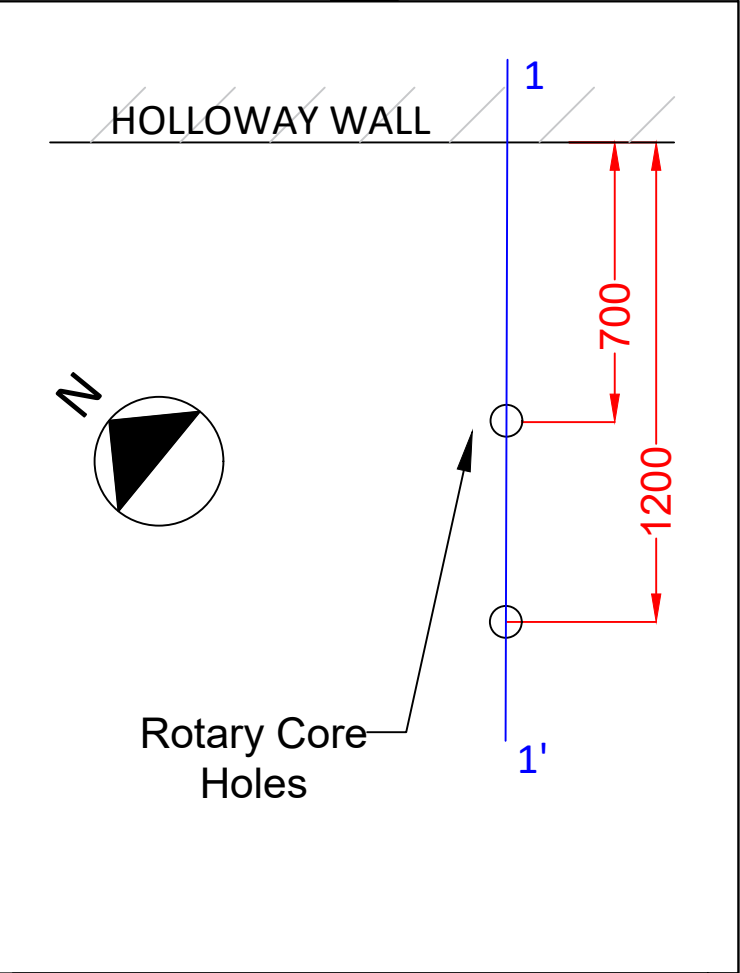
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Project Number: 51019/06		Logged By: AP Checked By: KP		Method and Plant Used				Groundwater		
				From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
Location Type: Rotary cored				0.00 1.20	1.20 2.80	IP RC	Hand Dug Beretta GT15			
Coords: 384759.48E/397663.82N		Level: 38.20mOD								
Scale: 1:50		Final Depth: 2.80								
Date Start: 03/10/2024		Date End: 08/10/2024								

Appendix C

Rotary Core Investigation Sections

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RC4001

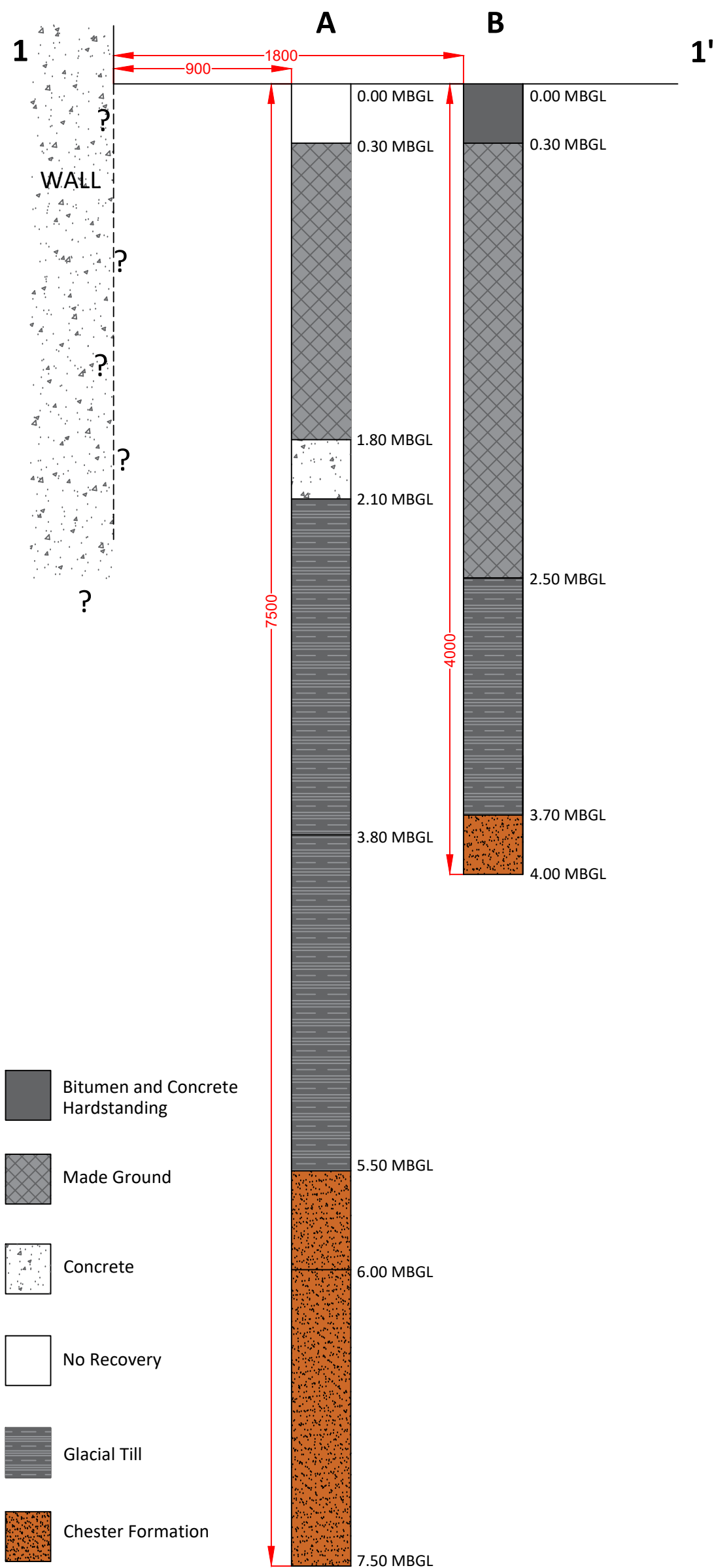
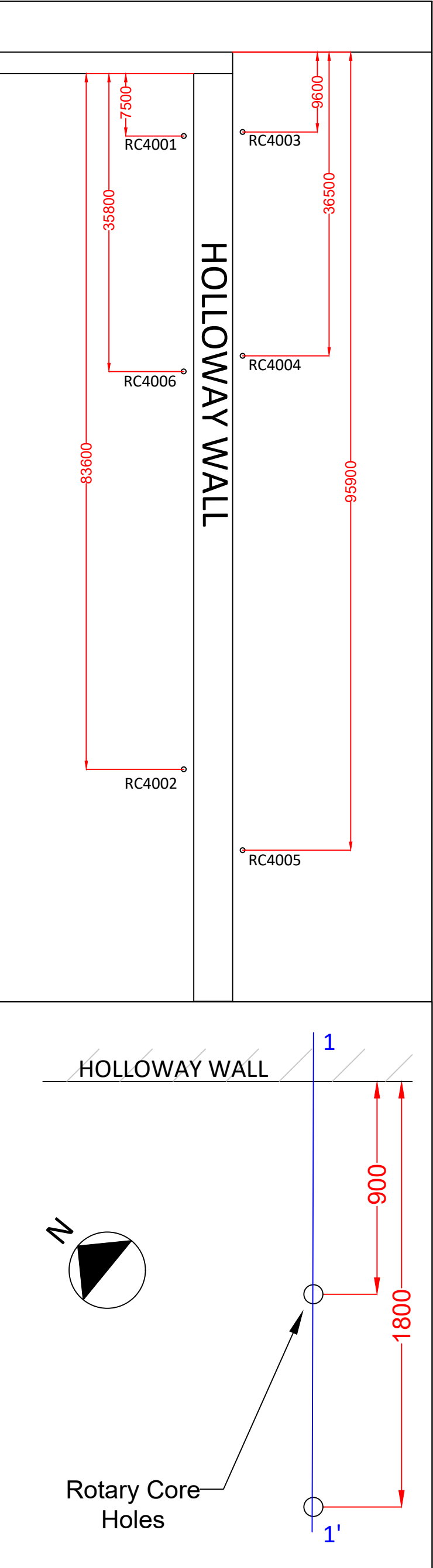


1. MBGL = metres below ground level
2. Dimensions of structures / foundations provided in mm unless otherwise stated.
3. See exploratory hole record for details of ground conditions.

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RC4002

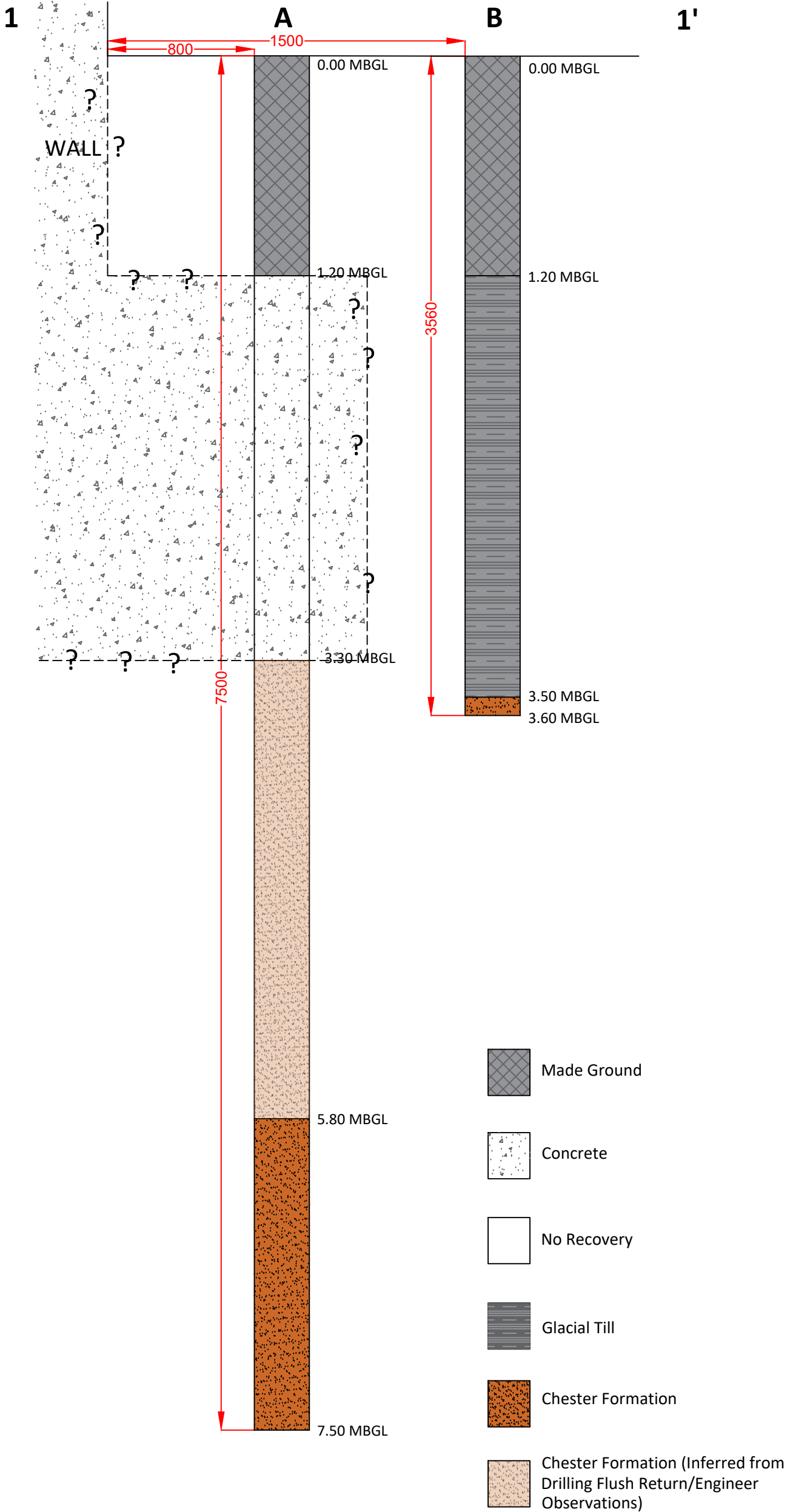
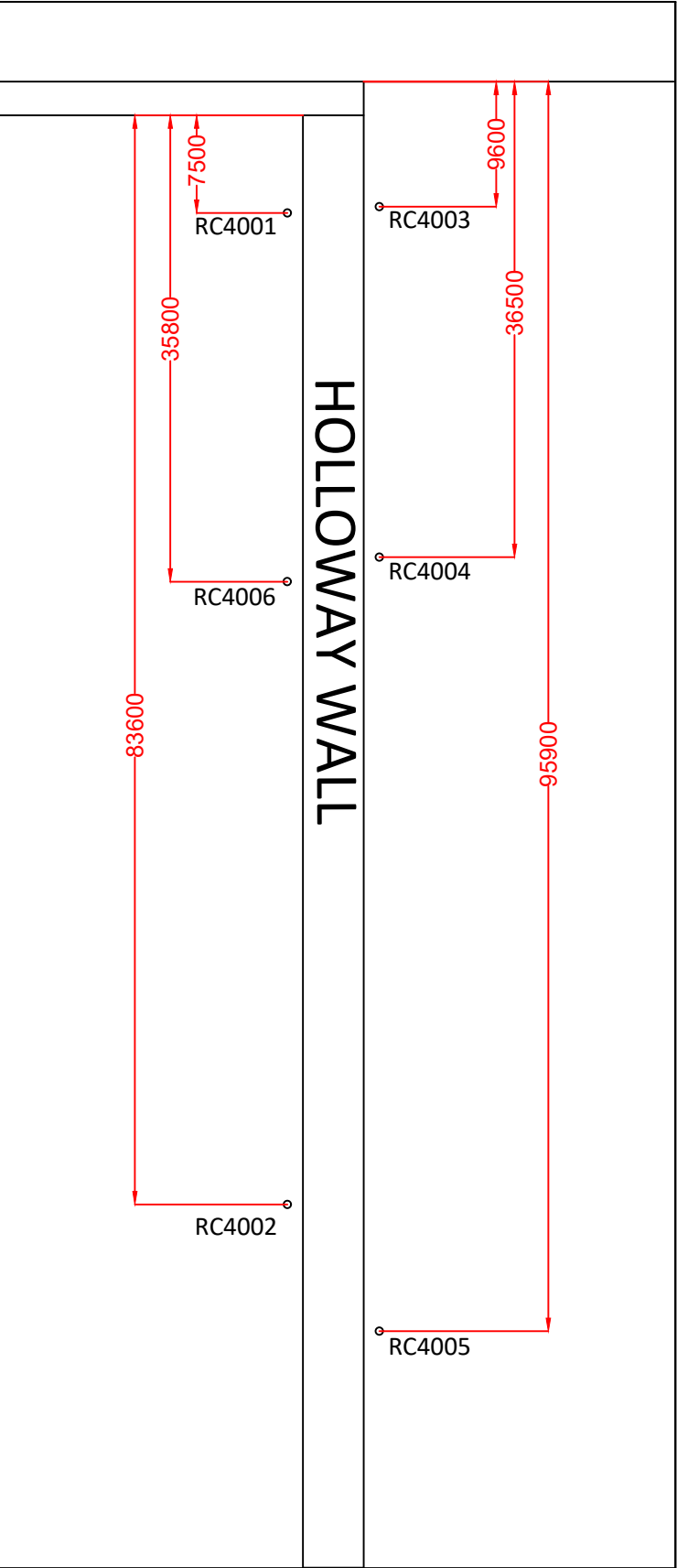
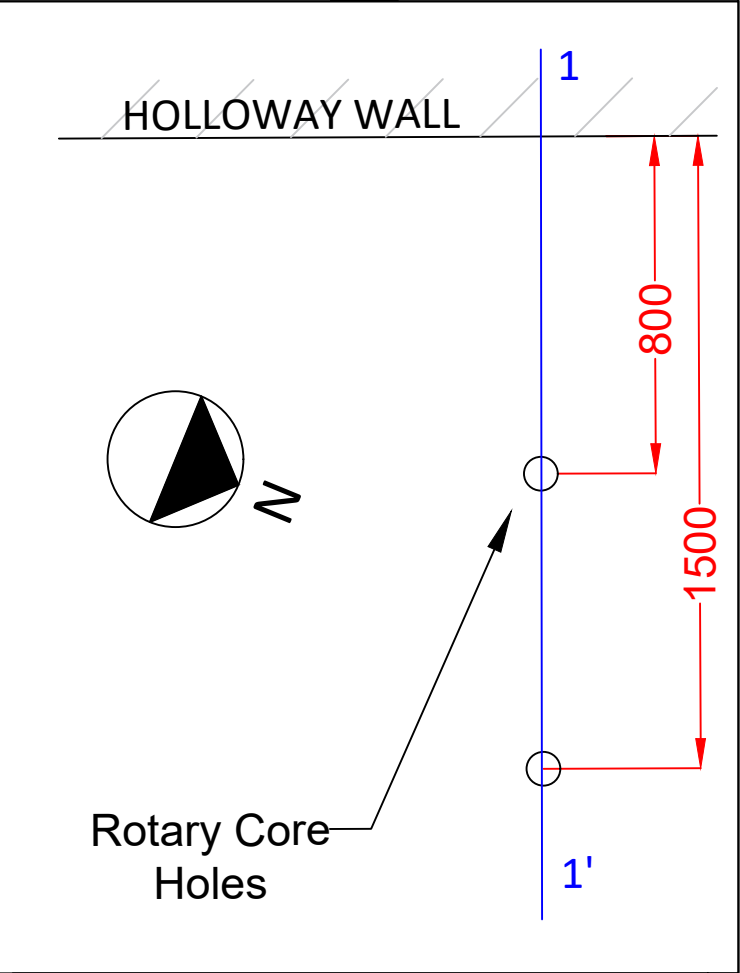


- 1. MBGL = metres below ground level
- 2. Dimensions of structures / foundations provided in mm unless otherwise stated.
- 3. See exploratory hole record for details of ground conditions.

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					Rotary Core RC4002			
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23/10/24	P01	First Issue	KIA	KP	DRAWING No.		REV	
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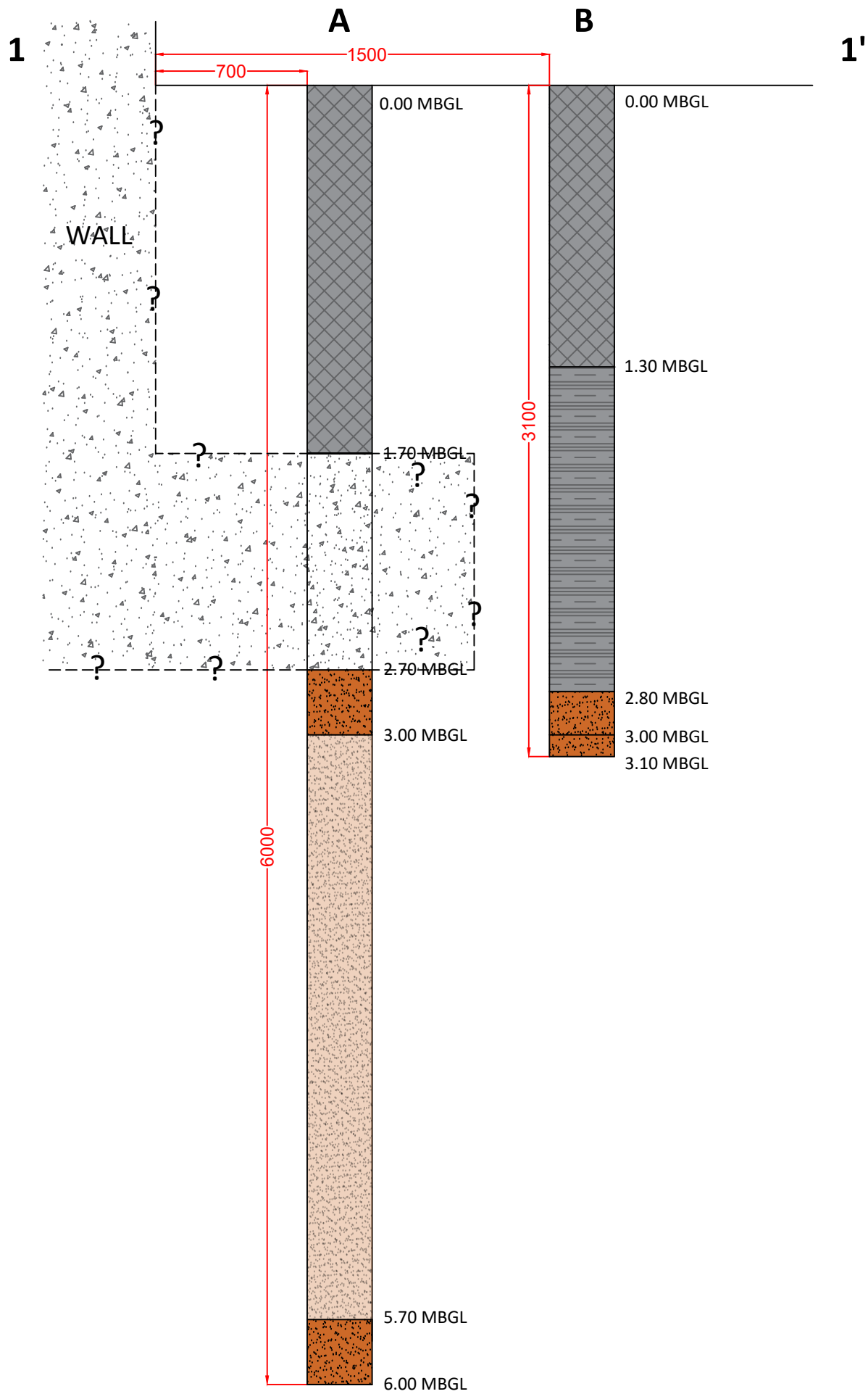
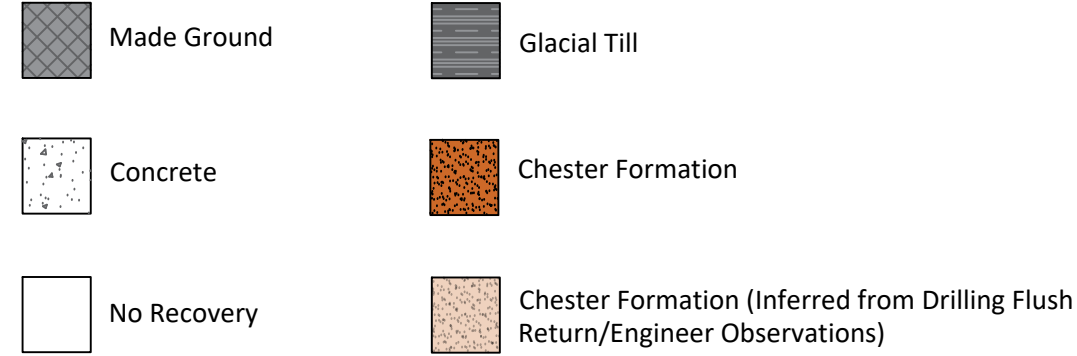
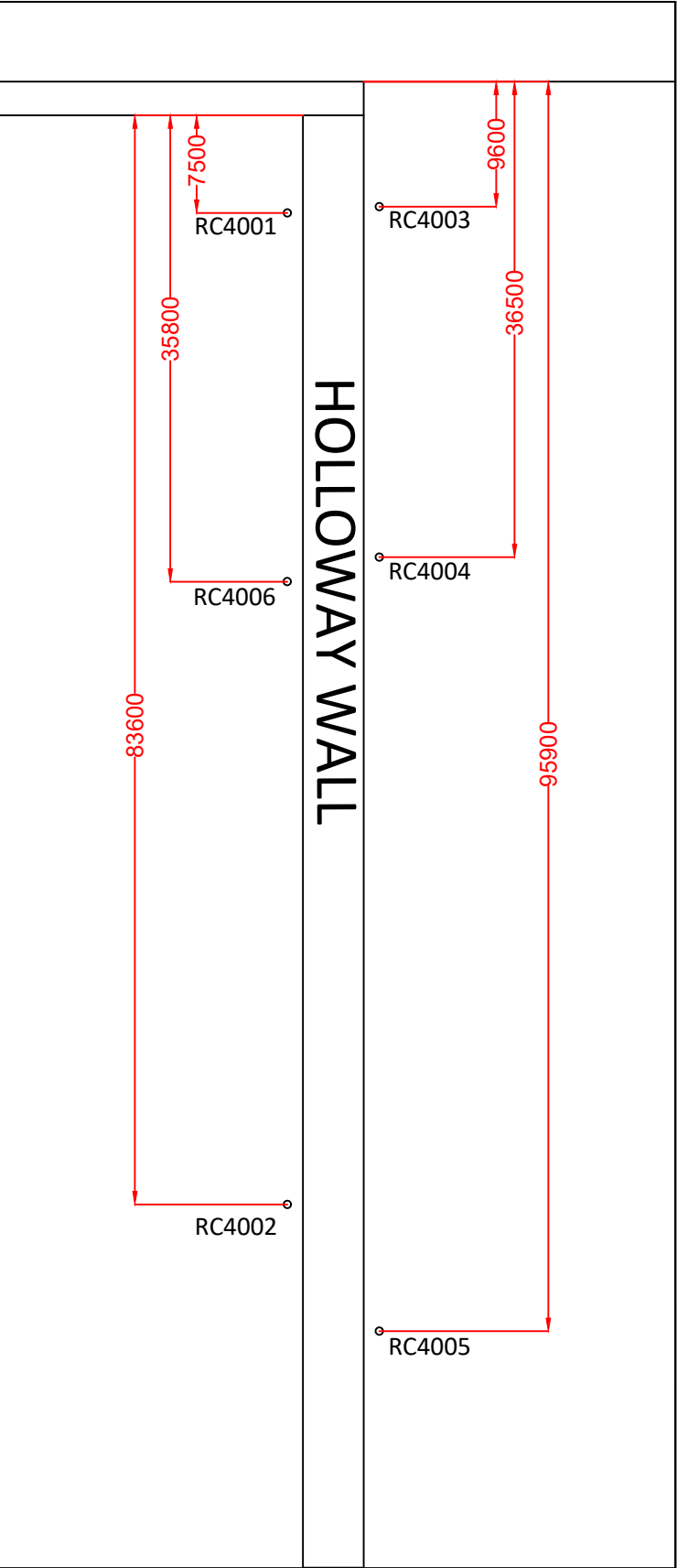
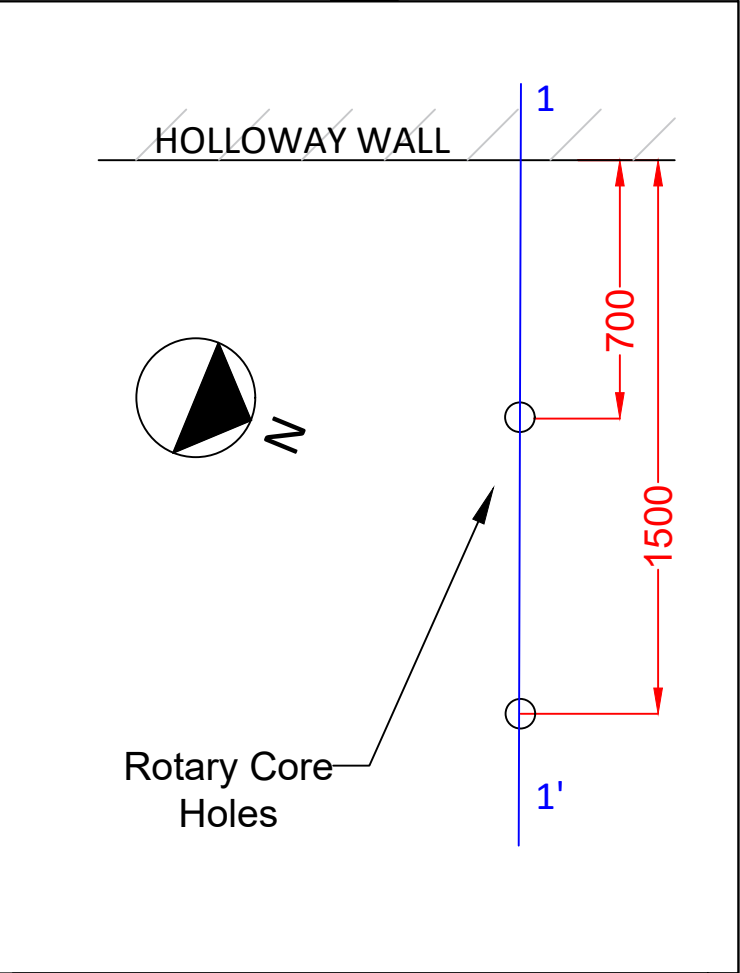
RC4003



1. MBGL = metres below ground level
2. Dimensions of structures / foundations provided in mm unless otherwise stated.
3. See exploratory hole record for details of ground conditions.

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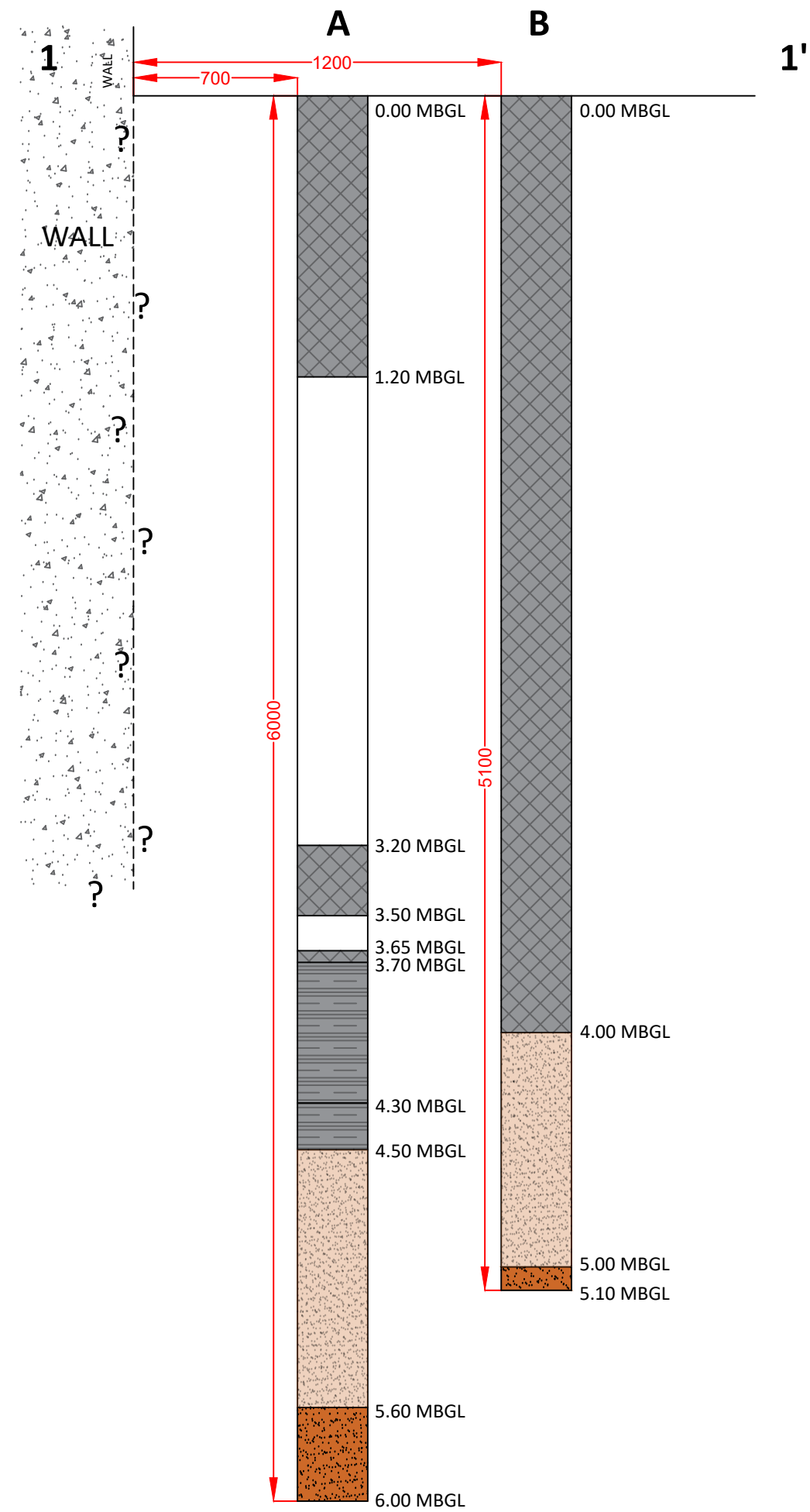
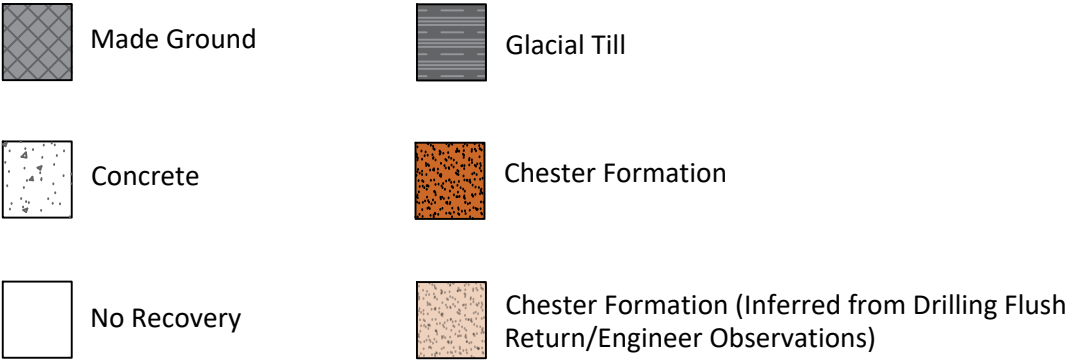
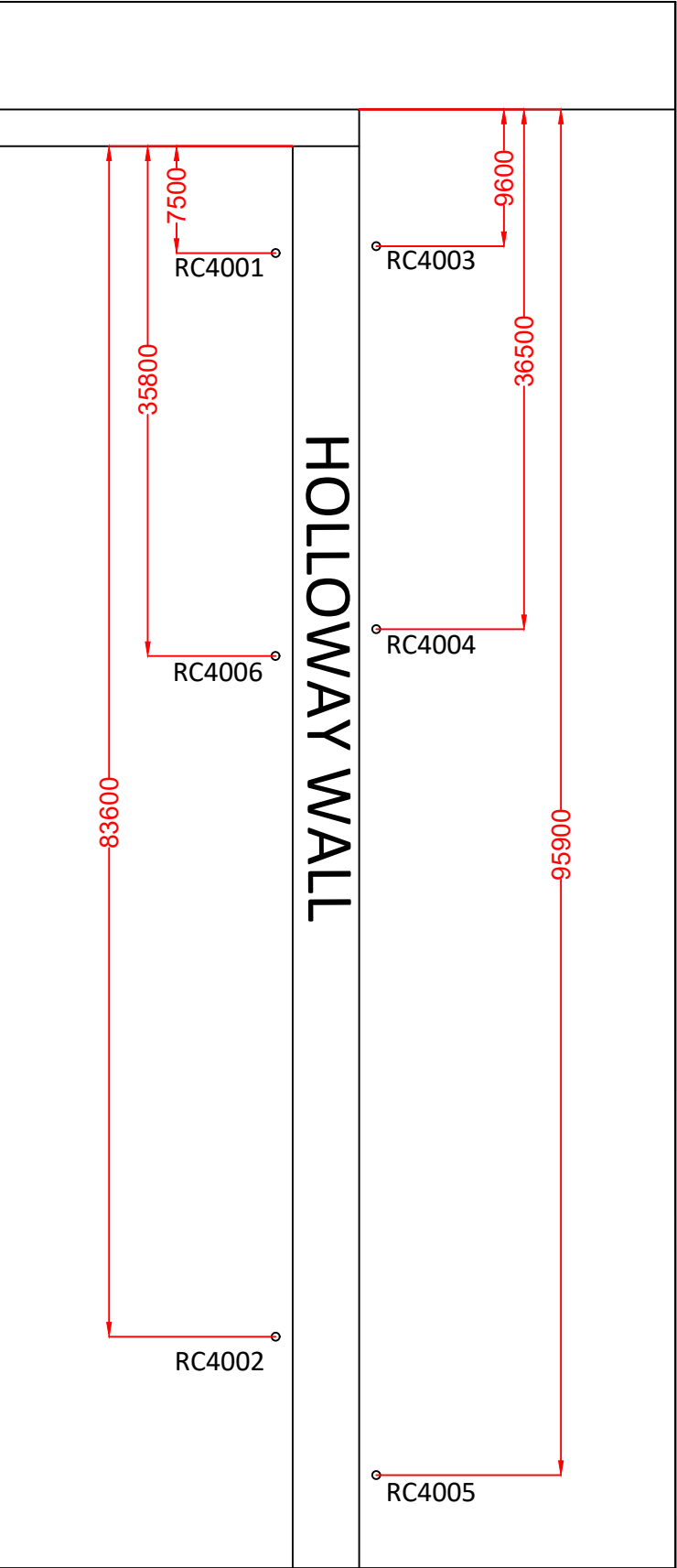
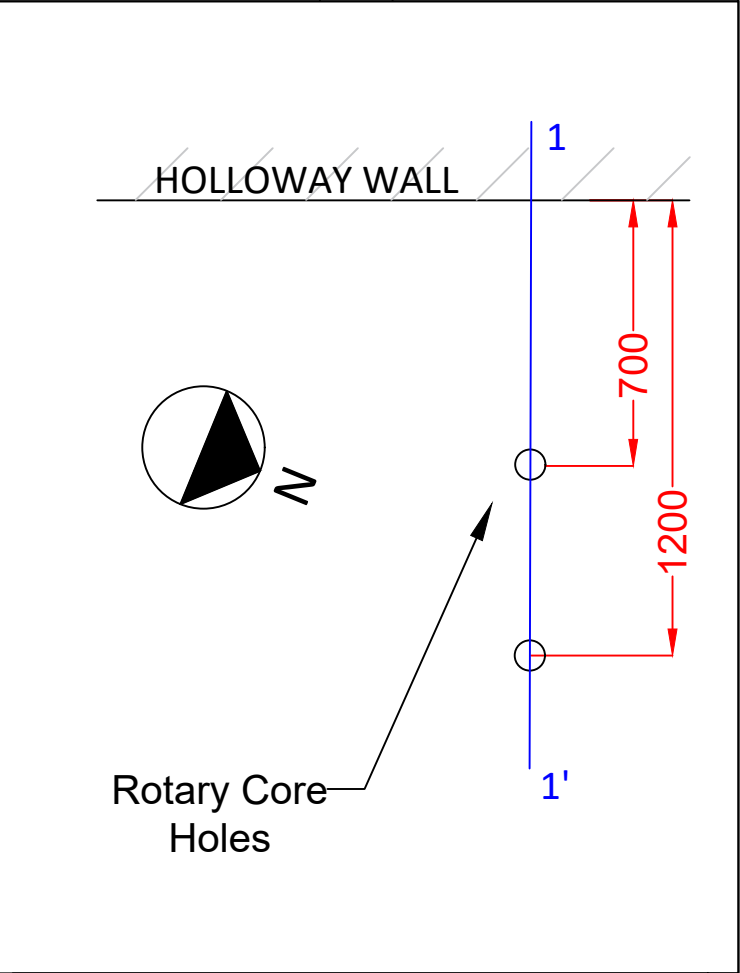
RC4004



1. MBGL = metres below ground level
2. Dimensions of structures / foundations provided in mm unless otherwise stated.
3. See exploratory hole record for details of ground conditions.

					PROJECT			
					Holloway Wall, Sister Manchester			
					TITLE			
					Rotary Core RC4004			
					DRAWING STATUS		CE PROJECT No.	STATUS CODE
					FOR INFORMATION		51019/06	-
					DATE CREATED	DRAWN	CHECKED	CIVIC EARTH civicearth.com
					23/10/24	KIA	KP	
23/10/24	P01	First Issue	KIA	KP	DRAWING No.		REV	
DATE	REV	DESCRIPTION	DRAWN	CHKD	51019-CE-06-XX-D-G-0004		P01	

RC4005

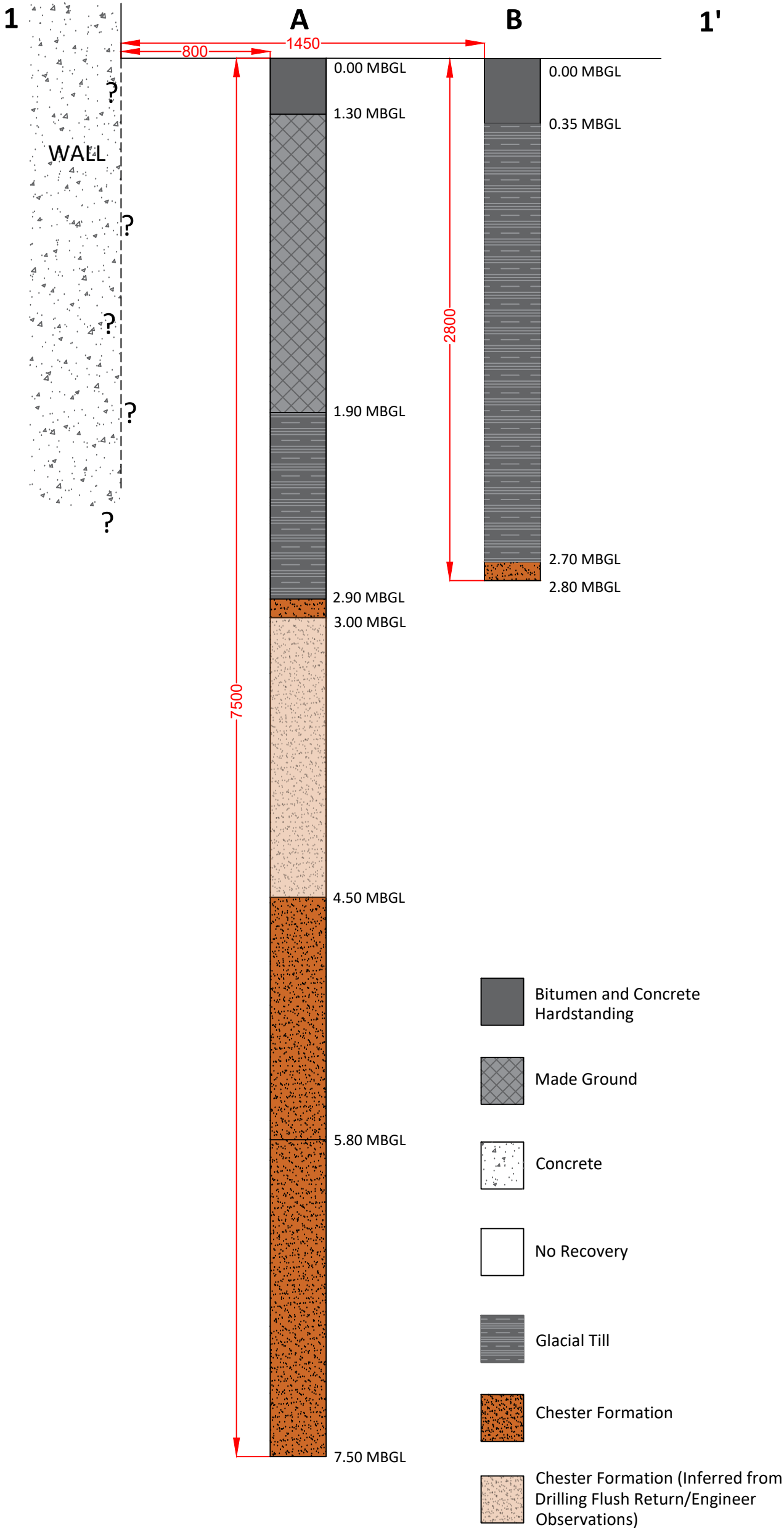
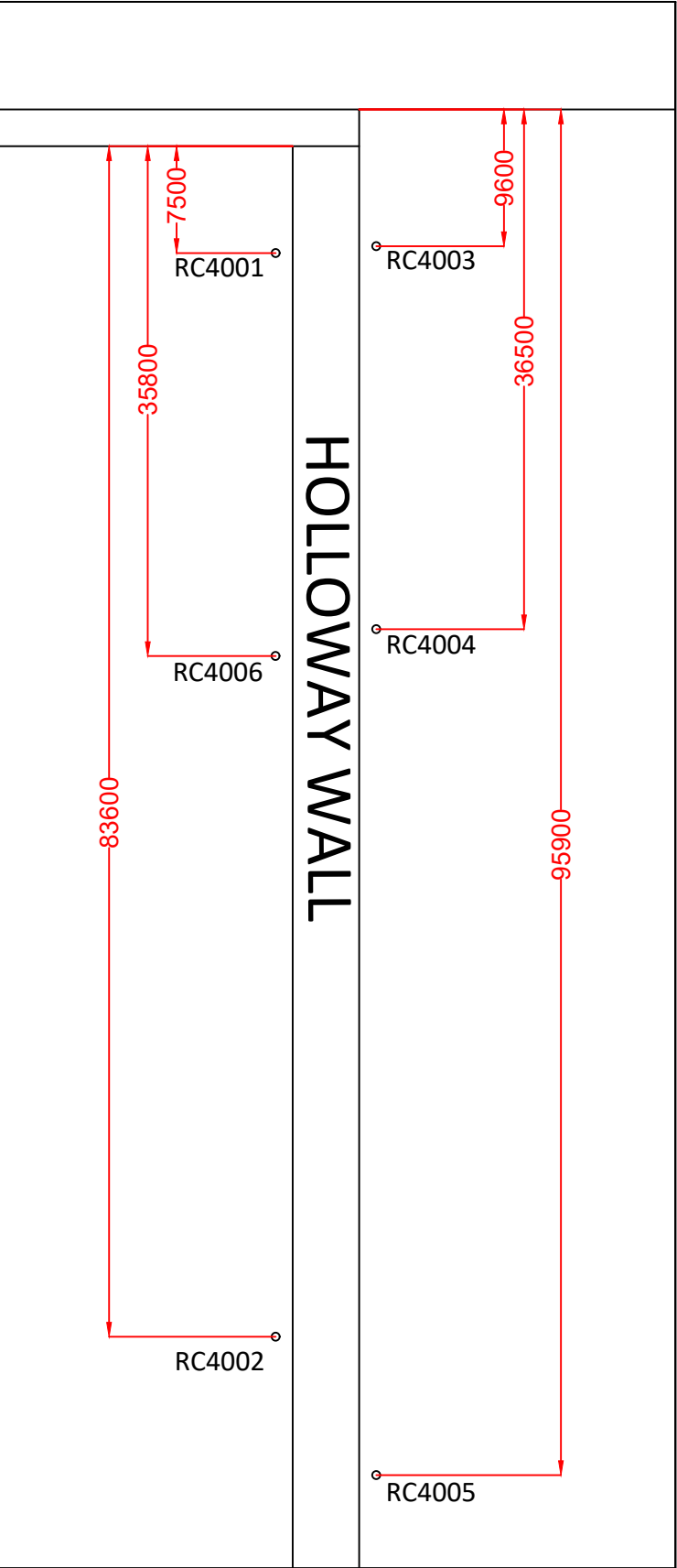
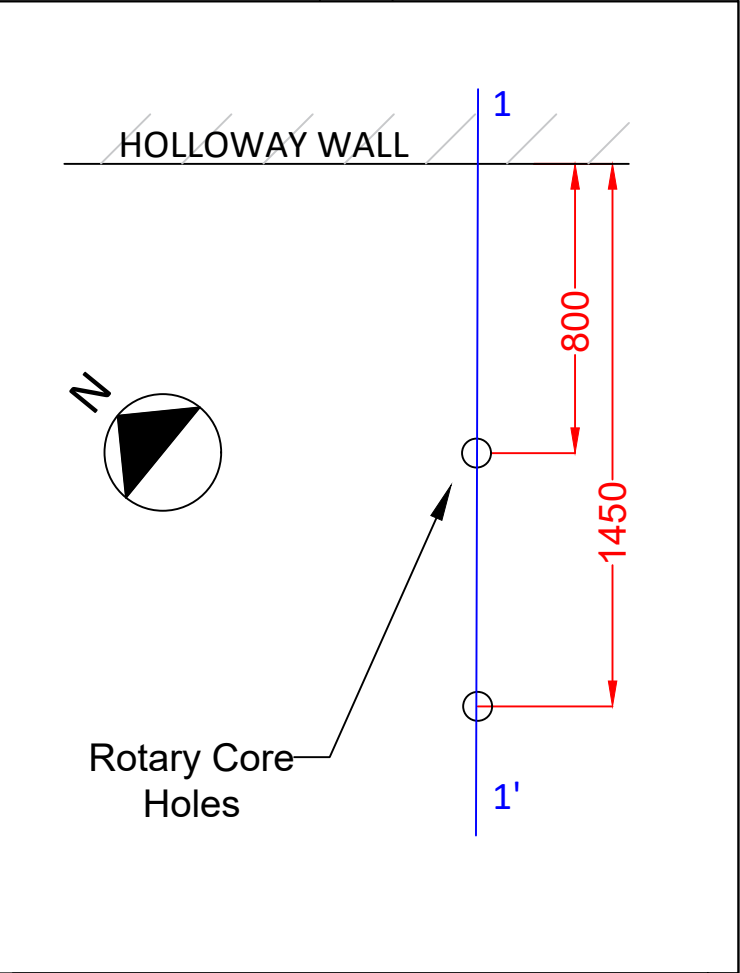


1. MBGL = metres below ground level
2. Dimensions of structures / foundations provided in mm unless otherwise stated.
3. See exploratory hole record for details of ground conditions.

					PROJECT	Holloway Wall, Sister Manchester			
					TITLE	Rotary Core RC4005			
					DRAWING STATUS	CE PROJECT No.	STATUS CODE	SCALE @ A3	
					FOR INFORMATION	51019/06	-	--	
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					23/10/24	KIA	KP		
23/10/24	P01	First Issue		KIA	KP	DRAWING No.	REV	civicearth.com	
DATE	REV	DESCRIPTION		DRAWN	CHKD	51019-CE-06-XX-D-G-0005	P01		

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RC4006



1. MBGL = metres below ground level
2. Dimensions of structures / foundations provided in mm unless otherwise stated.
3. See exploratory hole record for details of ground conditions.

					PROJECT			
					Holloway Wall, Sister Manchester			
					TITLE			
					Rotary Core RC4006			
					DRAWING STATUS		CE PROJECT No.	STATUS CODE
					FOR INFORMATION		51019/06	-
					DATE CREATED	DRAWN	CHECKED	CIVIC EARTH civicearth.com
					23/10/24	KIA	KP	
					DRAWING No.		REV	
23/10/24	P01	First Issue		KIA	51019-CE-06-XX-D-G-0006		P01	
DATE	REV	DESCRIPTION		DRAWN	CHKD			

Appendix D

Rotary Core Investigation Photographs

Site Photos



1. RC4001A



2. RC4002A

Site Photos



3. RC4003A



4. RC4004A

Site Photos



5. RC4005A



6. RC4006A

Appendix E

Geological Cross Sections

Project Id: 51019/06

Project Title: Sister Manchester

Location: Manchester

Client: ID Manchester Limited

Title: Illustrative Geological Cross Section

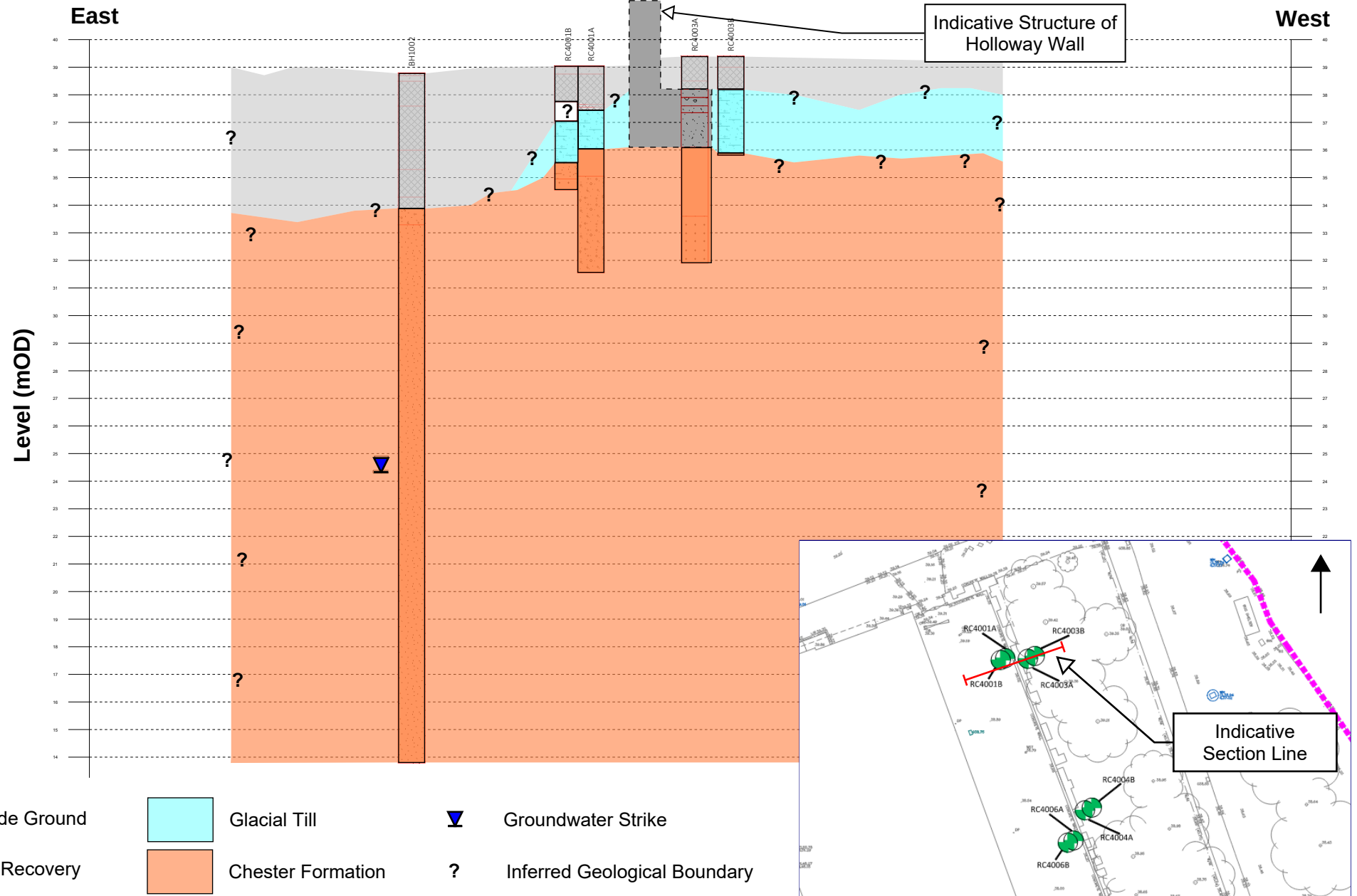
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Horizontal Scale: 1:118

Engineer: KP

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